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Vice President and 2014 Program Chair

ACPA/CPF National Office Staff
(l to r) – Alex, Amatullah, Emily, Todd, Nancy, Molly, Stephanie, Hillary

Debbie
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General Information

Registration and Information
Your ACPA registration and information desk is located in the Marriott Ballroom foyer on the second floor of the Indianapolis Downtown Marriott Hotel. Days and hours of operation are listed below. A message board has been provided for your convenience. Please check the board periodically for messages from other attendees or important telephone calls. Please have callers leave messages at your room if the messages are not urgent.

Registration Desk Hours

<table>
<thead>
<tr>
<th>Date</th>
<th>Hours of Registration</th>
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<tr>
<td>Sunday, March 23</td>
<td>4:00PM - 7:00PM</td>
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<tr>
<td>Monday, March 24</td>
<td>7:30AM - 5:30PM</td>
</tr>
<tr>
<td>Tuesday, March 25</td>
<td>7:30AM - 7:30PM</td>
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<tr>
<td>Wednesday, March 26</td>
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</tr>
<tr>
<td>Thursday, March 27</td>
<td>6:30AM - 6:00PM</td>
</tr>
<tr>
<td>Friday, March 28</td>
<td>7:00AM - 5:30PM</td>
</tr>
<tr>
<td>Saturday, March 29</td>
<td>7:30AM - 5:00PM</td>
</tr>
</tbody>
</table>

Program, Badge, and Ticket Policy
When you register, you will receive your badge as well as appropriate tickets for social events, CPF’s “Good Sports” Event at the NCAA Hall of Champions, eye openers, and study sessions. If you are not attending a social event, please donate your tickets to students and residents. You may leave tickets with ACPA staff at the registration desk.

It is essential that you keep your tickets with you for entrance into each of the above short courses and social events.
Volunteers will take your tickets at the doors. The tickets have cash value and can be purchased but not replaced at the registration desk. We suggest you put your tickets behind your badge in the badge holder.

You must wear your badge at all times during the meeting.
Your badge gains you entrance to the general, concurrent, keynote, and poster sessions of the annual meeting. Special badge markings are needed for the pre-conference symposia. The “BADGE POLICE” will be watching!
One program is provided for each registered attendee. If your program is lost or if additional copies are desired, they may be purchased at the registration desk for $15 each.

Social Packages for Guests
Additional tickets to social events are available at the registration desk. The $135 Social Package includes the Welcoming Reception, the Annual Luncheon, and Thursday’s Gala – A Night of Wonder – at the Indiana Roof Ballroom. Tickets may be purchased separately at $25 for the Welcoming Reception, $35 for the Luncheon, and $75 for the Thursday night Gala.

AV Instructions and Speaker Ready Room
(Audiovisual Preview)
Speakers may preview their presentations in the Phoenix Room located on the second floor. Look for directional signs in the Marriott Ballroom Foyer.

General and Concurrent Session speakers should pre-load their PowerPoint presentations at the podium prior to the beginning of their session, e.g., first thing in the morning or during coffee or lunch breaks.

Eye Opener and Study Session speakers are responsible for operating their own AV equipment.

Laser Pointers should be picked up by Session Co-Chairs just prior to their session and returned immediately afterwards to the ACPA Registration Desk.

All speakers must pick up their materials immediately following their presentation. Do not leave them with the technicians. ACPA and the AV staff will not accept responsibility for lost or damaged materials.

Journal Manuscripts
Manuscripts to be submitted to the Cleft Palate-Craniofacial Journal should be left at the registration desk with an ACPA staff member to be given to Dr. Jack C. Yu, Editor.

Posters Sessions, Exhibits and Coffee Breaks
Exhibits and posters will be displayed during the times specified in the Summary of Events. There will be five poster sessions: Poster Sessions A and B will be on Wednesday, Session C on Thursday, and Sessions D and E on Friday. All exhibits, poster sessions, and coffee breaks will be held in the Marriott Ballroom Foyer.

Welcome to New Members and Non-Members
Look for the LIGHT BLUE RIBBON affixed to the badge of individuals who have joined ACPA in the past year. Please take a moment to welcome them to ACPA and to introduce them to colleagues. Also, as you meet non-members (BLUE BADGES), you might take a moment to discuss the goals and activities of the organization and the benefits of ACPA membership. Membership applications are available at the ACPA/CPF information desk in the Marriott Ballroom Foyer on the second floor.

ACPA/CPF Authorized Photographs
Candid photos will be taken throughout the week in which you may be included. It is understood and agreed that these photos may be reprinted in our newsletter, on our website or in other publications. If you do not want your picture used, please inform the ACPA staff at the registration desk.

Unauthorized Recording
Please Do Not Take Photographs or Otherwise Record Any Meeting Proceedings
Taking photographs, audiotaping, or videotaping any annual meeting proceedings, oral presentations, or on screen images is STRICTLY PROHIBITED. Audience members who attempt to do so will be asked to leave the meeting rooms.

Please be Courteous to Other Attendees
Mobile devices: Turn off – or put in silent mode – your cell phones and/or pagers while sessions are in progress.
Children: Children under 13 years of age are not permitted in lecture areas.

2015 Annual Meeting
April 20-25 2015 ACPA’s 72nd Annual Meeting and Pre-Conference Symposium
Westin Mission Hills Resort and Spa
Palm Springs, California
Program Chair: Robert J. Havlik, MD

April 20-21 2015 Pre-Conference Symposium
What is a “Good” Outcome for a Child with a Cleft?
Co-Chairs: Mary Michaelene Cradock, PhD and Thomas D. Samson, MD

Children under 13 years of age are not permitted in lecture areas.
Educational Objectives

The overall educational objectives of the Annual Meeting are (1) to make concerned professionals aware of new clinical and research information through the organized presentation of original papers and poster sessions, and (2) to provide an opportunity for the involved professionals to update their knowledge and skills of their own and related disciplines through exhibits, and focused short courses. Specific educational objectives for each component of the meeting are presented throughout the agenda.

Continuing Education Credits

<table>
<thead>
<tr>
<th></th>
<th>ASHA</th>
<th>ACCME</th>
<th>Nursing*</th>
<th>Instructional Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convention</td>
<td>1.65 CEUs</td>
<td>16.75 hours</td>
<td>16.75 hours</td>
<td>Variable</td>
</tr>
<tr>
<td>Study Sessions</td>
<td>0.15 CEU each</td>
<td>1.5 hours ea</td>
<td>1.5 hours ea</td>
<td>Variable</td>
</tr>
<tr>
<td>(2 sessions)</td>
<td>(.3 for 2)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Eye Openers</td>
<td>0.10 CEU each</td>
<td>1.0 hour ea</td>
<td>1.0 hour ea</td>
<td>Variable</td>
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<tr>
<td>(2 sessions)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Pre-Conference</td>
<td>0.9 CEUs</td>
<td>9.5 hours</td>
<td>9.5 hours</td>
<td>Intermediate</td>
</tr>
<tr>
<td>Symposium</td>
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<td></td>
</tr>
<tr>
<td>Post-Conference</td>
<td>0.6 CEUs</td>
<td>N/A</td>
<td>N/A</td>
<td>Beginner</td>
</tr>
</tbody>
</table>

* Contact hours have been applied for from the North Carolina Nurses Association, but have not been confirmed. NCNA is an accredited approver by the American Nurses Credentialing Center’s Commission on Accreditation.

American Speech-Language-Hearing Association

This program is offered for 3.65 CEUs (Various Levels, Professional Area).

Instructions for ASHA: When you check in to the meeting, you will be given an ASHA participant form and the date and time of your arrival will be noted. Complete the form and return it to an ACPA staff member at the registration desk after you attend your last session. You are also required to complete online evaluation forms (see section below) in order to receive credit.

Continuing Medical Education:

Accreditation Statement: The American Cleft Palate-Craniofacial Association (ACPA) is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

Designation Statement: ACPA designates this educational activity for a maximum of 31.25 AMA PRA Category 1 Credits™. Physicians should only claim credits commensurate with the extent of their participation in the activity.

Instructions for ACCME: When you register, the date and time of your arrival will be noted. At the end of the meeting or time of your departure, you must return the completed continuing education form to an ACPA staff member at the registration desk. You will also need to complete online evaluation forms (see section below) for each component of the meeting for which you are seeking credit (i.e., annual meeting, symposia, study sessions, and eye openers). Approximately 4 weeks after the meeting, a continuing education certificate will be mailed to you. If the continuing education form and evaluation forms are not completed, we will not be permitted to award credits.

Online Evaluation Forms

Help us improve future programs while fulfilling requirements to obtain your continuing education credits. Complete the online evaluation form for each component for which you are seeking credit. Links can be found here: http://www.acpa-cpf.org/am-feedback starting Friday, March 28th. You will need the registration ID number found on your meeting badge to log-in.

Full Disclosure Policy

The American Cleft Palate-Craniofacial Association, in compliance with the Accreditation Council for Continuing Medical Education (ACCME) Standards for Commercial Support, has adopted the following Full Disclosure Policy:

Presentations made at continuing medical educational activities sponsored or jointly sponsored by the American Cleft Palate-Craniofacial Association must include information regarding all commercial or industrial funding, consulting, or equity holdings by the presentations’ author(s) and/or anyone related to the author(s) which could be affected by or could have an effect on the content of the presentation. This information is requested during the abstract submission process and will be disclosed to participants through statements in printed meeting materials and declared by the faculty member at the beginning of his/her presentation.

Faculty Disclosure Statements: It is the policy of ACPA to ensure its programs are fair, balanced, independent, objective, and scientifically rigorous. In support of this policy, ACPA requires that: 1. Trade names are to be avoided during presentations. 2. Presentations made at continuing medical educational activities sponsored or jointly sponsored by ACPA, in compliance with standards for accreditation by ACCME, must include: a. information regarding off-label use(s); b. all commercial or industrial funding, consulting, or equity holdings by the authors of this presentation and/or anyone related to the author(s) which could be affected by or could have an effect on the content of the presentation. 3. This information will be disclosed to meeting participants through printed materials and must be declared verbally by the presenter at the beginning of the presentation. See Abstracts, page 52, for indication of disclosures.

Disclaimer

The scientific material presented at this meeting has been made available by the American Cleft Palate-Craniofacial Association for educational purposes only. The material is not intended to represent the only, nor necessarily the best, methods or procedures appropriate for the health care situation discussed, but rather is intended to present an approach, view, statement, or opinion of the presenter which may be helpful to others who face similar situations.

The American Cleft Palate-Craniofacial Association disclaims any and all liability and injury or other damage resulting to any individual attending a course and for all claims which may arise out of the use of the techniques demonstrated therein by such individuals, whether these claims shall be asserted by members of the health care professions or any other person.
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Julie DeLaurier .................. 2002
Karen Le Clair .................. 2001
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Mark P. Mooney, PhD .............. 2003

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Earl J. "Gip" Seaver, PhD ........ 2000-2012

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Malcolm Johnston, DDS, MSDC, PhD .... 1995
M. Michael Cohen, Jr., DMD, PhD .... 1996
Syvan Stool, DDS .................. 1997
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M. Samuel Noordhoff, MD ........ 2000
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Karlind T. Moller, PhD ........ 2009
Sheldon W. Rosenstein, DDS, MSD .... 2012
Ross E. Long, Jr., DMD, MS, PhD .... 2012
Karin Vargervik, DDS .......... 2012
Anthony Hershey, DDS, PhD ....... 2014
Henry J. Kawamoto, Jr., MD, DDS .... 2014

Distinguished Service Award Of The Association

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Charlotte G. Wells, PhD .............. 1978
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Judith Trost-Cardamone, PhD ....... 2012
Kim S. Uhrich, MSW .............. 2012
Don LaRossa, MD .................. 2014

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Elisabeth Bednar .................. 1989
Donnie Schleeth .................................. 1990
Bernice Bergen .......................... 1991
Karen Schudson .......................... 1992
Pamela Onyx .......................... 1993
Peg Byerly, EdD .................. 1993
Betsy Wilson .......................... 1995
Rochelle “Rickie” Anderson ....... 1996
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Karen Le Clair .......................... 2001
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Ginny Petzer .......................... 1998
Carrie Gruman-Trinkner .............. 2004
Debbie Oliver .......................... 2005
Cheryl Hendrickson .............. 2006
Paula Goldenberg, MD .............. 2007
Claire Crawford .......................... 2008
Harriet Fisher .......................... 2010
Paula Miller .......................... 2011
Zeb and Meaghan Caraballo ....... 2012
Maria Teresa Torres Morales de Salcedo .... 2014

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1995 - Dr. Michael Jainisch, Plastic Surgeon, Pecs, Hungary
1996 - Dr. Wirat Chantharatanapiboon, Plastic Surgeon, Bangkok, Thailand
1997 - Ms. Juanita Prada, Team Coordinator, Bogota, Colombia
1998 - Dr. Raymond Joaquin Eres, Plastic Surgeon, Marikina City, Philippines
1999 - Dr. Orm Prakash Kharbanda, Orthodontist, New Delhi, India
2000 - Dr. Anna Gerasimova, Speech-Language Pathologist, St. Petersburg, Russia

The Visiting Scholar Program has been continuously funded through a grant by Stryker Craniofacial Foundation 1995.
The Board of Directors would like to thank the following individuals for their contributions to the 2014 Annual Fund through 2/28/2014

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Sustainer ($5000+)
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Benefactor ($2500-$4999)
Anonymous

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<tr>
<td>Cynthia Seldin, Coral Springs, FL</td>
<td>Lisa Eidelman, Winnetka, IL</td>
<td>Manager</td>
<td>Illinois</td>
</tr>
</tbody>
</table>
Annual Business Meeting Minutes – April 20, 2012

I. President’s Call to Order and Welcome
The meeting was called to order at 9:05 AM by President H. Saal.

II. Declaration of a Quorum
Communications Officer R. Kirschner declared a quorum was present.

III. Approval of Minutes
The minutes of the April 8, 2011 Annual Business Meeting were approved by the members present.

IV. Election of Nominating Committee Members
There were five nominations from the floor. Kelly Nett Cordero (Speech) and Lynn Marty Grames (Speech) were elected.

V. Treasurer’s Report (B. Costello)
B. Costello reviewed the FY2011 audited financial reports as presented in the Annual Meeting program. ACPA net assets increased $288,537 to $1,565,988. Investments increased $77,234. In addition, the 2011 Annual Meeting, which was a record attendance, realized a profit.

CPF realized a $17,101 deficit, but $108,626 investment income for a net $91,525 increase in assets to $1,054,231.

VI. ACPA/CPF Executive Director’s Remarks (N. Smythe)
Nancy Smythe announced that Todd Pfeiffer has joined the national office staff in the role of Member Services Manager and Jill Galuten as CPF Director of Family Services.

VII. CPF President’s Remarks (E. Seaver)
E. Seaver highlighted the changes in the National Office staff and recognized the work of Emily Kiser. The CPF Board has added two new members, Lori Cilley and Amy Mackin. Marilyn Cohen has been elected President-Elect and will begin her term as President in January 2013. The Scholarship Committee, under the leadership of Chair Ginger Hinton, currently has funding for nineteen scholarships. Five CPF research grants were awarded this year, and funding the grant program will remain an important part of the Foundation’s efforts. The Foundation is currently in the process of changing the design of its website. Members should provide feedback regarding the new site to Emily Kiser. The Foundation continues to translate its publications into other languages and has a contractual agreement with an independent company to do this, thereby broadening the audience for CPF literature. This year’s Connections conference was very successful. The Connections conference will be offered every other year, and the Foundation is now exploring the possibility of sponsoring regional conferences for families. Social media (Facebook and Twitter) are becoming increasingly important for Foundation outreach and communications. Finally, E. Seaver thanked the members for their continued support through donations, volunteerism, and referrals.

VIII. ACPA President’s Remarks (H. Saal)
H. Saal thanked the members for their support of the organization as well as the national office staff. He noted that the ACPA strategic plan will be revised this year, and that this will bring new challenges. The committees and task forces will play an essential role as they carry out new charges.

IX. Necrology
President H. Saal asked for a moment of silence in honor of ACPA members who passed away since the last annual meeting in Fort Worth: Julia May Avert, Raymond O. Brauer, Patrick E. Brookhouser, Douglas L. Buck, Hugh Howard Crawford, John Curtin, Marion D. Meyerson, D. Ralph Millard, Jr., D.C. Spriestersbach, and Lisa Vecchione.

X. CPCJ Editor (J. Yu)
CPCJ Editor J. Yu reported that there has been a steady increase in the number of manuscripts submitted. The turnaround time has been improving. J. Yu thanked all of the section editors, the reviewers, and Editorial Assistant Debbie Ogle for their efforts. 2013 will mark the Journal’s 50th anniversary. The Journal will remain committed to the publication of quality manuscripts, and efforts will continue to speed the process of review and publication. Each issue will feature two open access manuscripts and approximately 20 online-only publications.

XI. Committee Reports
Task Force on Economic Models of Team Care Chair R. Kirschner described the focus of the task force. A survey of all teams in the U.S. will be soon be conducted in order to define the spectrum of financing models as well as the advantages and challenges associated with each.

XII. Old Business
There was no old business.

XIII. New Business
There was no new business.

XIV. Adjournment
The meeting was adjourned by President H. Saal at 9:45 AM.

Respectfully submitted,
Richard E. Kirschner, MD, FACS, FAAP
ACPA Communications Officer
Statement of Financial Position  
June 30, 2013

ASSETS

CURRENT ASSETS:
Cash and cash equivalent 979,141
Accounts receivable 22,797
Due from Cleft Palate Foundation 229,568
Deposits 3,070
Total Current Assets $1,234,576

Investments 741,518

FIXED ASSETS:
Building 451,586
Office furniture and equipment 141,418
Less accumulated depreciation – bldg (142,155)
Less accumulated depreciation – office furniture and equipment (121,213)
Total Fixed Assets $329,636

TOTAL ASSETS $2,305,730

LIABILITIES

CURRENT LIABILITIES:
Accounts payable 135,397
Accrued liabilities 37,763
Due to Cleft Palate Foundation 72,406
Deferred revenue 192,785
Total Liabilities $438,351

NET ASSETS
Unrestricted 1,867,379
Total liabilities and net assets $2,305,730

Statement of Activities  
For the year ended June 30, 2013

<table>
<thead>
<tr>
<th></th>
<th>Unrestricted Funds</th>
<th>Temporarily Restricted Funds</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REVENUE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Member Dues and fees</td>
<td>384,702</td>
<td>0</td>
<td>384,702</td>
</tr>
<tr>
<td>Annual Meeting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Exhibits</td>
<td>82,150</td>
<td>0</td>
<td>82,150</td>
</tr>
<tr>
<td>- Commercial Support</td>
<td>112,000</td>
<td>0</td>
<td>112,000</td>
</tr>
<tr>
<td>- Registration</td>
<td>772,891</td>
<td>0</td>
<td>772,891</td>
</tr>
<tr>
<td>- Other</td>
<td>42,660</td>
<td>0</td>
<td>42,660</td>
</tr>
<tr>
<td>Miscellaneous Receipts</td>
<td>39,075</td>
<td>0</td>
<td>39,075</td>
</tr>
<tr>
<td>Cleft Palate-Craniofacial Journal</td>
<td>47,550</td>
<td>0</td>
<td>47,550</td>
</tr>
<tr>
<td>CAT Application Fees</td>
<td>21,625</td>
<td>0</td>
<td>21,625</td>
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<tr>
<td>Grant Revenue</td>
<td>13,497</td>
<td>0</td>
<td>13,497</td>
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<tr>
<td>Net assets released from restriction</td>
<td>2,725</td>
<td>(2,725)</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total Revenues</strong></td>
<td>$1,518,875</td>
<td>$(2,725)</td>
<td>$1,516,150</td>
</tr>
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</table>

|                      |                    |                              |           |
| **EXPENSES**         |                    |                              |           |
| Programs:            |                    |                              |           |
| - Membership Services | 174,112            | 0                            | 174,112   |
| - Annual Meeting     | 881,018            | 0                            | 881,018   |
| - Symposia           | 36,604             | 0                            | 36,604    |
| - Cleft Palate-Craniofacial Journal | 81,287 | 0 | 81,287 |
| - Communications     | 57,541             | 0                            | 57,541    |
| - Commission on Approval of Teams | 32,331 | 0 | 32,331 |
| Total Program Expenses | $1,262,893         | 0                            | $1,262,893|
| Management and General | 51,568            | 0                            | 51,568    |
| **Total Operation Expenses** | $1,314,479 | 0 | $1,314,479 |

Excess (deficiency) of operating revenues and other support over operating expenses 204,396 $(2,725) 201,671

|                      |                    |                              |           |
| **NONOPERATING SUPPORT AND REVENUES** |                    |                              |           |
| Investment Income    | 44,236             | 0                            | 44,236    |

|                      |                    |                              |           |
| **CHANGES IN NET ASSETS** |                    |                              |           |
| Beginning of year    | 1,618,747          | 2,725                        | 1,621,472 |
| End of year          | 1,867,379          | 0                            | 1,867,379 |

Following are the audited financial reports prepared by the firm of Maher Duessel. Additional information will be provided at the Annual Business Meeting in Indianapolis, IN on Friday, March 28, 2014. Copies of the audits are available through the National Office.
**Statement of Financial Position**  
**June 30, 2013**

**ASSETS**  
**CURRENT ASSETS:**  
- Cash and cash equivalent: $543,874  
- Accounts Receivable: $17,656  
- Due from ACPA: $72,406  
**Total Current Assets:** $633,936  

**FIXED ASSETS:**  
- Building: $149,435  
  Less accumulated depreciation: ($49,458)  
**Total Fixed Assets:** $99,977  

**TOTAL ASSETS:** $1,582,486

**LIABILITIES**  
- Due to ACPA: $229,568

**NET ASSETS**  
- Unrestricted, board designated for endowment: $23,353  
- Unrestricted, undesignated: $529,330  
**Total unrestricted:** $552,683

**Temporarily restricted**  
- Temporarily restricted — program purposes: $279,046  
- Temporarily restricted — accumulated endowment earnings: $179,395  
**Total temporarily restricted:** $458,441

**Permanently restricted:** $341,794

**Total Net Assets:** $1,352,918

**Total Liabilities and Net Assets:** $1,582,486

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**Statement of Activities**  
**For the year ended June 30, 2013**

<table>
<thead>
<tr>
<th></th>
<th>Unrestricted</th>
<th>Temporarily Restricted Funds</th>
<th>Permanently Restricted Funds</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REVENUE AND OTHER SUPPORT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Member Contributions</td>
<td>49,179</td>
<td>0</td>
<td>0</td>
<td>49,179</td>
</tr>
<tr>
<td>Non-Member Contributions</td>
<td>102,402</td>
<td>4,516</td>
<td>0</td>
<td>106,918</td>
</tr>
<tr>
<td>Pamphlet and bear sales</td>
<td>32,703</td>
<td>0</td>
<td>0</td>
<td>32,703</td>
</tr>
<tr>
<td>Education Income</td>
<td>260</td>
<td>0</td>
<td>0</td>
<td>260</td>
</tr>
<tr>
<td>Research and Foundation Grants</td>
<td>0</td>
<td>37,709</td>
<td>0</td>
<td>37,709</td>
</tr>
<tr>
<td>Net assets released from restriction</td>
<td>$119,087</td>
<td>(119,087)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total Revenue and other support</strong></td>
<td>$303,631</td>
<td>(76,862)</td>
<td>0</td>
<td>$226,769</td>
</tr>
</tbody>
</table>

**EXPENSES**  
- Programs:  
  - Communication and Public Education: 160,188  
  - Inter-organizational Activities: 7,942  
  - Scholarship and Research Grants: 61,841  
**Total program expenses:** $229,971

- Management and General: 30,546
**Fundraising:** 15,776

**Total Expenses:** $276,293

**Excess (deficiency) of operating revenues and other support over operating expenses:** $27,338

**NONOPERATING SUPPORT AND REVENUES**  
- Investment income: 8,143
**Fundraising:** 48,790
**Total expenses:** 15,776

**TOTAL NONOPERATING REVENUES:** $56,933

**CHANGES IN NET ASSETS**  
- 35,481
**Beginning of year, as reclassified:** $8,143

**End of year:** $48,790

**NET ASSETS:**  
- Beginning of year, as reclassified: $517,202  
- $486,513  
- $341,794  
- $1,345,509  
- End of year: $352,683  
- $458,441  
- $341,794  
- $1,352,918
Facial Asymmetries...More or Less – Dysplasias, Hyperplasias, Hypoplasias

Overview: Craniofacial teams are often confronted with individuals with progressively deforming conditions caused by overgrowth or progressive loss of tissue resulting in asymmetric presentations. Since many of these conditions are individually uncommon, no consensus exists as to the optimum approach to care. This preconference symposium will tackle this problem by presenting a framework through which these disparate conditions may be understood predicated upon emerging understanding of the molecular pathogenesis and goals for therapy. In addition to the considerable challenges faced in surgical reconstruction, dental and orthodontic management in the midst of change, alimentation and communication disorders and psychological well-being, affected individuals and families have to adapt often to the reality of a progressive condition. Contemporary diagnostic tools and protocols for management of these challenges will be presented. It is hoped this symposium will stimulate discussions of possible registries for the study of outcomes in some of these rare disorders with world-wide collaboration amongst centers.

Educational Objectives: At the conclusion of the symposium, the attendee should be familiar with:

1) The broad array of craniofacial hypo- and hyperplastic entities and growth disorders which present to the craniofacial clinic.

2) The evaluation of each individual from a patho-genetical and medical perspective and be able to identify major tissue deformities at hand.

3) The need for and implementation of both comprehensive and focused dental, orthodontic, surgical, medical, speech, psychological and other perioperative management schemes for challenging growth disorders and asymmetries of the craniofacial region.

4) Speech evaluation for the patient with gnathic growth disorders, tongue overgrowth, and other palato-pharyngeal tissue asymmetries.

5) Contemporary surgical decompression for skeletal overgrowth impingement of foramina and airway concerns in neurofibromatoses, vascular anomalies and tongue hyperplasias.

6) Medical and surgical management of vascular anomalies of the craniofacial region.

Symposium Faculty:
Adriane L. Baylis, PhD, CCC-SLP *
Nationwide Children’s Hospital, Columbus, OH

James P. Bradley, MD
UCLA Plastic and Reconstructive Surgery, Los Angeles, CA

Marilyn J. Bull, MD
Riley Hospital for Children, Indianapolis, IN

Patricia D. Chibbaro, RN, MS, CPNP
NYU Langone Medical Center, New York, NY

Canice E. Crerand, PhD
Nationwide Children’s Hospital, Columbus, OH

Amelia F. Drake, MD
University of North Carolina Craniofacial Center, Chapel Hill, NC

Arl K. Greene, MD, MMSc
Boston Children’s Hospital, Boston, MA

Ann W. Kummer, PhD, CCC-SLP *
Cincinnati Children’s Hospital Medical Center, Cincinnati, OH

Janice Lee, DDS, MD
NIH/NDCR, Bethesda, MD

Donald R. Mackay, DDS, MD *
Milton S. Hershey Medical Center, Hershey, PA

Jeffrey L. Marsh, MD
Mercy Children’s Hospital, St. Louis, MO

Mark P. Mooney, PhD
University of Pittsburgh, Dept. of Oral Biology, Pittsburgh, PA

Kirt E. Simmons, DDS, PhD
Arkansas Children’s Hospital, Roland, AR

Bryan J. Williams, DDS, MSD, Med
Seattle Special Care Dentistry, Seattle, WA

Featured Speaker:
Jamie M. Verdi, Esq.

*An asterisk indicates the presenter made a disclosure. Please see symposium faculty listings on pages 22-23 for disclosure.

Symposium Support
With grateful appreciation to:
KLS-Martin and Mohammad Mazaheri, MDD, DDS, MSc
for their support through educational grants.
Fibrous dysplasia is the most common craniofacial tumor, presenting in both monostotic and polyostotic forms with varying degrees of severity. No consensus exists regarding the surgical management of craniofacial fibrous dysplasia, particularly in the zygomaticomaxillary region. This presentation will report on a study that compared long-term outcomes of limited reduction burring vs. radical resection of zygomaticomaxillary fibrous dysplasia. While different approaches have been advocated to treat fibrous dysplasia, the conclusions of this study support a more aggressive management for zygomaticomaxillary disease with radical resection and cranial bone graft reconstruction for more involved disease.

This talk addresses compressive complications of hyperplasias and illustrates endoscopic decompression as surgical therapy.

Fibrous dysplasia is a benign bone tumor and associated with a GNAS mutation. It is commonly found in the facial bones or skull base and may be monostotic or polyostotic with involvement of contiguous bones in the face. FD of the facial and jaw bones may expand to dramatic proportions resulting in significant asymmetry. The growth is often gradual though rapid expansion may occur, particularly when FD is associated with another lesion (such as an aneurysmal bone cyst). The tumor may require contouring, debulking, or resection, and occasionally orthognathic reconstructive surgery to restore symmetry and normal facial proportions. In this presentation, I will discuss the evaluation and management of the asymmetry that results from the growth of FD in the facial and jaw bones.

Hyperplasias of the Craniofacial skeleton and soft tissue include a broad spectrum of recognized disorders and syndromes. These disorders are predominantly congenital with genetic etiologies, affecting the skeletal system, such as fibrous dysplasia, or soft tissue, such as the neurovascular disorders of neurofibromatosis or vascular anomalies and hemangiomas. The pathogenesis, evaluation and management of some of these entities will be presented.
magnitude of concomitant dento-skeletal deformities is much more recent. Based on personal examination of 460 individuals with BWS, the distribution of their orofacial dysmorphology will be presented. What the relationship between macroglossia and dento-skeletal deformities is and whether surgical tongue reduction affects these deformities will be documented by review of 340 patients who underwent a single tongue reduction by one surgeon using one technique. Outcome of tongue reduction surgery will be presented for breathing, speech, taste and anterior occlusion.

2:30 PM  **HEMANGIOMAS AND OTHER VASCULAR ANOMALIES**  
*Arin K. Greene, MD, MMSc*

Vascular anomalies are common lesions, affecting approximately 5% of the population. The field is confusing because different lesions look similar, and incorrect terminology is commonly used. Vascular anomalies are divided into 2 broad categories: tumors and malformations. The most common tumors include infantile hemangioma, congenital hemangioma, kaposiform hemangioendothelioma, and pyogenic granuloma. The major types of malformations are capillary malformation, lymphatic malformation, venous malformation, and arteriovenous malformation. Vascular anomalies also can be associated with overgrowth syndromes (e.g., Klippel-Trenaunay, Sturge-Weber). Treatment of vascular anomalies is specific to the type of lesion, which may include pharmacotherapy, laser, sclerotherapy, embolization, and/or resection. This presentation will describe the classification, diagnosis, and management of the major types of vascular anomalies. Attendees will be able to use correct terminology when describing vascular anomalies, diagnose the 8 major types of lesions, and understand treatments for these patients.

3:00 PM  **IMPACT ON THE EARS, AIRWAY AND NASAL CAVITIES**  
*Amelia F. Drake, MD*

This talk discusses hyperplasias of the head and neck, including vascular malformations, fibrous dysplasia and others. Illustrative examples will be presented, as well as challenges in diagnosis and treatment of these clinical problems.

3:30 PM  **PANEL Q&A**

3:45 PM  BREAK

4:15 PM  **INTRODUCTION TO HYPOPLASIAS**  
*Bruce B. Horswell, MD, DDS, MS*

This presentation will address hypoplastic asymmetries of the craniofacial region, both the skeletal and soft tissue components. The etiology, evaluation, particularly during growth, and the management of these challenging entities will be presented.

4:25 PM  **HYPOPLASIA AND ATROPHY STATES — “BULKING UP”**  
*Donald R. Mackay, DDS, MD*

Plastic surgeons have had the good fortune of being able to take advantage of the techniques learned from training in aesthetic surgery to improve the outcomes in our reconstructive work. The wide range of conditions that result in facial asymmetries can frequently be improved by applying these techniques. Fat grafting in particular is a simple procedure that is particularly well suited to improving the treatment of asymmetries due to hypoplasia and atrophic conditions. Fat grafting has for many of us transformed the way we treat Romberg’s hemifacial atrophy where large volume grafts have replaced the need for free tissue transfers. Fat grafting also has a wide application to asymmetries primarily treated bony osteotomies, repositioning and bone grafts. A patient with a great bony result will often still have soft tissue deficiencies where fat can help.

5:00 PM  **DYSPLASIAS AND SPEECH/SWALLOWING DISORDERS: FROM FACE TO PHARYNX**  
*Adriane L. Baylis, PhD, CCC-SLP, Ann W. Kummer, PhD, CCC-SLP*

Hypoplasia, hyperplasia and other forms of dysplasia can affect the craniofacial skeleton, and also the orofacial muscles and soft tissue structures. These dysplasias may occur as an isolated congenital anomaly or as part of a complex craniofacial syndrome. In this presentation, the authors will review various types of orofacial growth abnormalities and their impact on speech sound production, resonance, velopharyngeal function, and swallowing. This session will include many video case examples to illustrate the consequences of orofacial dysplasias on speech and swallowing, as well as to show the remarkable adaptation that children with these conditions display as they acquire these skills.

5:30 PM  **ADJOURN**

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**TUESDAY, March 25, 2014**

8:00 AM-11:45 PM  
**Room: Marriott 6**

8:00 AM  **INTRODUCTION**  
*Bruce B. Horswell, MD, DDS, MS, Marilyn C. Jones, MD*

Families of children with craniofacial anomalies present many challenges to their pediatric care providers. Significant medical problems must be addressed in early infancy and multiple
pediatric and surgical specialists must contribute to ensure optimal outcome for the child. The child’s problems add stress to the family and the primary physician must become familiar with an often rare condition and help communicate the care needs to the parents. As the child grows, normal stages of development are encountered with needs that require special attention and when addressed proactively, can help minimize secondary disability. Recommendations addressing these issues will be discussed and cases will be presented to amplify the discussion. Conference attendees will develop an understanding of the challenges faced by the primary care provider, the importance of communication among everyone involved in the patient’s care and each person’s role in providing a medical home for the child with a craniofacial anomaly.

8:45 AM DENTAL MANAGEMENT IN TEAM CARE OF CHILDREN WITH ASYMMETRIES AND OTHER COMPLEX CRANIOFACIAL ANOMALIES

Bryan J. Williams, DDS, MSD, Med

Timely and appropriate dental evaluation and management is a key foundation for successful craniofacial team management of children with asymmetries and other craniofacial anomalies. This presentation will focus on the complex dental disease and dental morphology issues which can impact the quality of overall team outcomes. Team based strategies for enhancing both dental health and the dental component of team outcomes will be reviewed. At the conclusion of the lecture attendees should have an understanding of the primary dental diseases which can affect these complex patients and an integrated approach to the management of these diseases. Attendees should also have an understanding of the range of strategies which integrate dental management approaches into the overall team care plan.

9:15 AM ORTHODONTIC MANAGEMENT — BALANCING IMBALANCE

Kirt E. Simmons, DDS, PhD

This presentation is intended to briefly familiarize non-dental Craniofacial Team members with the role and thought processes involved in the orthodontic and dental care of individuals affected by facial asymmetry problems. Paramount to providing ideal care to these patients is the presence of a good dentition, and the role of all Team members in this regard will be reviewed. Also dependent on a good outcome is a proper diagnosis and treatment plan, not a simple proposition in many of these complex cases. The role and thought processes of the dental professionals in determining a three dimensional diagnosis and the development of an interdependent treatment plan, with not just three dimensional but also temporal goals and objectives, will be explored. Lastly, examples of the clinical means by which dental professionals can contribute to the correction of these asymmetry problems will be provided.

9:45 AM PANEL Q&A

10:00 AM BREAK

10:30 AM HELPING CHILDREN (AND THEIR FAMILIES) WITH FACIAL DIFFERENCES — THE NOW AND NOT YET

Canice E. Crerand, PhD

The experience of having a facial disfigurement can present numerous challenges for children and their families. Facial disfigurement can affect not only how children view themselves but how they are perceived of and treated by others. Children and adolescents with facial disfigurements are vulnerable to psychosocial problems, including poor self-esteem, body image dissatisfaction, depression, social anxiety, and social difficulties, including stigmatization, discrimination, and rejection. Despite these challenges, there is growing recognition that positive changes can result from having a visible difference. This presentation will examine factors that impact psychosocial adjustment to facial disfigurement with an emphasis on body image and its role in psychosocial functioning and quality of life. Intervention strategies that can be used to help children and their families successfully navigate disfigurement-related challenges will also be reviewed, and future directions for clinical care will be offered.

11:00 AM THE TEAM’S JOURNEY AND THE ROAD HOME

Patricia D. Chibbaro, RN, MS, CPNP, Jamie M. Verdi, Esq.

Rare craniofacial conditions, including Craniofrontonasal or Fibrous Dysplasia, Vascular Anomalies, Beckwith-Wiedemann Syndrome and Hemifacial Atrophy, present significant challenges to the patient and family. Their journey often requires years, if not a lifetime, of medical, surgical and psychosocial interventions, requiring constant, consistent support from an experienced craniofacial team. Each patient is unique, not only in terms of the severity of their condition, but also regarding their family structure, socioeconomic background, cultural beliefs, coping mechanisms and resilience. The nurse/team coordinator is often their “air traffic controller” - the lifeline between the patient/family and all who participate in their care, giving us a unique perspective. This presentation will highlight the road that we all travel together, guided by our primary goal of helping our patients to become an accepted and productive member of society.

11:30 AM PANEL Q&A

11:45 AM ADJOURN
**Symposium Faculty**

*Adriane Baylis, PhD, CCC-SLP,* is the Director of the Velopharyngeal Dysfunction Program and Co-Director of the 22q Center at Nationwide Children’s Hospital, in Columbus, OH. She is also Assistant Professor of Clinical Plastic Surgery, Speech and Hearing Science, and Pediatrics at The Ohio State University. She is actively involved in ASHA Special Interest Group 5 (Speech Science and Orofacial Anomalies) and serves on Council for the American Cleft Palate-Craniofacial Association. Her clinical and research interests include perceptual and instrumental assessment of velopharyngeal dysfunction in children with cleft palate, craniofacial anomalies and 22q11.2 deletion syndrome. Disclosures: Consulting Fees (e.g., advisory boards): National Advisory Council for ETS Praxis SLP Exam. Contracted Research: NIH NIDCR grant funding.

James P. Bradley, MD. Dr. Bradley’s research focuses on basic science studies and translational research related to bone biology, bone tissue engineering, and wound healing. In clinical outcome investigations, the research team focuses on refining surgical protocols and innovative surgical procedures. All of these studies aim to improve surgical outcomes for patients with craniofacial syndromes (i.e. Treacher Collins, Apert, Crouzon, Nager etc.) or Craniofacial injuries.

Marilyn J. Bull, MD, is the Morris Green Professor of Pediatrics at Riley Hospital for Children at Indiana University Health. She is a neurodevelopmental pediatrician and geneticist and serves as consultant to the Craniofacial Program. Dr. Bull is a frequent speaker nationally and internationally and has served on the American Academy of Pediatrics Committee on Genetics and is currently on the Board of Directors. She is a longstanding member of the ACPA.

Patricia D. Chibbaro, RN, MS, CPNP, has been the Pediatric Nurse Practitioner at the Institute of Reconstructive Plastic Surgery, NYU Langone Medical Center for the past 26 years. Pat received the Donna Pruzansky Memorial Fund Award from the Cleft Palate Foundation in 1992, and since that time, has been a very active nursing member of the American Cleft Palate-Craniofacial Association. She is also the host of The Nurse Practitioner Show on Doctor Radio, Sirius/XM Channel 81.

Canice E. Crerand, PhD, is an Assistant Professor of Pediatrics, Department of Pediatrics, The Ohio State University College of Medicine and Center for Biobehavioral Health, The Research Institute at Nationwide Children’s Hospital (NCH). As a clinical psychologist, she works closely with the Cleft Lip and Palate Center at NCH, providing psychological assessment and treatment for patients and conducting research on psychosocial adjustment and body image in youth with craniofacial conditions. She previously served as a craniofacial team psychologist at The Children’s Hospital of Philadelphia and was an Assistant Professor in the Department of Surgery at the University of Pennsylvania’s Perelman School of Medicine.

Amelia F. Drake, MD, is Executive Associate Dean of Academic Programs, Newton D. Fischer Distinguished Professor of Otolaryngology/Head & Neck Surgery, and Director of the UNC Craniofacial Center. Dr. Drake, a pediatric otolaryngologist, has clinical and research interests which focus on pediatric airway disorders and craniofacial anomalies. She has been named on both “America’s Top Doctors” and “America’s Best Doctors” lists for many years. She received the Gabriel F. Tucker Award, for significant contributions to the field of pediatric laryngology, from the American Laryngological Association.

Arin K. Greene, MD, MIMSc, is a plastic surgeon at Boston Children’s Hospital. He received his BA from the University of Chicago and his MD from the University of Illinois. He completed his plastic surgery residency in the Harvard Training Program, followed by a craniofacial fellowship at Boston Children’s Hospital. Dr. Greene is an Associate Professor of Surgery at Harvard Medical School. He is a member of the Vascular Anomalies Center, Co-Directs the Lymphedema Program, and Directs the Department of Plastic Surgery research laboratory. His clinical and research focus is in the fields of vascular anomalies and lymphedema.

Bruce B. Horswell, MD, DDS, MS, is a native Minnesotan where he took his dental degree and oral and maxillofacial surgical training. He then received his medical degree and general surgery training at the University of Connecticut. Fellowship training in Cranio-Maxillofacial Surgery was abroad at the Royal Children’s Hospital in Melbourne, Australia and Alder Hey Children’s Hospital in Liverpool, England. He has had academic appointments at the Universities of Connecticut, Maryland, Minnesota and currently is Associate Clinical Professor of Surgery at the West Virginia School of Medicine. He also is Director of FACES, the regional craniofacial-cleft center at CAMC in Charleston, West Virginia. He is very active in the American Cleft Palate-Craniofacial Association as well as his specialty organizations. Dr. Horswell is married and has five children.

Marilyn C. Jones, MD, is Professor of Pediatrics at the University of California, San Diego and Director of the Cleft Palate and Craniofacial Treatment Teams at Rady Children’s Hospital. She is past president of ACPA and of the American College of Medical Genetics. She has served the Association in many capacities, most recently as Chair of the Committee on Accreditation of Teams. She is interested in normal and abnormal morphogenesis as well as the etiology and pathogenesis of cleft and craniofacial disorders. She has been a member of ACPA for 29 years.
**Ann W. Kummer, PhD, CCC-SLP,** is the Senior Director of the Division of Speech-Language Pathology at Cincinnati Children’s Hospital Medical Center. She is also Professor of Clinical Pediatrics and Professor of Otolaryngology-Head and Neck Surgery at the University of Cincinnati. Dr. Kummer does lectures and seminars on a national and international level in the areas of cleft palate and craniofacial anomalies, resonance disorders, velopharyngeal dysfunction, and even on business practices in speech-language pathology. She has written numerous professional articles and 22 book chapters in speech pathology and medical texts. She is an author of the SNAP test of nasometry and an inventor of the patented Nasoscope. She is the author of the book entitled *Cleft Palate and Craniofacial Anomalies: The Effects on Speech and Resonance,* 2nd edition (Delmar Cengage Learning, 2008). Dr. Kummer has received numerous honors and was elected Fellow of the American Speech-language–Hearing Association in 2002. Disclosures – Royalty: For textbook entitled *Cleft Palate and Craniofacial Anomalies: The Effects on Speech and Resonance,* Cengage Learning; also for the *Oral & Nasal Listener,* Super Duper Publications. Receipt of Intellectual Property Rights/Patent Holder. Patent for the Nasoscope.

**Janice Lee, DDS, MD,** joined the NIH in August 2013 as the NIDCR Deputy Clinical Director. She is an oral & maxillofacial surgeon with expertise in craniofacial anomalies, orthognathic reconstruction, and benign bone tumors, such as fibrous dysplasia. She received her DDS and MS from UCLA, her MD from Harvard, and completed her OMFS training at the MGH in Boston. She completed a 2-year fellowship in the Craniofacial and Skeletal Diseases Branch, NIDCR. Prior to returning to the NIH, she was at UCSF as Professor of Clinical OMFS, Vice Chair of OMFS, and an active member of the Craniofacial Anomalies Team.

**Donald R. Mackay, DDS, MD,** is the William P Graham III Professor of Plastic Surgery and Vice Chair of Surgery at PennState. He is the past-president of the American Association of Plastic Surgeons and serves on the Education Committee of ACPA. He co-chaired this symposium in 2009. He serves on a number of society boards and is currently a director of the American Board of Plastic Surgery and a member of the Plastic Surgery RRC. Disclosures: Receipt of Intellectual Property Rights/Patent Holder – Synthes: rib fracture fixation system. Consulting Fees (e.g., advisory boards): Synthes. Professional: Operation Smile - Chief Medical Office.

**Jeffrey L. Marsh, MD,** is Director of Pediatric Plastic Surgery and the Cleft Lip/Palate and Craniofacial Deformities Center at Mercy Children’s Hospital, St. Louis MO. A graduate of Johns Hopkins University and School of Medicine, Dr. Marsh received the Hopkins Alumni Association’s “Knowledge for the World” award in 2011 for his international cleft care volunteerism. He has assisted training of healthcare providers in multidisciplinary cleft-care in Bhutan, Cambodia, China, Israel, Laos, Taiwan, and Thailand as well as the USA. He is a past-President of American Cleft Palate-Craniofacial Association and the Cleft Palate Foundation.

**Mark P. Mooney, PhD,** is Professor and Chair, Department of Oral Biology, University of Pittsburgh with appointments in Anthropology, Plastic Surgery, Orthodontics, and Communication Sciences and Disorders. He is immediate past president of the American Cleft Palate-Craniofacial Association and was recently awarded the Distinguished Scientist Award in Craniofacial Biology from the International Association of Dental Research. Dr. Mooney’s research interests include factors that affect growth and development and the development of animal models of craniofacial.

**Kirt E. Simmons, DDS, PhD,** did an NIH fellowship in craniofacial anomalies at University of North Carolina. After teaching 10 years at the Universities of Indiana and North Carolina, he became the first Director of Orthodontics at Arkansas Children’s Hospital, providing all orthodontic services for their cleft, craniofacial and special needs patients. Currently President of Southwest Society of Orthodontists, he is orthodontic consultant for The MAGIC Foundation and a Section Editor of the Cleft Palate-Craniofacial Journal. His career-long interest has been treatment of patients with cleft lip/palate/craniofacial anomalies. He has contributed multiple chapters on orthodontic treatment of patients with cleft/craniofacial conditions.

**Bryan J. Williams, DDS, MSD, Med,** is a Pediatric Dentist and Orthodontist practicing in the Seattle area. He is an Affiliate Professor in the Departments of Pediatric Dentistry and Orthodontics at the University of Washington and a member of the active medical staff at Seattle Children’s Hospital and Swedish Medical Center. After 16½ years as an active member he now continues to have a strong working relationship with the Craniofacial Center at Seattle Children’s Hospital.

**Jamie Verdi, Esq.,** of Rochester, Michigan was born with a facial cleft and underwent her first intracranial surgery at the young age of two. Forty years worth of reconstructive procedures followed, but Verdi’s craniofacial condition didn’t prevent her from being an activist on behalf of others. In 2008, Verdi founded her own law firm, MI-PAL (Michigan Patient Advocacy Liaison) where she provides pro bono legal services to veterans and their widows, advocates for the insurance and health care needs of the elderly, and provides legal services to people with mental and physical illnesses and their family members. In addition to her full-time position as a probate attorney, she is actively involved with many community organizations including the Rochester Regional Chamber of Commerce, the National Citizen’s Coalition for Nursing Home Reform, the Michigan Campaign for Quality Care, Professional Patient Advocate Institute and Citizens for Better Care.
ACPA Primer For Cleft Care Providers

The 2014 Program Committee is pleased to announce the addition of an exciting new pre-conference symposium, The 2014 Team Care Primer. This program is designed for newer members of ACPA and for those who are simply interested in learning more about optimizing team care. *Continuing Education credit is not available for this program.

Room: Marriott 3-4

8:00 AM-12:00 PM

8:00 AM WELCOME
Nancy C. Smythe, ACPA/CPF Executive Director

8:05 AM THE 5 FUNDAMENTAL LAWS OF TEAM CARE
Richard E. Kirschner, MD, Nationwide Children’s Hospital

We all know that teamwork is essential to providing optimal care to cleft-affected children. But how does a successful team really work? What makes some teams excel while others fail? What separates great teams from groups of individuals that struggle to reach their full potential? The 5 Fundamental Laws of Team Care will discuss the basic principles and strategies that are essential to building a winning cleft-craniofacial team. Understanding and applying these ideas, including The Law of Significance (Yes, It Takes a Team), The Law of Purpose (It Really is the Vision Thing), and the Law of the Helm (The Team Sinks or Sails on Leadership), will not only help your team fulfill its mission but also empower your team to achieve greatness. This session is designed for all team members and team leaders (which, on successful teams are truly one and the same). Learning and practicing these laws will enhance your capacity to unlock your potential and to function effectively as a team builder, allowing you to provide your patients with the best in comprehensive cleft and craniofacial care.

8:35 AM ORIGINS OF TEAM CARE: THE LANCASTER CLEFT PALATE CLINIC
Ross E. Long, Jr., DMD, MS, PhD, Lancaster Cleft Palate Clinic

ACPA’s mission is based on the concept of multi-interdisciplinary team care. The original application of team care as applied to management of patients with clefts and craniofacial anomalies, was first developed by a Lancaster, PA orthodontist in 1938, Dr. HK Cooper. Seventy-five years later, while technology and procedures have continued to improve our treatment capabilities, the underlying principle of team care remains the same. This presentation will summarize the history and concepts of team care.

8:45 AM INTRODUCTION TO THE AMERICAN CLEFT PALATE-CRANIOFACIAL ASSOCIATION (ACPA)
Helen M. Sharp, PhD, Western Michigan University, Dept. of Speech Pathology & Audiology

Welcome to ACPA! This session will deliver an overview of what makes ACPA an exceptional interprofessional organization. We will take a look at what ACPA does, the many disciplines and countries represented in the association, and our future directions and plans. Whether you are a first time attendee or a seasoned member, you will learn something new about ACPA.

8:55 AM UNDERSTANDING THE CLEFT PALATE FOUNDATION (CPF)
Marilyn A. Cohen, LSLP, Cooper University Hospital, Regional Cleft-Craniofacial Program

The Cleft Palate Foundation was originally established in 1973 as the American Cleft Palate Educational Foundation. Its goal at that time was to provide special educational symposia, both as a part of the annual ACPA meeting and as separate freestanding educational programs. That goal has evolved over the years and is now focused on patient, and public education about cleft, and craniofacial conditions. This presentation will highlight the major services, projects and products of the Cleft Palate Foundation and its mission. Particular emphasis will be placed on how it supports team care, and a description of the foundation’s educational materials and programs including student scholarships for both undergraduate and graduate specialty education. In addition, the types of research funding available will be described. The goal of this presentation will be to familiarize the attendees with the scope of programs available through the CPF. Attendees following this presentation will be able to discuss the basic mission and function of the Cleft Palate Foundation.

9:05 AM PARAMETERS OF CARE AND THE COMMISSION ON APPROVAL OF TEAMS (CAT)
David Kuehn, PhD, University of Illinois at Urbana-Champaign, Dept. of Speech and Hearing Science

The six standards adopted by the ACPA for team approval will be discussed in relation to the Parameters for Evaluation and Treatment of Patients with Cleft Lip/Palate or Other Craniofacial Anomalies.

9:20 AM Q&A

9:35 AM BREAK

9:50 AM ABC’S OF TEAM CARE
Lynn M. Fox, MA, MEd, CCC-SLP, University of NC at Chapel Hill Craniofacial Center, School of Dentistry
This presentation will deconstruct, describe, and discuss craniofacial team formation, mission, composition, leadership, decision-making, roles, collaboration skills, communication, goals, conflict, ethics, and the team process.

10:20 AM **FUNDAMENTALS OF CLINICAL RESEARCH**  
*Carrie L. Heike, MD, MS, Seattle Children’s*

We have the opportunity to improve cleft and craniofacial care by contributing to high quality research. This presentation will provide a review of clinical study designs, highlight considerations for participation in research, and offer tips to get started.

10:45 AM **CLINICAL AUDITS AND OUTCOMES RESEARCH**  
*Ross E. Long, Jr., DMD, MS, PhD, Lancaster Cleft Palate Clinic*

Internal audit of our clinical outcomes is an obligation we have as part of quality assurance and improvement. If carried out with agreed-upon standards for records and record taking to measure outcomes of significance, an additional opportunity presents itself for intercenter outcomes comparisons and research. Such collaboration can provide insight into the processes and outcomes of treatment or comparable services elsewhere and the exchange of clearly successful practices.

11:10 AM **GLOBAL ASPECTS OF TEAM CARE: HURDLES TO SUCCESS**  
*John A. van Aalst, MD, Div. of Plastic & Reconstructive Surgery, University of NC at Chapel Hill*

Becoming involved in the global aspects of team care is a natural outgrowth of team care at our home institutions: we are likely to meet international cleft practitioners and are aware of home team members with international affiliations. To start, be true to your skill set: do globally what you do locally. Identify a need, and go with teams that have established relationships in a region. Go as a teacher. Go with an exit timetable: how long do you plan to teach your skillset? Go to a place where you know the language — if not, consider learning the language. Make a long-term commitment. Encourage local colleague independence. Build in-country cleft organizations. Think of regional partnerships. Then exit. Repeat algorithm.

11:35 AM **THE 5TH LAW**  
*Richard E. Kirschner, MD, Nationwide Children’s Hospital*

11:45 AM **Q&A**

12:00 PM **ADJOURN**

1:00 PM **2014 Team Care Primer Luncheon (Optional)**  
*Room: Marriott 2*

**DISCIPLINE FORUMS**

Back by popular demand, these informal professional networking opportunities will be held Wednesday afternoon from 4pm-6pm. First organized at the 2013 International Congress last May, reports from forum leaders indicated a wide range of topics and information was exchanged, but even more importantly, connections were made. This is your opportunity to ‘meet and greet’ colleagues in your discipline from around the world. Forum specialties and room assignments are:

- Genetics/Pediatrics  
  Columbus
- Mental Health  
  Denver
- Nursing/Coordination  
  Marriott 5
- Oral-Maxillofacial Surgery  
  Lincoln
- Orthodontics/Prosthodontics  
  Marriott 3
- Otolaryngology  
  Marriott 4
- Pediatric Dentistry  
  Austin
- Plastic Surgery  
  Marriott 2
- Research  
  Boston
- Speech-Language Pathology/Audiology  
  Marriott 1
TUESDAY, March 25, 2014

7:30 AM-7:30 PM
REGISTRATION
Room: Marriott Foyer

SPEAKER READY ROOM
Room: Phoenix

8:00 AM-12:00 PM
PRE-CONFERENCE SYMPOSIUM (CONTINUED):
FACIAL ASYMMETRIES...MORE OR LESS —
DYSPLASIAS, HYPERPLASIAS, HYPOPLASIAS
Room: Marriott 6

8:00 AM-12:00 PM
ACPA PRIMER FOR TEAM CARE PROVIDERS
(w/Optional Lunch)
Room: Marriott 3-4

12:00 PM-1:30 PM
ACPA/CPF COMMITTEE CHAIR LUNCHEON
Room: Santa Fe

1:30 PM-6:00 PM
EXHIBITS

3:00 PM-5:00 PM
EXHIBIT SET-UP

5:30 PM-6:30 PM
NEW MEMBER ORIENTATION
Room: Santa Fe

6:30 PM-8:30 PM
PRESIDENT’S WELCOMING RECEPTION
Join ACPA President Helen Sharp, PhD and
CPF President Marilyn Cohen, LSLP for cash bar
and light hors d’oeuvres. Supported in part by
KLS Martin and Medical Modeling
Room: Marriott Ballroom 5

WEDNESDAY, March 26, 2014

6:30 AM-6:30 PM
REGISTRATION/SPEAKER READY ROOM OPEN

7:00 AM-1:00 PM
POSTER SESSION A

7:00 AM-5:00 PM
EXHIBITS

1:30 PM-6:00 PM
POSTER SESSION B

EYE OPENERS — GROUP I
7:00 AM-8:00 AM
*Separate registration fee required.

Codes:  Instruction Level  Format
B=Beginner  L=Lecture
I=Intermediate  H=Hands-on
A=Advanced  P=Panel
V=Varied  R=Roundtable

1  COMMISSION ON APPROVAL OF TEAMS: REVIEW
AND DISCUSSION OF THE TEAM APPROVAL PROCESS
A review and discussion of the team approval process
moderated by the Commission on Approval of Teams.
Members of teams that have applied for approval will
have the opportunity to discuss the application,
Standards and impact of the approval process. (B, P)
David Kuehn, PhD
Room: Marriott 1

2  JOURNAL MANUSCRIPT PREPARATION AND
SUBMISSION
This Eye Opener will be given by members of the “Cleft
Palate-Craniofacial Journal” Editorial Board, Section
Editors from a variety of disciplines will discuss what
constitutes a good scientific manuscript, what kinds of
manuscripts are accepted, and what is required by the
Cleft Palate-Craniofacial Journal. Common problems in
manuscript preparation and ways of avoiding them will
be addressed. (B, P)
Jack C. Yu, MD, DMD, MSEd
Room: Marriott 2

3  THE AMERICLEFT PROJECT: GUIDELINES FOR
PARTICIPATION IN COLLABORATIVE INTERCENTER
OUTCOMES STUDIES
The purpose of this eye opener is to 1) provide an update
on the current status of the Americleft Project; 2) provide
details about carrying out actual outcomes comparisons
of internal quality assurance audits; 3) encourage
participation by other individuals, centers, and disciplines;
and 4) discuss the requirements necessary for other
centers to collaborate and participate in the project. The
presentation will include background information about
the inception and growth of the project and progress
made by the Orthodontic Group. Information will also be
provided about the progress made by the Speech Group
in developing standard procedures for data collection and
analysis and conducting reliability studies to allow for
reliable rating of speech data as well as the progress of a
newly formed Psychosocial Group. In addition to
providing these updates on progress with data collection
across participating centers, goals for the next phase of
these three working groups will be presented. (LP)
Ross Long, Jr, Judith Trost-Cardamone, Kathy
Chapman, Debbie Sell, Adriane Baylis, Angela Dixon,
Kelly Nett Cordero, Cindy Dobbelsteyn, Anna Thurmes,
Kristina Wilson; Kathy Kapp-Simon
Room: Marriott 3

AMERICAN CLEFT PALATE-CRANIOFACIAL ASSOCIATION
71ST ANNUAL MEETING
VPD MANAGEMENT IN SYNDROMIC POPULATIONS:
ASHA SIG 5 CHALLENGING CASES
This session explores the decision-making process involved with management of VPD in syndromic populations. ASHA Special Interest Group 5, Speech Science and Orofacial Disorders, offers this case-based panel presentation to SLPs, surgeons, and other ACPA attendees involved in treatment of VPD. Audience participation will be encouraged. At the conclusion of the session, attendees will be able to identify several syndrome-specific considerations involved with VPD management. (I, P)
Adriane Baylis, Angela Dixon, Sara Kinter, Kristen DeLuca
Room: Marriott 4

OPENING CEREMONIES - CELEBRATE THE WONDER
Room: Marriott 6-10
8:30 AM
Welcome and Opening Remarks
Helen M. Sharp, PhD, ACPA President
Richard E. Kirschner, MD, ACPA Vice President and Program Committee Chair
Ronald R. Hathaway, DDS, MS, MS, Local Arrangements Committee Chair
Marilyn Cohen, LSLP, President, Cleft Palate Foundation

GENERAL SESSION I — KEYNOTE ADDRESS — R. J. Palacio
9:00 AM
Room: Marriott 6-10
Session Chair: Helen M. Sharp, PhD
Session Co-Chair: Richard E. Kirschner, MD

THE WONDER OF WONDER
R. J. Palacio was an art director and graphic designer for more than 20 years, while waiting for the perfect time to start writing her own novel. When she had a chance encounter with an extraordinary child in front of an ice cream store, she realized the time had come to tell Auggie’s story, a boy born with a craniofacial anomaly.

In the spring of 2012, Wonder inspired a movement based on the importance of empathy and acceptance known as Choose Kind. At ChooseKind.tumblr.com, users can pledge to choose kind; watch the trailer for Wonder; download educational resources; and read about Wonder and R. J. Palacio. The home page features a weekly spotlight of a reader, classroom, or community that has responded to the story.

Wonder has been the recipient of numerous starred reviews, awards, and accolades, including several “Best of 2012” lists. With over 700,000 copies of Wonder sold, Palacio continues to travel the country speaking about the novel that has inspired countless children, educators, and families. She has been interviewed by national media outlets such as NPR’s Morning Edition, Time Out Chicago Kids, and Slate.com. Over 100 schools and communities have chosen Wonder for their One Book, One Read Programs, including citywide reads in Santa Monica, CA; Fairfield, CT; Memphis, TN; Naperville, IL; and others.

10:00 AM POSTER SESSION A, EXHIBITS, COFFEE BREAK

GENERAL SESSION I — ETIOLOGY, OUTCOMES, QUALITY OF CARE I
10:30 AM-12:30 PM
Room: Marriott 6-10

Goal: To expose attendees to the state-of-the-art research in the etiology of cleft and craniofacial conditions, outcomes, and improvement of quality of care for individuals with orofacial cleft or craniofacial anomalies.

Objective: Attendees will be able to identify the contemporary contributions of three or more disciplines to the diagnosis, treatment, and improvement in care for individuals with orofacial cleft or craniofacial conditions.

Session Chair: Mark P. Mooney, PhD
Session Co-Chair: Ronald R. Hathaway, DDS, MS, MS

10:30 AM ORAL HEALTH RELATED QUALITY OF LIFE (OHRQOL) AND SELF-RATED SPEECH IN CHILDREN WITH EXISTING FISTULAS IN MID-CHILDHOOD AND ADOLESCENCE
Barry Grayson, Pradip Shetye, Hillary Broder, Maureen Wilson-Genderson, Ross Long, Jr

10:40 AM DEMOGRAPHIC FACTORS ASSOCIATED WITH SURGICAL RECOMMENDATION AND QUALITY OF LIFE AMONG YOUTH WITH CLEFTS
Janine Rosenberg, Hillary Broder, Leanne Magee, Maureen Wilson-Genderson
10:50 AM  
**VISUAL-MOTOR FUNCTIONS AMONG SCHOOL AGE CHILDREN WITH AND WITHOUT SINGLE SUTURE CRANIOSYNOSTOSIS (SSC)**  
Lauren Buono, Kathleen Kapp-Simon, Kristen Gray, Brent Collett, Mary Michaeleen Cradock, Matthew Speltz

11:00 AM  
**DISCUSSION**

11:10 AM  
**COMPARATIVE OUTCOMES OF TWO NASOALVEOLAR MOLDING TECHNIQUES FOR BILATERAL CLEFT NOSE DEFORMITY**  
Yu-Fang Liao, Yi-Chin Wang

11:20 AM  
**VELOPHARYNGEAL OUTCOMES AT AGE SIX FOR THREE TYPES OF PALATOPLASTY**  
Lynn Grames, Jeffrey Marsh, Gary Skolnick, Dennis Nguyen, Rachel Skladman, Albert Woo

11:30 AM  
**ROBIN SEQUENCE: MORTALITY, RISK STRATIFICATION, AND CLINICAL OUTCOMES**  
Melinda Costa, Michael Tu, Michael Friel, Sunil Tholpady, Roberto Flores

11:40 AM  
**DISCUSSION**

11:50 AM  
**THE AMERICLEFT PROJECT: BURDEN OF CARE FROM SECONDARY SURGERY IN PATIENTS WITH CCLP**  
Thomas Sitzman, Ross Long, John Daskalogiannakis, Kathleen Russell, Ana Mercado, Ronald Reed Hathaway, Jennifer Fessler

12:00 PM  
**COMPARATIVE ANALYSIS OF ANTERIOR MAXILLARY DISTRACTION WITH CONVENTIONAL LEFORT I OSTEOTOMY IN THE MANAGEMENT OF CLEFT MAXILLA**  
Mustafa Khader

12:10 PM  
**AIRWAY OUTCOMES FOLLOWING CLEFT PALATE REPAIR IN ROBIN SEQUENCE**  
Melinda Costa, Kariuki Murage, Michael Tu, Michael Friel, Sunil Tholpady, Robert J. Havlik, Roberto Flores

12:20 PM  
**DISCUSSION**

12:30 PM-2:00 PM  
**Lunch Break (On Your Own)**  
**POSTER SESSION B, EXHIBITS**  
**2015 PROGRAM COMMITTEE MEETING/LUNCHEON**  
Room: Marriott 2  
**ETHICS ROUNDTABLE — REGISTRATION REQUIRED (OPTIONAL LUNCH AVAILABLE)**  
Room: Marriott 3-4  
**COMMISSION ON APPROVAL OF TEAMS/MEETING LUNCHEON**  
Room: Columbus

1:30 PM-6:00 PM  
**POSTER SESSION B**

**GENERAL SESSION II — MEASURING OUTCOMES PANEL**  
2:00 PM-3:30 PM  
Room: Marriott 6-10  
**Goal:** To provide an overview to the science of measuring patient-reported outcomes and to the CLEFT-Q, a PRO instrument designed for patients with cleft lip and/or palate.  
**Objective:** Attendees will be able to 1) understand the potential impact of measuring PROs in a clinically significant manner, 2) understand the concepts that should be evaluated in both adult and pediatric patients with clefts, and 3) understand how to use the various scales within the CLEFT-Q.  
**Panel Moderator:** Karen Wong, MD, MSc, FRCS(C)

**MEASURING OUTCOMES THAT MATTER TO PATIENTS WITH CLEFT LIP AND/OR PALATE**  
The objective of this symposium is to outline our international team approach to developing PRO instruments (BREAST-Q, FACE-Q) using modern psychometric methods. The CLEFT-Q is our newest measure, developed following interviews with 151 patients in Canada, USA, UK, Philippines, India, and Kenya. We will explain the importance of meaningful measurement of PROs and how these concepts are applied in the CLEFT-Q.  
Karen Wong, Elena Tsangaris, Timothy Goodacre, Christopher R. Forrest, Sophie Ricketts, Jeff Fialkov, Andrea Pusic, Stefan Cano, Anne Klassen

**LUNCH BREAK (ON YOUR OWN)**
4:00 PM-6:00 PM
DISCIPLINE FORUMS
Back by popular demand, these informal professional networking opportunities have been scheduled during the 2014 ACPA Annual Meeting in Indianapolis. First organized at the 2013 International Congress last May, reports from forum leaders indicated a wide range of topics and information was exchanged, but even more importantly, connections were made. This is your opportunity to ‘meet and greet’ colleagues in your discipline from around the world! See room assignments on Summary of Events, Page 128.

6:00 PM-7:00 PM
THE VOYAGE OF DISCOVERY THROUGH LEADERSHIP FORUM
Room: Santa Fe

* Separate Registration Required

Join us as a panel of speakers explains exciting, uncharted territory for ACPA in leadership development. Our organization aims to create a culture that trains current and future leaders to fulfill the mission of the ACPA. Creating strong leaders with a shared vision within the organization will ensure long-term growth and provide professional and personal benefits to each member. These benefits will translate into improved care for the children and communities that we serve. Panel speakers will explain the pathways to leadership development within the organization and will elicit audience participation as we undertake a voyage in leadership development. Beer, soda and pretzels will be provided!

7:30 PM-10:00 PM
CPF “GOOD SPORTS” EVENT — NCAA HALL OF CHAMPIONS

CLEFT PALATE FOUNDATION GOOD SPORTS EVENT
Join us for an evening of March Madness fun while supporting the programs of the Cleft Palate Foundation!

The 23rd Annual CPF Good Sports Event will be held Wednesday, March 26 from 7:30-10:00 PM at the NCAA Hall of Champions. Come get your hands on two levels of interactive exhibits that create a true-to-life understanding of what it takes to make the grade:

Arena, on the first level, hosts all 23 NCAA sports and includes a novice to historian trivia challenge, current team rankings, video highlights, and artifacts donated from colleges around the nation.

Play, on the second level, is a fully interactive area to compete virtually and hands-on, a media room displaying current games on seven television screens, and a 1930’s retro basketball gymnasium.

This is the place to fully appreciate the trials and triumphs of the student-athlete as well as the NCAA attributes:

Learning, Balance, Spirit, Community, Fair Play, and Character. Sound familiar?

IT TAKES A TEAM!!
EYE OPENERS — GROUP II

7:00 AM-8:00 AM

*S;evate registration fee required.

Code:
B = Beginner
I = Intermediate
A = Advanced
V = Varied
L = Lecture
H = Hands-on
P = Panel
R = Roundtable

5
SPEECH OUTCOME DATA: OVERCOMING BARRIERS AND USING TECHNOLOGY
Implementing a systematic protocol to monitor speech outcomes is critical to cleft team care. This session will present various methods for collecting, storing, and analyzing speech outcome data. A range of technologies to increase efficiency, including web-based products and a database, will be discussed. Attendees will describe strategies to overcome barriers to collecting speech outcome data, including challenges related to cost and time, selecting valid and reliable tools, and equipment. (V, P)
Anna Thurmes, Kelly Nett Cordero, Kristina Wilson, Adriane Baylis, Kathy Chapman, Angela Dixon, Cindy Dobbelsteyn, Debbie Sell, Judith Tratt-Cardamone
Room: Utah

6
SPEECH THERAPY: STRATEGIES FOR CORRECTION OF ERRORS SECONDARY TO VELOPHARYNGEAL DYSFUNCTION AND VARIOUS ORAL ANOMALIES
In this session, specific speech therapy techniques for correction of compensatory errors due cleft palate, VPI, and other structural anomalies will be described and demonstrated. Short video clips of these techniques will be presented for clarity. There will be a discussion of methods for achieving carry-over once normal production is achieved. Participants will receive a handout of techniques, including those that can be used before and after velopharyngeal surgery. (I, L)
Ann Kummer
Room: Santa Fe

7
PRENATAL CLEFT COUNSELING FOR BEGINNERS: ANSWERING THE CALL
The goal of this session is to promote competence and confidence in basic prenatal cleft counseling. Typical scenarios will be presented and recommendations will be made regarding the purpose, content and structure of a prenatal counseling session. Suggestions will also be made regarding handouts and visual aids to facilitate teaching during the counseling session.
Karla Haynes, Irene Klecha
Room: Columbus

8
USING PLAY-BASED THERAPY APPROACHES AND HOME PROGRAMMING FOR REDUCING COMPENSATORY ARTICULATION
The aims of this presentation are: to review Play-based therapy approaches for decreasing Compensatory articulation; instruct how to use drill, repetitive practice, and motor-programming in sessions; review home programming and how to assist parents in being more active in monitoring their child’s speech and progress. Finally, patients with common Craniofacial syndromes that may have coexisting speech deficits. Learners will be able to identify the key components of a speech therapy home program. (B, L)
Tambi Braun, Kelly Moll, Kristen Deluca
Room: Lincoln

9
SYNDROMIC VERSUS NONSYNDROMIC CLEFTING: THE ROLE OF GENETICS IN THE INTEGRATED CLEFT TEAM APPROACH
A significant proportion of individuals who have a cleft lip with or without cleft palate (CL/P) can have an underlying genetic syndrome. In this session, Powerpoint slides will be utilized to review the role of a genetic counselor and a geneticist in the fetal and postnatal evaluation for CL/P. Participants will have an understanding of genetic contribution to nonsyndromic and syndromic clefting. Inheritance patterns and current technologies for genetic testing will be highlighted. Specific cases will be presented to emphasize the value of incorporating genetic counselors and geneticists to improve the overall healthcare provided by the interdisciplinary team. (I, L)
Susan Starling Hughes, Nicole Safina, Shao Jiang, Alison Kaye
Room: Denver

10
ESSENTIAL ELEMENTS OF MULTISITE NURSING RESEARCH: OPERATIONAL STUDY IMPLICATIONS
Strategies for design and planning of a nurse led multicenter research study, an overview of the background, purpose, research questions, methods, plan for analysis of a proposed multicenter study and proposed data collection tool will be discussed. Learners will: recognize need for further study in use of arm restraints after cleft palate repair, list essential strategies in planning a multicenter research study, and discuss development of electronic data collection tool. (V, L)
Jennifer Huth
Room: Austin/Boston
Goal: To encourage and support multidisciplinary research by investigators in or recently graduated from training programs dealing with cleft and craniofacial evaluation and treatment.

Objective: Attendees will be able to identify and discuss three research questions related to cleft and craniofacial care.

Session Chair: Mohammad Mazaheri, MDD, DDS, MSc
Session Co-Chair: S. Alex Rottgers, MD

8:00 AM
SPECTRUM OF DENTAL PHENOTYPES IN OROFACIAL CLEFTING
Brian Howe, Lina Moreno, Margaret Cooper, Judith Resick, Alexandre Vieira, Nichole Nidey, George Wehby, Mary Marazita

8:10 AM
THE EFFECTS OF TIMING OF PALATOPLASTY IN FACIAL GROWTH AND OCCLUSAL RELATIONSHIPS: A COMPARATIVE STUDY
Koichi Otsuki, Tadashi Yamanishi, Chihiro Sugiyama, Wakako Tome, Tetsuya Seikai, Taku Yamamoto, Takeshi Harada, Emiko Isomura, Koji Ishihama, Mikihiro Kogo

8:20 AM
DECREASED SECONDARY BONE GRAFTING BUT POORER MIDFACE GROWTH AFTER PRIMARY ALVEOLAR CLEFT REPAIR WITH GINGIVOPERIOSTEoplasty AND RHBMP-2
Kristen Yee, Justine Lee, Brian Andrews, James Bradley

8:30 AM DISCUSSION

8:40 AM
WHITE MATTER STRUCTURE IN INDIVIDUALS WITH ISOLATED CLEFT LIP AND/OR PALATE: A DIFFUSION TENSOR IMAGING STUDY
Ian DeVolder, Amy Conrad, Lynn Richman, Vincent Magnotta, Peg C. Nopoulos

8:50 AM
HMGB1 SIGNALING IS ESSENTIAL FOR GRAFT-INDUCED BONE FORMATION
Liliana Camison, Dan Wang, James Gilbert, Melissa Shaw, Sameer Shakir, Adam Kubala, Liliana Camison, Joseph Losee, Timothy Billiar, Gregory Cooper

9:00 AM
MODULATION OF BMP2-INDUCED CALVARIAL DEFECT HEALING USING ADIPOSE, BONE MARROW, AND MUSCLE-DERIVED STROMAL CELLS
Sameer Shakir, Dan Wang, Melissa Shaw, Darren Smith, Sanjay Naran, Joseph Losee, Gregory Cooper

9:10 AM DISCUSSION

9:20 AM
A SURVEY OF THE ACPA MEMBERSHIP.
THE CONTROVERSIAL SIMONART'S BAND:
ITS AFFECT ON CLEFT CLASSIFICATIONS, AND IMPLICATIONS ON BILLING AND REIMBURSEMENT. SHOULD THE TERM BE RETIRED?
Sanjay Naran, Richard Kirschner, Matthew D. Ford, Mark Mooney, Joseph Losee

9:30 AM
NASOLABIAL CHANGES AFFECTED BY 2 DIFFERENT ALAR BASE CINCH SUTURE TECHNIQUES AFTER MAXILLARY LEOFRT I OSTEOTOMY IN CLASS III MALOCCLUSIONS: RANDOMIZED CONTROLLED TRIAL
Yihsuan Chen, Cheng-Hui Lin, Ellen Wen-Ching Ko

9:40 AM
EVALUATING THE NEED FOR ROUTINE ADMISSION FOLLOWING PRIMARY CLEFT PALATE REPAIR: AN ANALYSIS OF 100 CONSECUTIVE CASES
Benjamin Wood, Keshav Magge, Tina Sauerhammer, Michael Boyajian, Gary F. Rogers, Albert Oh

9:50 AM DISCUSSION

10:00 AM
FOSTER SESSION C, EXHIBITS, COFFEE BREAK
PAUL BLACK JUNIOR INVESTIGATOR AWARD PANEL MEETING

GENERAL SESSION III — QUALITY OF LIFE PANEL
10:30 AM-11:45 AM
Room: Marriott 6

Goal: To describe the significance of QoL research; how we do it; and what we have learned from it. Data from an ongoing six-center longitudinal research project exploring how specialists can contribute to a patient-centered approach to clinical care are addressed.

Objective: Attendees will define QoL; and identify two key findings from this QoL research, two useful sources for this research, and gaps in the public health research literature.

Panel Moderator: Hillary Broder, PhD, MEd

31 ORAL HEALTH-RELATED QUALITY OF LIFE: THE WHY, HOW, WHAT WE KNOW AND WHERE WE GO
The rationale for treatment interventions for individuals with clefts is to improve and enhance their quality of life (QoL). While QoL research has been incorporated into medical care across many conditions, QoL has been largely unexplored in individuals with clefts. Patient-reported QoL outcomes in cleft lip and palate treatment are critical as we advance evidence-based care. Panel members will consist of investigators from the NIH-research team, including clinical and health services research specialists from academia, and from the Centers for Disease Control and Prevention. Data
from the ongoing NIH-supported six-center observational, longitudinal project entitled “Quality of Life in Children with Cleft” will be presented, with assessments from clinicians, patients and caregivers. Panelists will share salient findings and discuss potential implications for patient care, outreach, and public health. 
Hillary Broder, Margot Stein, Canice Crerand, Cynthia Cassell, John Riski

11:30 AM  DISCUSSION

11:45 AM  BREAK FOR LUNCH

12:00 PM-2:00 PM
ACPA/CPF ANNUAL AWARDS LUNCHEON
Presentation of ACPA Honors and Distinguished Service Awards, CPF Leadership Award, announcements of CPF Research Grant, Junior Investigator, Journal, and Scholarship Recipients; ASCFS Award Winners
Room: Marriott Ballroom 5

2:15 PM  EXHIBITS, POSTER SESSION C

SHORT COURSES — GROUP I
2:30 PM-4:00 PM

*Separate registration fee required.

Codes: Instruction Level Format
B=Beginner L=Lecture
I=Intermediate H=Hands-on
A=Advanced P=Panel
V=Varied R=Roundtable

A.  AN INTRODUCTION TO FEEDING AND SWALLOWING CONCERNS IN THE CHILD WITH CLEFT PALATE OR CRANIOFACIAL SYNDROMES
This presentation will begin with a brief overview of cleft anatomy and physiology related to swallowing. Next, specific feeding practices for children with CLP on the typical developmental course of feeding skills will be emphasized. Demonstration and hands-on experience with specific cleft feeders will be provided. Finally, feeding issues specific to cleft related syndromes will be addressed, emphasizing team evaluation process and management approach. (B, R)
Scott A. Dailey, Brandon Viet, Kerry Mandulak
Room: Santa Fe

B.  ESTABLISHING MENTAL HEALTH SERVICES ON CRANIOFACIAL TEAMS
This course will address the various mental health services typically provided in a team clinic setting, as well as determining which services are feasible to implement, given clinical demands and available resources. Information will be presented on establishing a role within the team and educating team members about services. Objective: Participants will be able to identify at least two common challenges for new mental health providers on craniofacial teams. (B, P)
Celia Heppner, Amy Conrad, Canice Crerand, Kathleen Deidrick, Sandra Sinclair, Heather Snyder
Room: Marriott 7

C.  UNILATERAL CLEFT LIP REPAIR
The complexity of the cleft lip and nasal deformity, the variability within the spectrum of the deformity, and our high expectations all contribute to the surgical challenge. Over the past centuries, numerous techniques have been described; advancing the craft as newer techniques adopt the principles of previously described repairs while addressing their deficiencies. The purpose of this session is to review the anatomy of the cleft lip and nasal deformity, to review the history of left lip repair, to review principles of repair, and to highlight the keys to successful repair using the Anatomic Subunit Approximation Technique.
David Fisher
Room: Denver

D.  ORTHOPEDIC AND ORTHODONTIC TREATMENT FOR PATIENTS WITH CLEFTS OF THE LIP AND PALATE: FROM BIRTH TO MIXED DENTITION
This course will provide the audience with a detailed description of the use of Nasoalveolar Molding Technique for infants born with unilateral and bilateral cleft deformities. The course will also discussed maxillary arch preparation for a secondary bone grafting procedure during the mixed dentition. Educational Objective: The participant should be able to introduce the discussed principles into his/her daily orthopedic/orthodontic practice. (V, L)
Pedro Santiago
Room: Utah

E.  CLEFT ORTHOGNATHIC SURGERY
This course will be given in a multidisciplinary fashion by practitioners involved in cleft orthoanetics and surgery, and orthognathic surgery. The focus will be for the practicing orthodontist and surgeon who treats these patients from infancy through adulthood. We will focus both on orthodontic and surgical challenges. Considerations will include the unilateral deformity, bilateral deformity, technical modifications, dealing with residual fistulae, segmental osteotomies, simultaneous bone grafting, management of existing posterior pharyngeal flap, and impact on sleep apnea and speech postoperatively. Additional emphasis will be placed on preoperative planning, including conventional model surgery, splint type and fabrications, virtual surgical planning, and speech and airway assessments. Final considerations of orthodontic finishing will be discussed as well.
Anand Kumar, Lindsay Schuster, Derek Steinbacher
Room: Marriott 8
F. MEDICAL MANAGEMENT AND SURVEILLANCE PROTOCOLS FOR COMPLEX CRANIOFACIAL CONDITIONS
A panel of experts will discuss the development of management protocols for patients with four conditions: fibrous dysplasia, Robin sequence, syndromic craniosynostosis, and craniofacial microsomia. For each condition, participants will: 1) define diagnostic criteria, differential diagnoses, and confirmatory studies, 2) identify health concerns that could impact readiness for surgery or increase risk for adverse outcome, and 3) provide critical appraisal of a health care supervision timeline. (V, P)
Anne Hing, Howard Saal, Yvonne Gutierrez, Kelly Evans, Emily Gallagher, Ophir Klein, Robert Byrd, Katrina Dipple, Charlotte Lewis, Michael Cunningham
Room: Austin/Boston

G. IMPROVING OUTCOMES BY TREATING THE WHOLE PATIENT: INTEGRATING LANGUAGE, COGNITIVE AND PSYCHO-SOCIAL ISSUES IN TEAM CARE
This course will enable participants to understand and apply concepts, strategies and techniques drawn from the fields of language, cognition and social-emotional development to enhance craniofacial team care and patient outcomes. The discussion presents an overview of relevant current research, including special populations. The methodology includes case studies, discussion, demonstrating assessment tools, and role play. Small groups will design formal team protocols to assess these domains. (P)
Margot Stein, Patricia Stone, Lynn Fox
Room: Marriott 9

H. SURGICAL MANAGEMENT OF VPD IN 22Q11.2 DELETION SYNDROME: MASTERS CLASS FOR THE SURGEON AND SLP
The nature of VPD in 22q11DS is complex, thus treatment planning and surgical technique must be tailored to syndrome-specific and patient-specific factors to optimize outcome. This masters’ class will provide a comprehensive overview of the multifactorial nature of VPD in 22q and algorithms for successful surgical-speech management. Attendees will be able to describe syndrome-specific considerations for pre-surgical, perioperative, and post-surgical VPD management and outcomes assessment. (I, L)
Adriane Baylis, Richard Kirschner
Room: Lincoln

I. LINKING THE BRIDGE BETWEEN VIRTUAL AND ACTUAL ORTHOGNATHIC SURGERY (OGS): THE INTRODUCTION OF SURGICAL POSITIONING GUIDES (SPG)
Virtual surgical planning (VSP) has revolutionized pre-operative treatment planning for orthognathic surgery. In this session, the presenters will demonstrate the application of VSP surgical work-ups in cleft and syndromal orthognathic surgical cases. Participants experience with hands-on virtual surgical planning and design of OPS is the central purpose of this course.
John Polley, Alvaro Figueroa
Room: Columbus

J. PLASTIC SURGERY FOR THE REST OF THE TEAM
This course will use an interactive format to review common procedures offered to patients with cleft lip and palate. Procedures reviewed will include cleft lip repair, cleft palate repair, pharyngeal flap and sphincter pharyngoplasty. Drawings, models, and other visual aids will be used to give participants an understanding of how these procedures are done. Three dimensional understanding will be emphasized. Correlations will be drawn between specific techniques and the theoretical advantages and disadvantages among them. Common postoperative complications and how they link with surgical techniques will also be discussed. After taking this course, participants will have a better understanding of what happens in the operating room. The course assumes knowledge of the anatomy of the face and mouth but does not require advanced medical or surgical knowledge.
Martha Matthews, Marilyn Cohen
Room: Marriott 10

4:00 PM-4:30 PM
POSTER SESSION C, EXHIBITS, COFFEE BREAK

SHORT COURSES — GROUP II
4:30 PM-6:00 PM

*Separate registration fee required.

Codes: Instruction Level Format
B=Beginner L=Lecture
I=Intermediate H=Hands-on
A=Advanced P=Panel
V=Varied R=Roundtable

K. THE FURLOW PALATOPLASTY: SURGICAL TECHNIQUE AND OUTCOMES IMPROVEMENT
The Furlow Z-palatoplasty may be used to achieve excellent results both in primary cleft palate repair and in secondary management of velopharyngeal dysfunction. This course will provide a review of the detailed step-by-step surgical technique while providing tips on how to optimize surgical outcomes through patient selection and technical precision. At the completion of the course, participants will be able to discuss methods by which to optimize outcomes with the Furlow repair. (I, L)
Richard Kirschner
Room: Austin/Boston
L.

SPEECH EVALUATION, THERAPY, AND COLLABORATION FOR THE CLEFT TEAM SPEECH-LANGUAGE PATHOLOGIST
This course will provide tools and information for the SLP to conduct an efficient perceptual speech evaluation and to categorize speech production errors. Indications for additional velopharyngeal management vs. speech therapy will be discussed. Articulation therapy techniques and methods for collaborating with the local SLP will be addressed. Objective: The participant will describe the role of the SLP with the cleft palate team. (B, L)
Lynn Marty Grames
Room: Denver

M.

DENTAL AND ORTHODONTIC PREPARATION FOR SECONDARY ALVEOLAR BONE GRAFT SURGERY
The course will include an historical review of secondary alveolar bone grafts and diagnostic factors necessary to determine the nature and timing of dental and orthodontic treatment for optimum surgical outcome. The educational objective is to understand the role of the orthodontist/pediatric dentist in surgical outcome assessment and post-surgical treatment. Clinical cases will illustrate the important considerations in effectively managing patients who require secondary alveolar bone grafts. (B, L)
Peter Spalding, Ana Mercado, Pearson Gregory, Ashok Kumar
Room: Marriott 7

N.

CARE OF THE CHILD WITH A CLEFT: PRENATAL DIAGNOSIS THROUGH THE FIRST YEAR OF LIFE
A multidisciplinary panel will describe their roles in caring for children and families affected by clefting. We will introduce family centered team care, emphasizing nursing and care coordination. We will highlight delivery of culturally competent care and address socioeconomic needs. ACPA Team Standards will be incorporated. Psychosocial issues and interventions will be discussed. Our objective is to orient new providers to team care in the first year of life. (B, L)
Noreen Clarke, Alexis Johns, Karla Haynes, Daniela Schweitzer, Lori Howell, Yvonne Gutierrez
Room: Santa Fe

O.

ADVANCED SKILLS FOR MENTAL HEALTH PROVIDERS ON CRANIOFACIAL TEAMS
This course will educate mental health providers on advanced themes for craniofacial care. Topics will include cognitive/learning and psychological assessment; interventions for psychosocial concerns (bullying and self-image); and implementing clinical research. Educational Objective: describe at least 1 evaluation method for cognitive, learning, and social-emotional functioning; identify at least 1 intervention for psychosocial concerns; and describe key components of a clinical research plan.
Amy Conrad, Canice Cerand, Kathleen Deidrick, Celia Heppner, Sandra Sinclair, Heather Snyder
Room: Marriott 10

P.

NASOALVEOLAR MOLDING AND COLUMELLA ELONGATION
This course will take an in depth view of NasoAlveolar Molding, the biomechanics, advanced techniques and patient management. Registered students may submit a well documented case showing pretreatment and clinical progress records through the end NAM therapy for discussion by the presenters. Due to time limitations, not all submitted cases will be discussed. Cases should be sent via email to Barry.grayson3@gmail.com up to two weeks prior to the course, March 27, 2014. (V, L)
Barry Grayson, Pradip Shetye, Lawrence E. Brecht
Room: Marriott 8

Q.

TECHNIQUE OF PALATE REPAIR
A presentation of a technique of palate repair with radical muscle dissection including: 1. A description of the anatomy - the basis of the repair; 2. Hints on the use of the operating microscope; 3. A detailed description of the operative technique with videos; 4. An analysis of outcomes - of both primary and secondary repair; The session will be interactive with discussion encouraged. Educational objective: Participants should leave with a better understanding of the technique and its outcomes. (V, L)
Brian Sommerlad
Room: Marriott 9

R.

PIERRE ROBIN SEQUENCE: FEEDING MANAGEMENT ACROSS INTERVENTIONS
Pierre Robin Sequence is recognized today as a condition characterized by micrognathia and/or retrognathia, glossoptosis, respiratory distress, and cleft palate. The respiratory difficulties resulting from the upper airway obstruction lead to impairments in the newborn’s ability to feed effectively. The basis of the feeding problems have been explained as an over-expenditure of energy on breathing, leading to further difficulty in attempts to feed. The upper airway obstruction interferes with the infant’s ability to engage in the suck-swallow-breathe synchrony that comprises normal feeding. This presentation will review the feeding challenges of children with PRS and present feeding options and techniques based upon treatment modalities; from tracheostomy to mandibular distraction osteogenesis. Case studies and hands-on demonstrations of feeding techniques will be presented in lecture format. (I, L)
Kelly Mabry, Kerri Langevin
Room: Utah

S.

PRACTICAL GUIDELINES FOR MANAGING PATIENTS WITH COPY NUMBER VARIANTS INVOLVING CHROMOSOME 22Q11.2
22q11.2 deletion syndrome is the most common cause of syndromic palatal anomalies; nonetheless, systematic guidance for clinical management is limited. Thus, The International 22q11.2DS Consortium established practical guidelines with a goal of
transcending nationalities, health care systems, and subspecialty biases. These recommendations will be shared to include an overview of the condition, the approach to speech and language, associated behavioral differences, surgical interventions, and coordinated multidisciplinary perioperative care. (A,P)

Donna McDonald-McGinn, Cynthia B. Solot, Meg Maguire, Oksana Jackson, Anne Bassett
Room: Columbus

T.  A KEEN EYE TOWARDS EFFECTIVE TEAM COORDINATION
This is for cleft/craniofacial team coordinators/directors wanting to optimally manage their interdisciplinary team. This often requires creative thinking, willingness to try something new, and critical analysis of current clinical and team management practices. Topics include handling team growth, team politics, referral protocols, and utilizing process mapping to evaluate patient and clinical flow. Learners will identify effective practices for improving team coordination. (V,L)

Iris Sageser, Jamie Iidelberg
Room: Lincoln

7:00 PM-11:00 PM
ACPA 71st ANNUAL GALA — A NIGHT OF WONDER
Champagne reception, sit down dinner, music and dancing to the popular local band “Souled Out”
—supported in part by KLS Martin LP and Medical Modeling Inc.

FRIDAY, March 28, 2014

7:00 AM-8:00 AM
ASCFS BREAKFAST
Room: Santa Fe

7:00 AM-5:00 PM
EXHIBITS, POSTER SESSIONS D & E

7:00 AM-5:30 PM
REGISTRATION/SPEAKER READY ROOM OPEN

8:00 AM-12:30 PM
POSTER SESSION D

CONCURRENT GENERAL SESSIONS (GROUP 1)

SESSION A: ASCFS LINTON WHITAKER LECTURE
8:00 AM-9:00 AM
Room: Marriott 6

Session Chair: Kant Y.K. Lin, MD

Goal: To provide a comprehensive overview and discussion of craniofacial microsomia.
Objective: Attendees will be able to examine the common features and discuss recent observations related to craniofacial microsomia. Attendees will learn and discuss the etiology, pathogenesis and treatment of craniofacial microsomia.

THOUGHTS AND OBSERVATIONS ON CRANIOFACIAL MICROSOMIA
The 2014 ASCFS Linton Whitaker Lecture, “Thoughts And Observations On Craniofacial Microsomia,” will be presented by Scott Bartlett, MD. The Lecture, named in honor of Linton A. Whitaker, recognizes Dr. Whitaker’s years of service to the specialty of craniofacial surgery and his mentorship and education of a generation of plastic surgeons.

Scott Bartlett, MD

SESSION B: ALVEOLAR BONE GRAFT PANEL
8:00 AM-9:00 AM
Room: Marriott 5

Panel Moderator: Sidney Eisig, DDS

Goal: To recognize complicated alveolar bone grafting cases, and identify appropriate alternatives to traditional flap designs.
Objective: Attendees will be able to compare alternative techniques for alveolar bone grafting, identify restorative options of the alveolar cleft site, and manage the alveolus and the pre-maxilla in the bilateral alveolar cleft.

UPDATE IN ALVEOLAR BONE GRAFTING
Alveolar bone grafting can be complex and may require alternative techniques to the more traditional treatment options. This program will include presentations on autologous bone graft reconstruction of the cleft maxilla and use of recombinant human BMP-2 in the cleft patient, reconstruction of bilateral cleft defects, and restorative options of the alveolar cleft site.

Barry Steinberg, Sidney Eisig, Bonnie L. Padwa, Lawrence E. Brecht
SESSION C: BARRIERS TO CLEFT CARE PANEL
8:00 AM-9:00 AM
Room: Marriott 7-8

Panel Moderator: Margot Neufield, MA

Goal: To provide a forum to discuss barriers to accessing care for children with orofacial clefts in the United States.

Objective: Attendees will be able to identify two gaps in the literature addressing barriers to care; list two proposed strategies under development for parents; and understand two ways the accessibility and quality of information can be improved for parents.

ADDRESSING BARRIERS IN ACCESS TO PRIMARY CLEFT AND CRANIOFACIAL CARE
While many children and families affected by orofacial clefts in the United States may benefit from available information and resources on accessing health care, many do not due to difficulties in obtaining and utilizing these items. Panelists will summarize the various types of barriers these families and children face on a daily basis and present possible strategies to improve access to care.

Margot Neufeld, Cynthia Cassell, George Wehby, Michael VanLue

SESSION D: MEDICAL ADHERENCE IN THE CRANIOFACIAL TEAM PANEL
8:00 AM-9:00 AM
Room: Marriott 9-10

Panel Moderator: Karla Haynes, RN, MPH, MS, CPNP

Goal: The purpose of this presentation is to describe strategies for improving patients' adherence to Craniofacial Team recommendations and delineate the decision making process for referring to a child welfare agency.

Objective: Participants will be able to identify families in need of assistance in improving adherence, list three barriers that may contribute to diminished adherence, and describe different resources and agencies to consult when collaborating with families.

STRATEGIES AND TOOLS TO HELP IMPROVE MEDICAL ADHERENCE IN THE CRANIOFACIAL TEAM
This course will outline the steps Teams can take to help optimize patient adherence to multiple medical recommendations that comprise care of the child with a craniofacial diagnosis. Pertinent cases will be presented. Participants will be able to describe different resources and agencies to consult when collaborating with families.

Karla Haynes, Noreen Clarke, Laura Garcia, Amy Goodier, Alexis Johns, Sally Ward, Yvonne Gutierrez
11:20 AM

ARE ENDOSCOPIC AND OPEN TREATMENTS OF METOPIC SYNOSTOSIS EQUIVALENT IN TREATING TRIGONOCEPHALY AND HYPOTELORISM? Dennis Nguyen, Andrew H. Huang, Komlesh Patel, Gary Skolnick, Sybill Naidoo, Matthew Smyth, Albert Woo

11:30 AM

CRANIAL BASE ASYMMETRY AFTER OPEN AND ENDOSCOPIC REPAIR OF ISOLATED LAMBDOID CRANIOSYNOSTOSIS Ema Zubovic, Albert Woo, Gary Skolnick, Sybill Naidoo, Matthew Smyth, Kamlesh Patel

11:40 AM

IMPACT OF AGE AND OPERATION ON ADVERSE EVENTS AFTER CRANIOSYNOSTOSIS REPAIR Michael DeLong, Kyle Halvorson, John Gallis, Carrie Muh, Shivanand Lad, Jeffrey Marcus

11:50 AM

DISCUSSION

12:00 PM-1:30 PM

LUNCH BREAK (ON YOUR OWN)

ASCFS LUNCHEON/BUSINESS MEETING
(separate registration fee required)
Open only to members of the American Society of Craniofacial Surgery
Room: Marriott 1-2

10:40 AM

USE OF AN INFERIOR PENNANT FLAP DURING UNILATERAL CLEFT LIP REPAIR IMPROVES LIP SYMMETRY Aaron Russell, Kamlesh Patel, Gary Skolnick, Albert Woo

10:50 AM

A MODIFIED V-Y CHONDROMUCOSAL COMPOSITE FLAP FOR CORRECTION OF SECONDARY CLEFT NASAL DEFORMITY: A PHOTOMGRAMMETRIC ANALYSIS Morten Basta, Jesse Goldstein, Anthony Wilson, Jesse Taylor

11:00 AM

A THREE DIMENSIONAL ANALYSIS OF NASAL AESTHETICS FOLLOWING LE FORT I ADVANCEMENT IN PATIENTS WITH CLEFT LIP AND PALATE Edward Davidson, Lino Miele, Oluwaseun Adetayo, Anand Kumar

11:10 AM

DISCUSSION

11:20 AM

SKELETAL STABILITY AFTER MAXILLARY DISTRACTION WITH A RIGID EXTERNAL DEVICE (RED) IN ADULT PATIENTS WITH CLEFT LIP AND PALATE Shashwat Magarkar, Sherry Peter

11:30 AM

INCIDENCE OF POSITIVE SCREENING FOR OBSTRUCTIVE SLEEP APNEA IN CHILDREN WITH ISOLATED CLEFT LIP AND PALATE Jason Silvestre, J. Thomas Paliga, Youssef Tahiri, Scott Bartlett, Jesse Taylor

11:40 AM

THE RATE OF ORONASAL FISTULA FOLLOWING PRIMARY CLEFT PALATE SURGERY: A META-ANALYSIS Michael Bykowski, Daniel Winger, Sanjay Naran, Joseph Losee

11:50 AM

DISCUSSION

CONCURRENT 2: CLEFT LIP AND PALATE SURGERY
Room: Marriott 5

Goal: To provide a forum focused on research and surgical techniques used in the management of patients with cleft lip and palate.

Objective: Attendees will be able to discuss at least three research findings related to techniques or outcomes of surgical techniques used in cleft lip and palate surgery.

Session Chair: Robert J. Havlik, MD
Session Co-Chair: Gregory Pearson, MD

10:30 AM

UNILATERAL CLEFT LIP REPAIR USING THE ANATOMIC SUBUNIT APPROACH: MODIFICATIONS AND ANALYSIS OF EARLY RESULTS IN 93 CONSECUTIVE CASES Raymond Tse, Samuel Lien, Clinton Morrison

11:00 AM

A THREE DIMENSIONAL ANALYSIS OF NASAL AESTHETICS FOLLOWING LE FORT I ADVANCEMENT IN PATIENTS WITH CLEFT LIP AND PALATE Edward Davidson, Lino Miele, Oluwaseun Adetayo, Anand Kumar

11:10 AM

DISCUSSION

11:20 AM

SKELETAL STABILITY AFTER MAXILLARY DISTRACTION WITH A RIGID EXTERNAL DEVICE (RED) IN ADULT PATIENTS WITH CLEFT LIP AND PALATE Shashwat Magarkar, Sherry Peter

11:30 AM

INCIDENCE OF POSITIVE SCREENING FOR OBSTRUCTIVE SLEEP APNEA IN CHILDREN WITH ISOLATED CLEFT LIP AND PALATE Jason Silvestre, J. Thomas Paliga, Youssef Tahiri, Scott Bartlett, Jesse Taylor

11:40 AM

THE RATE OF ORONASAL FISTULA FOLLOWING PRIMARY CLEFT PALATE SURGERY: A META-ANALYSIS Michael Bykowski, Daniel Winger, Sanjay Naran, Joseph Losee

11:50 AM

DISCUSSION

CONCURRENT 3: PERSPECTIVES
Room: Marriott 9-10

Goal: To provide those who treat patients with cleft lip and palate with a forum to discuss the impact the cleft lip and palate condition can have on every day social interactions and the importance multi disciplinary care can have on developing healthy coping skills.
Objective: Attendees will be able to discuss, in psychological terms, what actually transpires in daily social interactions. Attendees will be able to identify 3 common coping mechanisms used.

Session Chair: Robert Mann, MD

10:30 AM-11:50 AM

70 NAVIGATING SOCIAL CHALLENGES: LIFE WITH A CLEFT LIP AND PALATE
Robert Mann, Alan McEvoy, Tony Meyer

11:50 AM DISCUSSION

12:00 PM-1:30 PM
LUNCH BREAK (ON YOUR OWN)

CONCURRENT 4: SPEECH
Room: Marriott 3-4

Goal: To provide a forum focused on research and clinical aspects of speech evaluation and treatment related to individuals with orofacial clefts and other craniofacial conditions.

Objective: Attendees will be able to identify and discuss at least three speech evaluation and treatment techniques relevant to research or management of patients with cleft and craniofacial conditions.

Session Chair: David Zajac, PhD
Session Co-Chair: Anna Thurmes, MA, CCC-SLP

10:30 AM
71 PHONETIC DETERMINANTS OF AUDIBLE NASAL EMISSION (VELAR FLUTTER) IN CHILDREN WITH REPAIRED CLEFT PALATE
David Zajac, Kate Winterbottom, John Preisser

10:40 AM
72 ARTICULATION OUTCOMES IN CHILDREN WHO ARE INTERNATIONALLY ADOPTED
Amy Morgan, Claudia Crilly Bellucci, Mary O’Gara, Brent Collett, Pravin Patel, Eva Kowalewicz, Kathleen Kapp-Simon

10:50 AM
73 LANGUAGE DEVELOPMENT IN CHILDREN WITH OROFACIAL CLEFTS ADOPTED FROM NON-ENGLISH SPEAKING COUNTRIES
Claudia Crilly Bellucci, Brent Collett, Amy Morgan, Arthur Curtis, Eva Kowalewicz, Jody Coppersmith, Kathleen Kapp-Simon

11:00 AM
74 THE INFLUENCE OF SPEAKING RATE ON NASALANCE IN TYPICAL ADULT SPEAKERS
Rachel Whitney, Stephen Tasko, Helen Sharp, Greg Flamme

11:20 AM
75 DEVELOPING A NOVEL SPEECH INTERVENTION IPAD GAME FOR CHILDREN WITH CLEFT PALATE: A PILOT STUDY
Jamie Funamura, Yen Hsieh, Sri Kurniawan, Zachary Rubin, Christina Roth, Susan Goodrich, Travis Tollefson

11:30 AM
76 STRUCTURAL AND FUNCTIONAL ASSESSMENT OF SPEECH IN YOUNG CHILDREN USING DYNAMIC MAGNETIC RESONANCE IMAGING
Jamie Perry, David Kuehn, Bradley Sutton

11:40 AM
77 USE OF DYNAMIC MRI TO QUANTIFY VELOPHARYNGEAL CONTACT LENGTH AND DIFFERENTIATE VELOPHARYNGEAL CONTACT CONFIGURATIONS AMONG PHONEMES
Catherine Pelland, Josh Inouye, Xue Feng, Craig Meyer, Kathleen Borowitz, Knt Y.K. Lin, Silvia Blemker

11:50 AM DISCUSSION

12:00 PM-1:30 PM
LUNCH BREAK (ON YOUR OWN)

CONCURRENT 5: PIERRE ROBIN SEQUENCE
Room: Marriott 7-8

Goal: To provide a forum focused on research and clinical aspects of Pierre Robin Sequence.

Objective: Attendees will be able to identify at least three evaluation and management strategies for individuals with Pierre Robin Sequence.

Session Chair: Carrie Heike, MD, MS
Session Co-Chair: Marilyn Cohen, LSLP

10:30 AM
78 AN OUTCOMES ANALYSIS OF MANDIBULAR DISTRACTION OSTEONEogenesis FOR THE TREATMENT OF NEONATAL TONGUE-BASED AIRWAY OBSTRUCTION
Jesse Goldstein, Cyndi Chung, Christopher Cielo, Carol Marcus, Janet Lioy, Scott Bartlett, Jesse Taylor

10:40 AM
79 A SIMPLE MANDIBULAR DISTRACTION PROTOCOL TO AVOID TRACHEOSTOMY IN PATIENTS WITH PIERRE ROBIN SEQUENCE
Jessica Ching, Sergio Alvarez, Cathy Conley, Ernesto Ruas

11:00 AM DISCUSSION
FRIDAY, March 28, 2014

**Concurrent Specialty Sessions**

10:50 AM

**EVALUATION OF SURGICAL TREATMENT OF SYMPTOMATIC PIERRE ROBIN SEQUENCE: A COHORT COMPARISON STUDY BETWEEN FURLOW PALATOPLASTY VS. RADICAL INTRAVELAR VELOPLASTY**

_Brian Gander, Wesley Sivak, Zoe MacIsaac, Lorelei Grunwaldt, Anand Kumar_

11:00 AM

**MAPPING THE MANDIBULAR LINGULA IN SYMPTOMATIC PIERRE ROBIN SEQUENCE: A GUIDE TO THE INVERTED L-OSTEOTOMY**

_Wendy Chen, Edward Davidson, Zoe MacIsaac, Anand Kumar_

11:10 AM

**DISCUSSION**

11:20 AM

**EVALUATION OF OTOLOGY OUTCOMES AFTER SURGICAL TREATMENT OF SYMPTOMATIC PIERRE ROBIN SEQUENCE: A COHORT COMPARISON STUDY BETWEEN FURLOW PALATOPLASTY VS. RADICAL INTRAVELAR VELOPLASTY**

_Kavita Dedhia, David Chi, Anand Kumar, Deepak Mehta_

11:30 AM

**NASOPHARYNGEAL INTUBATION FOR SEVERE CASES OF ROBIN SEQUENCE: A FOLLOW UP OF THREE YEARS WITH EVALUATION OF NEUROLOGICAL DEVELOPMENT**

_Ilza Lazarini Marques, Tatiane Romanini, Alvaro Bertucci, Rosana Prado-Oliveira_

11:40 AM

**CARDIAC AND NEUROLOGIC ANOMALIES IN ROBIN SEQUENCE: INCIDENCE AND CLINICAL IMPLICATIONS**

_Melinda Costa, Michael Tu, Robert J. Havlik, Sunil Tholpady, Roberto Flores_

11:50 AM

**DISCUSSION**

12:00 PM-1:30 PM

**LUNCH BREAK (ON YOUR OWN)**

**FRIDAY, March 28, 2014**

## Concurrent Specialty Sessions (Group 2)

1:30 PM-3:00 PM

**Concurrent 6 ASCFS Part II**

Room: Marriott 6

**Goal:** To provide a forum focused on research and surgical management of individuals with craniofacial anomalies.

**Objective:** Attendees will be able to discuss and evaluate at least three new surgical management techniques for a variety of craniofacial conditions.

**Session Chair:** Joseph Losee, MD

**Session Co-Chair:** John A. van Aalst, MD

1:30 PM

**A CURRENT ASSESSMENT OF CRANIOFACIAL FELLOWSHIP TRAINING**

_Niyant Patel, Kanlaya Ditthakasem, Jeffrey Fearon_

1:40 AM

**RETRIEVAL OF A FULL FACIAL ALLOGRAFT BASED ON THE MAXILLARY ARTERY: INDICATIONS AND TECHNIQUE**

_Bahar Bassiri Gharb, Gaby Doumit, Antonio Rampazzo, Frank Papay_

1:50 AM

**AUTOLOGOUS BONE-ASSISTED CRANIOPLASTY FOLLOWING DECOMPRESSIVE CRANIECTOMY IN PEDIATRIC PATIENTS: RISK FACTORS AND RATES OF RESORPTION**

_Nicholas Berlin, Brooke French, Frederic Deleyiannis, Austin Badeau_

2:00 PM

**PEDIATRIC FACIAL FRACTURE PATTERNS: TRAJECTORIES AND RAMIFICATIONS IN 151 PATIENTS**

_Sanjay Naran, Christopher Kinsella, Zoe MacIsaac, Evan Katzel, Michael Bykowski, Sameer Shakir, Roee Rubinstein, Joseph Losee_

2:10 PM

**DISCUSSION**

2:20 PM

**EARLY DISTRACTION AT PIERRE ROBIN SYNDROME PATIENTS: 15 YEARS FOLLOW UP**

_Carmen Morovic, Claudia Vidal_

2:30 PM

**5 YEAR FOLLOW-UP OF MIDFACE DISTRACTION IN GROWING CHILDREN WITH SYNDROMIC CRANIOSYNOSTOSIS**

_Parit Patel, Pradip Shetye, Stephen Warren, Barry Grayson, Joseph G McCarthy_

2:40 PM

**SUCCESSFUL NEONATAL MANDIBULAR DISTRACTION OSTEOMESIS IN PATIENTS WITH CONCOMITANT LARYNGOMALACIA**

_Melinda Costa, Michael Tu, Kariuki Murage, Robert J. Havlik, Roberto Flores, Sunil Tholpady_

2:50 PM

**DISCUSSION**

3:00 PM

**POSTER SESSION E, EXHIBITS, COFFEE BREAK**
CONCURRENT 7: ALVEOLAR BONE GRAFTS  
Room: Marriott 5

**Goal:** To provide a forum focused on alveolar bone graft research, clinical care, and outcomes.

**Objective:** Attendees will be able to discuss three clinical or research topics related to alveolar bone grafting.

**Session Chair:** Joli Chou, DMD, MD  
**Session Co-Chair:** Ana Mercado, DMD, PhD

1:30 PM  
**MINORITY AND PUBLIC INSURANCE STATUS: IS THERE A DELAY TO ALVEOLAR BONE GRAFTING SURGERY?**  
Jason Silvestre, Giovanni Greaves, Kristen Lowe, Rosario Mayro, Oksana Jackson

1:40 PM  
**CRANIAL BONE GRAFTING FOR ALVEOLAR CLEFTS: A 25- YEAR REVIEW OF OUTCOMES**  
Kristen Hudak, Patrick Hettinger, Arlen Denny

1:50 PM  
**QUALITATIVE ANALYSIS OF MESIAL AND DISTAL ALVEOLAR BONE OF MAXILLARY CANINES MOVED TO GRAFTED ALVEOLAR CLEFT: A TOMOGRAPHIC EVALUATION**  
Marília Yatabe, Camila Massaro, Daniela Gamba Garib

2:00 PM  
**PERIODONTAL MORPHOLOGY OF CENTRAL INCISORS OF PATIENTS WITH UNILATERAL ALVEOLAR CLEFT: A CBCT ASSESSMENT**  
Marília Yatabe, Gabriela Natsumeda, Daniela Gamba Garib

2:10 PM  
**DISCUSSION**

2:20 PM  
**NEW PERSPECTIVES TO PERFORM BONE TISSUE ENGINEERING FOR ALVEOLAR BONE GRAFT TO CLEFT LIP AND PALATE PATIENTS USING NON INVASIVE SOURCES OF STEM CELL**  
Daniela Bueno, Carla Cristina Pinheiro, Daniela Tanikawa, Rita Martins, Diogenes Rocha, Luiz Fernando Reis

2:30 PM  
**UTILIZING A SURGICALLY CREATED ALVEOLAR CLEFT MODEL IN JUVENILE SWINE TO TEST STEM CELL-BASED TREATMENT STRATEGIES**  
Jeyhan Wood, Montse Caballero, Alex Halevi, Justin Morse, Michael Pharaon, Luiz Pimenta, Enrique Petti, Jesse Goldstein, John Van Aalst

2:40 PM  
**IS PLATELOTS RICH FIBRIN (PRF) ENHANCING MAXILLARY ALVEOLAR CLEFT RECONSTRUCTION**  
Sameh Monier

2:50 PM  
**DISCUSSION**

3:00 PM  
**POSTER SESSION E, EXHIBITS, COFFEE BREAK**

CONCURRENT 8: CRANIOFACIAL BIOLOGY  
Room: Marriott 9-10

**Goal:** To provide a forum focused on cell biology, craniofacial biology, and genetics as they relate to orofacial clefts and craniofacial conditions.

**Objective:** Attendees will be able to discuss at least three molecular, genetic, morphological, and surgical factors affecting growth and development in individuals with orofacial clefts and craniofacial conditions.

**Session Chair:** Michael Cunningham, MD, PhD  
**Session Co-Chair:** Seth Weinberg, PhD

1:30 PM  
**DIFFERENTIAL EFFECTS OF INFLAMMATORY MEDIATORS TNFα, TGFβ1 ON CELLULAR DIFFERENTIATION IN A MURINE IN VITRO MODEL OF HETEROTOPIC OSSIFICATION**  
S. Alex Rottgers, Laura Meszaros, Anand Kumar

1:40 PM  
**TGFβ1 INHIBITS BMP2 MEDIATED OSTEOGENIC DIFFERENTIATION IN A PRIMARY MURINE MUSCLE CELL IN VITRO MODEL OF HETEROTOPIC OSSIFICATION**  
S. Alex Rottgers, Laura Meszaros, Anand Kumar

1:50 PM  
**TGF-BETA 3 AND FGF ANTAGONIZE BMP-2-INDUCED OSTEOGENIC DIFFERENTIATION**  
Rick Mai, James Gilbert, Joseph Losee, Gregory Cooper

2:00 PM  
**VIBRATORY STIMULUS ELICITS BOTH OSTEOGENESIS AND CHONDROGENESIS IN UMBILICAL CORD MESENCHYMAL STEM CELLS**  
Justin Morse, Montse Caballero, Zach Cashion, Robert Dennis, John Van Aalst

2:10 PM  
**DISCUSSION**

2:20 PM  
**MANDIBULAR AND MAXILLARY LENGTHS IN FIVE SUBGROUPS OF CLEFT PALATE WITH OR WITHOUT CLEFT LIP**  
Nuno V. Hermann, Tron A. Darvann, Sven Kreiborg

2:30 PM  
**MICROESTHETIC DENTAL ANALYSIS IN PARENTS OF CHILDREN WITH ORAL CLEFTS**  
Chloe Hoppens, Steven Miller, Judith Resick, Nichole Nidey, George Wehby, Mary Marazita, Lina Moreno
2:40 PM  | AN EXPERIMENTAL STUDY OF PARTICULATE BONE GRAFT FOR SECONDARY INLAY CRANIOPLASTY OVER SCARRED DURA  
Reid Maclellan, Aladdin Hassanein, John Mulliken, Gary Rogers, Arin Greene

2:50 PM  | DISCUSSION

3:00 PM  | POSTER SESSION E, EXHIBITS, COFFEE BREAK

**CONCURRENT 9: PSYCHOSOCIAL**
Room: Marriott 3-4

**Goal:** To provide a forum focused on psychological issues and outcomes for individuals with orofacial cleft and other craniofacial conditions.

**Objective:** Attendees will be able to list and discuss at least three psychological and educational issues or outcomes for individuals with orofacial cleft or other craniofacial conditions.

**Session Chair:** Canice Crerand, PhD
**Session Co-Chair:** Margot Stein, PhD

1:30 PM  | BODY IMAGE DIMENSIONS IN YOUTH WITH CRANIOFACIAL CONDITIONS: GENDER DIFFERENCES AND PARENT VS. SELF RATINGS OF APPEARANCE  
Canice Crerand, Alexandra Clarke, Anne Kazak, David Sarwer, Nichola Rumsey

1:40 PM  | QUALITY OF LIFE AMONG YOUTH WITH CLEFT: DEVELOPMENTAL INFLUENCES ON PSYCHOSOCIAL FUNCTIONING  
Leanne Magee, Margot Stein, Janine Rosenberg, Hillary Broder, Maureen Wilson-Genderson

1:50 PM  | MODIFIERS AND TRAJECTORIES OF ACADEMIC ACHIEVEMENT OF CHILDREN AND ADOLESCENTS WITH ORAL CLEFTS COMPARED TO CLASSMATES  
George Wehby, Brent Collett, Sheila Barron, Paul A. Romitti, Timothy Ansley, Matthew L. Speltz

2:00 PM  | PATIENT-REPORTED OUTCOMES FOLLOWING CLEFT SURGERY: A SYSTEMATIC REVIEW  
Kavitha Ranganathan, Steven Buchman, Jennifer Waljee, Seth Warschawsky

2:10 PM  | DISCUSSION

2:20 PM  | PRENATAL DIAGNOSIS OF ORAL CLEFTS, EARLY LIFE HEALTHCARE EXPERIENCES, AND MATERNAL WELLBEING  
Nichole Nidey, George Wehby

2:30 PM  | MOTHERS OF CHILDREN WITH AN OROFACIAL CLEFT: SATISFACTION WITH MOTHERHOOD AND EXPERIENCED STRESS  
Annemieke Bos, Charlotte Prahl

2:40 PM  | FAMILY SUPPORT NETWORK NEEDS ASSESSMENT  
Suzanne Woodard, Jennifer Fessler

2:50 PM  | DISCUSSION

3:00 PM  | POSTER SESSION E, EXHIBITS, COFFEE BREAK

**CONCURRENT 10: SYNDROMES**
Room: Marriott 7-8

**Goal:** To provide a forum for discussion of cleft-related syndromes.

**Objective:** Attendees will be able to describe at least three aspects of clinical care related to syndromic clefts.

**Session Chair:** Howard Saal, MD
**Session Co-Chair:** Donna McDonald-McGinn, MS, CGC

1:30 PM  | CRANIOFACIAL ABNORMALITIES IN ASSOCIATION WITH THE 22Q11.2 DELETION SYNDROME (22Q11.2DS): BEYOND CLEFTING  
Donna McDonald-McGinn, Christina Passick, Elaine Zackai, Oksana Jackson, David W. Low, Jesse Taylor, Patricia Schultz, Brian Forbes, Scott Bartlett, Linton Whitaker

1:40 PM  | PHYSICAL FUNCTION IN INDIVIDUALS WITH 22Q11.2 DELETION SYNDROME  
Dianne Altuna, Kanlaya Ditthakasem, Hao Liu, Yasser Salem

1:50 PM  | SPEECH CHARACTERISTICS IN VCFS (22Q11.2DS)  
Ariela Nachmany, Yehuda Finkelstein, Doron Gothelf

2:00 PM  | SELF-REPORTED SPEECH PROBLEMS IN ADOLESCENTS AND YOUNG ADULTS WITH 22Q11.2 DELETION SYNDROME  
Nicole Spruijt, Jacob Vorstman, Moshe Kon, Aebele Mink van der Molen

2:10 PM  | DISCUSSION

2:20 PM  | IRF6-RELATED MUTATIONS IN VAN DER WOUDEN SYNDROME AND POPULITEAL PTERYGIUM SYNDROME FAMILIES FROM NIGERIA AND ETHIOPIA

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**FRIDAY, March 28, 2014**

**Concurrent Specialty Sessions**
FRIDAY, March 28, 2014

**Concurrent Specialty Sessions**

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**Azeez Butali**, Peter Mossey, Wasiu Adeyemo, Mekonen Eshete Abebe, LauRén Gaines, Ramat Braimoh, Babatunde Aregbesola, Christian Emeka, Jennifer Rigdon, Fikre Abate, Jeffrey Murray

2:30 PM

**Positive Screening for Obstructive Sleep Apnea in Children with Syndromic Cleft Lip and Palate**

*Jason Silvestre*, J. Thomas Paliga, Youssef Tahiri, Scott Bartlett, Jesse Taylor

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2:40 PM

**A 35-Year Experience with Syndromic Cleft Palate Repair: Operative Outcomes and Long-Term Speech Results**

*Marten Basta*, Jason Silvestre, Cynthia B. Solot, Marilyn Cohen, Elaine Zackai, Donna McDonald-McGinn, Richard Kirschner, David W. Low, Don LaRossa, Oksana Jackson

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2:50 PM

**Discussion**

3:00 PM

**Poster Session E, Exhibits, Coffee Break**

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FRIDAY, March 28, 2014

**Concurrent Specialty Sessions (Group 3)**

3:30 PM-5:00 PM

**Concurrent 11 — Craniosynostosis**

*Room: Marriott 6*

**Goal:** To provide a forum for the discussion of the clinical care of infants with craniosynostosis.

**Objective:** Attendees will be able to discuss at least three aspects of the evaluation and surgical management of infants with craniosynostosis.

**Session Chair:** Kant Y.K. Lin, MD

**Session Co-Chair:** Roberto Flores, MD

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3:30 PM

**Dural Tears in Craniosynostosis Repair Are More Common in Patients with Unicoronal Craniosynostosis**

*Alexander Lin*, Michael Del Core, Jonathan Kneib, Mark Markarian, Raghuram Sampath, Samer Elbabaa

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3:40 PM

**Facial Asymmetry in Children Surgically Treated for Unicoronal Synostosis in Infancy**

*Louise Owall*, Tron A. Darvann, Per Larsen, Hanne Dahlgaard Hove, Nuno V. Hermann, Lars Bøgeskov, Sven Kreiborg

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3:50 PM

**Evaluating the Efficacy of Airway Expansion Using Transcranial Versus Subcranial Facial Osteotomies: A Cohort Comparison Study Between Monobloc Frontofacial Advancement and Le Fort III Facial Advancement**

*Oluwaseun Adetayo, S. Alex Rottgers, Lino Miele, Zoe MacIsaac, Edward Davidson, Anand Kumar*

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4:00 PM

**Optimizing Treatment of Sagittal Synostosis Using Dynamic Cranioplasty: A Cohort Comparison Study Between Reverse PI Cranioplasty and Extended Strip Cranioplasty**

*S. Alex Rottgers*, Christopher Bonfield, Zoe MacIsaac, Ian Pollack, Mandeep Tamber, Anand Kumar

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4:10 PM

**Discussion**

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4:20 PM

**Open Strip Cranietomy, Total Cranial Vault Reconstruction, and Endoscopic Strip Cranietomy: A Retrospective Study Including Cost Analysis**

*Maria Helena Lima*, Sarah Garber, Barbu Gociman, Jay Riva-Cambrin, Faizi Siddiqi

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4:30 PM

**Is the Need for Cranioplasty Dependent Upon Pattern of Craniosynostosis?**

*Lisa Morris*, Louis Morales, Rodney E. Schmelzer

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4:40 PM

**An Evaluation of a Novel Craniofacial Skills Laboratory Curriculum: An Aid to Plastic Surgery Resident Milestone Achievement**

*Sameer Shakir*, Nicole Jarrett, Anand Kumar

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4:50 PM

**Discussion**

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**Concurrent 12 — Speech Surgery/VPD**

*Room: Marriott 5*

**Goal:** To provide a forum for discussion of research, diagnostic, and surgical techniques for the management of velopharyngeal insufficiency.

**Objective:** Attendees will be able to discuss at least three different evaluation and treatment techniques for the management of individuals with velopharyngeal insufficiency.

**Session Chair:** Jamie Perry, PhD, CCC-SLP

**Session Co-Chair:** Sherard Tatum, MD

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3:30 PM

**Adult Quality of Life Post Cleft Palate Repair: A Comparison of Two Techniques**

*Rachel Skladman*, Lynn Graves, Gary Skolnick
3:40 PM
**10 YEAR EXPERIENCE OF SURGICAL TREATMENT OF VELOPHARYNGEAL INSUFFICIENCY IN THE PATIENT WITHOUT A CLEFT PALATE**
*Michael Golinko, Sameer Kapadia, Katie Nett, Kazlin Mason, Joseph Williams*

3:50 PM
**SPEECH OUTCOME FOLLOWING TONGUE REDUCTION SURGERY IN CHILDREN WITH BECKWITH-WIEDEMANN SYNDROME**
*Renee Diomis, Earl Gage, Dana Kiley, Jeffrey Marsh*

4:00 PM
**PROSTHETIC OBTURATORS FOR MANAGEMENT OF VELOPHARYNGEAL DYSFUNCTION (VPD)**
*Barbara Sheller, Steve Tseng, Linda Eblen, Elizabeth Velan, JoAnna Scott*

4:10 PM
**DISCUSSION**

4:20 PM
**THREE-DIMENSIONAL COMPUTER SIMULATIONS DEMONSTRATE THAT INCREASING SURGICAL OVERLAP OF THE LEVATOR VELI PALATINI IMPROVES VELOPHARYNGEAL CLOSURE**
*Silvia Blemker, Josh Inouye, Catherine Pelland, Kant Y.K. Lin, Kathleen Borowitz*

4:40 PM
**A MATHEMATICAL MODEL PREDICTS THAT ANATOMICAL VARIABILITY INFLUENCES THE EFFICACY OF PALATE REPAIR PROCEDURES**
*Joshua Inouye, Jamie Perry, Jillian Nysswonger, Catherine Pelland, Kant Y.K. Lin, Kathleen Borowitz, Silvia Blemker*

4:50 PM
**DISCUSSION**

**CONCURRENT 13 — DEFORMATIONAL PLAGIOCEPHALY**
Room: Marriott 9-10

**Goal:** To provide a forum for the discussion of the diagnosis, evaluation, and management of infants with deformational plagiocephaly.

**Objective:** Attendees will be able to describe at least three methods for the evaluation and treatment of infants with deformational plagiocephaly.

**Session Chair:** Alex Kane, MD
**Session Co-Chair:** Yvonne Gutierrez, MD

3:30 PM
**LONG-TERM HEAD SHAPE AFTER TREATMENT FOR DEFORMATIONAL PLAGIOCEPHALY: A LONGITUDINAL COHORT STUDY**
*Sybill Naidoo, An-Lin Cheng*

3:40 PM
**THE EFFECT OF TORTICOLLIS ON HELMET THERAPY FOR DEFORMATIONAL PLAGIOCEPHALY**
*Alexander Lin, Emma Kulig, Sarah Donigian, Chelsea Horwood*

3:50 M
**DIAGNOSTIC YIELD OF CERVICAL RADIOGRAPHS IN INFANTS WITH DEFORMATIONAL PLAGIOCEPHALY**
*Min-Jeong Cho, Loa Borchert, Alex Kane*

4:00 PM
**DEFORMATIONAL SCAPHOCEPHALY RESULTS IN INCREASED THERAPY DURATION AND LESS EFFECTIVE CRANIAL INDEX CORRECTION THAN OTHER TYPES OF DEFORMATIONAL PLAGIOCEPHALY**
*Alexander Lin, Emma Kulig, Sarah Donigian, Chelsea Horwood*

4:10 PM
**DISCUSSION**

4:20 PM
**LONG-TERM SATISFACTION AND PARENTAL DECISION MAKING ABOUT TREATMENT FOR DEFORMATIONAL PLAGIOCEPHALY**
*Sybill Naidoo, An-Lin Cheng*

4:30 PM
**A COMPARISON OF DIRECT AND DIGITAL MEASURES OF CRANIAL VAULT ASYMMETRY FOR ASSESSMENT OF PLAGIOCEPHALY**
*Gary Skolnick, Sybill Naidoo, Kamlesh Patel, Albert Woo*

4:40 PM
**AGE OF INITIATION OF HELMET THERAPY FOR DEFORMATIONAL PLAGIOCEPHALY DOES NOT SIGNIFICANTLY AFFECT TREATMENT DURATION, CORRECTION RATE, OR FINAL OUTCOME**
*Alexander Lin, Emma Kulig, Sarah Donigian, Chelsea Horwood*

4:50 PM
**DISCUSSION**

**CONCURRENT 14 — NURSING**
Room: Marriott 3-4

**Goal:** To provide an educational forum for the discussion of infant nutritional assessment and the improvement of patient-centered outcomes through nursing research.

**Objective:** Attendees will be able to identify infants with clefts who are at risk for poor weight gain, and to discuss a preliminary design for a nursing research study which could evaluate initial nutritional interventions for the infant with a cleft.

**Session Chair:** Patricia Chibbaro, RN, MS, CPNP
**Session Co-Chair:** Patricia Terrell, MSN, CPNP
FRIDAY, March 28 and SATURDAY, March 29 2014

Specialty Sessions/General Sessions

SATURDAY, March 29, 2014

7:30 AM-5:00 PM
REGISTRATION, SPEAKER READY ROOM OPEN

CONCURRENT GENERAL SESSIONS (Group 2)
8:00 AM-10:00 AM

SESSION E: ETIOLOGY, OUTCOMES, QUALITY OF CARE II
Room: Marriott 6

Goal: To expose attendees to the state-of-the-art research in the etiology of cleft and craniofacial conditions, outcomes, and improvement of quality of care for individuals with orofacial cleft or craniofacial anomalies.

Objective: Attendees will be able to identify the contemporary contributions of three or more disciplines to the diagnosis, treatment, and improvement in care for individuals with orofacial cleft or craniofacial conditions.

Session Chair: Adriane Baylis, PhD, CCC-SLP
Session Co-Chair: Patricia Glick, DMD, MS

8:00 AM
THE TWO-ALTERNATIVE FORCED-CHOICE PARADIGM: THE MODERN Q-SORT
Rollin Reeder, Kevin Calder, Maryanne Koech, William Magee
SESSION F: ASCFS DYNAMIC FORCE ON THE SKULL FOR TREATMENT OF SYNOSTOSIS PANEL

8:00 AM-10:00 AM
Room: Marriott 5

Goal: To expose attendees to a debate style discussion among panelists on the current role of dynamic forces to treat the skull anomaly of craniosynostosis.

Objective: Attendees will be able to understand the indications and contraindications for the use of distraction osteogenesis in the treatment of patients with single suture and multiple suture craniosynostosis. Attendees will be able to understand the technical differences of using spring compared to distraction devices to exert dynamic forces on the cranial skeleton for the treatment of craniosynostosis.

Session Chair: Richard A. Hopper, MD, MS

158 THE ROLE OF DISTRACTION OSTEOGENESIS IN THE MANAGEMENT OF CRANOSYNOSTOSIS: A SYSTEMATIC REVIEW
Owen Johnson

157 EARLY EXPERIENCE WITH 30 CASES OF ENDOSCOPIC SPRING ASSISTED SURGERY FOR SAGITTAL CRANIOSYNOSTOSIS
Lisa David

ANTERIOR DISTRACTION FOR UNILATERAL CORONAL SYNOSTOSIS - AN EARLY EXPERIENCE
Jesse Taylor

EARLY MONOBLOC DISTRACTION — WHAT ARE THE INDICATIONS?
Richard Hopper

PANEL DISCUSSION
Owen Johnson, Lisa David, Jesse Taylor, Richard Hopper

10:00 AM-10:30 AM Break

10:30 AM-12:00 PM

CLOSING GENERAL SESSION: BACK OF THE BOOK
Have you ever wondered what happens to all of those great ideas that our members jot down in the back of their program books during the national meeting? Come join us for an open forum discussion of these too-often-forgotten pearls of wisdom, insight, and collaborative opportunity in our first-ever “Back of the Book Forum.”
POSTER SESSIONS

WEDNESDAY, March 26 thru FRIDAY, March 28, 2014

POSTER SESSION
March 26-28, 2014
Room: Marriott Foyer

There will be five poster sessions (sessions A through E). Two (2) sessions are scheduled per day except Thursday. On Wednesday, Poster Session A will run from 7:00 AM-1:00 PM, and Poster Session B will run from 1:30 PM-6:30 PM. On Thursday, Poster Session C will run from 7:00 AM-6:30 PM. And on Friday, Poster Session D will run from 8:00 AM-12:30 PM, and Poster Session E will run from 1:00 PM-5:30 PM. The posters will be located in the Marriott Foyer.

Goal: To create a discussion-based visual forum for exchanging new findings in interdisciplinary research, team care, assessment, and treatment of individuals with orofacial cleft or other craniofacial conditions.

POSTER SESSION A
WEDNESDAY, MARCH 26
7:00 AM-1:00 PM

1. A NOVEL METHOD OF PHOTOGRAMMETRY AND ANALYSIS OF FACIAL AND NASAL LANDMARKS FOLLOWING CLEFT LIP/PALATE REPAIR
Rebecca Barnett, Kristen Aliano, Rachel Ruotolo

2. WHAT TO DO WHEN PEOPLE STARE WORKSHOP: TEACHES INDIVIDUALS WITH DISFIGURING CONDITIONS TO CONTEND WITH STARING AND TAKE MORE CONTROL OF SOCIAL INTERACTIONS
Patricia Charlene Pell

3. PUBLIC AWARENESS OF CLEFT PALATE IN DULUTH AND SURROUNDING AREAS
Michelle Marnich, Dana Collins, Linda Vallino

4. PAIN MANAGEMENT IN ALVEOLAR BONE GRAFTING SURGERY
Kaitlyn Paine, Anthony Taglianti, Anthony Wilson, Michael Mirzabiegi, David W. Low, Jesse Taylor, Scott Bartlett, Oksana Jackson

5. READING ACHIEVEMENT, NEUROPSYCHOLOGICAL SKILLS, AND NEUROCIRCUITRY IN BOYS WITH NON-SYNDROMIC CLEFT PALATE ONLY
Amy Conrad, Peg C. Nopoulos, Lynn Richman

6. DIFFERENTIAL GENE EXPRESSION OF CALVARIAL COMPARTMENTS WITH DIFFERENT EMBRYONIC ORIGINS
Negar Homayounfar, Sarah Park, Michael Cunningham

7. DESIGN AND FABRICATION OF A NOVEL CAD/CAM SURGICAL GUIDES COMBINED WITH SINGLE-SPLINT TECHNIQUE FOR CLEFT-ORTHOGNATHIC SURGERY
Chien-Hsuan Wang, Hsiu-Hsia Lin, Sam Sheng-Pin Hsu, YaFang Chuang, Lun-Jou Lo

8. CRANIOFACIAL TRAINING FOR CLEFT TEAM SLPS: A MODEL FOR SLP EDUCATION AND EXPANDING ACCESS TO SPEECH THERAPY SERVICES
Katie Garcia, Adriane Baylis

9. THE EFFECTS OF ANCHORS ON THE RELATIONSHIP BETWEEN NASALITY RATINGS AND NASALANCE SCORES
Kristine Galek, Thomas Watterson

10. RENAL AND SPINE SCREENING IN SUB-PHENOTYPIC POPULATIONS OF PATIENTS WITH CRANIOFACIAL MICROsomia
Laura Stueckle, Babette Saltzman, Daniela Luquetti, Anne Hing, Kelly Evans

11. HOW AN AUDIT INTO THE AGE AT WHICH CHILDREN WITH CLEFTS STOP USING A BOTTLE TO DRINK HAS LED US TO A NEW STRATEGY FOR ENCOURAGING THEM TO STOP BY THE RECOMMENDED 12 MONTHS
Jacqueline Smallridge, Susan O’Connell

12. THE EFFECTIVENESS OF PARENT-IMPLEMENTED INTERVENTION FOR YOUNG CHILDREN WITH CLEFT PALATE
Seungeun Jung, Heewon Moon, Kyung S. Koh

13. FEEDING OUTCOMES FOLLOWING MANDIBULAR DISTRACTION OSTEOSTEMESIS IN PIERRE ROBIN SYNDROME
Katherine Rose, John Girotto

14. RACIAL/ETHNIC DIFFERENCES IN BULLYING, AGGRESSION, AND SOCIAL SUPPORT AMONG SCHOOL-AGE CHILDREN IN A PEDIATRIC CRANIOFACIAL CLINIC
Dailyn Martinez, Lauren Smith, Crista Donewar, Celia Heppner

15. FACIAL SOFT-TISSUE ASYMMETRY IN 3D CONE BEAM COMPUTED TOMOGRAPHY IMAGES OF CHILDREN WITH SURGICALLY CORRECTED UNILATERAL CLEFTS
John Starbuck, Ahmed Ghoneima, Katherine Kula
16. **DELETIONS OF EFTUD2 IN PATIENTS WITH FACIAL DYSOSTOSIS: A USEFUL CONSIDERATION IN A DIFFERENTIAL DIAGNOSIS**  
   Julie Kaylor, Larry Hartzell, Yuri Zarate, Lauren Kilpatrick

17. **EXPLORING COMMUNICATION ATTITUDE AND ITS RELATIONSHIP TO COMMUNICATION APPREHENSION, AND SPEECH SEVERITY IN CHILDREN WITH VELOPHARYNGEAL INSUFFICIENCY (VPI)**  
   Agnieszka Dzioba, Philip Doyle, Elizabeth Skarakis-Doyle, Murad Husein, R. Anne Dworschak-Stokan

18. **QUANTIFICATION OF MAXILLARY SINUSITIS IN UNILATERAL CLEFT LIP AND PALATE**  
   John Starbuck, Lindsay Hale, Ahmed Ghoneima, Katherine Kula

19. **CRANIAL BASE IN HEMIFACIAL MICROsomia: AN OBJECTIVE CRANIOMETRIC ANALYSIS**  
   Youssef Tahiri, J. Thomas Paliga, Scott Bartlett, Jesse Taylor

20. **IMPACT OF VISIBILITY ON PSYCHOSOCIAL FUNCTIONING AMONG YOUTH WITH CRANIOFACIAL DIFFERENCES**  
   Jaee Bodas, Jennifer Rhodes, Ruth Trivelpiece

21. **IMPROVING MANDIBULAR ASYMMETRY ASSOCIATED WITH CONGENITAL MUSCULAR TORTICOLLIS USING AN EARLY INTERVENTION PROTOCOL**  
   Regina Fenton, Susan Gaetani, S. Alex Rottgers, Lorelei Grunwaldt, Anand Kumar

**POSTER SESSIONS**  
**WEDNESDAY, MARCH 26 1:30 PM-6:00 PM**

1. **POSTERIOR CRANIAL VAULT ASYMMETRY IN LAMBOID CRANIOSYNOSTOSIS AFTER OPEN AND ENDOSCOPIC REPAIR**  
   Ema Zubovic, Albert Woo, Gary Skolnick, Sybill Naidoo, Matthew Smyth, Kamlesh Patel

2. **VOLUMETRIC COMPARISON OF MAXILLARY SINUSES IN PATIENTS WITH UNILATERAL CLEFT**  
   Luiz Pimenta, Henrique Pretti, Jason Roberts, Christine Klatt-Cromwell, Brent Golden, Amelia Drake

3. **EXPERIENCE WITH THE ORTICOCHOEA SPHINETERIC PHARYNGOPLASTY IN OVER 200 PATIENTS**  
   Regina Fenton, Anne McGillivary, Triona Sweeney

4. **THE PATH OF THE SUPERIOR SAGITTAL SINUS IN UNICORONAL SYNOSTOSIS**  
   Aaron Russell, Kamlesh Patel, Gary Skolnick, Matthew Smyth, Albert Woo

5. **COMPARATIVE EVALUATION OF NASOPHARYNGEAL AIRWAYS OF UNILATERAL CLEFT LIP AND PALATE PATIENTS USING THREE-DIMENSIONAL METHOD**  
   Henrique Pretti, Omri Emodi, Amelia Drake, Emile Rossouw, David Zajac, John Van Aalst, Luiz Pimenta

6. **USING SYNCHRONIZED AUDIO MAPPING TO PREDICT VELAR AND PHARYNGEAL WALL LOCATIONS DURING DYNAMIC MRI SEQUENCES**  
   Pooya Rahimian, Jamie Perry, Nasseh Tabrizi

7. **INTEGRATING THREE-DIMENSIONAL DIGITAL DENTAL MODEL INTO CRANIOFACIAL SKULL COMPUTED TOMOGRAPHY BY AUTOMATIC SUPERIMPOSITION OF INTRA-ORAL FIDUCIAL MARKERS**  
   Wei-Min Yang, Cheng-Ting Ho, Huey-Ling Chen, Sam Sheng-Pin Hsu, Ellen Wen-Ching Ko, Lun-Jou Lo

8. **CHANGES IN MANDIBULAR PROXIMAL SEGMENT AFTER SURGICAL CORRECTION OF MANDIBLE DEVIATION AND THE RELATION WITH MANDIBULAR FUNCTIONAL ALTERATION**  
   Ellen Wen-Ching Ko, Chiung Shing Huang, Abdelmounem Issam

9. **VELOPHARYNGEAL INSUFFICIENCY IN CHILDREN WITH PRADER-WILLI SYNDROME AFTER ADENOTONSILLECTOMY**  
   David Crockett, Saqib Ahmed, Derrick Sowder, Steven Goudy

10. **SENSORY RETRAINING FACILITATES SENSORY RECOVERY AFTER BILATERAL SAGITTAL SPLIT OSTEOOTOMY — PRELIMINARY STUDY**  
    Yea Ling Yang, Chiung-Shing Huang, Yu-Ray Chen

11. **CRANIOFACIAL AND DENTAL DEVELOPMENT IN CARDIO-FACIO-CUTANEOUS (CFC) AND COSTELLO SYNDROME (CS)**  
    Alice Goodwin, Snehlata Oberoi, Maya Londan, Cyril Charles, Jessica Massie, Cecilia Fairley, Katherine Rauen, Ophir Klein
12. **EFFECTS OF NASOALVEOLAR MOLDING (NAM) ON INFANT GROWTH VELOCITY AND TIMING OF PRIMARY BILATERAL CLEFT LIP REPAIR**  
*Michael Pharaon, Jeyhan Wood, Jesse Goldstein, Pedro Santiago, John Van Aalst*

13. **EFFECTS OF NASAL ALVEOLAR MOLDING (NAM) ON INFANT WEIGHT GAIN AND TIMING OF PRIMARY UNILATERAL CLEFT LIP REPAIR**  
*Jeyhan Wood, Michael Pharaon, Ipek Cakmak, Sedat Cakmak, Jesse Goldstein, Pedro Santiago, John Van Aalst*

14. **STOP-GAP DURATION OF PERSIAN PLOSIVES IN MID AND FINAL WORD POSITIONS IN THE SPEECH OF CHILDREN WITH CLEFT LIP AND PALATE**  
*Marziye Eshghi, David Zajac, Mahmood Bijankhan, Sheila Pratt*

15. **VOICE ONSET TIME OF PERSIAN WORD-INITIAL PLOSIVES IN CHILDREN WITH CLEFT LIP AND PALATE**  
*Marziye Eshghi, David Zajac, Mahmood Bijankhan*

16. **NASAL CHANGE WITH MAXILLARY REPOSITIONING: A NOVEL THREE-DIMENSIONAL CT-BASED METHOD FOR ASSESSMENT**  
*Belinda Daniel, Linping Zhao, David Morris*

17. **CURVILINEAR BONE TRANSPORT OSTEOGENESIS DEVICES FOR TREATMENT OF LARGE CALVARIAL DEFECTS: AN ALTERNATIVE TO CONVENTIONAL CALVARIAL RECONSTRUCTION AND LINEAR BONE TRANSPORT IN A PRE-CLINICAL SHEEP MODEL**  
*Nadya Clarke, Jason Wink, Patrick Gerety, Ramzi Sherif, Gregory Heuer, J. Thomas Paliga, Hyun-Duck Nah, Jesse Taylor*

18. **MINIMAL ACCESS CRANIAL VAULT REMODELING FOR SAGITTAL CRANIOSYNOSTOSIS: ANALYSIS OF SURGICAL RESULTS AND ESTHETIC OUTCOMES**  
*M. Barbara Honnebier, Chunqiao Luo, Todd Nick, Rongsheng Cai, Eylem Ocal, Gregory Albert*

19. **OPERATIVE AND POST-OPERATIVE OUTCOMES FOLLOWING USE OF DENTO MAXILLARY APPLIANCE FOR INFANT ORTHODONIC TREATMENT IN PATIENTS WITH UNILATERAL COMPLETE CLEFT LIP AND PALATE**  
*Veerasathpurush Allareddy, Min Kyeong Lee, Elizabeth Ross, Richard A. Bruun, Stephen Shusterman*

20. **CONNECTING FAMILIES PEER TO PEER MENTOR PROGRAM**  
*Lisa Repaske*

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**POSTER SESSION C**  
**THURSDAY, MARCH 27**  
7:00 AM-6:00 PM

1. **THE ROLE OF DISTRACTION OSTEOGENESIS IN THE SURGICAL MANAGEMENT OF CRANIOSYNOSTOSIS: A SYSTEMATIC REVIEW**  
*Owen Johnson III, Anne Tong Jia Wei, Christopher Wallner, Amir H. Dorafshar*

2. **AN INVESTIGATION OF RELATIONSHIP BETWEEN ARTICULATION AND MOTOR COORDINATION IN INDIVIDUALS WITH UCLP**  
*Chihiro Sugiyama, Kanji Nohara, Akemi Hikage, Ayako Hishikawa, Etsuko Takai, Mikihiro Kogo, Takayoshi Sakai*

3. **SPECTRAL ANALYSIS OF WORD-INITIAL /S/ AND /SH/ IN PERSIAN SPEAKING CHILDREN WITH BILATERAL CLEFT LIP AND PALATE AND MAXILLARY COLLAPSE**  
*Marziye Eshghi, David Zajac*

4. **CHILDREN BORN WITH CLEFT LIP AND PALATE DEFORMITIES EXPERIENCE FELT, INTERNALIZED, ENACTED, FELT NORMATIVE, AND SYMBOLIC STIGMA**  
*Wasiu Adeyemo, Olutoye James, Azeez Butali, Mobolanle O. Ogunlewe, Akinola L. Ladeinde*

5. **SECONDARY CRANIAL VAULT REMODELING WITH DISTRACTION**  
*Christian Albert El Amm, Omar Beidas, Wyatt Ho, Thomas Howard, Aaron Morgan*

6. **LEVATOR VELI PALATINI MUSCLE MORPHOLOGY IN ADULTS WITH REPAIRED CLEFT PALATE**  
*Jillian Nyswonger, Jamie Perry*

7. **APPLICATION OF GAME-BASED 3D SCANNING IN CRANIOFACIAL ANALYSIS**  
*Christian Albert El Amm, John Dyer, Ian Le*
8. EVALUATION OF VENTILATION TUBE PLACEMENT AND AUDIOLOGIC OUTCOME IN CHILDREN WITH CLEFT PALATE
Elissa Kim, Milan Dang-Vu, Daniela Carvalho, Marilyn Jones, Taz Zhou, Jennifer Cui, Aline Yaghsezian, David Chang, Amanda Gosman

9. INTERNAL CAROTID ARTERY VARIATIONS IN VELOCARDIOFACIAL SYNDROME PATIENTS AND IT’S IMPLICATIONS FOR SURGERY
Baek-kyu Kim, Rongmin Baek

10. MIDFACE GROWTH FOLLOWING SEVERE PEDIATRIC FACIAL TRAUMA: A CEPHALOMETRIC STUDY
Edward Davidson, Lindsay Schuster, Sanjay Naran, Anand Kumar, Joseph Losee

11. EFFECTIVENESS OF DYNACLEFT FOR PRESURGICAL ORTHOPEDICS FOR PATIENTS WITH UNILATERAL CLEFT LIP AND PALATE
LaQuia Walker, Roberto Flores, George Eckert, Marvin Thomas

12. FACTORS INFLUENCING TIMING OF ALVEOLAR BONE GRAFTING SURGERY: CURRENT PRACTICES AND PATIENT OUTCOMES
Anthony Wilson, Kaitlyn Paine, Anthony Taglienti, Michael Mirzabiegi, Rosario Mayro, Kristen Lowe, David W. Low, Jesse Taylor, Scott Bartlett, Oksana Jackson

13. RELATIONSHIPS AMONG BULLYING AND OTHER PSYCHOSOCIAL FACTORS IN CHILDREN WITH CRANIOFACIAL CONDITIONS
Lauren Smith, Dailyn Martinez, Celia Heppner, Crista Donewar

14. PRIMARY NOSE REPAIR IN UNILATERAL CLEFT LIP PATIENTS: “CLOSED TRIPLE SUTURE” TECHNIQUE
Ozhan Celebiler, Hakan Şirinoğlu, Burak Ersoy, Ayhan Numanoglu

15. DEVELOPMENT OF A SMARTPHONE APPLICATION FOR PATIENTS WITH CLEFT LIP & PALATE AND THEIR FAMILIES
Vejas Sinuk, Jeongeun Kim, James G. Boram Kim, Yeram Jang, Kiwhan Ahn, Sukwha Kim

16. TREATMENT OF CLINICAL CONGENITAL ANOPHTHALMIA WITH AN INTRA-ORBITAL EXPANDER
Brad Morrow, William Albright, Rogerio Neves, Michael Wilkinson, Thomas Samson
**Poster Sessions**

**WEDNESDAY, March 26, 2014 thru FRIDAY, March 28, 2014**

5. **MSX1 GENE C330T (P. G119G) AND G817T (P. G273C) POLYMORPHISMS IN TYPICAL ADULT SUSTAINED VOWELS IN TYPICAL ADULT SPEAKERS: PREVALENCE AND POTENTIAL CAUSES**
   **Catherine Hearit**, Helen Sharp, Stephen Tasko, Gregory Flamme

6. **REDUCTION OF FACIAL SWELLING AFTER ORTHOGNATHIC SURGERY: A RANDOMIZED CONTROLLED TRIAL COMPARING TWO DIFFERENT DOSES OF DEXAMETHASONE**
   **Sun Goo Kim**, Hye-Young kim, Lun-Jou Lo

7. **THE FUNCTION OF IRF6 IN TGFB3-DEPENDENT PALATAL FUSION**
   **Chen-Yeh Ke**, Ho Ying, Mei-Chun Pan, Fen-Hwa Wong, Lun-Jou Lo

8. **DIGITAL IMAGING ANALYSIS OF NASOPHARYNGOSCOPY: ADVANCING THE SCIENCE OF MEASURING VELOPHARYNGEAL FUNCTION FOR SPEECH**
   **Angela Chen**, Caitlin Cummings, Adriane Baylis

9. **INTERNET SEARCHES: THE READABILITY OF INFORMATION RELATED TO PARENTING OF A CHILD WITH A CLEFT**
   **Farnaz Kar**, Nanci De Felippe

10. **CRANIOFACIAL MICROSOMIA: INVESTIGATING SPEECH OUTCOMES**
    **Sara Kinter**, Babette Saltzman, Carrie Heike

11. **VALIDATION OF 3D GAND CLASSIFICATION OF LESSER SEGMENT CONSIDERING THE VOLUMETRIC SHAPE OF THE ALVEOLAR CLEFT**
    **Gabriella de Rezende Barbosa**, Henrique Pretti, Omri Emodi, John van Aalst, Solange Almeida, Donald Tyndall, Luiz Pimenta

12. **GROWTH AND PUBERTY OF PATIENTS WITH CLEFT PALATE FROM 10 TO 18 YEARS OLD**
    **Maria Cristina Cres**, Ilza Marques

13. **COMPUTED TOMOGRAPHIC GENERATED ANTHROPOMETRIC MEASUREMENTS OF ORBITAL RELATIONSHIPS IN NORMAL INFANTS AND CHILDREN**
    **Garrett Pool**, Matthew Lewis, Ryne Didier, Dianna Bardo, Anna Kuang

14. **GENETIC MEDICINE IN THE MULTIDISCIPLINARY CLEFT CLINICS: A PERSONALIZED MEDICINE APPROACH TO OPTIMIZE DIAGNOSIS, MANAGEMENT AND REVENUE**

15. **UNSTEADY NASALANCE TRACES AMONG SUSTAINED VOWELS IN TYPICAL ADULT SPEAKERS: PREVALENCE AND POTENTIAL CAUSES**
    **Catherine Hearit**, Helen Sharp, Stephen Tasko, Gregory Flamme

16. **MEMORY, LANGUAGE AND COGNITIVE FUNCTIONS OF CHILDREN WITH CLEFT LIP AND PALATE**
    **Matheus Tabaquim**, **Márcia Ferro**, Ana Vera Niquerito, Ana Paula Razera

17. **SCREENING FOR OBSTRUCTIVE SLEEP APNEA IN CHILDREN TREATED AT A MAJOR CRANIOFACIAL CENTER**
    **Jason Silvestre**, J. Thomas Paliga, Youssef Tahiri, Scott Bartlett, Jesse Taylor

18. **ANALYSIS OF THE PERCENTAGE OF PATIENTS RETURNING FOR CLEFT PALATE REPAIR FOLLOWING CLEFT LIP REPAIR**
    **Nicholas Sinclair**, Michael Capata, Alex Campbell, Bjorn Schonmeyr, Lisa Wendby, Donald Loub

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**POSTER SESSION E**

**FRIDAY, MARCH 28**

**1:00 PM-5:00 PM**

1. **THE MATERNAL RISK FACTORS FOR CLEFT LIP WITH OR WITHOUT CLEFT PALATE IN THE PHILIPPINES**
   **Jonald Nadal**, Glenn Angelo Genuino, Bernard Tansipek
2. THREE-DIMENSIONAL COMPUTED TOMOGRAPHY ANALYSIS OF PHARYNX IN ADULT PATIENTS WITH UNREPAIRED ISOLATED CLEFT PALATE
Yi Xu

12. FORMATTING THE SURGICAL MANAGEMENT OF TESSIER CLEFTS 3 AND 4
Sobhan Mishra

3. COST ANALYSIS OF PALATAL REPAIR IN INTERNATIONAL ADOPTEES
Sandra Tomlinson-Hansen, Kaitlyn Paine, J. Paliga, Jesse Taylor

13. WHAT IS THE OPTIMAL AGE FOR CRANIAL VAULT REMODELING IN SYNDROMIC CRANIOSYNOSTOSIS? INSIGHTS FROM THE JOHNS HOPKINS EXPERIENCE

4. EFFECT OF SURGICAL TECHNIQUE ON MAXILLARY GROWTH IN PATIENTS WITH UNILATERAL CLEFT LIP AND PALATE: A SYSTEMATIC REVIEW
Steven Rueda, Gaby Doumit

14. INTER- AND INTRA-EXAMINER RELIABILITY OF DIGITAL MODELS VS PLASTER DENTAL MODELS USING HLD INDEX
Hussain Ebrahim, Stephen Yen, Hani Yousef

5. SAFETY OF IBUPROFEN IN POSTOPERATIVE PAIN AFTER PALATOPLASTY
Brandon Cardon, Robert Glade

15. ORTHODONTIC MANAGEMENT AND FACTORS AFFECTING TREATMENT OUTCOMES OF PERSONS BORN WITH OROFACIAL CLEFTS AT THE UNIVERSITY OF GHANA DENTAL SCHOOL
Merley Newman-Nartey, Paul Matondo

6. EFFECT OF LOUDNESS VARIATION ON VELOPHARYNGEAL FUNCTION IN CHILDREN WITH 22Q11.2 DELETION SYNDROME: A PRELIMINARY REPORT
Caitlin Cummings, Adriane Baylis, Rebecca McCauley

16. UTILIZING THE PARASCAPULAR FLAP TO ADDRESS PRUZANSKY III HYPOPLASTIC MANDIBLES: SURGICAL OUTCOMES OF 7 PATIENTS
Scott Rapp, Anthony Vu, Brian Pan, Armando Uribe-Rivera, David A. Billmire, Christopher Gordon

7. PARENTAL AND CHILDREN’S SATISFACTION WITH CLEFT REPAIR AND RELATED ASPECTS IN MONGOLIA
Shagdar Batsukh, Myagmar Bat-Erdene, Bulgan Baasan, Bazar Amarsaikhan, Gomboasuren Davaa, Nagato Natsume, Ariuntuul Garidkhuu

17. POSTERIOR CRANIAL VAULT DISTRACTION IN A PATIENT WITH OSTEOPETROSIS AND PROGRESSIVE POSTNATAL PAN-CRANIOSYNOSTOSIS
Jason Pomerantz, Nirmal Nathan

8. CULTURE AND BELIEFS ON ETIOLOGY AND TREATMENT OF CLEFT LIP AND PALATE
Ejike Ezeja, Peter Okwerekhu, Nanci De Felippe

18. MANDIBULAR VOLUMETRIC INCREASE FOLLOWING DISTRACTION OSTEONEOGENESIS
Miles Pfaff, Philipp Metzler, Yunsoo Kim, Derek Steinbacher

9. SURGICAL ANATOMY OF THE FACIAL NERVE AND INFERIOR ORBITAL NERVE DURING MIDFACE CRANIOFACIAL APPROACHES
Gaby Doumit, Frank Popay

19. ARE POSTOPERATIVE DRAINS AND CIRCUMFERENTIAL HEAD WRAPS NECESSARY AFTER CRANIAL VAULT RECONSTRUCTION?
Lisa Morris, Louis Morales, Rodney E. Schmelzer

10. EXPERIMENTAL JUSTIFICATION OF APPLICATION OF A MEMBRANE FROM AN UMBILICAL CORD FOR REPLACEMENT OF DEFECTS OF THE JAW
Abduazim Yuldashev

20. ASSESSMENT OF ALVEOLAR BONE CLEFT GRAFTING USING SWAG TECHNIQUE IN THE CLEFT CARE CLINIC; EGYPT
Aliaa Khadre, Marwa elkassaby, Amr Ghaneim

21. FORMATTING THE SURGICAL MANAGEMENT OF TESSIER CLEFTS 3 AND 4
Sobhan Mishra

Withdrawn
ABSTRACTS

The Scientific Program Agenda lists abstract titles with the primary author listed first, followed by co-authors, if any. The presenter’s name is bolded.

All program planners, faculty, presenters, authors and relevant staff members are required to disclose any financial as well as professional or personal relationships that they could be affected by, or which could have an effect, on the content of the presentations. This information is requested during the planning and abstract submission process. Faculty members are required to declare disclosures, if any, at the beginning of his/her presentation.

Abstract numbers that are marked with an asterisk (*) indicate that an author or presenter disclosed commercial or industrial funding, consulting, or equity holdings, or personal relationship(s) potentially relevant to his or her presentation. Asterisks placed next to a session chair or co-chair name indicate these individuals had disclosures to report.

Otherwise, all remaining authors, presenters, and session chairs and co-chairs indicated they had nothing to disclose.

Disclosures for all participants can be found online at http://meeting.acpa-cpf.org/disclosures.html

For more information on disclosure policies and disclaimers, please refer to page 4 of this program.
COMMISSION ON APPROVAL OF TEAMS: REVIEW AND DISCUSSION OF THE TEAM APPROVAL PROCESS

David Kuehn, PhD

Contact Email: dkuehn@illinois.edu

A review and discussion of the team approval process moderated by the Commission on Approval of Teams. Members of teams that have applied for approval will have the opportunity to discuss the application, Standards and impact of the approval process.

Disclosure: Chair: Commission on Approval of Teams

JOURNAL MANUSCRIPT PREPARATION AND SUBMISSION

Jack Yu, MD, DMD, MSED

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This Eye Opener will be given by members of the “Cleft Palate-Craniofacial Journal” Editorial Board, Section Editors from a variety of disciplines will discuss what constitutes a good scientific manuscript, what kinds of manuscripts are accepted, and what is required by the “Cleft Palate-Craniofacial Journal.” Common problems in manuscript preparation and ways of avoiding them will be addressed.

Disclosure: Editor-in-Chief, Cleft Palate-Craniofacial Journal

THE AMERICLEFT PROJECT: GUIDELINES FOR PARTICIPATION IN COLLABORATIVE INTERCENTER OUTCOMES STUDIES

Ross Long, Jr, DMD, MS, PhD (1), Judith Trost-Cardamone, PhD (2), Kathy Chapman, PhD (3), Debbie Sell, PhD, (4), Adriane Baylis, PhD, CCC-SLP (5), Angela Dixon, MA (6), Kelly Nett Cordero, PhD, CCC-SLP (7), Cindy Dobbelsteyn, MSc (8), Anna Thurmes, MA, CCC (9), Kristina Wilson, PhD (10).

(1) Lancaster Cleft Palate Clinic, Lancaster, PA, (2) California State University at Northridge, Northridge, CA, (3) University of Utah, Salt Lake City, UT, (4) Great Ormond Street Hospital for Children NHS Foundation Trust, London, United Kingdom, (5) Nationwide Children’s Hospital, Columbus, OH, (6) Riley Hospital for Children at Indiana University Health, Indianapolis, IN, (7) Center for Craniofacial Services, St. Paul, MN, (8) Nova Scotia Hearing and Speech Centres, Halifax, NS, (9) University of Minnesota, Minneapolis, MN, (10) Texas Children’s Hospital, Houston, TX

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BACKGROUND & PURPOSE: The purpose of this eye opener is to 1) provide an update on the current status of the Americleft Project; 2) provide details about carrying out actual outcomes comparisons of internal quality assurance audits; 3) encourage participation by other individuals, centers, and disciplines; and 4) discuss the requirements necessary for other centers to collaborate and participate in the project. The presentation will include background information about the inception and growth of the project and progress made by the orthodontic group in the area of alveolar bone grafting. Information will also be provided about the progress made by the speech group in developing standard procedures for data collection and analysis and conducting reliability studies to allow for reliable rating of speech data. In addition to providing an update on progress with data collection across participating centers, goals for the next phase of the speech project will be presented.

METHODS: Will provide attendees with information for participation in intercenter outcome studies, based on the experiences of those who have successfully executed such studies as part of the Americleft Project. The steps to initiate those projects, records required and methodologies to insure scientifically valid and reliable comparisons will be discussed. Accomplishments to date will illustrate the benefits of these studies. Emphasis will be placed on the progress of the Americleft Speech Group.

VPD MANAGEMENT IN SYNDROMIC POPULATIONS: ASHA SIGS CHALLENGING CASES PANEL

Adriane Baylis, PhD, CCC-SLP (1), Angela Dixon, MA (2), Sara Kinter, MA, CCC-SLP (3), Kristen Deluca, MS, CCC-SLP (4).

(1) Nationwide Children’s Hospital, Columbus, OH, (2) Riley Hospital for Children at Indiana University Health, Indianapolis, IN, (3) Seattle Children’s Hospital, Seattle, WA, (4) N/A, Hollywood, FL

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BACKGROUND & PURPOSE: Speech outcomes are of paramount importance to members of cleft/craniofacial teams. Children with craniofacial syndromes pose a particular challenge to team members, especially for management of velopharyngeal dysfunction (VPD). Speech outcomes for syndromic populations have been widely reported to be less optimal than those of nonsyndromic populations with cleft palate/VPD. This section explores some of the more common syndromes associated with VPD and the decision-making process involved with the management of challenging cases of VPD in these syndromic populations. ASHA Special Interest Group 5, Speech Science and Orofacial Disorders, offers this case-based panel presentation based on surgeons, SLPs, and other ACPA attendees involved in management of VPD.

METHODS: The panel includes SLPs from various cleft/craniofacial teams in the US who are part of the ASHA SIGS Continuing Education Committee. They will present a variety of cases in syndromic populations including 22q11.2 deletion syndrome (velocardiofacial syndrome), Moebius syndrome, Neurofibromatosis, hemifacial microsomia, and Stickler syndrome. Syndromic-specific speech, velopharyngeal, medical, and other related factors will be discussed. Each stage of the diagnostic and treatment process will be reviewed including information on case history, diagnostic protocol and speech findings, instrumental assessment choices and findings, VP imaging studies, treatment options, and outcome. Both speech therapy and surgical treatment approaches will be presented, as well as other factors related to the child’s syndromic diagnosis (e.g., cardiac, cognitive, airway, etc.), which may influence treatment decision-making. Cases will be presented in both audio and video format and audience participation is strongly encouraged.

ORAL HEALTH RELATED QUALITY OF LIFE (OHQOL) AND SELF-RATED SPEECH IN CHILDREN WITH EXISTING FISTULAS IN MID-CHILDHOOD AND ADOLESCENCE

Barry Grayson, DDS (1), Pradip Shetye , DDS, MDS (2), Hillary Broder, PhD, MEd (3), Maureen Wilson-Genderndon, PhD (4), Ross Long, Jr, DMD, MS, PhD (5). (1) NYU Langone Medical Center, Dept. of Plastic Surgery, New York, NY, (2) New York University Institute of Reconstructive Plastic Surgery, New York, NY, (3) NYU College of Dentistry, New York, NY, (4) NYU, New York, NY, (5) Lancaster Cleft Palate Clinic, Lancaster, PA

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BACKGROUND & PURPOSE: Residual fistulas following primary cleft repair may impact patients’ speech and quality of life. Surgical repair is usually considered necessary by the cleft team, to improve speech and QOL. But surgery represents an additional burden to patients with little evidence that the benefits assumed by care providers, result in measurable changes from the patient’s perspective. The purpose of this investigation was to assess the OHQOL and self-rated speech in children who were candidates for fistula repair.

METHODS: 1199 children with clefts (mean age=11.6 years) from 6 centers participated in an observational study of QOL. Cross-sectional baseline data included cleft type, presence of alveolar cleft, previously repaired/unrepaired, and presence of fistulas. For this investigation, any communication between oral (palatal or labial) and nasal cavities was considered a fistula even if related to an unrepaired alveolar cleft. Presence of fistulas was examined in three groups: (1) alveolar cleft present-not previously repaired(n = 273); (2) alveolar cleft present-prerior surgical repair(n = 545); and (3) alveolar cleft (n = 381). At baseline, patients completed the Child Oral Health Impact Profile (COHIP). Frequency and chi-square tests were used to compare presence of fistulas between groups. Mean scores for patient-reported OHQOL and self-rated speech were compared within groups for presence/absence of fistula.

RESULTS: Fistulas were present in 11.4% of Group 1(n = 31), 4.4% of Group 2 (n = 24), and 1.8% of Group 3(n = 7) (χ2(2) = 30.6, p < 0.0001). Group 1 scores were significantly lower when fistula was present for functional(F(10, 357) = 6.44, p < .02)), socioemotional(F(10, 255) = 5.01, p < .03)), and school(F(10, 255) = 7.24, p < .01)) and the overall OHQOL COHIP score(f(10, 255) = 5.92, p < .02)). These participants also rated their speech as significantly different from their peers when fistula was present (F(10, 255) = 4.47, p < .05)). In Groups 2 and 3, only functional well-being for Group 3 was significantly different (F(10, 357) = 4.07, p < .05).

CONCLUSIONS: Comparisons between three groups revealed that alveolar cleft present-unrepaired had significantly higher fistula rate and lower OHQOL scores on all dimensions except for self-esteem and the highest ratings for speech difference.

DEMOGRAPHIC FACTORS ASSOCIATED WITH SURGICAL RECOMMENDATION AND QUALITY OF LIFE AMONG YOUTH WITH CLEFTS

Anine Rosenberg, PhD (1), Hillary Broder, PhD, MEd (2), Leanne Magee, PhD (3), Maureen Wilson-Genderndon, PhD (4). (1) University of Illinois Medical Center at Chicago, Chicago, IL, (2) NYU College of Dentistry, New York, NY, (3) The Children’s Hospital of Philadelphia, Philadelphia, PA, (4) NYU, New York, NY

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BACKGROUND & PURPOSE: Oral health-related quality of life (Qol) is an essential factor for determining treatment needs in youth with clefts and is also linked to surgical recommendations. This study sought to investigate demographic factors (i.e., race/ethnicity) associated with surgical recommendation and Qol in youth with clefts.

ABSTRACTS
METHODS: Data come from a five-year longitudinal study examining outcomes in youth (ages 7 to 18) with cleft and their caregivers. Participants were 1200 youth (43.28% female) recruited from six US cleft centers. They averaged 11.6 years old (sd=3.1), and 16.5% were recommended for surgery within one year. The majority of the sample was white (67.7%), 16% were Hispanic, 10.7% Asian, 9.7% Black/African American, and 11.8% other/mixed. At baseline, participants completed self-report questionnaires to assess demographic factors and QoL. QoL was assessed with the Child Oral Health Impact Profile (COHIP), a 34-item, self-report measure with five discrete subscales: Oral Health; Functional Well-being; Socio-Emotional Well-being; School; and Self-esteem. Surgeons also provided recommendations for surgery within a year time span.

RESULTS: Chi-square analyses revealed that more Hispanic youth (46%) were recommended for surgery within the year compared to non-Hispanic youth (34%). p<.004. Comparisons of racial differences showed that only 33% of white youth were recommended for surgery, compared to 48.7% of African-American and 41% of mixed-other race, p < 0.04. GLM models separately examined race and ethnicity differences in COHIP, controlling for age, gender, diagnosis (CP or CLP), and clinical rating of the severity of defect. Results showed significant racial differences across all subscales, except for self-esteem, such that African-American and other/mixed race participants reported lower QoL compared to other groups. Significant ethnicity differences were also observed across COHIP subscales, except for functional well-being, showing that Hispanic youth reported lower QoL compared to non-Hispanic participants.

CONCLUSIONS: Significant racial and ethnic differences were observed in QoL among youth with cleft. In addition, minority races/ethnicity youth were much more likely to have surgical needs than white youth. The importance of racial and ethnic differences when considering treatment needs of children with cleft will be discussed.

7 VISUAL-MOTOR FUNCTIONS AMONG SCHOOL AGE CHILDREN WITH AND WITHOUT SINGLE SUTURE CRANIOSYNOSTOSIS (SSC)
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BACKGROUND & PURPOSE: Children with SSC (cases) score lower than unaffected children (controls) on cognitive and motor measures in infancy. School age data suggest age IQs overall, with scores lower than controls. No studies have investigated visual-motor functioning: age 7 is a critical period for these skills. The purpose of this presentation is to examine the visual-motor performance of children with/without SSC and sub-group differences as a function of sex and SSC diagnosis.

METHODS: Data came from the age 7 assessment (mean age=7.4 years, SD=0.43) of children followed from infancy and included 166 cases (sagittal: N=75, metopic: N=48, unilateral coronal: N=43) and 152 controls. Visual-motor tests included the Beery-Buktenica Developmental Test of Visual Motor Integration (VMI), Visual Perception (VP) and Motor Coordination (MC), and the Purdue Pegboard Test (Purdue). Linear regression with robust standard errors was used to assess associations between visual motor skills and (1) case/control status; 2) case/control status by sex; and 3) affected suture. Case-control analyses were adjusted for maternal IQ, age at assessment, race, SES and when appropriate, sex of child; analyses for suture groups were adjusted for maternal IQ, age at assessment and sex of child.

RESULTS: Handedness in both groups matched population estimates (right-handed: 89% cases, 87% controls). Cases performed worse than controls on all measures, though differences were small and mostly statistically non-significant (p=0.03 to 0.70). In analyses by sex, both male and female cases scored lower than same-sex controls; however, differences were largest for male cases versus controls. Among cases, males performed worse than females on VMI and VP and on the Purdue Non-Preferred Hand, Both Hands, and Assembly (p’s=.08 to <.001). Children with sagittal SSC performed better with metopic and unilateral coronal SSC on the VMI (p=0.02, 0.03). For all SSC diagnoses, females outperformed males on all but two subscales.

CONCLUSIONS: Children with SSC evidenced modestly lower performance than controls on fine motor and visual motor measures. Case males demonstrated greatest vulnerability in visual perception, visual motor integration and bimanual hand function.

8 COMPARATIVE OUTCOMES OF TWO NASOALVEOLAR MOLDING TECHNIQUES FOR BILATERAL CLEFT NOSE DEFORMITY
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BACKGROUND & PURPOSE: Bilateral cleft nose deformity is increasingly being treated before primary repair with nasoalveolar molding (NAM). The Grayson technique starts nasal molding when the alveolar gap is reduced to 5 mm, while the Figueroa technique performs nasal and alveolar molding at the same time typically lengthening columella, but their comparative efficacy, efficiency, and incidence of complications have not been investigated.

METHODS: In this blinded, retrospective study of 58 patients with complete bilateral cleft lip-cleft palate, 27 received Grayson NAM and 31 received Figueroa NAM. Outcomes were compared by analyzing pretreatment and posttreatment facial photographs and clinical charts for efficacy (columella length ratio, alar width ratio, alar base width ratio, nostril shape, nasal tip angle, nasolabial angle, nasal base angle), efficiency (molding frequency), and incidence of complications (facial irritation, oral mucosal ulceration).

RESULTS: Grayson and Figueroa NAM did not differ in treatment efficacy for columellar length ratio (0.12±0.04 vs. 0.12±0.06), alar width ratio (1.19±0.13 vs. 1.21±0.12), alar base width ratio (1.13±0.16 vs. 1.15±0.16), nostril shape (0.30±0.07 vs. 0.32±0.16), nasal tip angle [118.5±24.4 deg vs. 119.0±23.1 deg], nasolabial angle (109.2±26.3 deg vs. 102.2±22.9 deg), and nasal base angle (40.6±8.4 deg vs. 35.4±11.2 deg) (all p>0.05). Grayson NAM was less efficient, i.e., required more adjustments (10.6±4.1 vs. 7.6±1.5, p=0.001), and had a higher incidence of oral mucosal ulceration (26% vs. 3%, p<0.05).

CONCLUSIONS: Both Grayson and Figueroa NAM similarly improve nasal deformities and reduce alveolar gaps; however, the Figueroa technique is associated with less oral mucosal complication and more efficiency.

9 VELOPHARYNGEAL OUTCOMES AT AGE SIX FOR THREE TYPES OF PALATOPLASTY
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BACKGROUND & PURPOSE: In 1989, The Cleft Palate and Craniofacial Journal published the first prospective surgical trial comparing two types of palatoplasty for velopharyngeal outcomes. That publication, and later follow up publications concerning that surgical cohort, indicated that there was no difference between the surgery types in need for secondary velopharyngeal management. In 1997, the primary investigator of that study altered the surgical procedure to a “radical intravelar veloplasty” as described by Cutting and Sommerlad. The purpose of this study was to evaluate the need for secondary velopharyngeal management in patients receiving the radical IVV, and compare the results to those obtained from the earlier prospective surgical trial.

METHODS: Charts of 71 patients who received the radical IVV by the same surgeon were reviewed. Patients were eliminated from the study using the same elimination criteria from the previous prospective trial (syndromes, developmental delay, dehiscence, sensorineural hearing loss, or palatoplasty after 18 months of age.) The remaining 54 Radical IVV outcomes were compared with outcomes of the 95 non-IVV and the 105 Krien’s IVV patients. Fisher’s Exact Test was employed to compare outcomes between the three groups. ANOVA (and Tukey's HSD post-hoc analysis) were used to compare the mean age at repair between the groups.

RESULTS: There was no significant difference in the proportions of different cleft types receiving the three different repairs (p = 0.202) ANOVA found significant differences between groups for age of repair, with the Radical cohort to be younger than both the non-IVV (p < 0.001) and the Krien’s cohorts (p = 0.006). There was no significant difference in the proportion of subjects requiring secondary surgery by age six following the three different repairs (p = 0.267), although the radical group trended lower (19%, vs. 26% and 31% for the non-IVV and Krien’s IVV respectively.) Additional analysis of hearing sensitivity data at age three revealed better hearing in the Radical group.

CONCLUSIONS: Although there was a trend for the radical IVV patients to require secondary velopharyngeal surgery less frequently, there was no significant difference between the three surgical groups for need for velopharyngeal management by age 6.
10 ROBIN SEQUENCE: MORTALITY, RISK STRATIFICATION, AND CLINICAL OUTCOMES

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BACKGROUND & PURPOSE: The purpose of this study is to analyze causes of and risk factors associated with mortality in infants with Robin Sequence (RS). We hypothesize that in the background of modern airway monitoring devices, the cause of death due to airway obstruction is low. In addition, long-term clinical outcomes are reported.

METHODS: An 11-year (2001-2012) retrospective review of infants with RS admitted to the neonatal intensive care unit (NICU) at a tertiary care children's hospital was performed. Variables assessed included gravid drug exposure, prematurity, intrauterine growth restriction, syndromic diagnosis, isolated RS, cardiac, central nervous system (CNS), pulmonary anomalies, gastrointestinal abnormalities (gastrointestinal reflux disease (GERD), Nissen fundoplication, gastrostomy tube (GT)), and abnormality of ≥2 organ systems (pulmonary, cardiac, CNS, GI). Additional variables were collected by treatment modality: nonoperative (NONOP) and surgical intervention (SURG). The primary outcome was mortality rate. Cause of death was identified by a neonatologist. Secondary outcomes were emergency room (ER) visit and hospital admission rates. Univariate analysis was performed to identify risk factors for outcomes.

RESULTS: 181 infants were identified. Mean follow up was 35 months. 33.2% of patients possessed a syndromic diagnosis, 32.6% isolated RS, 30.9% cardiac, 26.5% CNS, 32.6% pulmonary, and 67.4% GI anomalies. Distribution by treatment modality was NONOP 78.8% NONOP and 48.1% SURG. Overall mortality was 16.6% (30 patients); two deaths in 181 patients (1%) were related to airway problems (pneumonia and spontaneous loss of breathing). There were no deaths in patients with isolated RS (p=0.002). Variables associated with an increased mortality rate were cardiac (p<0.001), CNS (p=0.001), and 2 or more organ system abnormalities (p<0.001). Variables associated with an increased number of ER visits were cardiac anomalies (p=0.04), GT (p=0.001), and patients with ≥2 organ system abnormalities (p=0.04). Variables associated with an increased number of admissions were GT (p=0.001), ≥2 organ system abnormalities (p=0.04), and SURG (p=0.02).

CONCLUSIONS: Mortality in infants with RS is associated with non-pulmonary organ system disease. Risk stratification for this complex disorder should consider abnormalities in non-pulmonary organ systems. Mortality was not increased in patients with isolated RS.

11 THE AMERICLEFT PROJECT: BURDEN OF CARE FROM SECONDARY SURGERY IN PATIENTS WITH CLEFTL

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BACKGROUND & PURPOSE: The burden of care for children with cleft lip and palate extends beyond primary lip and palate surgery. Specifically, children may undergo additional surgery to improve their appearance or speech. Current understanding of the burden of secondary surgery in North America is limited to reports from single centers. To address this deficiency, we performed an inter-center comparison of secondary surgery rates among centers participating in Americleft.

METHODS: Retrospective chart review was performed to identify all secondary surgeries among children included in the initial Americleft outcomes studies. Three of the original five centers participated (Center A, n=20; Center C, n=39; Center E, n=36). All children had complete, nonsyndromic unilateral cleft lip and palate and data were at least through age 6. Incidence of secondary surgery was calculated for lip, palate and nasal surgeries. To account for censoring from variable follow-up, outcome was defined as duration of survival without revision surgery. Survival without revision surgery was compared between centers using the log-rank test. Fisher exact test was used for categorical analyses.

RESULTS: The duration of survival without revision lip surgery was significantly different between centers (p<0.0001). Rates of revision lip surgery at 10 years after primary repair ranged from 6 to 60%. Survival without secondary palate surgery was significantly different between centers (p=0.0275). Rates of revision palate surgery at 10 years after primary repair, including re-repair and pharyngeal flap, ranged from 6 to 26%. The duration of survival without secondary rhinoplasty was significantly different between centers (p<0.0001). Rates of secondary rhinoplasty by 20 years of age ranged from 52 to 74%. Revision lip surgery was associated with a GOSLON score ≥4 (p=0.002). No association was detected between revision palate surgery and GOSLON score ≥4 (p=0.7474).

CONCLUSIONS: Survival without cleft lip revision, secondary palate surgery, and secondary rhinoplasty is significantly different between centers. This variation may contribute to differences in aesthetic and speech results between centers.

12 COMPARATIVE ANALYSIS OF ANTERIOR MAXILLARY DISTRACTION WITH CONVENTIONAL LEFORT I OSTEOLOGY IN THE MANAGEMENT OF CLEFT MAXILLA

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BACKGROUND & PURPOSE: 1) To compare the stability and relapse between anterior maxillary distraction and conventional LeFort I Advancement Osteotomy 2) To compare the soft tissue profile between the 2 groups. 3) To assess the speech outcome in the 2 groups.

METHODS: 40 patients with hypoplastic maxilla in the age group of 18-25 years who needed maxillary advancement were randomly assigned to 2 groups Group 1: 20 patients were subjected to Conventional Orthognathic Surgery(CO), All patients underwent lefort I ostectomy; 8 patients underwent mandibular setback as well. Group 2: 20 patients were subjected to Anterior Maxillary distraction(AMD). 40 patients underwent alveolar bone grafting and periodontal orthodontics spanning 3 in group 2. Lateral cephalograms were taken for all patients. Survival analysis was carried out followed by dental model surgery AMD was performed in group 2 as per standard protocol. Rhythm-morning 3 turns; evening 2 turns Pitch-0.25mm/turn; 1mm/day 3 months of consolidation period Lateral cephalograms were repeated for group 1: 3rd post op day and 6 & 12 months postoperatively; for group 2: On completion of distraction, 4,6 & 9 months postoperatively. Changes in the soft tissue profile were assessed by measuring the most anterior point of the upper lip from the true vertical line in both the groups. The relapse rate between the groups and the difference in soft tissue profile was statistically analysed using the unpaired ‘t’ test, whereas the speech variables like nasality, articulation, intelligibility and acceptability were compared between the 2 groups by Mann Whitney U test and Wilcoxon Signed Ranks Test.

RESULTS: Mean relapse of 0.35mm for AMD Vs 2.15mm for CO Mean changes in soft tissue profile of 5.85mm for AMD Vs 2.65 mm for CO Independent samples test was performed for both the variables and derived a p value of <0.005, hence statistically significant. The speech variables were subjected to Wilcoxon Signed Ranks test and derived a p value that was statistically significant in Group 2, whereas not significant in Group 1.

CONCLUSIONS: 1) The relapse rate in AMD was found to be much lesser as compared to CO and hence more stable. 2) The soft tissue profile changes in AMD were more promising making the concave profile convex, normalizing the nasolabial angle and making the upper lip more prominent thereby improving the lip esthetics and minimizing the residual deformity and the stigma of the cleft. 3) There was a subtle improvement in speech outcome in AMD patients, improving the frontal consonants, thus improving the articulation and acceptability of speech. 4) AMD is cost effective, the device is easy to fabricate and is inexpensive and moreover well tolerated by patients in our study. All these factors make AMD the treatment of choice for cleft hypoplastic maxilla. However long term studies would help us to give conclusive evidence for the same.

13 AIRWAY OUTCOMES FOLLOWING CLEFT PALATE REPAIR IN ROBIN SEQUENCE

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BACKGROUND & PURPOSE: Prior studies report increased airway complications following cleft palate repair in infants affected by Robin sequence (RS). The primary objective of this study is to compare airway complications after palatoplasty in RS to cleft palate only (CPO). Secondary objectives are to compare patients with RS who underwent neonatal mandibular distraction osteogenesis (RS-MDO) to those with CPO and identify risk factors for airway complications in these patients.

METHODS: A 12-year (Jan 2000 - Dec 2012) retrospective review of patients with CPO or RS undergoing palatoplasty was performed. CPO patients were Veau types I and II matched controls. RS patients consisted of RS-MDO or RS-MDO as well as CPO patients who underwent palatoplasty for RS-MDO. Airway complications were recorded and compared between groups using a chi-square analysis.

RESULTS: 61 patients were included in the study, 38 with RS (20 RS-MDO and 18 CPO) and 23 with CPO. There were no significant differences in airway complications between the groups (p>0.05). The most common airway complications were snoring (18.5%), nasal obstruction (12.3%), and stridor (10.5%). The incidence of airway complications was not significantly different between the groups (p>0.05).

CONCLUSIONS: Airway outcomes following cleft palate repair in Robin sequence are similar to those in patients with CPO. However, further studies are needed to identify risk factors for airway complications in these patients.
Nonop (managed nonoperatively). Preoperative variables included gestational age (GA), birth weight (BW), age at palate repair, syndromic diagnosis, and central nervous system (CNS), cardiac, and lower airway anomalies. Complications were defined as reintubation, readmission, or emergency room (ER) visit for airway compromise within 3 months of CP repair.

RESULTS: 93 patients met inclusion criteria: 40.9% had CPO, 59.1% had RS, and 36.6% had RS-MDO. Mean follow up was 18 months, mean GA 37.4 weeks, and mean BW 3 kg. Mean age at palate repair was greater in RS (15.7 months) than CPO (13.3 months), p=0.032. Variables that occurred more frequently in RS versus CPO were syndromic diagnosis (10.9% vs. 0%, p=0.04) and lower airway anomalies (12.7% vs. 2.6%, p=0.03). 64% of patients had an airway complication: RS (7.3%) and CPO (5.3%), p=0.71. 2.2% required reintubation: RS-MDO (5.9%), CPO (0%) and RS-Nonop (0%), p=0.07. Chi-square analysis demonstrated an increased reintubation rate associated with syndromic diagnosis (16.7%, p=0.01), cardiac anomalies (14.3% p=0.02), and lower airway anomalies (14.3%, p=0.02). In isolated RS, the reintubation rate was 0%.

CONCLUSIONS: Patients with RS have comparable risks for airway compromise following CP repair compared to those with CPO. Syndromic diagnosis, cardiac, and lower airways are associated with reintubation following repair in the RS population.

SPEECH THERAPY: STRATEGIES FOR CORRECTION OF ERRORS SECONDARY TO VELOPHARYNGEAL DYSFUNCTION AND VARIOUS ORAL ANOMALIES

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BACKGROUND & PURPOSE: Children with a history of cleft lip/palate or other oral anomalies are at risk for certain speech and resonance disorders. These may be secondary to velopharyngeal insufficiency (abnormal structure), velopharyngeal incompetence (abnormal neurophysiology), oral anomalies (i.e., macroglossia, small oral cavity, fistula, or large tonsils), and dental malocclusion. Even with early surgical repair, a large number of preschoolers with cleft lip/palate demonstrate difficulties with speech production. Any type of structural anomaly in the vocal tract can cause obligatory distortions or compensatory errors. Obligatory distortions are those that occur when function (i.e., articulation) is normal, but the structure is abnormal and causes distortion of speech. In contrast, compensatory errors are those that occur when articulation placement (function) is altered in response to the abnormal structure. It is important for the speech-language pathologist to determine the underlying cause of each of the child’s speech characteristics in order to determine if correction will require physical management (i.e., surgery or orthodontics), speech therapy, or both. In addition, when speech therapy is indicated, the speech-language pathologist must be skilled in employing techniques that are most effective with these types of errors. The purpose of this session is to provide methods for determining when speech therapy will be effective in correcting the presenting speech errors. In addition, this session is designed to help participants apply effective speech therapy techniques for correction of errors due to a history of cleft palate, VPI, or other structural anomalies.

METHODS: In this session, the presenter will discuss and give examples of obligatory distortions and compensatory errors due to VPI and other oral anomalies. The presenter will explain how to determine which errors will respond to speech therapy, and which will require physical management. Specific speech therapy techniques will be described and demonstrated for the correction of a variety of speech errors that are typical in this population. Short video clips of the use of these techniques with patients will be presented for further clarity. There will be a discussion of methods for achieving carry-over once normal production is achieved. Finally, the participants will receive a handout with specific instructions on a variety of techniques, including those that can be used before and after velopharyngeal surgery.

PRENATAL CLEFT COUNSELING FOR BEGINNERS: ANSWERING THE CALL
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BACKGROUND & PURPOSE: Many providers on Craniofacial teams will be asked to speak to a family expecting a baby with a cleft at some point, either formally or informally, possibly without ever having been trained to provide this type of sensitive counseling. It is optimal for this counseling to be provided in conjunction with a Perinatology team to confirm the cleft diagnosis and to provide education to decrease fear and anxiety, however this team approach is not always possible. This talk will provide an overview of a prenatal counseling session. Suggestions will also be made regarding handouts and visual aids to facilitate teaching during the counseling session.

USING PLAY-BASED THERAPY APPROACHES AND HOME PROGRAMMING FOR REDUCING COMPENSATORY ARTICULATION
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BACKGROUND & PURPOSE: Many graduate students and new clinicians do not have the advantage of completing a Craniofacial Anomaly course within their degree program. The treatment approaches for VPI and Compensatory Articulation are often discussed minimally during Voice Disorders class or Articulation/Phonology class. There then seems to be a lack of knowledge about treating Compensatory Articulation and the generalization of the therapy progress. Parents report that many clinicians do not know how to identify and reduce Glottalizations and other Compensatory Articulation and how to encourage parents to work on this at home. Although Drill-based therapy is needed, Play-based therapy approaches are motivating and encourage patient and parent participation. A discussion on how to use drill, repetitive practice, and motor-programming techniques will be evaluated. The goal of this presentation will be to review Play-based therapy approaches to Compensatory Articulation, a review of home programs and home programming techniques, and how to assist parents in being more active in monitoring speech progress if the child is receiving speech therapy within the school setting as well as private speech therapy. A discussion of patients with common Craniofacial syndromes that may have speech deficits will also be reviewed to assist clinicians in identifying compensatory articulation and articulation changes based on changed anatomy and resonance disorders.

METHODS: The presentation will be both lecture style and interactive learner participation. An overview of Compensatory Articulation will be provided and then specific approaches and cases will be reviewed. Videos of actual therapy sessions will be observed and then discussions of the play-based techniques will follow. Home programming theory and use will be examined and patient feedback on ease of use and time needed to implement these programs will be discussed. Learners will receive resources on how to develop Play-based therapy sessions, home program approaches, and information associated with more common Syndromes that may have speech deficits.

Salary: Braun- Nova Southeastern University, Moll - Progressive Pediatric Therapy Inc. DeLuca - Joe DiMaggio Children’s Hospital. Professional: All authors are members of American Speech Language Association. Braun: Past president of the Florida Cleft Palate Association (FCPA). DeLuca: Speech Board Member for FCPA

SYNDROMIC VERSUS NONSYNDROMIC CLEFTING: THE ROLE OF GENETICS IN THE INTEGRATED CLEFT TEAM APPROACH
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BACKGROUND & PURPOSE: A significant proportion of individuals who have a cleft lip with or without cleft palate (CL/P) can have an underlying genetic syndrome. Over 200 genetic conditions can be characterized by a specific pattern of congenital anomalies, in addition to CL/P. The etiology of syndromic CL/P in the majority of individuals is monogenic or chromosomal. Multifactorial inheritance plays a significant role for non-syndromic CL/P. Genetic counselors and geneticists are trained healthcare providers that assist in the evaluation of individuals for possible genetic conditions. At Children’s Mercy Hospital, genetic counselors and geneticists participate in many aspects of the overall evaluation, including the prenatal assessment, inpatient consultation and outpatient comprehensive team approach. This aids in establishing a correct diagnosis, which will guide future medical management for individuals with CL/P. Additionally, this continuity of care allows for evolving conversations with the families with respect to genetic counseling and recurrence risk estimates.

METHODS: Power point slides will be utilized to review the role of a genetic counselor and a geneticist in the fetal and postnatal evaluation for CL/P. Participants will have an understanding of genetic contribution to nonsyndromic and syndromic clefting. Inheritance patterns and current technologies for genetic testing will be highlighted. Specific cases will be presented to emphasize the value of incorporating genetic counselors and geneticists to improve the overall healthcare provided by the interdisciplinary team.

ESSENTIAL ELEMENTS OF MULTISITE NURSING RESEARCH: OPERATIONAL STUDY IMPLICATIONS
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BACKGROUND & PURPOSE: Results of 2008 and 2012 surveys of North American surgeon members of the American Cleft Palate Association demonstrate existing variations and rationales in the use of arm restraints after cleft palate repair. Concerns related to the use of restraints include monitoring of skin integrity, education on safe use, and compliance. Recently, a pilot prospective, randomized trial and a retrospective chart review demonstrated no significant difference in occurrence of postoperative complications in children whether or not arm restraints were prescribed. Both publications called for studies with a larger sample size. A multisite study of children after cleft palate repair that would provide an adequate sample size is proposed.

METHODS: The goal of this presentation is to describe the development of a multisite nurse led research study. Strategies for design and planning of a multisite study will be reviewed and will include: 1. Value of a pilot, 2. Elements of the research team, 3. Importance of a steering committee, 4. Processes for communication between team members, 5. Site responsibilities, 6. Protocol adherence, 7. Plan for data collection and analysis, 8. Budget considerations, and 9. Establishment of a writing team. The presentation will include an overview of the background, purpose, research questions, methods, and plan for analysis of a proposed multisite study. The proposed data collection tool will be discussed. Implications: Despite the movement toward conducting multisite research, little information is available in the literature about the individual knowledge, skills, and abilities necessary to conduct such studies. This presentation will provide an overview of the fundamental elements identified in the literature as part of the operational implementation of a multisite study.

SPECTRUM OF DENTAL PHENOTYPES IN OROFACIAL CLEFTING
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BACKGROUND & PURPOSE: Children with oral clefts often present with dental anomalies adding complexity to the phenotypic spectrum of orofacial clefting and resulting in more intrusive oral rehabilitation procedures. Such dental abnormalities can also be seen in seemingly unaffected family members of children with clefts and include: Hypodontia, delayed dental development, microdontia, supernumerary teeth, excess mammelons, incisal tissions, hypoplasia, hypercalciﬁcation, dental malpositions and a slightly higher caries risk. The purpose is to expand and further deﬁne the spectrum of dental phenotypes in children with orofacial clefts, their parents and siblings.

METHODS: Samples were recruited from 5 sites including Pittsburgh, Texas, Iowa, Philippines and Hungary for a total of 3120 subjects. Of these, 605 are...
affected, 1721 are unaffected relatives, and 876 are controls. Multiple introral photographs were taken per subject and rated with forms including the DFT/dft index and variables such as hypodontia, microdontia, malpositions, mammelons, and incisal fissures. Descriptive statistics and regression analysis on affecion status were performed.

RESULTS: Inter and intrarater reliability were completed and we obtained intraclass correlation coefficients (ICC) of >0.8 indicating excellent reliability. All data has been collected. Sample sizes for the U.S. sites combined included 1027 individuals processed already. Of these 257 were affected probands (149 probands, 71 parents and 37 siblings) and 770 belong to affected families (199 are affected probands, 322 are unaffected parents and 249 are unaffected siblings). Amongst affected probands, 41 have a cleft lip, 132 have a cleft lip and cleft palate and 26 have a cleft palate only. Preliminary results for DFT and dft indexes in affected case probands (n=199) vs. control probands (n=149) comparisons for the primary, mixed and permanent dentition indicated significant differences for the primary (p<0.005) and the mixed dentition (p<0.0005). Also, preliminary comparison of DFT/dft indexes between parents and siblings of cases vs. parents and siblings of controls for the Iowa sample showed no significant differences (p>0.05). Efforts are ongoing to complete processing and analyses of the total sample for our presentation.

CONCLUSIONS: This is the largest study to date evaluating dental phenotypes in children with clefts, parents and siblings in an effort to enhance our understanding of cleft lip and palate etiology.

24 DECREASED SECONDARY BONE GRAFTING BUT POORER MIDFACE GROWTH AFTET PRIMARY ALVEOLAR CLEFT REPAIR WITH GINGIVOPERIOSTEOPLASTY AND RHBMP-2

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BACKGROUND & PURPOSE: Studies from NYU revealed that following nasoalveolar molding/gingivoperioplasty (GPP) 60% of patients did not require an alveolar bone graft. In our lab midface animal growth was not detrimentally affected after BMP-2 healing of alveolar clefts. In this study, we performed a similar procedure to NYU with alveolar molding/GPP but with BMP-2 on a resorbable matrix for alveolar repair in the infant. We compared long-term follow-up (10 years) for 1) No GPP, 2) GPP only or 2) GPP with BMP-2 by analyzing alveolar bone, tooth eruption, and maxillary growth.

METHODS: For the three primary unilateral cleft repair patient groups: 1) No GPP (n=15), 2) GPP only (n=15) or 2) GPP with BMP-2 (n=10) we performed follow-up studies at least 10 years after the procedure. There was one GPP patient lost to follow-up. We recorded need for secondary alveolar bone grafting, timing of tooth eruption, and clinical evidence of maxillary hypoplasia. New-Tom scans were used to analyze dentition, bone volume and bone density.

RESULTS: For dentition, there was absent cleft lateral incisor in 40% of patient (40%, 46%, 50%). Cleft site secondary tooth eruption was variable but occurred at a mean of 1.8+0.4 years earlier in Groups 2 and 3 (GPP and BMP/GPP, respectively) compared to Group 1 (No GPP). Greater bone graft volume/density was seen at the cleft site in Group 3 (GPP/BMP-2) compared to Group 2 (GPP only) (86% vs 42% bone fill). Secondary alveolar bone grafting at age 13 was unnecessary in Group 1 (100%), Group 2 (73%), Group 3 (20%). Two patients in Group 3 (GPP/BMP-2) underwent Le Fort I distraction at age 13. In the other groups there were no patients, to date, who have undergone Le Fort I distraction. Clinical evidence of maxillary hypoplasia was seen in Group 1 (40%); Group 2 (53%); Group 3 (60%). We are in the process of collecting and recording our lateral cephalograms data.

CONCLUSIONS: In a long-term follow-up, after mid-childhood but prior to skeletal maturity, GPP/BMP-2 primary alveolar cleft repairs showed similar tooth eruption, improved bone fill of the cleft site, less need for secondary alveolar grafting. However, data thus far shows poorer midface growth compared to No GPP. Our results confirm our group’s IRB approved study primary alveolar clefts with the use of gingivoperioplasty, BMP-2 and a collagen scaffold as an alternative technique to traditional care.

25 WHITE MATTER STRUCTURE IN INDIVIDUALS WITH ISOLATED CLEFT LIP AND/OR PALATE: A DIFFUSION TENSOR IMAGING STUDY

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BACKGROUND & PURPOSE: The development of the face and the brain are intimately linked. Abnormal craniofacial development, such as seen in isolated clefts of the lip and/or palate (ICLP), is likely to also be accompanied by abnormal brain development. Our laboratory has been evaluating brain structure and function in persons with ICLP using Magnetic Resonance Imaging (MRI). We have previously reported on abnormalities in brain structures in individuals with ICLP. However, structure of the white matter in the brain (myelinated axons that connect neurons within and between different brain regions) has not been examined in this group. We anticipated that similar to the neuroanatomical findings, development of white matter would be disrupted and abnormal in individuals with ICLP.

METHODS: 67 persons with ICLP (42 males, 25 females) were compared to 69 healthy controls (31 males, 38 females). Age ranged from 7-25 years old. Diffusion tensor imaging (DTI) was used to obtain measures of white matter structure and integrity. The primary measure obtained via DTI was Fractional Anisotropy (FA), a measure of how water diffuses within tissues. Higher FA values are indicative of healthier white matter. Average FA for each of the four lobes of the brain (both right and left hemisphere) along with the corona radiata and subcortical structures were compared between groups, while controlling for the effects of age, socioeconomic status, and whole brain FA. Males and females were analyzed separately.

RESULTS: For males with ICLP, FA was significantly lower in the left temporal lobe (p<0.01). This was the only brain region in which FA was different for males with ICLP. No significant differences in FA were found for females with ICLP.

CONCLUSIONS: White matter structure appears abnormal only in males with ICLP and only within the left temporal lobe. Axonal development and myelination may be disrupted within the left temporal region. This brain area is critical for language and reading abilities. This disruption in white matter

23 THE EFFECTS OF TIMING OF PALATOPLASTY IN FACIAL GROWTH AND OCCLUSAL RELATIONSHIPS: A COMPARATIVE STUDY.

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BACKGROUND & PURPOSE: While two-stage palatoplasty appears to warrant a controlling of tooth growth, the ideal timing has not been established. The present study was designed to assess the effects of anterior-posterior maxillary length, dental arch widths, and occlusal relationships than PB. The results supported our previous report showing that at the patient’s age of 4 years palatal growth following ETS was showing that at the patient’s age of 4 years palatal growth following ETS was significantly larger in ETS than those in PB, suggesting that ETS showed better anterior-posterior maxillary development than PB. Cast model analysis demonstrated that ETS showed significantly larger dental arch width measured at inter-second deciduous molar (ETS; 43.7±4.1mm, PB; 38.6±3.9mm, P<0.01) than did PB. Average Goslon Yardstick scores of ETS and PB were 3.60±1.2, and 3.85±1.2 (P<0.05), respectively. Distributions in each Goslon score also showed apparent improvements of occlusal relationship in ETS.

CONCLUSIONS: The present results demonstrated that ETS provided better outcome in anterior-posterior maxillary length, dental arch widths, and occlusal relationships than PB. The results supported our previous report showing that at the patient’s age of 4 years palatal growth following ETS was better than that after PB (Kitagawa et al. 2004 CPCJ).
integrity within the left temporal lobe may be related to the increased incidence of reading disabilities and language problems in individuals with ICLP.

**HMG1 SIGNALING IS ESSENTIAL FOR GRAFT-INDUCED BONE FORMATION**

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BACKGROUND & PURPOSE: The high mobility group box 1 (HMG1) chromatin protein is released by damaged tissues and can initiate tissue regeneration. HMG1 plays a complex role in musculoskeletal repair, acting as a chemotactic factor for osteoclasts and osteoblasts during endochondral ossification and protecting damage-associated cell death within scaffolds. Here we tested the role of HMG1 signaling during bone healing with and without bone allograft.

METHODS: Morselized bone grafts were obtained from femora and tibiae of WT mice. Four groups were generated: 1) bone graft suspension, “graft group”; 2) bone graft with anti-HMG1 peptide, “graft+anti-HMG1 group”; 3) anti-HMG1 suspension, “anti-HMG1 group”; and, 4) PBS control, “control group”. All suspensions were encapsulated in fibrin glue before surgery. Circular parietal bone defects were made using a 1.8mm trephine in WT mice. Implants were placed within calvarial defects and healing was assessed at weekly intervals for 28 days using µCT and histology.

RESULTS: Significantly less bone healing was observed in the graft+anti-HMG1 group compared to the graft group based upon µCT analyses on postoperative day 28. No significant difference was observed between the anti-HMG1 group and the control group.

CONCLUSIONS: These data suggest that HMG1 provides a signal which is essential for bone allograft-induced calvarial bone repair.

**MODULATION OF BMP2-INDUCED CALVARIAL DEFECT HEALING USING ADIPOSE, BONE MARROW, AND MUSCLE-DERIVED STROMAL CELLS**

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BACKGROUND & PURPOSE: Current methods of tissue engineering for craniofacial reconstruction focus on implantation of bioresorbable scaffolds seeded with proteins and/or osteogenic progenitor cells. It remains unclear whether specific stromal cell types are better suited for use in craniofacial reconstruction. This study aims to determine the healing capacity of adipose, bone marrow, and muscle-derived stromal cell populations augmented with bone morphogenetic protein 2 (BMP2) in a calvarial defect model.

METHODS: ADSCs, BMDCSCs, and MDCSCs were harvested from 10-week old wildtype mice (n=8). Cells were seeded overnight onto 5mm acellular dermal matrix (ADM) discs (100,000 cells/disc) and were osteoinduced with 150ng BMP2. Unseeded ADM discs treated with either BMP2 or vehicle served as controls. Discs were placed into 5mm circular calvarial defects. Mice were euthanized 4 weeks postoperatively. Regenerate tissue was analyzed by 3D microCT and histology.

RESULTS: Differences in percent healing (mean ± SE) were observed between vehicle (31.5%±8.9), BMP2 control (71.9%±7.0), ADSC + BMP2 (31.4%±1.8), BMDCSC + BMP2 (21.9%±4.9), and BMDCSC + BMP2 (38.5%±20.2) groups. One-way ANOVA revealed a statistically significant main group effect (F=3.988, p<0.02). Percent healing was significantly decreased in osteoinduced stromal cell constructs when compared to unseeded, BMP2 therapy. Pentachrome staining revealed endochondral ossification in all treatment groups. BMP2 treated defects regenerated vascularized, thick woven bone with large marrow spaces. Osteoinduced stromal cell-treated defects regenerated less bone that was also thinner than BMP2-regenerated bone.

CONCLUSIONS: Low-dose BMP2 potently stimulates local osteoprogenitors to heal osseous deficiencies within the calvaria. We observed significant modulation of BMP2-induced osteogenesis with the addition of stromal cells; unlike BMP2 therapy alone, osteoinduced stromal cell therapies do not improve defect healing beyond that of vehicle in this model. This calls into question the role of progenitor cells in tissue engineering strategies for calvarial repair, and suggest that engrafted cells may be susceptible to environmental influences that determine their ability to contribute to cranial regeneration.

**NASOLABIAL CHANGES AFFECTED BY 2 DIFFERENT ALAR BASE CINCH SUTURE TECHNIQUES AFTER MAXILLARY LEFORT I OSTEOTOMY IN CLASS III MALOCCLUSION: RANDOMIZED CONTROLLED TRIAL**

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BACKGROUND & PURPOSE: The alteration of the nasolabial soft tissue after maxillary Le Fort I osteotomy is one of the most common complaints of patients after surgery. This study compared the effectiveness of a modified and conventional alar base cinch technique on changes over the nasolabial morphology after maxillary Le Fort I osteotomy.

METHODS: The prospective randomized controlled study recruited 50 skeletal Class III patients who received maxillary Le Fort I osteotomy to correct skeletal discrepancies. During the intraoral wound-closing procedure, patients were equally separated into 2 groups. G group (25 patients) received the conventional alar base cinch technique; M group (25 patients) received the modified technique. 3DMD stereogrammetry was taken preoperatively and postoperatively 6 months. 3D CBCT data was taken preoperatively and 4-6 weeks after operation. Three dimensional soft tissue changes 6 months after operations were measured and corresponded to the skeletal movement during surgery.

RESULTS: Six months after operation, most of the intergroup difference showed no significant difference, except nasal width widening was significantly reduced by 1.40 mm in the C group than in the M group. Most of...
EVALUATING THE NEED FOR ROUTINE ADMISSION FOLLOWING PRIMARY CLEFT PALATE REPAIR: AN ANALYSIS OF 100 CONSECUTIVE CASES

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BACKGROUND & PURPOSE: Routine admission following primary cleft palate repair (PCPR) is the standard of care at most institutions. The postoperative length of stay (LOS) is typically determined by the need for intravenous fluids (IVF), pain medication, and supplemental oxygen. Insurance companies have demonstrated increasing resistance to hospitalization longer than a ‘short stay’ (23 hour) observation period following PCPR. The purpose of this study is to identify the factors related to LOS following PCPR.

METHODS: Retrospective chart review was conducted for 100 consecutive patients undergoing PCPR from May 2009 to February 2013. Demographic and perioperative data were collected, and two-sample t-test, univariate and multivariate linear regression models were performed to assess for correlation.

RESULTS: The male:female ratio was 47:53 and mean age at time of surgery was 12.7 months. There were 62 infants with a complete cleft palate (CP), and 12 patients with a syndromic diagnosis. The mean duration of surgery and general anesthesia was 1.7 hours and 2.8 hours, respectively. Mean LOS was 47.6 hours; 76% of patients required IVF greater than 23 hours after admission. Postoperative intravenous (IV) narcotics were required in 91% of patients, and the last dose was given on average 19.8 hours after admission. Of the 17 infants requiring postoperative supplemental oxygen, 13 (77%) patients required oxygen greater than 23 hours following admission. A correlation was identified between increased LOS and age at time of surgery, female gender, complete CP, syndromic diagnosis, longer duration of surgery and general anesthetic, and complete CP without presurgical orthodontia.

CONCLUSIONS: The majority of infants in this study required IVF greater than 23 hours until adequate PO intake could be established, and nearly all patients required postoperative IV narcotics. Postoperative supplemental oxygen was also necessary for greater than 23 hours in most of the infants for whom it was required. Factors identified in association with increased LOS may guide opportunities for reducing postoperative hospitalization; however, these findings would oppose the safety of routine outpatient or short-stay observation following PCPR.
ABSTRACTS

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BACKGROUND & PURPOSE: Mental health providers serve numerous functions within craniofacial teams (Hood et al., 2011). Because of these roles, mental health services are included as a critical part of team care in The American Cleft Palate-Craniofacial Association’s (ACPA) 2009 Parameters for Evaluation and Treatment of Patients with Cleft Lip/Palate or Other Craniofacial Anomalies. The purpose of this course is to orient new craniofacial mental health providers to the types of services typically implemented in a team clinic setting and provide information about screening tools and strategies that can be used in team clinics. Additionally, this course aims to educate participants about common issues and challenges experienced by mental health providers who are new to their role on a craniofacial team, as well as possible solutions.

METHODS: This course will address the various mental health services and psychosocial screenings typically provided in a team clinic setting, as well as determining which services are feasible to implement, given clinical demands and available resources. Information will be presented on establishing a role within the team and educating team members about available services. Mental health providers from different craniofacial teams also will discuss common challenges and themes, and will provide information on resources for craniofacial mental health providers.

UNILATERAL CLEFT LIP REPAIR

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BACKGROUND & PURPOSE: The complexity of the cleft lip and nasal deformity, the variability within the spectrum of the deformity, and our high expectations all contribute to the surgical challenge. Over the past centuries, numerous techniques have been described; advancing the craft as newer techniques adopt the principles of previously described repairs while addressing their deficiencies. The purpose of this masters class is to review the anatomy of the cleft lip and nasal deformity, to review the history of left lip repair, to review principles of repair, and to highlight the keys to successful repair using the Anatomic Subunit Approximation Technique.

METHODS: By way of a review of the anatomic features of the cleft lip and nasal deformity and a historical review of previously described techniques, the learner will identify the principles of successful cleft lip repair. The key elements of the Anatomic Subunit Approximation Technique will be demonstrated. Learners will become familiar with the finer points of this technique so that they may apply it successfully for all cases of unilateral cleft lip.

ORTHOPEdic AND ORTHODONTic TREATMENT FOR PATIENTS WITH CLEFTS OF THE LIP AND PALATE: FROM BIRTH TO MIXED DENTITION

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BACKGROUND & PURPOSE: Children born with clefts of the lip and palate present a wide variety and complexity of skeletal and dental anomalies. Timely attention to these issues is critical for the functional and psychosocial development of the affected child. It is imperative that the orthodontist and pediatric dentist understand the biological rationale and treatment options available in order to minimize interventions and maximize results. The learners will evaluate various orthopedic and orthodontic techniques used in the treatment of infants and children in the mixed dentition and will be able to recognize the adequate timing of their implementation. They will also be able to assess the feasibility and need to include these treatment modalities into their treatment portfolio for their patients.

METHODS: Through a series of case presentations, the learners will be able to describe in detail Nasaloveolar Molding pre-surgical infant orthopedic technique, face mask therapy for maxillary protraction, maxillary and mandibular expansion appliances, orthodontic therapy in the mixed dentition and maxillary arch preparation for a secondary alveolar bone graft surgical procedure.

CLEFT ORTHOGNATHIC SURGERY

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BACKGROUND & PURPOSE: Maxillary growth restriction is evident in a significant proportion of the repaired cleft-lip and palate population. In these cases, the resultant concave profile, poor upper lip and perioral support, anterior crossbite, and class III malocclusion require orthognathic surgery, at least a Le Fort I osteotomy, for correction. Orthognathic surgery in this setting is challenging given the altered vascularity and scar contracture, frequent need for concurrent bone grafting, possible fistulae closures, and impact on postoperative speech. It is incumbent upon any cleft team member, especially the orthodontist and surgeon, to appropriately diagnose, understand the presurgical orthodontic phase, effectively perform the surgical procedure, and understand the pitfalls, post-surgical finishing, and additional procedures that may be required.

METHODS: Description: This course will be given in a multidisciplinary fashion by practitioners involved in cleft orthodontics and surgery, and orthognathic surgery. The focus will be for the practicing orthodontist and surgeon who treats these patients from infancy through adulthood. We will devote 30 minutes to the orthodontic challenges, and setup necessary to adequately prepare these patients for surgery. We will devote 60 minutes to considerations in the unilaterial deformity, bilateral deformity, with requisite attention to technical modifications, dealing with residual fistulae, segmental osteotomies, simultaneous bone grafting, management of existing posterior pharyngeal flap, and impact on sleep apnea and speech postoperatively. Additional emphasis will be placed on preoperative planning, including conventional model surgery, splint type and fabrications, virtual surgical planning, and speech and airway assessments. Final considerations of orthodontic finishing will be discussed as well. Main Objectives Each learner: -will understand the presurgical orthodontic phase and considerations needed to deem a patient ready for surgery -will understand the objectives and rationale of preoperative surgical planning using both conventional methods and virtual surgical planning -will be capable of constructing and deciding on appropriate intra- and postoperative splints for cleft orthognathic surgery -will recognize technical steps and modifications when performing cleft orthognathic surgery (short video clips will be shown). Conventional and distraction osteogenesis techniques with be discussed, compared and contrasted -will obtain strategies to deal with particular challenges of cleft orthognathic surgery (large magnitude of advancement, significant scarring, residual fistulae, need for bone grafts, segmental surgery, dealing with PFPS, postoperative airway and speech concerns) -will understand the postop phase, and orthodontic finishing required. This will include analysis of long-term skeletal stability, occlusal results, speech and airway outcomes, and need for additional procedures.

34 MEDICAL MANAGEMENT AND SURVEILLANCE PROTOCOLS FOR COMPLEX CRANIOFACIAL CONDITIONS

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BACKGROUND & PURPOSE: Although many patients cared for by multidisciplinary cleft and craniofacial teams have isolated cleft lip and/or cleft palate and single suture craniosynostosis for whom there are published guidelines for health care supervision, few management protocols are available for patients with less common craniofacial conditions, and this may result in variability in care. In the absence of guidelines, this variability makes it difficult to evaluate outcomes or to conduct comparative effectiveness research in craniofacial care. The goals of this forum are to 1) address the need for the development and integration of nonsurgical management and surveillance protocols for patients with less common craniofacial conditions into multidisciplinary team settings and 2) create a shared resource for tracking and improving patient outcomes.

METHODS: A panel of experts in Craniofacial medicine (pediatricians and geneticists) will discuss the development and implementation of nonsurgical management protocols for patients with complex craniofacial conditions. We will focus on craniofacial conditions such as: fibrous dysplasia, Franceschetti syndrome, Robin sequence, syndromic craniosynostosis, craniofacial microsomia, and Neurofibromatosis type 1 with plexiform neurofibromas of the head and neck. For each condition, the panel member will provide a timeline for clinical surveillance protocols for patients with less common craniofacial conditions

IMPROVING OUTCOMES BY TREATING THE WHOLE PATIENT: INTEGRATING LANGUAGE, COGNITIVE AND PSYCHO-SOCIAL ISSUES IN TEAM CARE

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BACKGROUND & PURPOSE: Our focus will be on craniofacial teams, we pride ourselves on improving children’s lives that have craniofacial conditions. We time our surgeries for maximal aesthetic and functional impact with the goal of helping to normalize our patients’ lives. We strive to make our patients look, speak, breathe, and smile like their peers. Even if we are successful with these goals, however, we may not make a meaningful difference in our patients’ lives if we neglect their cognitive, language, and social-emotional development. A patient who shows few scars from a cleft lip may be socially ostracized or bullied due to poor pragmatic language skills. A patient who has the physical ability to achieve perfect velopharyngeal closure may not be able to communicate his or her wants and needs due to limited language or cognitive development. A patient who is in need of braces prior to orthognathic surgery may not be a candidate due to limited cognitive or behavioral skills or a difficult family situation. Therefore, cognitive, language, and psychosocial factors can and do impact craniofacial care and should be a significant portion of the team evaluation. The purpose of this short course is to enable the participant to understand and apply concepts, strategies and techniques drawn from the fields of language, cognition, and social-emotional development to enhance craniofacial team care and patient outcomes.

METHODS: This course will begin with an overview of current research on the impact of language, cognitive, and social-emotional development on medical/surgical patient outcomes, particularly with respect to the craniofacial population. Our discussion will include special populations such as international adoptees, second language learners, patients with velocardiofacial and other syndromes. The teaching methodology will include case studies, discussion and demonstration of appropriate assessment tools, and use of role play to practice interpreting these tools for parents and other craniofacial team members. Through small group discussion, participants will design a formal team protocols for incorporating these aspects of patient evaluation and decision-making.

SURGICAL MANAGEMENT OF VPD IN 22Q11.2 DELETION SYNDROME: MASTERS CLASS FOR THE SURGEON AND SLP
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BACKGROUND & PURPOSE: It is well-recognized that management of velopharyngeal dysfunction (VPD) in children with 22q11.2 deletion syndrome (22q11DS) poses a challenge to surgeons and SLPs. Multiple reports in the literature confirm that for clinicians with extensive cleft/craniofacial experience, speech surgery outcomes for 22q11DS are often less optimal than that of children with cleft palate or other causes of VPD. The nature of VPD in 22q11DS is complex, and thus treatment planning and surgical technique must be tailored to syndrome-specific and patient-specific factors to optimize outcomes. The purpose of this masters’ class is to provide a comprehensive overview of the multifactorial nature of VPD in 22q and an algorithm for successful surgical-speech management.

METHODS: This course will cover (1) presurgical speech assessment and guidelines for VP imaging, (2) preoperative medical evaluation and surgical planning for 22q11DS, (2) surgical techniques and modifications, (3) perioperative airway management, and (4) post-operative monitoring and speech outcomes assessment. Discussion of the various risks and benefits, as well as a summary of the current literature base, regarding pharyngeal flap vs sphincter pharyngoplasty and technical precision.

THE FURLOW PALATOPLASTY: SURGICAL TECHNIQUE AND OUTCOMES IMPROVEMENT
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BACKGROUND & PURPOSE: The Furlow double-opposing Z-palatoplasty may be used to achieve excellent results both in primary cleft palate repair and in secondary management of velopharyngeal dysfunction. This course will provide a review of the detailed step-by-step surgical technique while providing tips on how to optimize surgical outcomes through patient selection and technical precision.

METHODS: Using a standard lecture format, the history and key concepts of the Furlow Z-palatoplasty will be reviewed. A video presentation will then illustrate the technique in a step-by-step fashion, providing attendees with an understanding of how to simply and successfully perform the operation while optimizing surgical outcomes. Ample time will be devoted to audience participation, including a question-and-answer session at the conclusion of the course.

SPEECH EVALUATION, THERAPY, AND COLLABORATION FOR THE CLEFT TEAM SPEECH-LANGUAGE PATHOLOGIST
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BACKGROUND & PURPOSE: This course is intended for the speech-language pathologist (SLP) new to cleft palate care. It is the speech pathologist’s job to has increased the accuracy of preoperative treatment planning in orthognathic surgery, eliminating traditional techniques of indirect measurements, 2-dimensional cephalometry, face bow transfer, utilization of articulated model surgery and exposure to laboratory chemicals. In addition to pre-operative planning, VSP-derived intra-operative occlusal positioning systems (OPS) are now used to translate the VSP surgical plan to the operating room to perform exact repositioning of the maxilla and mandible. The use of intra-operative OPS eliminates the most difficult steps during OGS such as: the need for intra-operative intermaxillary fixation; intra-operative auto-rotation of the maxillary and mandibular complex; guessing intra-operative condylar centric relation, and guessing final vertical, horizontal and transverse positioning of osteotomized skeletal segments. The purpose of this study session is to expand participant’s knowledge and abilities in VSP orthognathic surgical planning. A firm background in orthognathic surgery is recommended for this course.

METHODS: The authors will demonstrate the application of VSP surgical work-ups in cleft and syndromal orthognathic surgical cases. Participants experience hands-on virtual surgical planning and design of OPS is the central purpose of this course.
analyze the speech production of a child with a cleft, to determine what aspects of the speech disorder can be treated with speech therapy, and what aspects require medical or surgical intervention. The SLP must advise medical/surgical care providers accordingly, but also coordinate with local SLPs who may have little or no background with cleft palate speech disorder. This course will provide tools and information for the SLP regarding how to conduct an efficient perceptual speech evaluation, how to categorize and describe speech production errors, how and when to refer for imaging studies or additional management. Articulation therapy techniques and methods of collaborating with the local SLP will be addressed.

METHODS: The course will follow the outline as follows: I. The oral mechanism exam: What's important? II. The Perceptual Speech Exam III. Categorizing Articulation Errors from the Perceptual Speech Exam IV. Making Decisions a. What can be treated with speech therapy? b. What errors indicate that further medical/surgical/dental management is needed? V. Therapy for articulation errors associated with cleft palate or velocpharyngeal dysfunction VI. Collaboration with the school/community SLP VII. Questions and Answers.

Salary: Grames - Drawn as a member of a cleft palate team and for providing education, address genetic concerns, and assist with support and coping skills.

CARE OF THE CHILD WITH A CLEFT: PRENATAL DIAGNOSIS THROUGH THE FIRST YEAR OF LIFE

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BACKGROUND & PURPOSE: Children born with cleft lip and/or palate receive medical/surgical care from various disciplines often involved in the care of children with clefts include: nursing, plastic surgery, genetics, pediatrics, pulmonology, otorhinolaryngology, audiology, speech language pathology, dentistry, orthodontics, nutrition, psychology, and social work. There are many challenges in the first year of life, including possible feeding and breathing issues, frequent appointments, and multiple surgeries. Families’ understanding and ability to follow through with treatment plans can be influenced by cultural and socioeconomic factors. The first year of life is a critical time for team members to coordinate medical and surgical care, provide initial education, address genetic concerns, and assist with support and coping skills.

METHODS: A multidisciplinary panel of experts will describe the role each discipline plays in the care of children and families affected by clefting. We will introduce family centered multidisciplinary team care for children with cleft palate, with an emphasis on the role of nursing and care coordination. ACPA Standards for Cleft Palate and Craniofacial Teams will be incorporated across disciplines. Common craniofacial issues and corresponding interventions will be discussed. Information about the delivery of culturally competent care to diverse families and socioeconomic groups will be addressed.

ADVANCED SKILLS FOR MENTAL HEALTH PROVIDERS ON CRANIOFAcial TEAMS

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BACKGROUND & PURPOSE: In response to the drive for evidence-based research, mental health providers strive to develop an understanding of what needs their patients have and the best ways to identify and address those needs. As part of a craniofacial team, providers encounter complex, multifactorial problems, including cognitive or learning concerns, psychosocial concerns such as bullying and self-image, as well as coping with ongoing medical interventions. The purpose of this course is to educate experienced mental health providers on these more advanced skills and functions within craniofacial teams, as well as to introduce methods of incorporating research within their own clinic setting. Mental health providers from different craniofacial teams will share perspectives on these topics and guidance on assessment and intervention approaches.

METHODS: This course will provide information on advanced themes for craniofacial mental health providers. Topics presented will include cognitive, learning, and neuropsychological assessment; interventions for psychosocial concerns such as bullying and self-image difficulties; and implementing clinical research in the team clinic setting.

DENTAL AND ORTHODONTIC PREPARATION FOR SECONDARY ALVEOLAR BONE GRAFT SURGERY

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BACKGROUND & PURPOSE: The rationale for this presentation is to provide orthodontists/pediatric dentists who are new to cleft care with basic knowledge of their role in the team management of patients who require a secondary alveolar bone graft. The general goals of the presentation are to improve the learners’ knowledge of the important considerations for the orthodontist/pediatric dentist in managing secondary alveolar bone grafts, and to improve their competence in assessment and preparation of the affected patient, resulting in enhanced surgical outcomes and optimized effectiveness of post-surgical orthodontic management.

METHODS: The presentation will include a lecture review of the history of the development of secondary alveolar bone grafts since their inception as well as the diagnostic factors necessary to determine the appropriate nature and timing of dental and orthodontic treatment for optimum surgical outcome. The role of the orthodontist/pediatric dentist in surgical outcome assessment and post-surgical treatment will be reviewed. Finally, clinical cases will be presented to illustrate the important considerations in effectively managing patients who require secondary alveolar bone grafts.

NASOALVEOLAR MOLDING AND COLUMELLA ELONGATION


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BACKGROUND & PURPOSE: This in-depth instructional course provides a detailed clinical protocol for the implementation and practice of NasoAlveolar Molding (NAM). Drawing on a 20-year clinical experience with NAM and columella elongation in infants born with unilateral (UCLP) and bilateral (BCLP) cleft lip and palate, this Master Class will address advanced clinical issues and techniques. The goal of this Master Class is to go beyond basics and explore issues that arise during clinical practice.

METHODS: This presentation will include advanced topics such as ways to retract and align the protrusive and rotated premaxilla, how to level the upturned end of the greater cleft alveolar segment, the management of clinical complications and the provision of improved nasal airway in the collapsed nostril. The Master Class will begin with an overview of basic NAM principles prior to launching into mastery level topics. The intention and maintenance of post-surgical nasal stents will be discussed. The presentation will employ lectures, video tape presentations and interactive dialogue between the presenters and the learners.

A TECHNIQUE OF PALATE REPAIR

Brian Sommerlad, MB, BS, FRCS (1), (1) Great Ormond Street Hospital for Children NHS Foundation Trust, Chelmsford, Essex, UK

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BACKGROUND & PURPOSE: The author has developed a technique for cleft palate repair, which has been adopted in many centres but is also controversial. The technique involves minimising dissection of the hard palate mucoperiosteum (by avoiding any incisions in 90% of cases) and radical dissection and reconstruction of the palate musculature using the operating microscope. The aim of the presentation is to present the technique and the evidence for its efficacy.

METHODS: The Master Class will include: • A description of the anatomy which is the basis of the repair • Hints on the use of the operating microscope • A detailed description of the operative technique with videos • An analysis of outcomes – of both primary repair and re-repair • Comparison with other techniques – where possible • Discussion of unresolved questions The session will be interactive with debate encouraged.

PIERRE ROBIN SEQUENCE: FEEDING MANAGEMENT ACROSS INTERVENTIONS

Kelly Mabry, PhD (1), Kerri Langevin, APRN (2), (1) Southern Connecticut State
BACKGROUND & PURPOSE: Pierre Robin Sequence is recognized today as a condition characterized by micrognathia and/or retroglossa, glossoptosis, respiratory distress, and cleft palate. The respiratory difficulties resulting from the upper airway obstruction lead to impairments in the newborn’s ability to feed effectively. The basis of the feeding problems have been explained as an over-expenditure of energy on breathing, leading to further difficulty in attempts to feed. The upper airway obstruction interferes with the infant’s ability to engage in the suck-swallow-breathe-suck pattern that comprises normal feeding. Purpose: This presentation will review the feeding challenges of children with PRS and present feeding options and techniques based upon treatment modalities; from tracheostomy to mandibular distraction osteogenesis.

METHODS: This Master Class program will be presented in lecture format with case studies and hands-on demonstrations of feeding techniques.

A KEEN EYE TOWARDS EFFECTIVE TEAM COORDINATION

Iris Sageser, RDH, MS (1), Jamie Idelberg, RDH, BS (2).

BACKGROUND/PURPOSE: This interactive session is for new and experienced coordinators or directors of a cleft and/or craniofacial team who are interested in optimally managing their team. The presenters have worked for over 20 years as team coordinators at two urban pediatric hospitals.

METHODS: Successful management of an interdisciplinary team is an ongoing challenge that often requires creative thinking, willingness to try something new, and critical analysis of current clinical and team management practices. Keeping both families and team members satisfied, handling team growth, insurance/reimbursement issues, patient referral protocols, organizing social events, the power of connecting, using the business tool of process mapping, and subspecialty biases. These recommendations were published in the Journal of Pediatrics in 2011 and will be shared with the audience during this session including specifics regarding assessment and treatment of palatal abnormalities, speech and language difficulties, intellectual and behavioral deficits and the approach to coordinating medical and surgical care. In line with the theme, it is now clear that these recommendations are applicable to patients with other copy number variants including the 22q11.2 duplication and those patients with an atypical nesed 22q11.2 deletion, all of which will be presented and shared with the audience in the setting of an interactive workshop.

UPDATES IN ALVEOLAR BONE GRAFTING

Barry Steinberg, PhD, DDS, MD, FACS (1), Sidney Elsig, DDS (2), Bonnie L. Padwa, DMD, MPT (3), Lawrence E. Brecht, DDS (4), Lawrence E. Brecht, DDS (4), David B. Cevallos, University of Florida/Dept of OMFS, Jacksonville, FL (1), New York Presbyterian Hospital/Columbia University, New York, NY (3), Children’s Hospital Boston, Boston, MA (4), New York University Langone Medical Center, Institute of Reconstructive Plastic Surgery, New York, NY

BACKGROUND & PURPOSE: Alveolar cleft bone grafting is one of the most common procedures performed by cleft care professionals. These can be complicated and require alternatives to traditional flap designs. Complicated alveolar cleft surgery will be discussed. The use of autogenous bone remains the gold standard. However, the use of bone stimulating substances such as BMP are increasingly being used. The panel will discuss bone and BMP in alveolar cleft reconstruction. Final reconstruction following grafting will also be discussed.

METHODS: The panel would be for 90 minutes and include presentations on: Autologous Bone Graft Reconstruction of the Cleft Maxilla Use of Bone Morphogenetic Protein (BMP-2) in the Cleft Patient Reconstruction of Bilateral Cleft Defects; Flap Options and Management of the Premaxilla Restorative options of the alveolar cleft site (implants, crown and bridge, orthodontic substitutions) The 4 presentations above would be for 20 minutes each, followed by 10 minutes for question and answer.

ADDRESSING BARRIERS IN ACCESS TO PRIMARY CLEFT AND CRANIOFACIAL CARE

Margot Neufeld, MA (1), Cynthia Cassell, PhD, MA (2), George Wehby, MPH, PhD (3), Michael VanLue, PhD (4). (1) Operation Smile, Virginia Beach, VA, (2) National Center on Birth Defects and Developmental Disabilities, CDC, Atlanta, GA, (3) University of Iowa, Iowa City, IA, (4) Children’s Hospital of Wisconsin, Milwaukee, WI

BACKGROUND & PURPOSE: While children and families affected by orofacial cleft (OFC) may be born with available information on accessing healthcare, these items may be difficult to obtain and utilize. Many families still face challenges obtaining essential treatment and services for their children with OFC. Potential barriers include families’ lack of information or misinformation about availability of health insurance coverage, cultural or communication barriers, misperceptions of medical need, cost, and geographical factors. Panel members will address gaps in knowledge regarding barriers to care for children with OFC and discuss possible strategies to improve the accessibility and quality of information on treatment for OFC for affected families.

METHODS: Panelists will include participants from academic institutions, cleft and craniofacial teams, organizations dedicated to cleft care, and the Centers for Disease Control and Prevention. Panelists will discuss past and current studies examining barriers to care among children with OFC, using data from population-based state birth defects registries, parental surveys, hospital discharge, and geographical information systems. Geographical barriers, including travel time and distance to cleft care accessibility compared to utilization of cleft and craniofacial teams, in various states will be examined. Panelists will also discuss the findings of a collaborative and comprehensive analysis of the existing literature on barriers to cleft care undertaken to identify the knowledge gaps. Panelists’ experiences observing perceived or actual barriers to accessing care for OFC and treatment during their work with children with OFC, their families, and cleft and craniofacial teams will be presented.

STRA TEGIES AND TOOLS TO HELP IMPROVE MEDICAL ADHERENCE IN THE CRANIOFACIAL TEAM

Karla Haynes, RN, MPH, MS, CPNP (1), Noreen Clarke, RN, MSN (1), Laura Garcia, MSW (1), Amy Goodler, RN, DNP, CPNP, IBCLC (1), Alexis Johns, PhD (1), Sally Ward, MD, FFAP (1), Yvonne Gutierrez, MD (2), Sally Ward, MD, FFAP (1), Yvonne Gutierrez, MD (2), (1) Children’s Hospital Los Angeles, Los Angeles, CA, (2) Children’s Hospitals Los Angeles, Los Angeles, CA

BACKGROUND & PURPOSE: Comprehensive care of patients with Craniofacial differences involves multiple health disciplines and entails interdisciplinary care. Treatment plans are often complex with various providers, including specialists outside the multidisciplinary Craniofacial team, and require adherence to timelines. It is crucial to partner with families, primary care providers/medical homes, schools, and community organizations to provide comprehensive family centered care. Our team uses a range of strategies and tools, including care notebooks, to empower families to advocate for their child and actively participate in his/her healthcare through optimizing communication and effective coordination. Some families have difficulties adhering to recommendations and medical treatment is delayed or disrupted with potentially negative impact on child health. Team members develop customized plans for improved adherence through addressing barriers and providing tools, with efforts to help families understand the importance of treatment plans and consequences of nonadherence. These efforts are not always enough to avoid referral to Child Welfare agencies for potential neglect. Decisions to collaborate with Child Welfare agencies involves consideration of multiple factors, including potential harm to child, team members’ relationship to patient and family, and barriers to care, such as limited
A SINGLE CENTER’S EXPERIENCE WITH ISOLATED UNICORONAL CRANIOSYNOSTOSIS RECONSTRUCTION: LONG-TERM OUTCOMES OF 182 PATIENTS OVER 35 YEARS
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BACKGROUND & PURPOSE: Assess long-term outcomes of patients with isolated unicoronal synostosis treated at our institution over a thirty-five year period.

METHODS: A retrospective review was performed of patients with unicoronal synostosis from 1977 to 2012. Patients were excluded with prior outside intervention, or diagnosis of syndromic or multisutural synostosis. Demographic, operative/post-operative data and outcomes were analyzed with chi-squared and Fisher’s exact test for categorical data and Wilcoxon rank-sum and Kruskal-Wallis rank for continuous data.

RESULTS: Over 35 years, 182 patients were treated for unicoronal synostosis and 156 met inclusion criteria. The patient population was predominantly female (65%, n=110) with synostosis predominantly on the right (60%, n=93). Patients presented with supraorbital retrusion (95%, n=148), orbital dysmorphology (71%, n=110), compensatory bossing (51%, n=79), nasal root deviation (38%, n=59), occipital irregularity (12%, n=18), and midfacial asymmetry (8%, n=12). Primary intervention included 53 (35%) unilateral frontoorbital advancements (FOA) with unilateral frontal craniotomy, 54 (35%) incomplete bilateral FOA with bilateral frontal craniotomy, 42 (27%) unilateral FOA with bilateral frontal craniotomy, and 5 (3%) bilateral FOA with bilateral frontal craniotomy at a mean age of 0.98±1.0 years. There were 3 acute surgical complications (3%). Mean follow up was 5.9±5.0 years, and in patients with ≥1 year follow-up (n=129), 57 (44%) required second intervention. At latest follow-up (n=129), 57 (44%) required second intervention. Of the 24 patients with metopic synostosis, 20 patients (83%) required second intervention.

CONCLUSIONS: Strategies for delaying surgical intervention and addressing craniofacial asymmetry and compensatory bossing need to be addressed. The need for second intervention could be reduced with a more aggressive approach to pterional craniotomy to minimize brain retraction and skull base junction complications.

THREE-DIMENSIONAL ORBITAL DYSMORPHOLOGY IN METOPIC SYNOSTOSIS
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BACKGROUND & PURPOSE: Metopic synostosis is characterized by trigonocephaly, lateral supraorbital retrusion, and hypotelorism. Most phenotypic evaluations have focused on the forehead without much emphasis on the orbits. The study seeks to explore differences in orbital dysmorphology for metopic and control patients, along with different degrees of metopic synostosis.

METHODS: Demographic and craniometric data were compiled. CT scans were digitized (Materialise) and metopic and control groups were compared. Degree of trigonocephaly was classified into moderate and severe cases based on endocranial bifrontal angle. Orbital plane angle, width, depth, volume, and corneal projection were measured. Statistical two-tailed t-tests were used, with significance determined as p<0.05.

RESULTS: Forty-six CT scans were analyzed (23 affected, 23 controls). Mean ages (6 months metopic, 7 months control) and genders (18 males metopic, 10 males control) were determined. Orbital plane angle measurements showed differences between the metopic and the control (p=0.0002), along with a correlation to trigonocephaly (p=0.0097). Orbital width and height were insignificant between controls and metotics, though height was less in severe metotics (p=0.046 left, p=0.0337 right). Orbital Depth was significant between control and metopic (p=0.0106 left, p=0.0025 right), and pronounced in severe cases (p=0.0349 left, p=0.0071 right). Corneal Projection correlates with metopic severity (p<0.01 left, right), while orbital volume showed insignificant change between control and metopic cases.

CONCLUSIONS: Orbital dysmorphology worsens with increasing degree of trigonocephaly, but is an independent co-deformity. The relative exopthalmos most directly correlates with worsening trigonocephaly. Expanding and advancing the lateral orbital wall is a critical treatment element in correction.

THE PREVALENCE OF STRABISMUS IN PATIENTS WITH UNICORONAL SYNOSTOSIS
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BACKGROUND & PURPOSE: While there is a clear correlation between unilateral coronal synostosis (UCS) and ocular motility abnormalities, the literature provides little information as to the epidemiology of strabismus, or the etiology of this pathology. The purpose of this study is to investigate the risk of ocular motility problems associated with UCS and its management.

METHODS: A retrospective review of all patients identified to have single-suture, non-syndromic UCS. Of patients identified as pre-operative strabismus to any craniofacial surgical intervention. Following surgical intervention, 52 patients (65.8%) were diagnosed as having strabismus with 24 patients (30.4%) identified as developing new onset strabismus postoperatively. Of the 52 patients who had postoperative strabismus, 30 (38.0%) went on to have extraocular muscle surgery. Of the 24 patients who had new onset strabismus following frontoorbital advancement, 11 (45.8%) required ocular surgery. There were no statistically significant differences in sex (p=0.44), race (p=0.360), or future involvement (p=0.80) in comparing the group with new postoperative strabismus and those without. Age at intervention also did not correlate with the development of strabismus (p=0.83).

CONCLUSIONS: This observational study, representing the largest of its kind, sheds new light on the prevalence of strabismus in UCS, and more importantly, the risk of developing strabismus in the setting of fronto-orbital advancement. This data helps surgeons more accurately counsel families and reinforces the important role of ophthalmologists as members of the multidisciplinary team caring for these patients.

AGE AT TIME OF SURGERY AND MAINTENANCE OF HEAD SIZE IN NON-SYNDROMIC SAGITTAL CRANIOSYNOSTOSIS
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BACKGROUND & PURPOSE: An important goal of treatment for non-syndromic sagittal craniosynostosis is to maintain appropriate intracranial volume to protect brain development and function. There is no consensus as to the type or timing of surgery. Regression in head circumference post-operatively is recognized in published data. It is possible that timing of surgery may play a role in regression. We aim to examine our experience with regard to age at time of surgery and maintenance of head size.

METHODS: We retrospectively reviewed all patients who underwent sub-total cranial vault reconstruction for non-syndromic sagittal craniosynostosis.
between 2005 and 2011. Head circumference (HC) was recorded preoperatively, 3 months post-operatively, and then yearly until 6 years of age. Preoperatively, and immediate- and 2-year- post-operative computed tomography (CT) imaging was also used to calculate the cranial index (CI). Head circumference percentile changes and CI were analyzed using one-way repeated measures analysis of variance (ANOVA).

RESULTS: We identified 61 patients and 33 met inclusion criteria. Eleven patients (33%) were >6 months old at the time of operation. Average age at operation was 6.4mo (3.2 to 40.9). The HC percentile was increased >3 months after surgery. One year after surgery, HC percentile was reduced compared to preoperative baseline. The average preoperative HC percentile was 87.5, which decreased to 75.6 at one year and to 69.7 at two years (*p<0.05). Patients aged >6 months old at time of operation experienced a smaller reduction in HC percentile two years after surgery than younger patients (-7.1 vs. -23.2, *p<0.05). In all patients, cranial index (CI) increased from an average of 76.7 to 86.5 approximately 2.4 years after surgery (*p<0.05). There was no significant effect of age at time of surgery on CI on 2-way ANOVA.

CONCLUSIONS: Subtotal cranial vault reconstruction to treat sagittal synostosis resulted in short- but not long-term over-correction in HC percentile. However, children operated >6 months of age, showed less regression in HC than children operated at <6 months of age. CI was improved in all patients. Older age at the time of cranial vault reconstruction for sagittal synostosis may play a role in the long-term maintenance of cranial expansion.

ARE ENDOSCOPIC AND OPEN TREATMENTS OF METOPIC SYNOSTOSIS EQUIVALENT IN TREATING TRIGONOCEPHALY AND HYPOTELORISM?

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BACKGROUND & PURPOSE: Patients with metopic craniosynostosis with associated hypotelorism and trigonocephaly are classically treated with fronto-orbital advancement. A less-invasive endoscopic treatment comprises narrow ostectomy of the fused suture followed by post-operative helmet molding. Here we compare the one-year post-operative results of our open versus endoscopically-treated patients in terms of their associated deformities.

METHODS: We reviewed pre-operative and one-year post-operative 3D reconstructed computed tomography scans of patients treated for non-syndromic metopic craniosynostosis by either open (n=15) or endoscopic (n=13) technique. Hypotelorism was assessed by interzygomaticofrontal distance (ZFD) and intercanthal distance (ID). Trigonocephaly was assessed by two independent angles: first, an axial-plane two-dimensional angle between frontotemporal bilaterally and the glabella (FTG); second, an interfrontal angle (IFA) between the most anterior point from a reconstructed midsagittal plane and supraorbital fontanelle bilaterally. Images were oriented to the sella-nasion horizontal. Age-matched scans of unaffected patients (n=28) served as controls for each case.

RESULTS: Patients with open repair (9.5±1.8 months) were older at time of surgery than patients with endoscopic repairs (3.3±0.4 months) (p=0.004). Male to female ratios were equivalent at roughly 7:3 in both groups. Preoperatively, the endoscopic group had more severe hypotelorism and FTG than the open group (p=0.04). After accounting for preoperative differences, all of the postoperative measurements of the two groups were statistically equivalent (p ≥ 0.38) except for ZFD (p = 0.005). Trigonocephaly was significantly improved post repair in both the open (8° [FTG] and 18° [IFA]) and endoscopic (13° [FTG] and 16° [IFA]) groups (p < 0.001). Postoperative measures in both groups were equivalent to controls (0.08 < p < 0.98). Intra-rater reliability ranged from 0.93 to 0.99 for all measurements.

CONCLUSIONS: Our retrospective series shows that endoscopic and open repair of metopic craniosynostosis are equivalent in normalizing hypotelorism and trigonocephaly at 1 year followup. In this small sample ZFD was greater in post-endoscopic compared to open repair. Additional studies are necessary to better define minor differences in morphology which may result from the different techniques.

CRANIAL BASE ASYMMETRY AFTER OPEN AND ENDOSCOPIC REPAIR OF ISOLATED LAMBDOID CRANIOSYNOSTOSIS

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BACKGROUND & PURPOSE: Premature fusion of the lambdoid suture results in deformity of the cranial base characterized by deviation of foramen magnum to synostotic side, asymmetry of the petrous ridges and the external acoustic meatus, and a mastoid bulge ipsilateral to the synostosis with contralateral occipital bossing. Previous studies have shown that traditional open cranial vault remodeling does not fully address the endocranial deformity in patients with lambdoid synostosis. This study aims to compare endoscopic-assisted suturoctomy with postoperative molding helmet therapy to traditional open reconstruction by quantifying changes in cranial base morphology.

METHODS: Anthropometric measurements were made on pre- and 1-year postoperative three-dimensionally reconstructed computed tomography scans of 12 patients with unilateral lambdoid synostosis: 8 patients underwent open posterior cranial vault reconstruction and 4 received endoscopic-assisted suturoctomy with molding helmet therapy. Cranial base asymmetry was analyzed using previously defined measures: posterior fossa deflection angle (PFA), petrous ridge angle (PRA), mastoid cant angle (MCA), and vertical and anterior-posterior (A-P) displacement of external acoustic meatus (EAM). Postoperative comparisons were made between the open and endoscopic groups.

RESULTS: Preoperatively, in the open and endoscopic groups were statistically equivalent in PFA (p=0.720), PRA (p=0.958), MCA (p=0.085), and A-P EAM displacement (p=0.591). Postoperatively, open and endoscopic patients were statistically equivalent in all measures. Mean postoperative PFA for the open and endoscopic groups was 6.61 and 6.43 degrees (p=0.939), PRA asymmetry was 6.37 and 7.56 percent (p=0.641), MCA was 4.01 and 3.18 degrees (p=0.387), vertical EAM displacement was -2.28 and -2.25 millimeters (p=0.974), and A-P EAM displacement was 6.84 and 7.75 millimeters (p=0.429).

CONCLUSIONS: Patients treated with both open and endoscopic repair of isolated lambdoid synostosis show persistent postoperative cranial base asymmetry. Results of endoscopic-assisted suturoctomy with postoperative molding helmet therapy are similar to those of open reconstruction.

IMPACT OF AGE AND OPERATION ON ADVERSE EVENTS AFTER CRANIOSYNOSTOSIS REPAIR

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BACKGROUND & PURPOSE: Surgical intervention for craniosynostosis varies widely with regards to type of repair and age at first operation. Postoperative adverse events and eventual reoperation rates secondary to this variability have not been completely defined, particularly as less invasive methods have gained popularity.

METHODS: All non-syndromic craniosynostosis patients who underwent surgical repair and had a recorded birth date were selected by CPT/ICD 9 codes from the Thompson Reuters Marketscan Database. Logistic regression models were used to compare 90-day adverse event rates according to age at surgery and procedure used. Relative reoperation events were assessed using Cox proportional hazards modeling. Fisher exact testing was used to determine impact of gender.

RESULTS: Of 1232 patients, 644 (52.3%) underwent surgical repair between 0 and 6 months, 471 (38.2%) between 6 and 12 months, and 117 (9.5%) between 12 and 18 months. Variations of strip craniectomy alone were performed in 515 (44.3%) cases, and cranial vault reconstruction (CVR) was performed in 647 (52.5%). Surgical intervention between 6 and 12 months of age was associated with increased incidence of ICD9-defined hemorrhagic events and transfusions compared to earlier repair (hemorrhagic 6.2% vs 3.0%, transfusion 26.3% vs 21.3%, both p < 0.05). Additionally, ICD9-defined hemorrhagic events were more frequently observed in male patients (5.0% vs 2.3%, p < 0.03). Lastly, repair with CVR was associated with an increased reoperation rate compared to repair with strip craniectomy (8.7% vs 2.9%, p < 0.001).

CONCLUSIONS: Repair between 6 and 12 months and male gender may increase the risk of adverse bleeding events in craniosynostosis patients. Additionally, CVR surgery appears to increase eventual reoperation rate compared to strip craniectomy.

UNILATERAL CLEFT LIP REPAIR USING THE ANATOMIC SUBUNIT APPROACH: MODIFICATIONS AND ANALYSIS OF EARLY RESULTS IN 93 CONSECUTIVE CASES
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BACKGROUND & PURPOSE: Fisher published early results of an anatomic subunit approach for unilateral cleft lip (uCL) repair in 2005. He has since presented favorable intermediate results; however, the experience using this approach by other surgeons has yet to be reported. The purpose of this study is to determine the early outcomes using the Anatomic Subunit Approach to uCL repair and to compare measures to outcomes with modifications.

METHODS: Ninety-three consecutive patients who underwent primary uCL repair by a single surgeon using the Anatomic Subunit Approach were included. Pre- and post-operative anthropometric measurements on 3D images were used to determine cleft severity and objective outcome. Asher-McCade scores by a blinded independent surgeon on 2D photos were used to determine subjective outcomes. Differences in measurements were analyzed using 2-tailed t-tests and scaling scores were compared using Mann-Whitney tests.

RESULTS: Male-to-female ratio was 1.3:1, 4% had associated syndromes, and right-to-left ratio was 1:2. Cleft presentation was: 3 microform, 42 incomplete, 12 complete with Simonart band, and 36 complete. Median age at surgery was 6 months (range 3-45). Mean pre-operative columellar angle was 30.7 degrees (range 5-70), nostril-width-ratio was 2.06 (range 1.13-5.50), and medial-lip-height-ratio was 0.59 (range 0.40-0.90). The mean inferior triangle used was 1.8 mm (range 0.4-5.5). All patients underwent caudal septoplasty. Modifications during the course of this series included more extensive nasal floor closure and conversion from non-absorbable to absorbable sutures. For the first 10 patients, post-operative measurements were significantly improved from pre-op (p<0.05) and normalized to: columellar angle 7.8 degrees, nostril-width-ratio 1.14, nostril-height-ratio 0.97, and medial-lip-height-ratio 1.24. Asher-McCade scores were 1.22 for nasal form, 1.44 for nasal deviation, 1.00 for vermilion border, and 1.22 for nasal profile. For the last 10 patients in the series, the post-operative measurements and Asher-McCade scores were not significantly different than for the first 10 patients. Images for the remaining 73 patients have been collected and will be measured for final detailed analysis.

CONCLUSIONS: The Anatomic Subunit Approach for unilateral cleft lip repair in a single surgeon series can be used to achieve improvements in anthropometric measures and early favorable post-operative form. Long-term follow-up is necessary.

64 USE OF AN INFERIOR PENNANT FLAP DURING UNILATERAL CLEFT LIP REPAIR IMPROVES LIP SYMMETRY

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BACKGROUND & PURPOSE: To improve the rotation of Cupid’s bow and achieve sufficient vertical lip height, several variations of the Millard rotation-advancement have incorporated a small laterally-based triangular flap above the cutaneous roll. This study uses three-dimensional photographic analysis to evaluate the outcomes of unilateral cleft lip repairs with and without pennant flaps.

METHODS: Three-dimensional photographs were analyzed to assess postoperative asymmetry in 90 unilateral cleft lip patients (58 complete, 32 incomplete) treated between 2001 and 2012. Cleft lip repairs were performed by 3 pediatric craniofacial surgeons using different techniques. 39 of 90 (43%) procedures utilized an inferiorly placed triangular flap. All patients were photographed at least 9 months postoperatively (mean = 4.2 years). All images were obtained prior to secondary cleft lip revisions. Image reorientation set the horizontal axis to the line through the exocanthia. Lip height asymmetry was based on the vertical distances from the subnasal to the peaks of Cupid’s bow.

RESULTS: A two-sided Fisher’s exact test confirmed that the proportions of complete and incomplete clefts were equal in the repairs with and without pennant flaps (p = 0.825). Regression analysis indicated that repairs which used a pennant flap had significantly less lip height asymmetry (β = 4.9%, p = 0.014). Patients with complete cleft lips had significantly greater asymmetry post-repair than patients with incomplete clefts (β = 4.1%, p = 0.038). The surgeon performing the repair was also a significant factor (β = 2.4%, p = 0.030), although subcategorization based on surgeon continued to demonstrate improved lip symmetry among patients who underwent pennant flap during reconstruction.

CONCLUSIONS: The outcomes of unilateral cleft lip repairs are affected by both the surgeon and the surgical technique. Procedures which utilized a pennant flap achieved better lip symmetry than non-pennant repairs. In addition, postoperative asymmetry was smaller in patients with incomplete clefts.
Abstracts

Cephalometric advancement between single and two piece osteotomy. The average nasal soft tissue changes were IAW 1.9mm (0.4-4.2), INW -0.2mm (-2.8-1.6), NTP -1.0mm (-4.9-2.0), CL -0.7mm (-2.9-1.5), NLA -0.2 degrees (-13.9-15.1) and NL -0.7mm (-4.3-1.5).p=0.001, 0.6, 0.08, 0.01, 0.9, 0.2). For single-piece osteotomy alone changes were IAW 1.2mm (0.6-4.1), INW -0.6mm (2.8-1.7), NTP -1.9 mm (-4.0-0.3), CL -1.2mm (-2.9-0.3), NLA -1.3degrees (-13.9-15.0) and NL -1.1mm (-4.3-0.7).p=0.007,0.3, 0.009, 0.002, 0.7, 0.2). For two-piece osteotomy alone changes were IAW 1.6mm (-0.4-3.3), INW 0.5mm (0.4-1.6), NTP 0.5mm (-1.1-2.0), CL 0.2mm (-1.4-1.5), NLA 2.8 degrees (7.6-10.1) and NL -0.1mm (-1.4-1.5).p=0.2, 0.4, 0.5, 0.6, 0.5, 0.9).

CONCLUSIONS: Cleft-related nasal scarring and malposition affect changes in nasal aesthetics following maxillary advancement. Patients with cleft lip and palate demonstrate a predictable increase in interalar width and decrease in columellar length as well as a trend to decrease nasal tip projection following Le Fort I osteotomy. Two-piece Le Fort I increases variability of changes in nasal aesthetics compared with single-piece advancement.

Skeletal Stability After Maxillary Distraction with a Rigid External Device (Red) in Adult Patients with Cleft Lip and Palate

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Background & Purpose: The study included 10 non-growing patients with maxillary hypoplasia in patients with cleft lip and palate with Class III skeletal relationship. There were 6 men and 4 women, with mean age at treatment of 21.4 years (range 16-32years). Mean follow up period was 36.6 months (range 12-70 months). The surgical treatment included a high Le Fort I osteotomy in combination with placement of an external distraction device. The Titanium distractor was fixed to the maxillary bone as an anchor during distraction. After 7 days of latency period, activation was done at the rate of 1mm per day. Consolidation period was observed for minimum of 3 months after which distractor was removed and maxilla was plated in its new position. Standardized Lateral cephalograms were obtained preoperatively (T1), immediately after the consolidation (T2), and during post distraction follow up period (T3). The horizontal and vertical maxillary skeletal changes at T1, T2, and T3 were assessed by various angular and linear cephalometric measurements. Horizontal movement of maxilla was assessed by using SNA(angular), FH-N-A (Maxillary depth angle) and N-A Horizontal. Vertical movement of maxilla was assessed by SN-Palatal plane angle, N-ANS (vertical), N-PNS (vertical), ANS-FH (vertical), PNS-FH (vertical), AHT (vertical). Median values were calculated for all the linear and angular measurements.

Results: The maxilla was significantly advanced as indicated by horizontal movement of point A (median difference:12.1mm) and increase in SNA angle (median difference-13.65º). Similar change can be observed with Maxillary Depth angle (median difference -15.5º).The palatal plane angle showed a minimum increase (median Difference - 4.05º) showing minimum clockwise rotation. Vertical movement of PNS compared to ANS along FH plane and N (7º reference plane- N) was less, indicating some amount of clockwise rotation. There was a wide variation in the vertical maxillary changes at the A point. The relapse in the horizontal position of point A was at the most 0.5 mm in 6 out of 10 cases (median difference:0.5 mm). There was a slight decrease in maxillary depth angle (median of difference: 1.05º) and SNA angle (median of difference: 0.65 º). Palatal plane angle was decreased (median difference: 0.25º) and in 6 out of 10 cases the relapse was at the most 0.50. The vertical distance between ANS, PNS and FH plane decreased with median of difference 1.0 and 0.85mm respectively. Similar decrease in vertical distance between ANS, PNS and N (7º reference plane-N) was seen.

Conclusions: Maxillary Distraction Osteogenesis in a non-growing patient with cleft maxillary deformity using Rigid External Distraction device is highly effective, predictable and stable modality for managing severe maxillary hypoplasia.

Incidence of Positive Screening for Obstructive Sleep Apnea in Children with Isolated Cleft Lip and Palate

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Background & Purpose: Children with cleft lip and/or palate (CLP) are at increased risk for developing obstructive sleep apnea (OSA) due to abnormalities in oropharyngeal anatomy present either at birth or as a result of surgical intervention. Despite the high prevalence of children with CLP, little is known on the incidence of OSA in this high-risk group. The purpose of this study is to determine the incidence of positive screening for OSA in children with isolated, non-syndromic CLP.

Methods: An IRB-approved, retrospective chart review was performed on consecutive patients seen by the cleft lip and palate team at a pediatric hospital between January 2011 and August 2013. Families completed the Pediatric Sleep Questionnaire (PSQ), a validated tool with a sensitivity of 85% and specificity of 87% in predicting moderate to severe OSA in otherwise healthy children. Patients were excluded if they had CLP with an underlying genetic syndrome or other craniofacial disorder. After stratifying by CLP type, ANOVA test with Tukey’s method was utilized to compare the risk for positive OSA screening according to clinical diagnosis.

Results: A total of 866 patients completed the PSQ during the study period and 491 children with isolated CLP met inclusion criteria. This cohort had an average age of 8.4 ± 4.39 years (range = 0.46–21.37) and was comprised of 60% males (293/491). The overall incidence of positive screening was 13.6% (67/491) with the most commonly reported symptoms being mouth breathing (27.7%), interrupting or choking on others (26.7%), and fidgeting with hands or feet (25.7%). A positive screen was seen in 12% of children with submucous cleft palate (0/14), 12.1% of children with soft palate cleft (4/33), 11.1% of children with soft and hard palate cleft (7/63), 14.3% of children with unilateral CLP (35/244), 13.2% of children with bilateral CLP (15/114), and 26.1% of children with isolated CL (6/23). There was no statistical difference in the rate of positive screening amongst cleft types.

Conclusions: Children with CLP are at phenotypic risk for OSA. Appropriate screening for OSA may lead to early diagnosis and treatment thereby limiting the natural history and long-term sequelae.

The Rate of Orofacial Fistula Following Primary Cleft Palate Surgery: A Meta-Analysis

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Background & Purpose: The authors present a meta-analysis of studies that reported on primary cleft palate repair over a 12-year period to determine the rate of oronasal fistula, and to identify risk factors for their development.

Methods: The Medline database was reviewed for English-written papers published between 2000 and 2012 with the search items: “cleft palate fistula” and “cleft palate surgery”. Inclusion criteria included: 1) primary cleft repair; 2) follow-up of median age of time of surgery of <4 years; 3) postoperative follow-up period of >3 months; and 4) a clear description of an oronasal fistula as a communication between oral and nasal cavities. Exclusion criteria included: 1) pre-clinical animal studies; 2) case reports; 3) patients with a type V-VII fistula, as defined by the Pittsburgh Fistula Classification System; and 4) repair of submucous cleft palates. A random effects meta-analysis of proportions and exact confidence intervals was performed. For Veau classifications, an extension of the Cochran-Mantel-Haenszel Test for a series of 2x4 tables was utilized.

Results: Of the 17 studies that met our inclusion criteria, 6 more were rejected because they were deemed to be statistical outliers. This resulted in 11 studies, comprising 2505 children, which were incorporated into our analysis. These studies were found to be statistically comparable to each other, meeting the homogeneity assumption with an acceptable I-squared 0.203). The primary outcome targeted for analysis was the occurrence of an oronasal fistula, which we found to be 4.9% (95% CI 3.8-6.1%). There was a significant relationship between Veau classification and the occurrence of a fistula (p<0.001) with fistulae most prevalent in patients with a Veau IV cleft. The rate of fistula occurrence did not correlate to the surgical technique utilized for palate repair. The location of fistula, based upon the Pittsburgh Fistula Classification System, were as follows: Type I, 0.0%; Type II 12.7%; Type III, 54.0%; Type IV, 27.0%; with the remaining reported as a combination of locations not otherwise specified. One study used decellularized dermis in cleft repair with a fistula rate of 3.2%.

Conclusions: Evaluation of the rate of occurrence of oronasal fistula following primary cleft palate repair is hindered by inconsistency of reporting surgical outcome details, inclusion or exclusion of submucous cleft palate
method, a wide range of patient populations, and differing surgical techniques. Utilizing 11 studies comprising 2505 children, we find the rate of fistula occurrence, defined as consonant communication between the oral and nasal cavities, to be 4.9%. Furthermore, patients with a Veau IV cleft are significantly more likely to develop an oronasal fistula but use of decellularized dermis may be protective. When fistulae do occur, they do so most often at the junction of the primary and secondary palate.

NAVIGATING SOCIAL CHALLENGES: LIFE WITH A CLEFT LIP AND PALATE

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BACKGROUND & PURPOSE: People born with a cleft lip and palate may struggle in social situations. Why does this happen and why do some people struggle more than others? As care givers we often lack the expertise to properly address these situations. Purpose: To improve understanding of the impact a cleft lip and palate can have on social interaction. To discuss the use of various coping techniques. To learn about social cues and how they are affected in different situations. To recognize how a cleft lip and palate can alter everyday perceptions.

METHODS: The presentation begins with a video that allows the viewer to empathize with four people born with cleft lip and palate as they share their experiences through a variety of life’s situations. The audience will recognize different coping skills and how these skills influence each individuals social growth. The video is followed by a didactic session during which a psychologist will define terms that can help create an effective learning forum for whole audience participation with the panel presenters, including a patient born with a cleft lip and palate and an oral cleft program director.

PHONETIC DETERMINANTS OF AUDIBLE NASAL EMISSION (VELAR FLUTTER) IN CHILDREN WITH REPAIRED CLEFT PALATE

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BACKGROUND & PURPOSE: Audible nasal air escape is a perceptual consequence of incomplete velopharyngeal (VP) closure during oral pressure consonants and can vary from a quiet hissing-like noise to a louder flutter (Trost, 1981). Although velar flutter (or rustle) is a common and distracting perceptual symptom, there is little information regarding its phonetic determinants. This study used perceptual and acoustic analysis to identify the occurrence of velar flutter in children with repaired cleft palate as a function of consonant (plosive versus fricative) and vowel (high versus mid-central) phonetic contrasts.

METHODS: Participants consisted of 32 consecutive children (12 boys, 20 girls, mean age = 8.6 years, range 4 to 13 years) with repaired cleft palate with or without cleft lip who exhibited visible and audible nasal air emission during clinical evaluation. All children were recorded using the oral and nasal microphones of the Nasometer while producing consonant-vowel (CV) syllables in the carrier phrase “Say CV CV CV again”. The targeted syllables were “pee”, “pah”, “tee”, “tah”, “fee”, “fah”, “see”, and “sah”. The acoustic software program TFS was used to isolate the stop gaps and fricative segments from the nasal audio signal of all targets. Using audio replay and inspection of the waveform and spectrograms, the segments were coded as having a) no velar flutter, b) flutter during part of the segment, or c) flutter during the entire segment.

RESULTS: Intra- and inter-judge reliability of coding for velar flutter was adequate. Percentages of syllables with velar flutter in at least part of the segment were: 58% plosive-high vowel, 42% plosive-mid vowel, 58% fricative-high vowel, and 51% fricative-mid vowel. Mantel-Haenszel tests for repeated measures indicated a significant effect of vowel (p=0.0287) and no significant consonant or interaction effects.

CONCLUSIONS: Velar flutter occurs more often in CV syllables with high-front plosives regardless of consonant (plosive or fricative). Results are discussed relative to a) possible differences in velar height that might facilitate flutter, and b) diagnostic implications relative to speech samples used for either perceptual or instrumental assessment of nasal emission and/or resonance.

ARTICULATION OUTCOMES IN CHILDREN WHO ARE INTERNATIONALLY ADOPTED

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BACKGROUND & PURPOSE: Children with orofacial clefts are frequently adopted into U.S. homes from non-English speaking countries. Articulation and phonemic development may be compromised in these children due to variable access to surgical care and later immersion in English. This study compares articulation outcomes of non-adopted (NA) children with those internationally adopted (IA) from non-English speaking countries.

METHODS: Eighty-one children (69 cleft palate ± cleft lip; ages 3.0 to 8.11) were included in analysis. Mean age at adoption for IA children (N=32) was 24.4 months (range = 10-48 months). Subjects completed The Goldman-Fristoe Test of Articulation-2 (GFTA) and Differential Abilities Scale-II nonverbal subtests (DAS-II NV). Frequency of cleft related errors (CRE; backing and nasal substitutions) was calculated from GFTA. Linear regression analyses (LRA) with robust standard errors were used to assess associations between: 1) GFTA and adoption status, age at adoption, age at assessment, parent SES and DAS-II NV; and 2) the association between CRE; adoption status and age of palate closure, after controlling for the same variables.

RESULTS: We found that IA children had poorer GFTA performance than NA children (adjusted mean difference = 15.5, [Confidence intervals (CI) 3.8, 28.1, p=0.012]). IA children had later palate repair than NA children (adjusted mean difference = -11.4, CI=-16.6, -6.2). Age at primary palate repair was not associated with frequency of CRE (beta=.028, CI=-.405, 300, p=.854); however, adoption status continued to contribute meaningfully to the analysis (beta = -359, CI=0.8, 20.4, p=.060). Older IA children had more CRE than same age NA children.

CONCLUSIONS: Children adopted from non-English speaking countries are at risk for articulation impairment. Age at primary palatoplasty did not influence articulation outcomes.

LANGUAGE DEVELOPMENT IN CHILDREN WITH OROFACIAL CLEFTS ADOPTED FROM NON-ENGLISH SPEAKING COUNTRIES

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BACKGROUND & PURPOSE: Children with orofacial clefts (OFC) are frequently adopted from non-English speaking countries. As a part of a larger research project investigating reading achievement and speech and language development, this study compares language development between children with OFC exposed to English (Early Exposure: EE) to children with OFC adopted into English speaking homes from non-English speaking countries (Late Exposure: LE).

METHODS: Sample included 81 children (39 males; 31 LE) with OFC, ages 3-8 years (Mean=6.1 yrs). Language skills were assessed using the CELF-P2 for the children ages 3-4 and the CELF-4 for the older children. We performed linear regression analyses (LRA) with bootstrapping to assess the association between English language exposure and language development for each of the index scores of the CELF: Core Language; Receptive Language; Expressive Language; Language Content; and Language Structure while controlling for parent SES and nonverbal abilities using Nonverbal Reasoning and Spatial Standard Scores of the Differential Abilities Scale (DAS-II). In follow-up LRA, we also examined associations between adoption age and time since adoption on CELF performance.

RESULTS: Mean age of adoption for LE children was 24.4 months (range=10-48 months) and mean length of time between adoption age and assessment (English Exposure Time; EET) was 50.9 months (range=19-83 months). LE children performed worse than EE children on all language measures with mean differences (MD) ranging from -6.7 to -10.4 (p-values = .015 to .004). EET, but not age of adoption, was associated with language outcomes (Beta = 1.003 (Expressive) to 0.549 (Receptive); all p’s<0.005, except Receptive Language and Language Content (both p’s>0.09)).

CONCLUSIONS: Children with OFC who are adopted from foreign countries and are learning the English language later in their development score significantly lower on assessments of language than children exposed to English since birth. English language skills improve significantly the longer children are in an English speaking environment regardless of age at adoption.
by insufficient access and long travel distances. In response to this unmet need, some of these children need additional speech interventions, but are limited by treatment coordination between speech-language pathologists and surgeons.

**BACKGROUND & PURPOSE:** Pediatric patients with cleft palate can have significant speech deficits after surgical repair necessitating team treatment coordinated between speech-language pathologists and surgeons. Some of these children need additional speech interventions, but are limited by insufficient access and long travel distances. In response to this unmet need, we developed a multidisciplinary team to build a game-based program that reinforces accurate production of typical problematic sounds that are characteristic in some cleft speech. The purpose of this pilot study is to determine the feasibility and replay value of this supplementary speech therapy tool.

**METHODS:** In a multidisciplinary effort between otolaryngologists, speech-language pathologists, and computer engineers, novel speech software was developed for the iPad. This program requires the child to produce a series of intelligible speech commands in order to progress through the game story. The game was designed to address high-pressure sounds problematic in cleft speech in children ages 2 to 7 after palatoplasty. The subjects completed the game with parental observation. Video was captured of the subject completing the standardized speech assessment tool for future comparison. After the encounter, the subject's parents completed a questionnaire (satisfaction and perceived effectiveness) using a 7-item Likert scale, ranging from 1(strongly disagree) to 5(strongly agree). Parental responses were analyzed using Kruskal-Wallis ANOVA. Specific feedback to the software engineers facilitated game adjustments.

**RESULTS:** Ten children were enrolled in this pilot study. All patients completed the game and video capture. The average time for a single play-through of the game was 3 minutes and 30 seconds. The majority of parents agreed/strongly agreed that the game was engaging to the player (70%), that the player perceived a sense of control of the game story (80%), and that the game was enjoyable to replay repeatedly (80%). No difference between the parental responses were found (p > 0.05).

**CONCLUSIONS:** This game-based speech software was engaging with high replay value. Implementation of this intervention-modality offers a promising supplement to standard speech therapy in improving intelligibility in patients with cleft palates. Iterative game improvements will be based on investigator, parent, and children's input leading to phase 2 of the game development.

**DEVELOPING A NOVEL SPEECH INTERVENTION IPAD GAME FOR CHILDREN WITH CLEFT PALATE: A PILOT STUDY**

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**BACKGROUND & PURPOSE:** Pediatric patients with cleft palate can have significant speech deficits after surgical repair necessitating team treatment coordinated between speech-language pathologists and surgeons. Some of these children need additional speech interventions, but are limited by insufficient access and long travel distances. In response to this unmet need, we developed a multidisciplinary team to build a game-based program that reinforces accurate production of typical problematic sounds that are characteristic in some cleft speech. The purpose of this pilot study is to determine the feasibility and replay value of this supplementary speech therapy tool.

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**THE INFLUENCE OF SPEAKING RATE ON NASALANCE IN TYPICAL ADULT SPEAKERS**

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**BACKGROUND & PURPOSE:** Nasometry is a non-invasive tool frequently used to measure speech resonance. Nasometry protocols do not provide detailed instructions for speaking rate control during data collection. Studies attempting to establish a relationship between speaking rate and nasalance have yielded mixed results. Therefore, it is important to identify the influence of speaking rate on nasalance in a variety of speaking tasks. The purpose of this research is to determine the degree to which natural variations in speaking rate influences nasalance measures for syllable repetition and paragraph reading tasks.

**METHODS:** Fifty-eight typical adult speakers (age 18-30 years) participated in a normative nasometry study. Subjects had normal hearing and no history of cleft palate. Participants produced 6 sustained vowels, 5 sentences, and 4 paragraphs presented in random order followed by 14 syllable repetitions from the SNAP-R (Kummer, 2005). This analysis focused on syllable repetitions and 4 paragraphs (Zoo, Nasal, Sibilant, and Rainbow passage). Speech waveforms were used to derive speaking rate in syllables per second. Mean percent nasalance was transformed into rationalized arc sine units (Studebaker, 1985). Multilevel linear regression was used to account for correlations among observations (i.e., observations nested within trials and subjects).

**RESULTS:** Syllable repetition rates ranged from 1.4 to 4.0 syllables per second and paragraph speaking rates ranged from 2.5 to 4.9 syllables per second. Faster speaking rate was predictive of lower nasalance for oral syllables and higher nasalance for nasal syllables containing the vowel /a/ (p<.0005). This effect was not observed for syllables containing /i/. On paragraphs, faster speaking rate was predictive of low nasalance values for the Zoo and Sibilant passages (p<.05).

**CONCLUSIONS:** Natural variations in speaking rate can influence nasalance values. The findings suggest that nasometry protocols should control for speaking rate, particularly for repeated syllable tasks and the Zoo and Sibilant passages. Detailed analysis of relationships between rate and nasalance will be presented.

**USE OF DYNAMIC MRI TO QUANTIFY VELOPHARYNGEAL CONTACT LENGTH AND DIFFERENTIATE VELOPHARYNGEAL CONTACT CONFIGURATIONS AMONG PHONEMES**

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**BACKGROUND & PURPOSE:** Velopharyngeal insufficiency is a common issue for children with repaired cleft palates, preventing proper production of certain sounds, particularly plosives and fricatives. Velar elevation is a near real-time using word-level productions have been described along the mid sagittal image plane (Sutton et al., 2009; Bae et al., 2011; Scott et al., 2013) and oblique coronal image plane (Perry et al., 2013b, 2013c; Scott et al., 2013). The purpose of this study was to examine the velopharyngeal mechanism using dynamic MRI at the sentence-level production in children between 4-9 years of age with normal velopharyngeal anatomy.

**METHODS:** A high resolution, T2-weighted turbo-spin-echo 3D anatomical scan (SPACE) was used to acquire static velopharyngeal data on 11 children with normal velopharyngeal anatomy between 4-9 years of age. Dynamic speech assessment was successfully obtained on 8 out of 11 child subjects using a fast-gradient echo FLASH multi-shot spiral technique to acquire 15.8 fsp of the oblique coronal image plane.

**RESULTS:** There was no significant difference between males and females for velar muscle measures. Females had an overall mean levator length at rest of 39.3 mm and males had a mean length of 39.6 mm. Males displayed a slightly larger distance between muscle origin (52.4 mm) compared to females (50.2 mm). On average, high back vowels, /u/, displayed a larger angle of origin and longer levator muscle compared to high front vowels, /I/ and /i/. Coarticulatory effects were noted across the sentence for the plosive-p consonant.

**CONCLUSIONS:** This study demonstrates a potentially useful technique in dynamic MRI that does not rely on cyclic repetitions or sustained phonation and can provide dynamic information related to muscle function. It is likely that future developments and improvements in techniques may demonstrate the clinical usefulness of dynamic methods in assessing speech prior to secondary surgical management.
METHODS: An IRB-approved, retrospective chart review was performed to evaluate the efficacy of our MDO treatment protocol from 1999-2013. Patients without a diagnosis of PRS were excluded. The MDO treatment protocol by a single surgeon using the same operative technique from 1999-2013 was analyzed with chi-squared, Fisher’s exact and Wilcoxon rank tests.

RESULTS: Between 2008 and 2013, 28 patients less than one year of age underwent mandibular distraction for tongue-based airway obstruction. Distraction was performed for documented obstructive sleep apnea and failure to thrive at an average age of 58 (range: 11-312) days with average distractor removal after 90 days. Pre-operative polysomnograms were obtained on 21 patients with an average apnea-hypopnea index (AHI) of 38.0/hr; the AHI on post-operative polysomnograms obtained after distraction completion was significantly reduced in all 13 patients in which it was measured (mean: 4.0/hr, p<0.0001). 19 patients were transitioned to oral ventilation after 90 days. Pre-operative polysomnograms were analyzed with chi-squared, Fisher’s exact and Wilcoxon rank tests. None required post-MDO tracheostomy.

CONCLUSIONS: Neonatal mandibular distraction is a powerful tool to treat airway obstruction. In contrast to tongue-lip adhesion, patients with a high GILLS score of 5 or higher were treated with tracheostomy (n=2/4). All patients who underwent a MPAS were categorized as having obstructive sleep apnea (n=33).

CONCLUSIONS: Our treatment protocol demonstrates MDO is a highly effective treatment modality for severe airway obstruction secondary to PRS and successfully avoids tracheostomy in the majority of patients. Patients diagnosed by MLB with laryngomalacia or tracheal stenosis are not candidates for MDO prior to tracheostomy; however, these patients may benefit from MDO after resolution of laryngomalacia or tracheal stenosis in order to expedite decannulation.

EVALUATION OF SURGICAL TREATMENT OF SYMPTOMATIC PIERRE ROBIN SEQUENCE: A COHORT COMPARISON STUDY BETWEEN FURLOW PALATOPLASTY VS. RADICAL INTRARALVEOLAR VELOPLASTY

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BACKGROUND & PURPOSE: Comparative outcome studies of speech development, velopharyngeal insufficiency, and palatal fistula formation after treatment of wide cleft palate defects seen with severe Pierre Robin Sequence (PRS) are currently limited. This study aims to compare speech development, speech outcomes, and palatal fistula rates in PRS patients requiring early neonatal/infant airway surgery (Tongue Lip Adhesion (TLA) vs. Mandible Distraction (DOG)) and later treated with Furlow palatopasty (FP) or radical intraralveolary velopasty (IVV).

METHODS: A retrospective cohort study of symptomatic PRS patients (n=23) treated over 81 months was performed using clinical data to compare time to speech development, speech outcomes, and palatal fistula rates between FP (Group 1) and IVV (Group 2) treatment groups.

RESULTS: In Group 1, the FP cohort, 10 patients were identified from September 2005- November 2009, (4 male and 6 female patients, average age at palatoplasty 1.30 years, 1 syndrome). In Group 2, the IVV cohort, 13 patients were identified from July 2007 – June 2012 (5 male and 8 female patients, average age at palatoplasty 1.57 years, 10 syndrome). The average age at oldest speech sample for FP was 3.96 years and for IVV was 2.48 (2.04 - 4.02) years. In Group 1 (FP), n=10 (100%) were treated with TLA and in Group 2 (IVV), n=12 (92%) were treated with DOG and n=1 (8%) with TLA. Conversion from TLA to mandible distraction for persistent sleep apnea occurred in 4 patients (25%). No patients initially treated with DOG converted to tracheostomy or TLA. Insertion of Alloderm at the time of palatoplasty in Group 1, n=4 (40%) and in Group 2, n=11 (85%) occurred. The palatal fistula rate in group 1 was one (0.0%) and in group 2 was none (0.0%) p=1.0. Delayed speech acquisition, velopharyngeal incompetence, and speech outcomes were less satisfactory in Group 1 vs Group 2.

CONCLUSIONS: Wide U-shaped cleft palates associated with severe symmetric Pierre Robin Sequence are adequately repaired with either Furlow palatoplasty or radical intraralveolary velopasty. Palatal fistulas were prevented using either technique with a higher rate of aloderm placement using IVV (85% vs. 40%). Persistent sleep apnea occurred more commonly in patients treated with TLA (25% vs 0%). Speech acquisition and subsequent speech delay was associated with syndromic status rather than type of palate repair. No significant differences in velopharyngeal incompetence were identified (10% vs. 7.5%). IVV operative time was significantly shorter than FP despite the increased time to implant alloderm.

A SIMPLE MANDIBULAR DISTRACTION PROTOCOL TO AVOID TRACHEOSTOMY IN PATIENTS WITH PIERRE ROBIN SEQUENCE

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BACKGROUND & PURPOSE: Historically, tracheostomy was the standard treatment for severe airway obstruction in patients with Pierre Robin Sequence (PRS). More recent treatment goals focus on avoiding tracheostomy through modalities such as mandibular distraction osteogenesis (MDO). Our practice utilizes a straightforward protocol to identify candidates for MDO, uniquely screening patients with a multipositional airway study (MPAS) and microlaryngoscopy and bronchoscopy (MLB). If the MPAS is consistent with significant obstructive sleep apnea, the airway is clinically unstable, then MLB is employed to exclude additional airway pathology before proceeding with MDO. In this study, we evaluated the efficacy of our MDO treatment protocol to resolve airway obstruction and avoid tracheostomy in patients with PRS.

METHODS: An IRB-approved, retrospective chart review was performed to assess our MDO treatment protocol. All patients were treated according to the MDO treatment protocol by a single surgeon using the same operative technique from 1999-2013. Patients without a diagnosis of PRS were excluded.

The data assessed included: tracheostomy status (pre-MDO, post-MDO, or none), MLB findings, MPAS results, and clinical resolution of airway obstruction following MDO.

RESULTS: Thirty-eight patients were identified according to the inclusion and exclusion criteria. Prior to referral for MDO, five patients required urgent tracheostomy. Of patients without a pre-MDO tracheostomy (n=33), two patients required tracheostomy post-MDO, while 94% avoided tracheostomy with clinical resolution of airway obstruction (n=31). The first patient requiring post-MDO tracheostomy failed multiple extubations, despite clinical resolution of airway obstruction. The second patient requiring post-MDO tracheostomy was diagnosed by postoperative MLB with laryngomalacia that was not visualized by preoperative MLB. A preoperative MLB diagnosis of laryngomalacia or tracheal stenosis was associated with a higher overall incidence of tracheostomy (n=2/4). All patients who underwent a MPAS were categorized as having obstructive sleep apnea (n=30).

CONCLUSIONS: Our treatment protocol demonstrates MDO is a highly effective treatment modality for severe airway obstruction secondary to PRS and successfully avoids tracheostomy in the majority of patients. Patients diagnosed by MLB with laryngomalacia or tracheal stenosis are not candidates for MDO prior to tracheostomy; however, these patients may benefit from MDO after resolution of laryngomalacia or tracheal stenosis in order to expedite decannulation.

MAPPING THE MANDIBULAR LINGULA IN SYMPTOMATIC PIERRE ROBIN SEQUENCE: A GUIDE TO THE INVERTED L-OSTEOTOMY

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BACKGROUND & PURPOSE: The inverted L osteotomy for mandibular lengthening in treatment of symptomatic Pierre Robin Sequence (PRS) is a useful technique for avoiding injury to the tooth root and inferior alveolar nerve. Identification of the position of the lingula relative to adjacent mandibular anatomic points is understood and may decrease iatrogenic complications. This study aims to map the position of the lingula in the micrognathic mandible.

METHODS: A retrospective cohort study of symptomatic PRS patients was performed comparing 3D CT data of relative lingula position between PRS patients (Group 1) and control patients (Group 2). Patients undergoing operative treatment for PRS between August 2008 and 2011 were included in Group 1. Patients undergoing craniomaxillofacial CT for aetiologies not affecting the mandible from the same time period were included in Group 2. Data measured included overjet, the gonial angle (Condylion to Gonion to Menton), length of the horizontal ramus (Gonion to Pogonion), height (measured as condylion (Co) to gonion (Go)) and width (measured as anterior vertical ramus (AVR) to posterior vertical ramus (PVR)) of the vertical ramus, and the distance of the lingula (Li) from the anterior ramus and from the gonion. Relative lingula position, with correction for differences in mandible size between test subjects and controls, was calculated as Li-AVR/AVR-PVR on the x-axis, and Li-Go/Co on the y-axis. Data were subjected to Mann-Whitney U testing to determine statistical significance between groups.

RESULTS: Eleven patients were identified for Group 1 and four for Group 2 (controls). The average overjet was 9.99mm in Group 1 and 4.28mm in Group 2 (p = 0.001). The gonial angle was 132.64° in Group 1 and 123.5° in Group 2 (p = 0.018). The average horizontal ramus length was 26.58mm in Group 1 and 40.62mm in Group 2 (p = 0.001). The average vertical ramus height was 16.05mm in Group 1 and 23.04mm in Group 2 (p = 0.003). The average vertical ramus width was 15.16mm in Group 1 and 20.67mm in Group 2 (p = 0.003). The average horizontal lingula position (Li-AVR) was 7.25mm in Group 1 and 10.75mm in Group 2 (p = 0.001). Relative horizontal lingula position was 0.44 in Group 1 and 0.52 in Group 2 (p = 0.138). The average vertical lingula position was 9.02mm in Group 1 and 11.34mm in Group 2 (p = 0.026). Relative vertical lingula position was 0.57 in Group 1 and 0.49 in Group 2 (p = 0.078).

CONCLUSIONS: Mandibles of PRS patients display globally smaller dimensions, as well as increased gonial angle and overjet compared to normal counterparts. There is a resultant decrease in vertical and horizontal distance of the lingula from gonion and from the anterior vertical ramus. When micrognathia is accounted for, the relative anatomic position of the lingula is maintained and equivalent to normal mandibles. Accurate anatomic identification using these measured landmarks can assist with locating and avoiding injury to the inferior alveolar nerve during L-osteotomy for mandibular lengthening.

EVALUATION OF OTOLARYNGOLOGY OUTCOMES AFTER SURGICAL TREATMENT OF SYMPTOMATIC PIERRE ROBIN SEQUENCE: A COHORT COMPARISON STUDY BETWEEN FURLOW PALATOPLASTY VS. RADICAL INTRANVELAR VELOPLASTY

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BACKGROUND & PURPOSE: Comparative outcome studies of otolaryngology outcomes (hearing loss, middle ear disease, and myringotomy rates with or without tube placement) after treatment of wide cleft palate defects seen with severe Pierre Robin Sequence (PRS) are currently limited. This study aims to compare otology outcomes in PRS patients requiring early neonatal/infant airway surgery (Tongue Lip Adhesion (TLA) vs. Mandible Distraction (DDG)) and later treated with Furlow palatoplasty (FP) or radical intravelar veloplasty (IVV).

METHODS: A retrospective cohort study of symptomatic PRS patients (n=23) treated over 81 months was performed using clinical data to compare hearing loss, middle ear disease, and myringotomy rates with or without Armstrong tube placement rates between FP (Group 1) and IVV (Group 2) treatment groups. Statistical analysis between groups using a Wilcoxon signed-rank test and students unpaired t-test was performed using SPSS 2.0.

RESULTS: In Group 1, the FP cohort, 10 patients were identified from September 2005- November 2009, (4 male and 6 female patients, average age at palatoplasty 1.30 years, 1 syndromic). In Group 2, the IVV cohort, 13 patients were identified from July 2007 – June 2012 (5 male and 8 female patients, average age at palatoplasty 1.57 years, 10 syndromic). The average age or widest drop sample for FP was 3.96 years and for IVV was 2.48 (0.4 – 4.02) years (p<0.05 for all demographic variables except syndromic status p=0.003). In Group1 (FP), n=10 (100%) vs. Group 2 (IVV), n=9 (69%) (p=0.056) were treated with tympanostomy with venting tubes at an average age of 1.03 years (0.33-1.63) vs. 1.01 years (0.45-1.44) respectively. The serious otitis, mucoid otitis, supplicative otitis media rates were 20%, 60%, and 20% in Group 1 (FP) and 11%, 78%, and 11% in Group 2 (IVV) respectively. The otorrhea rate was 30% in Group 1 and 31% in Group 2. The revision tube placement was in 20% in Group 1 and 30% in Group 2. The mean pure tone average (PTA) was 19.26 dB in Group 1 (n=8) vs. 20.75 dB in Group 2 (n=8). No patients required mastoectomy during the study period. Delayed speech acquisition, velopharyngeal incompetence, and adequate speech in group 1 was n=2 (20%), n=1 (10%), and n=5 (50%) respectively and in group 2 was n=11 (85%), n=1, (7.5%), n=17 (5%) respectively.

CONCLUSIONS: Symptomatic effusions were present during the first year of life in the majority of patients with severe symptomatic Pierre Robin Sequence. Tympanostomy tube placement rate was reduced in our study in patients treated with IVV when compared to Furlow palatoplasty. Hearing outcomes were similar for patients requiring tympanostomy tubes in either group. Speech acquisition and subsequent speech delay was associated with syndromic status rather than type of palate repair or rate of tympanostomy tube placement.

NASOPHARYNGEAL INTUBATION FOR SEVERE CASES OF ROBIN SEQUENCE: A FOLLOW UP OF THREE YEARS WITH EVALUATION OF NEUROLOGICAL DEVELOPMENT

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BACKGROUND & PURPOSE: Although the association of syndromic, lower airway, and gastrointestinal anomalies in Robin sequence (RS) is well known, the treatment of these anomalies was assessed. Univariate analysis was used to determine the purpose of this study is to evaluate the incidence of cardiac and central nervous system (CNS) anomalies in RS and determine whether screening for these anomalies should be recommended.

METHODS: An 11-year (2001-2012) retrospective review of infants with RS admitted to the neonatal intensive care unit (NICU) at a tertiary care children’s hospital was performed. The presence and type of cardiac and CNS anomalies was assessed. Univariate analysis was used to determine the
results were found to modify the Le Fort III procedure in order to allow safe inclusion of the maxillary sinus in the allograft.

METHODS: Sixteen fresh cadaver heads were used in this study. Ten full facial allografts containing nasal, maxilla, zygomatic, and maxillary bones were harvested through a traditional Le Fort III approach. In 6 cadaver heads, maxillary sinus and internal jugular veins where injected with red and blue latex, respectively. A modified Le Fort III approach was designed: the orbital floor osteotomy was performed at the posterior-most aspect of the orbit. The zygomatic arch was preserved and the pterygomaxillary disjunction was performed under direct vision after excising the temporals and lateral pterygoid muscles. Six full facial allografts were harvested through the modified approach. In all 16 allografts the maxillary sinus and its branches were dissected to assess laterality.

RESULTS: When the traditional Le Fort III approach was used to harvest the facial allograft, the terminal branches of the maxillary artery (the infraorbital and the terminal part of the sphenopalatine arteries) were injured constantly. The modified approach preserved these branches and allowed the dissection of the maxillary artery under direct vision. The pterygoid plexus veins were damaged in both cases.

CONCLUSIONS: Maxillary artery should be considered as the main blood supply of the facial allograft when a major portion of the facial bones is to be harvested along with limited amount of facial soft tissues. The described modified Le Fort III approach allowed the safe dissection of the maxillary artery, preserving the main blood supply to the facial skeleton.

87 AUTOLOGOUS BONE-ASSISTED CIANOPLASTY FOLLOWING DECOMPRESSION CRANIECTOMY IN PEDIATRIC PATIENTS: RISK FACTORS AND RATES OF RESORPTION
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BACKGROUND & PURPOSE: The efficacy of autologous bone-assisted cranioplasty for children who have undergone decompressive craniectomy has been disputed in recent studies. Development of symptomatic resorption has been reported at 50%, with most patients undergoing a revision cranioplasty. Risk factors for resorption in children are not well established. Previous studies identified age ≤2.5 years, permanent ventriculoperitoneal (VP) shunt, comminuted skull fracture, size of defect and interval >6 weeks to be associated with resorption. The purpose of this study is to evaluate potential risk factors for resorption in children for future studies of efficacy and prooperative risk stratification.

METHODS: All pediatric patients who underwent decompressive craniectomy and autologous bone-assisted cranioplasty from 2006 to 2013 were identified at our institution. A retrospective cohort study was conducted to evaluate risk factors for bone flap resorption. The primary risk factors evaluated were age ≤2.5 years, permanent VP shunt, comminuted fracture (≥3 pieces), removal of ≥2 cranial bones, interval >6 weeks, size of defect, cranioplasty surgeon, and cranioplasty surgical site infection. Multivariate analyses were performed to identify independent predictors of outcomes.

RESULTS: Fifty-two patients met eligibility criteria with 20 patients (38.5%) developing resorption. Of the entire cohort, 57.7% were male, 21.2% were ≤2.5 years old, 63.5% suffered traumatic brain injury, 13.5% required a permanent VP shunt, 42.3% had a comminuted skull fracture, 64% had removal of ≥2 cranial bones, and 73.1% underwent craniectomy to cranioplasty interval >6 weeks. The mean time to resorption was 7 months and mean follow-up time was 19.5 months. Among patients with resorption, 11 (55%) underwent revision with 4 (36.3%) undergoing an additional revision procedure. Multivariate analyses demonstrated age ≤2.5 years (adjusted OR 17.0) and comminuted skull fracture (adjusted OR 12.1) as independent predictors of resorption.

CONCLUSIONS: Although the rates of bone resorption and accompanying revision in this cohort are less than previously reported, these complications remain important considerations from a standpoint of efficacy and safety. Age ≤2.5 years and comminuted skull fracture were independent predictors of resorption, thus warranting further investigation.

ABSTRACTS

88 PEDIATRIC FACIAL FRACTURE PATTERNS: TRAJECTORIES AND RAMIFICATIONS IN 151 PATIENTS
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BACKGROUND & PURPOSE: Facial fractures in children present diagnostic and management challenges due to differences in facial trauma patterns and injury mechanisms. The objective of this study was to describe the patterns of facial fractures in children and identify risk factors associated with different types of injuries.

METHODS: A retrospective review of 151 pediatric patients with facial fractures was conducted. The patients were classified into three age groups: ≤2 years, 2-14 years, and 15-19 years. The fracture patterns were analyzed based on the trajectory of the fracture lines and the areas affected. Risk factors, including age, gender, mechanism of injury, and pre-existing conditions, were evaluated using statistical analyses.

RESULTS: The most common fracture types were zygomatic fractures (43%), mandible fractures (37%), and nasal fractures (25%). The patterns of facial fractures varied significantly among the age groups. For example, children ≤2 years had a higher incidence of orbital fractures, whereas teenagers had a higher incidence of nasal fractures. Multivariate analyses identified certain risk factors, such as younger age, falls, and motor vehicle accidents, as predictors of specific fracture patterns.

CONCLUSIONS: The study highlights the importance of considering age-related differences in the evaluation and management of pediatric facial fractures. Understanding these patterns can aid in the development of targeted interventions to prevent and manage these injuries.

86 RETRIEVAL OF A FULL FACIAL ALLOGRAFT BASED ON THE MAXILLARY ARTERY: INDICATIONS AND TECHNIQUE
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BACKGROUND & PURPOSE: Maxillary allograft has been traditionally considered the main blood supply of the facial skeleton. However, the deep and concealed location of the artery in the infratemporal and pterygopalatine fossae enclosed by the cranial base, mandible and maxilla makes the harvest of facial allografts based on this artery challenging. The purpose of this study was to determine the feasibility of using the maxillary artery as the primary blood supply for facial allograft retrieval.

METHODS: Sixteen fresh cadaver heads were used in this study. Ten full facial allografts containing nasal, maxilla, zygomatic, and maxillary bones were harvested through a traditional Le Fort III approach. In 6 cadaver heads, maxillary sinus and internal jugular veins where injected with red and blue latex, respectively. A modified Le Fort III approach was designed: the orbital floor osteotomy was performed at the posterior-most aspect of the orbit. The zygomatic arch was preserved and the pterygomaxillary disjunction was performed under direct vision after excising the temporals and lateral pterygoid muscles. Six full facial allografts were harvested through the modified approach. In all 16 allografts the maxillary sinus and its branches were dissected to assess laterality.

RESULTS: When the traditional Le Fort III approach was used to harvest the facial allograft, the terminal branches of the maxillary artery (the infraorbital and the terminal part of the sphenopalatine arteries) were injured constantly. The modified approach preserved these branches and allowed the dissection of the maxillary artery under direct vision. The pterygoid plexus veins were damaged in both cases.

CONCLUSIONS: Maxillary artery should be considered as the main blood supply of the facial allograft when a major portion of the facial bones is to be harvested along with limited amount of facial soft tissues. The described modified Le Fort III approach allowed the safe dissection of the maxillary artery, preserving the main blood supply to the facial skeleton.

85 A CURRENT ASSESSMENT OF CRANIOFACIAL FELLOWSHIP TRAINING
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BACKGROUND & PURPOSE: To evaluate the current status of craniofacial surgery training.

METHODS: An anonymous online survey was emailed to fellows completing a North American or Australian craniofacial fellowship in June of 2013.

RESULTS: Thirty of 33 craniofacial fellows (91%) completed the survey. All cited previously completing plastic surgery training. Of the respondents, only one U.S. trained plastic surgeon trained internationally, and several international plastic surgeons accepted U.S. fellowships. Only 14% of fellowships (4 of 29) offered the traditional apprenticeship model (single attending). Over half of the programs included some international experience, but only 19% stated this was necessary to address a case-type deficiency. The mean estimated number of cases reported were 380 (307-452, 95% CI). Based on case volume data, four main program types were identified: cleft/orthognathic, intracranial/orbital/midface, general pediatric plastics, and adult/trauma/reconstructive. Seventy-three percent of programs seemed to focus primarily on cleft/orthognathic surgery, 19% seemed focused on adult/trauma/reconstructive. Seventy-three percent of programs seemed to focus primarily on cleft/orthognathic surgery, 19% seemed focused on adult/trauma/reconstructive, and only 4% seemed to focus on intracranial/orbital/midface. Fellows were more likely to report feeling well prepared if greater than 12 cases in a particular category were performed. Fifty percent believed craniofacial training could be improved by establishing core areas of exposure and case category minimums. Operative experience, the faculty, clinical diversity, autonomy and mentoring were considered strengths of their fellowship by most and in that order.

CONCLUSIONS: Given that all trainees had initially completed plastic surgery training, it would seem that craniofacial surgery is truly a subspeciality of plastic surgery. Historically, craniofacial fellowships began as apprenticeships but few fellowships today retain this model with most structured in the “residency model” of multiple attendings, higher case volumes, and more generalized clinical experiences. Although, craniofacial surgery has been traditionally defined as orbital/intracranial surgery, currently there seems to be a broader diversity of clinical exposures offered within fellowships considered “craniofacial.” Today, the majority of fellowships focus on cleft/orthognathic and adult/trauma/reconstructive, with only a few focused on orbital/intracranial. Prospective applicants may wish to consider each fellowship’s unique clinical offerings to match the specific type of educational experience they are seeking.
5 YEAR FOLLOW-UP OF MIDFACE DISTRACTION IN GROWING CHILDREN WITH SYNDROMIC CRANIOSYNOSTOSIS

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BACKGROUND & PURPOSE: Maxillary skeletal position in patients with syndromic craniosynostosis after midface distraction has been shown to be stable 1 year postoperatively. The purpose of this study is to assess midfacial position in the growing child with craniosynostosis 5 years after Le Fort III advancement with a rigid external device (RED).

METHODS: Seventeen patients were identified to have the diagnosis of syndromic craniosynostosis and who underwent a Le Fort III osteotomy with midface advancement. There were 10 males and 7 females, 7 patients had Crouzon syndrome, 5 had Apert syndrome, and 5 had Pfeiffer syndrome. A standard subcranial Le Fort III osteotomy was performed and the midface advancement using a rigid external device.

RESULTS: Immediate after device removal, oribital advanced 13.67 mm along the x axis and downward 1.70 mm along the y axis. Point A advanced 15.97 mm along the x axis and downward 1.14 mm along the y axis. The greatest average movement was at the level of the upper incisal edge, 16.5 mm along the x axis and downward 1.94 mm along the y axis. At 1 year post-distraction, both oribital and point A advanced an additional 0.47 mm and 0.24 mm along the x axis and downward 0.58 mm and 1.78 mm along the y axis respectively. The upper incisal edge moved posterior 0.60 mm along the x axis and downward 3.46 mm along the y axis. At 5 years post-distraction, oribital moved posterior 0.58 mm, point A advanced an additional 2.08 mm and the upper incisal point advanced 1.93 mm along the x axis. Orbital, point A and upper incisal point moved downward 3.23, 5.20, and 6.35 along the y axis respectively. We also found that the maxillary and mandibular skeletal discrepancy improved over the 5 year period.

CONCLUSIONS: After significant Le Fort III advancement, the maxillary position remains stable and continues to advance minimally along the x axis and demonstrates more growth along the y axis over the long term.
MINORITY AND PUBLIC INSURANCE STATUS: IS THERE A DELAY TO ALVEOLAR BONE GRAFTING SURGERY?
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BACKGROUND & PURPOSE: Clefts of the lip and palate are repaired in infancy, but full rehabilitation is not complete until alveolar bone grafting (ABG). ABG surgery awaits many years of orthopedic correction and orthodontic therapy. This approach may sacrifice the best opportunity for maxillary growth and bony support for tooth eruption. To achieve optimal results, ABG is performed prior to the eruption of permanent teeth into the cleft site. When delayed, ABG can delay orthodontic treatment, oral rehabilitation, and worsen overall aesthetic outcomes. Studies have documented disparities in access to ABG care, but few have investigated ABG surgery outcomes with cranial bone grafting and no studies evaluating complications and long-term outcomes in a large series of patients undergoing cranial bone grafting.

METHODS: We conducted a retrospective study of all patients receiving ABG surgery from January 2003 to January 2013 at a large, urban cleft center. Patient charts were reviewed for race/ethnicity, insurance type, as well as dates of birth and ABG surgery. Race/ethnicity data were defined as Caucasian, Hispanic, or African American. Minority race status included Hispanic and African American. Insurance status was defined as public or private payer. Patients were excluded from analysis if they had an underlying genetic syndrome or if they transferred from another institution prior to four years of age. For purposes of comparison, a two-tailed student’s t test was employed with P values <0.05 considered significant.

RESULTS: A total of 419 patients underwent ABG surgery during the study period and 263 met inclusion criteria. The mean age of ABG surgery in our cohort was 8.10 +/- 2.32 years and 62.4% were male (164/263). Patients with minority status received delayed ABG surgery compared to white patients (9.33 vs 7.95 years, P<0.01). There was no difference in age at ABG surgery in patients with public insurance status compared to private insurance (8.62 vs 7.98 years, P=0.20).

CONCLUSIONS: This preliminary study shows a 16 month delay in ABG surgery for children with minority race status. Public payer status was not associated with delayed ABG surgery. Greater attention may be required to ensure patients with minority race status receive timely delivery of cleft care.

CRANIAL BONE GRAFTING FOR ALVEOLAR CLEFTS: A 25- YEAR REVIEW OF OUTCOMES
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BACKGROUND & PURPOSE: Cranial bone grafting for an alveolar cleft obtains membranous bone from a low morbidity donor site. Although iliac crest bone is the favored donor site there are no objective analysis of 3D radiological outcomes with cranial bone grafting and no studies evaluating complications and long-term outcomes in a large series of patients undergoing cranial bone grafting.

METHODS: A retrospective chart review was conducted on patients who underwent alveolar bone grafting from the cranium over a twenty-five year period by a single surgeon. Data collected included patient characteristics, complications and clinical outcomes. Radiological analysis of graft outcomes was determined using Amira volume-rendering software on the most recent ten consecutive patients.

RESULTS: Our study cohort was 308 patients, with an average age of 11.5 years. Complications involved harvesting the graft in 3.5%, donor site in 1% and recipient site in 17.2%. Regrafting was required in 7.1%, with a clinical success rate of 92.9%. The average alveolar defect was 1.19 mL preoperatively and 0.19 mL postoperatively with 85% fill of the cleft defect by radiologic analysis.

CONCLUSIONS: Cranial bone grafting for the alveolar cleft is a low morbidity operation and has similar success to iliac crest bone graft and should be considered more often as a viable option for the alveolar cleft patient.

QUALITATIVE ANALYSIS OF MESIAL AND DISTAL ALVEOLAR BONE OF MAXILLARY CANINES MOVED TO GRAFTED ALVEOLAR CLEFT: A TOMOGRAPHIC EVALUATION
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BACKGROUND & PURPOSE: The treatment protocol of patients with complete clefts is based on the primary plastic surgeries, the alveolar bone graft surgery followed by orthodontic treatment, which usually evolves the mesialization of the permanent canine to the missing lateral incisor region. Although it has been the main protocol for years, the surrounding alveolar bone healthiness remains the major concern for orthodontists. With a Cone-Beam computed tomography (CBCT) exam, it is possible to evaluate the periodontal morphology accurately. Purpose: the aim of this study was to qualitatively assess by means of CBCT imaging the mesial and distal alveolar bone of teeth orthodontically moved into the grafted area and compare it to the permanent canine in the non-cleft side.

METHODS: The sample comprised 30 CBCT exams of patients with unilateral alveolar clefts that had been submitted to alveolar bone graft surgery and comprehensive orthodontic treatment. The exams were assessed in the Nemoscan Software (Nemotec Inc., Madrid, Spain). The exams were positioned with the assessed tooth perpendicular to the horizontal plane for each axial image. The qualitative assessment was performed in three levels (3, 6 and 9 mm from the cemento-enamel junction) by means of indexes varying from 0 (total absence of bone) to 4 (anatomically normal bone morphology). Three previously calibrated evaluators assessed the images. The statistical analyses were performed by the Wilcoxon test.

RESULTS: The mesial aspect of the canines in the non-left side showed statistically better results than the left side canines in all axial levels. Differences between the canines in the non-cleft side showed a statistically better result than the contralateral only 3mm from the cemento-enamel junction. The 6mm and 9mm levels showed similar results between the canines in the cleft and non-cleft side.

CONCLUSIONS: The results suggests that despite the bone graft provides a better bone condition to the teeth adjacent to the cleft it might occur significant bone defects that must be considered, proposing the importance of a very low forces and a rigid periodontal control.

PERIODONTAL MORPHOLOGY OF CENTRAL INCISORS OF PATIENTS WITH UNILATERAL ALVEOLAR CLEFT: A CBCT ASSESSMENT
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BACKGROUND & PURPOSE: The treatment protocol of patients with complete clefts is based on the primary plastic surgeries, the alveolar bone graft surgery followed by orthodontic treatment, which usually evolves the mesialization of the permanent canine to the lateral incisor region. Although it has been the main protocol for years, the buccal and lingual alveolar bone thickness and crest level of the central incisors adjacent to the grafted region remains uncertain. With a Cone-Beam computed tomography (CBCT) exam, it is possible to evaluate the periodontal morphology accurately. Purpose: the aim of this study was to assess by means of CBCT imaging the buccal and lingual alveolar bone thickness and crest level of the central incisor to the missing lateral incisor region. Although it has been the main protocol for years, the buccal and lingual alveolar bone thickness and crest level of the central incisors adjacent to the grafted region remains uncertain. With a Cone-Beam computed tomography (CBCT) exam, it is possible to evaluate the periodontal morphology accurately. Purpose: the aim of this study was to assess by means of CBCT imaging the buccal and lingual alveolar bone thickness and crest level of the central incisor to the missing lateral incisor region. Although it has been the main protocol for years, the buccal and lingual alveolar bone thickness and crest level of the central incisors adjacent to the grafted region remains uncertain. With a Cone-Beam computed tomography (CBCT) exam, it is possible to evaluate the periodontal morphology accurately. Purpose: the aim of this study was to assess by means of CBCT imaging the buccal and lingual alveolar bone thickness and crest level of the central incisor to the missing lateral incisor region.
NEW PERSPECTIVES TO PERFORM BONE TISSUE ENGINEERING FOR ALVEOLAR BONE GRAFT TO CLEFT LIP AND PALATE PATIENTS USING NON INVASIVE SOURCES OF STRUC CT.

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BACKGROUND & PURPOSE: Cleft lip and palate (CLP), one of the most frequent congenital malformations, affects the alveolar bone in the great majority of the cases, and the reconstruction of this defect still represents a challenge in the rehabilitation of these patients. The gold standard in alveolar bone reconstruction is autogenous bone grafts. However, these surgical procedures may be subjected to complications such as donor area morbidity, post-surgical reabsorption and infections. To circumvent these problems, researchers have been focusing on the development of bone tissue engineering strategies and osteogenic substances that may offer alternative methods with minimal or no donor site morbidity for perform bone grafts. The purpose of this study is identify non-invasive sources of mesenchymal stem cells with osteogenic potential to be used in bone tissue engineering for Cleft Lip and Palate patients.

METHODS: To isolate the mesenchymal stem cells from non invasive sources we used Orbicular Oris Muscle (OOM) and Levator Palatine Muscle (LPM) fragments, which are regularly discarded during surgery repair of Cleft lip and palate patients (cheiloplasty and palatoplasty). We also used dental pulp (DP) obtained from deciduous teeth of patients to isolate and analyze the mesenchymal stem cells. The pre-plating technique was used to obtain mesenchymal stem cells from these tissues: OOM, LPM and DP (Bueno et al., 2009). The mesenchymal stem cells were characterized through flow cytometry analysis. They were also induced, under appropriate cell culture conditions, to osteogenic, chondrogenic, adipogetic and skeletal muscle cell differentiation that were evidenced by immunohistochemistry. To evaluate “in vivo” osteogenic potential of these mesenchymal stem cells obtained from non invasive tissues they were associated with a collagen membrane and they were transplanted to craniofacial bone defects in animal model.

RESULTS: The flow cytometry analysis showed that the mesenchymal stem cells obtained from non invasive sources (OOM, LPM and DP) were mainly positively marked for five mesenchymal stem cell antigens (CD29, CD90, CD105, CD73,CD166), while negative for hematopoietic (CD45) and endothelial cell marker(CD31). After induction under appropriate cell culture conditions, these mesenchymal cells obtained from OOM, LPM and DP were capable to undergo chondrogenic, adipogetic, osteogenic, and skeletal muscle cell differentiation, as evidenced by immunohistochemistry. We also demonstrated that these cells together with a collagen membrane lead to bone tissue reconstruction in animal model.

CONCLUSIONS: The cells obtained from OOM, LPM and DP are Mesenchymal stem cells and they have osteogenic potential “in vitro” and “in vivo”. Therefore, they represent a promising source of stem cells to be used in alveolar bone grafting treatment (bone tissue engineering), particularly in young CLP patients. Recently we obtained ethical permission to start the clinical trials in using these cells.

UTILIZING A SURGICALLY CREATED ALVEOLAR CLEFT MODEL IN JUVENILE SWINE TO TEST STEM CELL-BASED TREATMENT STRATEGIES

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BACKGROUND & PURPOSE: Congenital craniofacial malformations involving bone occur in 1:250 live births. Historically, reconstruction of these defects has relied on autologous bone grafting. Tissue engineering offers a novel alternative to this strategy. Our engineering efforts utilize mesenchymal stem cells (MSCs) from the umbilical cord (UC) grown on nanofiber scaffolds. Our preference for large animal model is the swine: like humans, swine are omnivores, with similar size and function of the facial skeleton, making them ideal to test tissue engineered bone. In this study, we utilize a previously reported juvenile swine alveolar cleft model to test autologous UC MSC bone generation.

METHODS: MSCs were isolated for autologous implantation from swine umbilical cords (UC) using an explant technique, transduced using adenov-associated virus (AAV) green fluorescent protein (GFP)-seeded electropson poly-lactic co-glycolic acid (PLGA) nanofiber scaffolds, and cultured in either growth or osteoinduction media for 1week. Four-week-old pigs (n=7) underwent survival surgery to confirm the dimensions of a critical-sized alveolar cleft defect, to determine bone generation with cancellous bone grafting, and to test the efficacy of undifferentiated (n=2) or differentiated (n=2) MSC-generated bone within the maxillary defect. All pigs were sacrificed at 1 month. Computed tomography (CT) scans were obtained at initial surgery and at sacrifice. IKT Snap and MIMICs were used to calculate bone densities and volume fill in the surgically created clefts. Swine weight and maxillary length were determined to normalize bone formation in the surgically created cleft. Histological evaluation and mechanical testing were performed on bone samples.

RESULTS: All surgical created clefts healed without complication. Critical sized defects, which approached 2 cm did not heal without treatment. Volume for new bone formation was lowest for cancellous bone treatment (388 mm3), followed by undifferentiated MSCs (426.985 mm3), and differentiated MSCs (730.24 mm3). Histological evaluation confirmed bone formation in all three treatment modalities.

CONCLUSIONS: This study uses a previously developed juvenile porcine unilateral alveolar cleft model with critical-sized defect of 2 cm to determine efficacy of autologous UC MSC-based therapies for treatment of the maxillary cleft. Both differentiated and undifferentiated UC MSCs generated bone within the surgically created cleft that is comparable to cancellous bone treatment. Ex vivo osteoinduced MSCs appear to result in better bone formation, and may eventually provide an alternative treatment modality for the alveolar cleft.

DIFFERENTIAL EFFECTS OF INFLAMMATORY MEDIATORS TNFα, TGFβ1 ON CELLULAR DIFFERENTIATION IN A MURINE IN VITRO MODEL OF HETEROTOPIC OSSIFICATION

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BACKGROUND & PURPOSE: Heterotopic ossification (HO) is a pathologic condition of bone formation in extremity muscles. Systemic and local inflammatory conditions acting on muscle-derived progenitor cells (MDCs) may either support or alter myogenic differentiation and promote pathologic chondrogenic or osteogenic differentiation. The aim of this study is to evaluate the effects of inflammatory mediators (TNFa, TGFβ1) on MDC myogenic, chondrogenic, and osteogenic differentiation.

METHODS: Primary mouse muscle cells were isolated from 8-week-old C57/6j mice. Hindlimb muscles were sterilized processed and pre-plating on collagen-coated flask for 2 hours to minimize fibroblasts. The non-adherent mixed population of MDCs was cultured in F-10 growth medium with no greater than 3-4 passages for amplification. Four populations of cells were analyzed via FACS for surface markers. 100,000 cells per well were cultured in
TGFβ1 inhibits BMP2 mediated osteogenic differentiation in a primary murine muscle cell in vitro model of heterotopic ossification

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BACKGROUND & PURPOSE: Heterotopic ossification (HO) is pathologic bone formation in extremity muscles. Alterations in inflammatory mediators and bone morphogenetic proteins acting on muscle derived progenitor cells (MDCs) are thought to be critical for HO formation. The aim of this study is to evaluate the effects of bone morphogenetic protein (BMP2) and inflammatory mediators (TNFα, TGFβ1) on MDC osteodifferentiation.

METHODS: Primary mouse muscle cells were isolated from 8-week-old C57B/6J mice. Hindlimbs muscles were sterilised processed, followed by pre-plating on collagen-coated flasks for 2 hours to remove fibroblast. 100,000 cells per well were cultured in DMEM-based proliferation medium (PM) alone or with 1 ng/ml of TGFβ1 alone or in various combinations. Samples were collected after 3 days. RNA was isolated and reverse transcribed to cDNA. Quantitative PCR for Osx, Alp and Runx2 was performed. Changes in target gene expression were expressed relative to untreated MDCs with expression normalized to GAPDH.

RESULTS: FACS analysis revealed a mixed population of cells, with high Sca-1 and CD34 expression and low CD31, CD 56, CD144 and CD146 expression. Umbilical cord (UC) MSCs and phenotype modulation with variations in delivered frequencies.

METHODS: Both human and porcine UC MSCs were harvested by explant technique with appropriate IRB and IACUC approval; cells were grown to subconfluence, and subjected to vibratory stimulus using an in vitro bioreactor programmed to deliver vibrations at 1 hertz (Hz) or 100 Hz for 15 hours per day for a period of 10 days. Positive controls were generated using standard osteogenic and chondrogenic media. At conclusion of the studies, cells were stained with Alizarin red to determine calcium deposition and alcian blue staining within 24 hr of culture. Co-stimulation with either TGF-beta3 or FGF, but not TGF-beta2, potently antagonized BMP-2-induced ALP staining.

CONCLUSIONS: These results indicate that TGF-beta3 and FGF can inhibit BMP-induced osteogenic differentiation. This finding may lead to the development of combinatorial growth factor therapies for the management of bone formation in patients with craniosynostosis.

VIBRATORY STIMULUS ELICITS BOTH OSTEONEGENESIS AND CHONDROGENESIS IN UMBILICAL CORD MESENCHYMAL STEM CELLS

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BACKGROUND & PURPOSE: Previous work in stem cell phenotype manipulation has demonstrated the capacity of tensile strain to induce osteogenesis in mesenchymal stem cells (MSCs), and for compression to induce MSC chondrogenesis. No work has examined the capacity of direct vibratory stimuli on MSC phenotype changes. This study details the design of an in vitro programmable bioreactor to generate precise vibratory stimuli to umbilical cord (UC) MSCs and phenotype modulation with variations in delivered frequencies.

RESULTS: Stimulation of C2C12 cells with BMP-2 resulted in elevated ALP formation in extremity muscles. Alterations in inflammatory mediators and TGF-beta superfamily, which includes the bone morphogenic proteins (BMPs) and TGF-beta isoforms, plays an essential role in normal craniofacial development. The relative abundance of TGF-beta superfamily members is thought to influence suture patency, and altered expression of these proteins has been observed in craniosynostotic patient samples and fusing animal studies. In the present study, we evaluated the interplay between BMP-2 and other growth factors (TGF-beta 2 and 3 and fibroblast growth factor (FGF)) in vitro as a model for management of excessive bone formation as seen in craniosynostosis.

METHODS: Murine C2C12 myoblasts were used in this investigation. Cells were stimulated with BMP-2 (50 ng/ml) with and without TGF-beta2 (25 ng/ml), TGF-beta3 (25 ng/ml) or FGF (25 ng/ml) for 24 hours. Osteogenic differentiation was assessed by qualitative Alkaline Phosphatase (ALP) assay. RESULTS: Stimulation of C2C12 cells with BMP-2 resulted in elevated ALP staining within 24 hr of culture. Co-stimulation with either TGF-beta3 or FGF, but not TGF-beta2, potently antagonized BMP-2-induced ALP staining.

CONCLUSIONS: These results indicate that TGF-beta3 and FGF can inhibit BMP-induced osteogenic differentiation. This finding may lead to the development of combinatorial growth factor therapies for the management of bone formation in patients with craniosynostosis.
BACKGROUND & PURPOSE: A short mandible and basal maxilla are common findings in infants with cleft palate with or without cleft lip (CP±CL); however, the possible relation to the extent of unrepaired clefts and mandibular as well as maxillary lengths has not been studied. The purpose of the present study was to investigate mandibular and maxillary lengths in five subgroups of CP±CL, including both complete (C) and incomplete (I) clefts.

METHODS: Material: 71 infants with unrepaired UICL (control group) and 227 infants with unrepaired CP±CL: 51 CP and 176 CLP (81 UCCPL, 19 BCCPL, 49 CCP/ICL, 27 CCP/ICL) (age range: 70-100 days). Measurements: mandibular length (MaL: cd-pgn) and basal maxillary length (MxL: ci-pm) in lateral cephalometric X-rays. The method error was estimated by duplicate measurements. Differences between groups were tested using ANOVA and Student’s test. The level of significance was set at 5%.

RESULTS: The method error was found to be within acceptable limits. Mean MaL: 53.8±3.3mm in controls, 49.1±3.4mm in isolated CP, and 49.8±2.8mm in CLP. MaL was significantly shorter in the total group with CP±CL compared to the controls, however, no significant differences were found between the five subgroups with CP±CL. Mean MxL: 12.5±1.7mm in the controls, 9.9±1.8mm in isolated CP, and 11.2±2.1mm in CLP. MxL was significantly shorter in all five subgroups with CP±CL compared to the control group, and the group with isolated CP had a significantly shorter maxilla than the four subgroups with CLP; however, no significant differences were found between the subgroups with CLP.

CONCLUSIONS: It seems that the primary anomaly in isolated CP and in four subgroups with varying combinations of CL is characterized by a significant and comparable foreshortening of the mandible in all groups. Furthermore, all groups have a significant foreshortening of the basal maxilla when compared to the norm, and this foreshortening is significantly more pronounced in subjects with isolated CP compared to subjects with varying combinations of CL. Finally, no significant differences are seen in the length of the basal maxilla between the subgroups with CLP.

MICROESTHETIC DENTAL ANALYSIS IN PARENTS OF CHILDREN WITH ORAL CLEFTS
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BACKGROUND & PURPOSE: Nonsyndromic cleft lip and palate (NSCL/P) is a complex trait caused by genetic and environmental factors that interact to produce a wide spectrum of orofacial malformations, including dental anomalies, most of which affect the upper anterior dentition. The underlying genetic etiology of such dental anomalies remains elusive. The purpose of this study is to compare the shape of the maxillary and mandibular dental arches using multivariate analysis of covariance (MANCOVA) in unaffected parents of children with NSCL/P (cases) and adult controls with no CL/P history to identify dental shape and microesthetetic variation within the NSCL/P phenotypic spectrum.

METHODS: Intraoral photographs of 482 individuals (253 cases, 229 controls) collected from 5 sites (Iowa, Texas, Hungary, the Philippines, and Pittsburgh, PA) were screened for healthy, non-restored maxillary and mandibular dentition and were digitized with 26 landmarks. The 2D coordinate data set was submitted to Procrustes analyses and residuals were analyzed via principal components separated by symmetric and asymmetric components of shape variation (Morpho J). Components explaining the most variation were regressed on case-control status via multivariate regression adjusting for age and gender.

RESULTS: Preliminary results indicate the 4 symmetric and 4 asymmetric components (displaying left-right variation) explain 71% and 67% of the variance in the upper anterior dentition respectively. Symmetric principal component 3 (SymmPC3) and asymmetric components 2 (AsymmPC2) and 4 (AsymmPC4), were significantly different (p<0.05) by case-control. For SymmPC3, explaining 7% of the variation, cases showed narrower intercanine width and increased inward dental angulation compared to controls. For AsymmPC2, explaining 11% of the variation, cases have more triangular shaped and apically located right laterals. For AsymmPC4, explaining 6% of the variation, cases displayed diamond-shaped left incisors and canines. Controls showed opposite morphology. Additional analyses of micro-esthetic parameters are underway.

CONCLUSIONS: Significant differences in anterior dental morphology were found between cases and controls. The identification of these dental features in carriers 277 NSCL/P genetic risk variants will enhance the phenotypic spectrum of NSCL/P which can enhance the power of genetic studies.

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BACKGROUND & PURPOSE: Inlay cranioplasty in children is difficult because autologous bone is limited. Cranial particulate bone graft effectively closes defects when placed over normal dura. The purpose of this study was to determine if particulate bone graft will heal when used for secondary cranioplasty over scarred dura.

METHODS: A 17mm x 17mm critical-sized defect was made in the parietal bone of 12 rats and allowed to heal. Sixteen weeks post-operative the 17mm x 17mm critical-sized defect was re-created and managed in two ways: Group I (no implant) (n=6) and Group II (particulate bone graft) (n=6). Particulate graft was obtained using a brace and bit from the frontal bone and placed over the scarred dura. Gross analysis and micro-computed tomography were performed 16 weeks following the cranioplasty to determine the area of critical-sized defect ossification and the thickness of the healed bone graft.

RESULTS: Critical-sized defects treated with particulate bone graft grossly exhibited superior ossification (96.0%; range, 86.5-100%) compared to those managed without an implant (49.9%; range, 42.6%-54.6%) (p < 0.0001). MicroCT examination showed critical-sized defects treated with particulate bone graft healed 91.1% (range, 79.0-97.2%) of the area, while control defects demonstrated inferior ossification 56.9% (range, 40.0-68.3%) (p < 0.0001). Critical-sized defects treated with particulate bone graft exhibited thinner bone (2.42mm; range, 1.69-3.30mm) compared to the normal adjacent parietal cranium (4.33mm; range, 3.28-5.00mm) (p < 0.0001).

CONCLUSIONS: Particulate bone graft ossifies inlay calvarial defect area over scarred dura, although the bone is thinner than the normal cranium. Clinically, particulate bone graft may be efficacious for secondary inlay cranioplasty.
QUALITY OF LIFE AMONG YOUTH WITH CLEFT: DEVELOPMENTAL INFLUENCES ON PSYCHOSOCIAL FUNCTIONING

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BACKGROUND & PURPOSE: Clinically, differences have been observed in psychosocial functioning across the course of adolescence among youth with cleft. This may reflect age-specific variations in social and emotional functioning based on models of adolescent development, such as those described by Erikson. This study explored the influence of stages of psychosocial development, as indicated by age, on depression, anxiety, self-concept, resilience, and health related quality of life (QOL) among youth with cleft.

METHODS: Six U.S. cleft centers participated in a longitudinal observational study of QOL among youth with cleft. Cross-sectional data were collected using Beck’s Youth Inventories (Beck, et. al., 2005), the Pediatric Quality of Life Inventory (Varni, Seid & Rode, 1999), and the Resiliency Scale for Children and Adolescents (Prince-Embury, 2008). 1,200 youth (mean age=11.6 years old, SD=3.1) were grouped by age: middle childhood (ages 8-11), n = 690; early adolescence (ages 12-15), n = 347; middle adolescence (ages 16-18), n = 124; and late adolescence (ages 19-21), n = 39. GLM was used to explore the association between age group and self-concept, anxiety, depression, resilience and QOL. Secondly, we explored differences relative to cleft type and surgical status.

RESULTS: The two younger groups reported significantly lower anxiety (F (3, 1159) = 4.69, p = 0.0029) and depression (F (3, 1159) = 11.16, p < .0001) than the older groups. Age groups did not differ on self-concept, resilience, or quality of life. Cleft type was not associated with differences in outcomes by age group, but participants recommended for surgery within a year endorsed lower self-concept, resilience and higher anxiety and depression (all p’s < .04).

CONCLUSIONS: Middle and older adolescence are associated with higher anxiety and depression among youth with cleft, as would be predicted by Erikson’s stage of “Identity vs. Role Confusion,” during which teenagers focus on social relationships and developing a sense of self. Coping with cleft may present unique emotional challenges to teens, particularly those undergoing surgical procedures.

MODIFIERS AND TRAJECTORIES OF ACADEMIC ACHIEVEMENT OF CHILDREN AND ADOLESCENTS WITH ORAL CLEFTS COMPARED TO CLASSMATES

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BACKGROUND & PURPOSE: Using a population-based sample, we recently showed that children with oral clefts scored lower than their classmates in multiple domains of academic achievement. The goal of this paper is to evaluate modifiers of these achievement gaps, and academic trajectories of children with oral clefts compared to unaffected classmates.

METHODS: The study sample included children with isolated oral clefts born in Iowa from 1983 through 2003 and ascertained by the Iowa Registry for Congenital and Inherited Disorders. A sample of unaffected classmates was matched by sex, school/school district, and month/year of birth. Academic achievement was measured using standardized tests developed by the Iowa Testing Programs. Household characteristics were measured from birth certificate data. The analytical sample included 588 children with clefts (3735 child-grade observations), and 1874 classmates (13159 child-grade observations). Regression models were used to evaluate interactions between achievement gaps and parental age, marital status, and education; maternal prenatal behaviors; and child birth weight and birth order. Trajectory analysis was used to model achievement over grade-level from elementary through high school.

RESULTS: Preliminary analyses showed that children of adolescent mothers experience larger achievement gaps than those born to 20-35 year-old mothers. Other household factors had little effect in modifying gaps. Preliminary trajectory analyses showed that academic achievement was stable for most children with and without clefts. Consistent with previously reported differences, children with oral clefts were more likely than classmates to be in steady, “low achievement” trajectories in Language and Mathematics and less likely to be in “high achievement” trajectories in these areas.

CONCLUSIONS: Preliminary analyses indicate that most measured household characteristics have insignificant effects on observed achievement gaps. Trajectory analyses show that longitudinal trends are stable for most children with and without oral clefts, and that children with oral clefts are less likely to be in steady “high-achievement” trajectories in Language and Mathematics than classmates. Further analyses are underway to examine less frequent, but potentially informative trajectories among children with clefts.

PATIENT-REPORTED OUTCOMES FOLLOWING CLEFT SURGERY: A SYSTEMATIC REVIEW

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BACKGROUND & PURPOSE: Cleft lip and/or palate (CLCP) profoundly influences self-perception and social functioning. Although surgical outcomes for CLCP are well described, the optimal approach to measuring patient-reported outcomes (PRO) is unclear. Cleft-specific surveys may capture highly detailed information regarding orofacial health, with less focus on global quality of life and health status. In contrast, generic instruments provide data that can be comparable across conditions and centers, but may lack sensitivity to orofacial specific issues. The purpose of this study is to systematically review the literature regarding the use of cleft-specific versus general assessment tools among patients with CLCP.

METHODS: We reviewed articles from MEDLINE, Embase, and PsycINFO that examined the use of PRO instruments for CLCP. Studies on patients with CLCP of all ages that described the use of patient-completed measures were included. Psychometric properties of each instrument (validity, reliability, and responsiveness) were analyzed and each article was reviewed specifically for instrument utilization and barriers to implementation. A research librarian confirmed the search, and two independent, blinded reviewers performed full-text review.

RESULTS: We identified 1,369 papers and selected forty-five for inclusion. Forty studies utilized generic questionnaires (n=60 instruments), most commonly the Strengths and Difficulties questionnaire (n=7), followed by the Satisfaction with Appearance questionnaire (n=6), Childhood Experience questionnaire (n=5), and Child Behavior Checklist (n=5). Five studies used cleft-specific measures (n=4 instruments), most commonly the Cleft Evaluation Profile. Cleft-specific questionnaires assessed the impact of well-defined factors associated with the cleft on general aspects of the patient’s life. Generic instruments first examined aspects of the patient’s life as a whole to determine overall psychosocial health accounting for variations in demographic variables common to this patient population.

CONCLUSIONS: To date, no accepted measure of health status among CLCP patients has emerged. Generic instruments could provide data comparable across conditions and centers, but have not been examined rigorously for this use. Further research to understand their performance in this population could provide an opportunity to collect patient-reported outcomes more efficiently and effectively in this population.

PRENATAL DIAGNOSIS OF ORAL CLEFTS, EARLY LIFE HEALTHCARE EXPERIENCES, AND MATERNAL WELLBEING

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BACKGROUND & PURPOSE: An increasing percentage of cases with orofacial clefting (OFC) are diagnosed during pregnancy due to advances in prenatal diagnostic technology such as 3D ultrasonography. However, little is known about the advantages or disadvantages of prenatal diagnosis for parents and affected children. This study evaluated the effects of prenatal diagnoses on early life utilization of healthcare services, seeking health information and prenatal and long-term maternal psychosocial wellbeing. We also compared maternal perception of the value of prenatal diagnosis and those who did not.

METHODS: A sample of 117 families with a child born with non-syndromic OFC had a diagnosis and those who did not.

RESULTS: Mothers who received a prenatal diagnosis were more likely to be in steady “high-achievement” trajectories in Language and Mathematics and less likely to be in “high achievement” trajectories in these areas.

CONCLUSIONS: Preliminary analyses indicate that most measured household characteristics have insignificant effects on observed achievement gaps. Trajectory analyses show that longitudinal trends are stable for most children with and without oral clefts, and that children with oral clefts are less likely to be in steady “high-achievement” trajectories in Language and Mathematics than classmates. Further analyses are underway to examine less frequent, but potentially informative trajectories among children with clefts.
diagnosis and those who did not controlling for maternal age, income, and child’s birth order.

RESULTS: Preliminary analyses indicates mothers who received a prenatal diagnosis had more hospitalization days after delivery (p=0.043), pediatric visits (p=0.029) contacts with a craniofacial team (p=0.037) and support groups (p=0.0004) compared to mothers without a prenatal diagnosis. They were more satisfied with the information from providers after delivery (p=0.001) and felt the health professionals were more sensitive to them about OFC (p=0.022). Mothers of prenatally diagnosed cases rated learning of the cleft prior to birth as more helpful than mothers without a prenatal diagnosis (p=0.003). Mothers of prenatally diagnosed cases were more likely to report anxiety (p=0.01) and depression (p=0.05) during pregnancy and distress at time of interview based on the SAD.

CONCLUSIONS: Our preliminary analyses indicate that women who received a prenatal diagnosis showed a greater propensity to seek health care services and information after delivery, which could be considered advantageous, but they experienced greater anxiety and depression during pregnancy and long term distress. These findings highlight the need to pay greater attention to effects of prenatal diagnosis on maternal psychosocial wellbeing given its strong effects on children’s health, development and family wellbeing.

111 MOTHERS OF CHILDREN WITH AN OROFACIAL CLEFT: SATISFACTION WITH MOTHERHOOD AND EXPERIENCED STRESS
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BACKGROUND & PURPOSE: In 2010, a study in the Netherlands was done to investigate and compare stress and satisfaction with motherhood of mothers of a child with an orofacial cleft and mothers of a child without an orofacial cleft. A sample of 76 mothers whose children, aged 0-4 years, with no other congenital malformation besides the orofacial cleft, were treated in the academic cleft palate center in Amsterdam, participated. Also a group of 52 mothers of children with no orofacial cleft, staying at a child day care, participated.

METHODS: Both groups of mothers completed two questionnaires. The first questionnaire (‘Motherhood Satisfaction Questionnaire’) contained 18 items about satisfaction with motherhood, and consisted of two subscales (‘Behavior of the child’ and ‘Support from others’). The second questionnaire (NOSI-k) contained 25 items concerning parental stress. This scale included five subscales (‘Fastidiousness’, ‘Behavior child’, ‘Competence’, ‘Fatigue’ and ‘Difficulties’). All items on the questionnaires were answered on a 6-point scale (from 1 (= totally disagree) to 6 (= totally agree)).

RESULTS: No significant differences were found. Both groups of mothers scored high on both questionnaires, meaning that mothers of a child with an orofacial cleft were equally satisfied and experienced equal stress levels about their motherhood compared to the child day care group. Only the item ‘if I have problems with my child or if I am concerned about the future, I can talk it through with family or friends’ on the subscale ‘Support of others’ of the Motherhood Satisfaction questionnaire differed significantly. The regression analysis showed that for the patient group the subscale ‘Competence’ and for the child day care group the subscale ‘Behavior Child’ were significant predictors of the ‘Satisfaction with Motherhood’ grade. No difference was seen at subscale level and for the overall ‘Motherhood Satisfaction’ questionnaire and ‘NOSI-k’ questionnaire, among the mothers of a child with an orofacial cleft and the child day care group.

CONCLUSIONS: It was concluded that mothers of children with a cleft did not substantively differ in satisfaction with motherhood and experienced stress compared to mothers of children without a cleft.

112 FAMILY SUPPORT NETWORK NEEDS ASSESSMENT
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BACKGROUND & PURPOSE: Families of children born with craniofacial anomalies encounter unique challenges. The prospect of years of treatment, perceived societal stigma, exposure to ‘bullying,’ and financial/emotional costs of treatment are some of these challenges. While psychosocial intervention on a professional level can aid families coping with these challenges, so too can networking and sharing between parents and children in similar situations. The assumption that families would benefit from mutual support offered through a Family Support Network prompted us to start the development of such a network. In preparation for that we attempted to determine: (1) what kind of support do our families want? (2) how do they want that support delivered? (3) what are the issues most important to them? and (4) do these priorities change as the patients reach new phases of treatment and stages of development.

METHODS: We asked our families to complete a Family Support Network Needs Assessment survey with Likert ratings. In addition to basic demographic information, the survey addressed: (1) the extent to which families needed and desired a Family Support Network; (2) the issues or topics they wished to see addressed; (3) the form they wanted the support to take (i.e., group meetings, social media, phone, etc.); and (4) the frequency, length, and time of desired networking or meetings.

RESULTS: Of the 270 surveys mailed (162 to parents; 108 to patients over age 12), we received 154 responses. Preliminary analysis of data revealed: (1) general interest in a support network ranges from moderate to high in 60% of respondents; (2) families with younger patients expressed higher interest in support; (3) large majority (over 85%) have not participated previously in a support network/group; (4) issues most important to families include advocacy, stages of cleft care, and insurance information.

CONCLUSIONS: Previous attempts by our center to establish a Parent Support Network were not sustainable, perhaps due to lack of accurate information from families about their wants and needs. From the data presented, centers can develop Family Support Networks that are responsive to the real needs, interests, and availability of families.

113 CRANIOFACIAL ABNORMALITIES IN ASSOCIATION WITH THE 22q11.2 DELETION SYNDROME (22q11.2DS): BEYOND CLEFTING.
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BACKGROUND & PURPOSE: Introduction: 22q11.2DS is a multisystem disorder involving haploinsufficiency of 30-40 genes and is most frequently associated with congenital heart disease, palatal abnormalities and immunodeficiency. Additional common findings include hypocalcemia, feeding/swallowing issues, renal problems, learning differences and psychiatric illness. Craniofacial teams are generally familiar with the presenting palatal phenotype but are unlikely to consider the diagnosis in the presence of less frequently occurring craniofacial anomalies. Here we report additional associated features, beyond clefting, which often result in referral to Plastic Surgery as the initial point of contact. Familiarity with such associations will likely advance detection of the underlying etiology; improve coordinated care and genetic counseling; and ultimately contribute to important genotype-phenotype correlations.

METHODS: Methods: 1175 individuals with 22q11.2DS have been evaluated since 1992. Uncommon craniofacial findings were noted and some have been reported previously. In addition, 836 records had suitable data to assess the presence or absence of asymmetric crying facies.

RESULTS: Important infrequent (<10%) craniofacial findings included craniosynostosis (5); Goldenhar syndrome; ptosis (4); sclerocornea (3); and severe micrognathia (3). More prevalent, asymmetric crying facies was identified in 117/836 (14%).

CONCLUSIONS: Conclusion: This study indicates that there are a number of significant craniofacial abnormalities, beyond palatal differences, found in association with 22q11.2DS which brings patients to the Craniofacial Clinic. Thus we suggest that providers remain alert for findings classically associated with 22q11.2DS such as congenital heart disease, palatal anomalies, feeding difficulties, hypocalcemia, and chronic infection when patients present with craniosynostosis, Goldenhar syndrome, ptosis, sclerocornea or severe micrognathia. Additionally, based on this evidence, we strongly recommend evaluation for associated features, such as congenital heart disease, as well as 22q11.2 deletion studies, in a first line of investigation in all patients with asymmetric crying facies. Lastly, rare findings in association with 22q11.2DS may well inform our understanding of the etiology of apparently isolated anomalies, via genotype-phenotype correlations, much like the recent report of four children with 22q11.2DS and uncommon features, including one with bilateral cleft lip and palate, and both a 22q11.2 deletion and a mutation in SNAP29 on the remaining 22q11.2 allele hence providing a convincing argument for tracking and reporting atypical patients.


**PHYSICAL FUNCTION IN INDIVIDUALS WITH 22q11.2 DELETION SYNDROME**

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**BACKGROUND & PURPOSE:** 22q11.2 deletion syndrome (aka VCFs) is the most common micro deletion syndrome identified in humans with an estimated incidence of one in 2,000 to 7,000 live births. The syndrome has a multisystem manifestation impacting nearly every organ system and developmental function. The clinical course and presentation are highly variable and vary from patient to patient and may include over 180 clinical findings. Previous research indicates children with 22q11.2 deletion syndrome exhibit developmental delay. However, to date, there is no research that has examined physical function in children with 22q11.2 deletion syndrome.

Physical function can be defined as the combination of strength, mobility, balance, walking and endurance for activities of daily living. The purpose of this study was to examine and describe the physical function in children with 22q11.2 deletion syndrome as compared to physical function in individuals who are typically developing.

**METHODS:** The study sample consisted of 24 subjects who have been diagnosed with 22q11.2 deletion syndrome, and 19 healthy control subjects without the deletion. Within the group with 22q11.2 deletion syndrome, 11 individuals were <9 years of age, 9 individuals were 10-19 years of age, and 4 individuals were > 20 years of age. Following informed consent, demographic information and medical history relating to 22q11.2 deletion syndrome was collected. Physical function was assessed using multiple tasks; Timed Up and Go (TUG) test, Five-Times-Sit-to-Stand Test, Single Leg Stance, handheld dynamometer to measure grip strength, 2-minute walk test and GAITRite. Differences in physical function between groups and within the group with 22q11.2 deletion syndrome were tested using an ANOVA test.

**RESULTS:** Preliminary data suggests significant differences between the group with 22q11.2 deletion syndrome and the control group were identified in Timed-Up & Go (7.40±1.45 vs 6.33±1.04; p < .01); right single leg stance (12.62±2.81 vs 52.27±34.54; p < .001); left single leg stance (10.08±9.02 vs 52.60±36.19; p < .001); and 2-minute walk test (469.08±74.09 vs 52.60±36.19; p < .001). The group with 22q11.2 deletion syndrome was divided into 3 age groups; <9 years, 10-19 years of age, and > 20 years. Significant differences between the groups were identified in the 2 minute walk (p<.006), right grip strength (p<.000) and left grip strength (p<.000).

Results from the GAITRite will also be discussed.

**CONCLUSIONS:** The results of this study demonstrate that individuals with 22q11.2 deletion syndrome present with decreased physical function as compared to individuals without the syndrome. Within the population with 22q11.2 deletion syndrome, there appears to be a decrease in physical function with age. Continued assessment of physical function across the lifespan is necessary for the population with 22q11.2 deletion syndrome in order to maintain physical abilities.

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**SPEECH CHARACTERISTICS IN VCFS (22Q11.2DS)**

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**BACKGROUND & PURPOSE:** There is increasing evidence in the literature to suggest that VCFs is a neurodevelopmental disorder characterized by cognitive-linguistic deficits, due to co-occurring phonological disorders, in addition to the impact of inadequate velopharyngeal function on resonance. The purpose of the present study was to assess the prevalence of speech disorders in VCFs and its relation to the pharyngoplasty and other palateopharyngeal anomalies.

**METHODS:** 132 individuals with VCFs were included in this retrospective case analysis. The subjects were stratified into four groups based on the presence of the following cleft-palatal anomalies: (1) overt cleft palate (CP), (2) submucous cleft palate (SMCP), (3) occult submucous cleft palate (OSMCP) and (4) no cleft palate anomalies (NCP). The relation between cephæalmetric measurements and nasopharyngeal space, cleft type, and speech disorders was investigated.

**RESULTS:** The prevalence of OSMCP found to be the highest, 56.10%, followed by SMCP (19.70%), CP (13.60%) and NCP anomalies (10.60%). The cranial-base angle of individuals with VCFs ranged between 124 o to 140 o. Of the total sample, 52.20% had pharyngoplasty. Of the 47.80% subjects with no pharyngoplasty, 10 subjects were diagnosed with acute angulation of the skull base. No significant difference in the cranial-base angle was found between the five cleft-palatal anomalies. Of the speech sound disorders, the prevalence of omission process and syllable simplification process was found to be relatively high.

**CONCLUSIONS:** Patients with VCFs demonstrate a unique profile of speech impairment and multiple anatomical differences of the velopharynx influenced by cranial-base flexure. Because the omission process is thought to be more sensitive to cognitive-linguistic deficits, consideration should be given to prioritizing treatment regarding this impairment.

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**SELF-REPORTED SPEECH PROBLEMS IN ADOLESCENTS AND YOUNG ADULTS WITH 22Q11.2 DELETION SYNDROME**

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**BACKGROUND & PURPOSE:** Speech problems are a common clinical feature in 22q11.2 deletion syndrome (22q11DS). Naturally, parents of young, newly diagnosed patients inquire what to expect regarding the clinical course and treatment options. The aim of this study was to determine the prevalence of speech and language therapy and pharyngoplasty and whether these interventions normalize the speech. The objectives of this study were to 1) inventory the speech history and current self-reported speech of adolescents and young adults, and 2) examine possible variables influencing the current speech ratings including cleft palate, surgery, speech and language therapy, intelligence quotient, and age at assessment.

**METHODS:** To do this, a cohort of 50 young adults with 22q11DS (ages 12-26 years, mean 18 years, 67% female) filled in questionnaires. A psychologist administered an age-appropriate intelligence quotient test. The demographics, histories and intelligence of patients with normal speech (speech rating =1) were compared to those with different speech (speech rating >1).

**RESULTS:** Of the 50 patients, a minority (25%) had a cleft palate, nearly half (46%) underwent a pharyngoplasty, and all (100%) had speech and language therapy. Poorer speech ratings were correlated with more years of speech and language therapy (Spearman correlation =0.418, p=0.004). Only 34% had normal speech ratings. The groups with normal and different speech were not significantly different regarding age, gender, a history of cleft palate, surgery or speech and language therapy, and intelligence quotient.

**CONCLUSIONS:** In conclusion, all adolescents and young adults with 22q11DS had undergone speech and language therapy and nearly half underwent pharyngoplasties. Only 34% attained normal speech ratings. Those with poorer speech ratings continued speech and language therapy for more years.

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**IRF6-RELATED MUTATIONS IN VAN DER WOUDE SYNDROME AND POPITELAL PTERYGIUM SYNDROME FAMILIES FROM NIGERIA AND ETHIOPIA**

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**BACKGROUND & PURPOSE:** Orofacial clefts (OFC) are complex genetic traits that are often classified as syndromic or non-syndromic clefts. Over 500 types of syndromic clefts are listed in the Online Mendelian Inheritance in Man (OMIM) database and Van der Woude syndrome (VWS) is one of the most common types, accounting for 2% of all OFC. Popiteal pterygium syndrome (PPS) is considered to be a more severe form of VWS. Mutations in the IRF6 gene have been reported to cause VWS and PPS in all the studied populations.

In this study, we report findings from families with VWS and PPS in sub-Saharan Africa.

**METHODS:** We screened the DNA of eight families with VWS and one family with PPS from Nigeria and Ethiopia by Sanger sequencing of the most common types, accounting for 2% of all OFC. Popiteal pterygium syndrome (PPS) is considered to be a more severe form of VWS. Mutations in the IRF6 gene have been reported to cause VWS and PPS in all the studied populations. In this study, we report findings from families with VWS and PPS in sub-Saharan Africa.

**RESULTS:** In the families with VWS, we found a novel nonsense variant in exon 4 (p.Lys66X), a novel splice-site variant in exon 4 (p.Pro126Pro), a novel missense variant in exon 4 (p.Phe230Leu), a previously reported splice-site variant in exon 4 (p.Arg84His) in the PPS family. All the mutations segregate in the families.
POSITIVE SCREENING FOR OBSTRUCTIVE SLEEP APNEA IN CHILDREN WITH SYNDROMIC CLEFT LIP AND PALATE.

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BACKGROUND & PURPOSE: The prevalence of obstructive sleep apnea (OSA) in the general pediatric population is 2% to 3%. Craniofacial differences, including cleft lip and palate (CLP) place patients at phenotypic risk for OSA. 30% of CLP occurs in the context of an underlying chromosomal abnormality, and this study aims to determine the frequency of positive screening for OSA in syndromic CLP.

METHODS: An IRB approved retrospective chart review was completed on consecutive patients presenting to a large, urban cleft center for treatment from January 2011 to August 2013. Patients and families with syndromic CLP answered 22 “Yes/No” questions for the Pediatric Sleep Questionnaire (PSQ). This validated tool has a sensitivity and specificity of 85% and 87% in predicting moderate to severe OSA in otherwise healthy children. Father’s exact test was utilized to compare the risk of positive OSA screening in a subgroup—children with 22q—compared to other chromosomal abnormalities. P values less than 0.05 were deemed significant.

RESULTS: A total of 886 patients completed the PSQ during the study period and 115 children with CLP and an underlying chromosomal abnormality met inclusion criteria. The mean age at screening was 8.2 +/- 4.53 years (range = 1.92-18.77) and 58% were male (67/115). The overall incidence of positive OSA screening was 35.6% (41/115). The majority of our study cohort (63/115) had 22q deletion syndrome and nearly half (47.6%) of these patients screened positively for OSA. The most commonly reported symptoms were being easily distracted (53.9%), fidgeting with hands or feet (47.8%), and interrupting or intruding on others (47.0%). Children with 22q were at increased risk for positive OSA screening compared to patients with other underlying chromosomal abnormalities (47.6% vs 21.1%, P<0.04).

CONCLUSIONS: Children with syndromic CLP, and especially those with 22q, appear to be at increased risk for the development of OSA by this validated screening tool. By screening this at-risk population, we hope to provide for early diagnosis and treatment to prevent long-term sequelae of OSA.

A 35-YEAR EXPERIENCE WITH SYNDROMIC CLEFT PALATE REPAIR: OPERATIVE OUTCOMES AND LONG-TERM SPEECH RESULTS.

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BACKGROUND & PURPOSE: Associated medical comorbidities and developmental delays can put syndromic patients with cleft palate at risk for poor speech outcomes. Reported rates of velopharyngeal insufficiency (VPI) vary from 8-64%, and need for secondary VPI surgery from 23-64%, with few studies providing long-term follow-up. The purpose of this study was to describe one institution’s long-term experience with a large series of syndromic patients undergoing cleft palate repair.

METHODS: A retrospective review was performed of all patients with syndromic diagnoses who underwent primary Furlow palatoplasty at a large pediatric center from 1975 –2011. Outcomes included post-operative oronasal fistula (ONF) and need for secondary VPI surgery. Speech scores for verbal patients 5 years or older were collected via the Pittsburgh Weighted Values for Speech Symptoms Associated with VPI. Based upon total score, the velopharyngeal mechanism was categorized as competent, borderline, or incompetent. Outcomes were analyzed by syndrome, association with Pierre Robin Sequence (PRS), Vaeu cleft type, age at repair, and gender.

RESULTS: 132 patients were included with average age at repair of 20.7 months (6-154). Cleft type distribution was 9% submucosal, 16% Vaeu Class I, 50% class II, 12% class III, and 13% class IV. The overall ONF rate was 4.5%. A total of 45 syndromes were recorded (most common: Stickler syndrome (32), 22q11.2 deletion syndrome (19); association with PRS (44)). 76 patients (58%) had valid speech records available at a minimum of age 5. The average age at last assessment was 10.4 years (5–21). Overall, 60.5% of all patients had a competent velopharyngeal mechanism, compared with 71.4% of patients with PRS (p=0.02) and 73.3% with Stickler Syndrome (p=0.01). Pittsburgh speech scores for patients with PRS and non-syndromic patients were not statistically different from the remaining cohort. VPI surgery was performed in 11.4% of all patients at average age of 8.3 years (4.0-15.8). 31.6% of patients with 22q underwent secondary VPI surgery, significantly higher than the remainder of the cohort (p=0.01), compared to only 13.6% of patients with sPRS (p=0.57) and 15.6% with Stickler syndrome (p=0.53). Age, Vaeu class, gender, and ONF did not correlate with speech outcomes.

CONCLUSIONS: This study demonstrates acceptably low rates of post-operative oronasal fistula after palatoplasty in syndromic patients. While overall incidence of VPI surgery is comparable to non-syndromic patients, those with 22q deletions consistently had borderline or incompetent speech mechanisms and a comparatively three-fold higher need for secondary VPI surgery.

DURAL TEARS IN CRANIOSYNOSTOSIS REPAIR ARE MORE COMMON IN PATIENTS WITH UNICORONAL CRANIOSYNOSTOSIS

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BACKGROUND & PURPOSE: Craniosynostosis surgery has risk of dural tears that can lead to complications such as meningitis, pseudomeningoceles, or encephaloceles. We reviewed our congenital craniosynostosis repairs looking at factors of diagnosis, intraoperative findings, and postoperative outcomes.

METHODS: Consecutive patients undergoing craniosynostosis surgery from 2002 to 2012 were retrospectively reviewed. Patients with incomplete data were excluded. Continuous variables were compared with t-tests, and categorical variables were compared with Fisher exact tests. When multiple categorical comparisons were performed, familywise error rate was controlled with Bonferroni correction.

RESULTS: 79 patients fulfilled the criteria. Dural tears were reported in 15 patients, of which 14 were small tears that were repaired, and 1 was due to purposeful evacuation of a subdural hematoma. The rate of dural tears among syndromic diagnoses were: syndromic 17% (1/6), nonsyndromic 19% (14/73), P=1.0. The rate of dural tears among different diagnoses of suture synostosis: sagittal 11% (3/24), metopic 33.3% (3/9), lambdoid 11% (1/9), unicoronal 33.3% (1/3), multiple 33.3% (1/3), *P<0.001. Pairwise comparisons, requiring Bonferroni correction of P<0.005 for a familywise error rate of P<0.05, confirmed that the dural tear rate in unicoronal craniosynostosis was significantly greater than sagittal (***P<0.001), and greater than metopic (**P<0.001). The following factors were not significantly different in patients with dural tears (D), compared to no dural tears (ND): age (D 26.3 months, ND 17.2, P=0.365), procedure time (D 335 minutes, ND 304, P=0.482), estimated blood loss (D 260 mL, ND 250, P=0.888), length of stay in PICU (D 2.8 days, ND 1.4, P=0.410), length of entire hospital stay (D 6.2, ND 4.1, P=0.214). None of the patients with dural tears had sequelae of meningitis, pseudomeningoceles, or encephalcele.

CONCLUSIONS: In our series, dural tears were more associated with unicoronal craniosynostosis than sagittal or metopic. Dural tears were not related to preoperative variables such as syndrome or age, and did not appear to affect outcomes such procedure time, blood loss, intensive care unit duration, or hospital length of stay. More significantly, none of the dural tears led to sequelae such as meningitis, pseudomeningocele, or encephalcele.

FACIAL ASYMMETRY IN CHILDREN SURGICALLY TREATED FOR UNICORONAL SYNOSTOSIS IN INFANCY

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RESULTS: In Group 1, four patients (1 female, 3 males, all syndromic) and in Group 2, three patients (3 males, all syndromic) were identified who were operated on using Dolphin Imaging Systems (Chatsworth, CA) and OsiriX software (Geneva, Switzerland). Computed tomography data was evaluated using a 3DMDtrio system. Guided by 21 manually placed landmarks, spatially detailed left-right point correspondences were obtained by deforming a symmetric 3D atlas to each individual’s surface scan. Point correspondences allowed computation of a detailed map of 3D asymmetry vectors describing information about the amount of asymmetry in bilateral, vertical, and transverse directions, respectively. Mean, SD and maximum values were calculated in the forehead, eye, nose, mouth, chin and cheek regions. Paired Student’s t-test was used in order to compare mean values between the UCS and the control group.

RESULTS: The amount of asymmetry in the UCS group was significantly larger than in the control group (mean: 4.3mm; SD: 1.4mm). The ratio of the mean values (UCS/controls) ranged between 2 and 5, indicating that some of the UCS children showed mean values of asymmetry 5 times larger than their controls. Validation was performed by visual scoring by three experienced observers (correlation coefficient R = 0.81).

CONCLUSIONS: A quantification of spatially detailed 3D facial asymmetry in children treated for UCS showed that remaining asymmetry was present in all face regions, with largest values in the cheek and forehead regions. The method was found to be suitable for clinical follow-up.

EVALUATING THE EFFICACY OF AIRWAY EXPANSION USING TRANSCRANIAL versus SUBCRANIAL FACIAL OSTEOTOMIES: A COHORT COMPARISON STUDY BETWEEN MONOBLOC FRONTOFACIAL ADVANCEMENT AND LE FORT III FACIAL ADVANCEMENT

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BACKGROUND & PURPOSE: The optimal treatment of early presenting (<1 year old) non-syndromic sagittal synostosis remains controversial. The utility of dynamic shortening of cranial length using a Reversed Pi Cranioplasty (RPC) compared to non-dynamic Extended Strip Cranioplasty (ESC) has not been reported. This study aims to compare radiographic parameters of head shape for patients treated with RPC and ESC in patients less than 12 months of age.

METHODS: A 10-year retrospective cohort study of patients (<12 months of age) with non-syndromic sagittal synostosis was performed comparing cranial width, length, nasofrontal angles (NFA), and cranial index (CI) changes between RPC (Group 1) and ESC (Group 2) using CT data.

RESULTS: In Group 1, 13 patients were identified from August 2008-December 2012 (11 male and 2 female, average age 9.4 months, 0 syndromic). In Group 2, 22 patients were identified from July 2003-May 2012 (18 male and 4 female, average age 3.9 months, 0 syndromic). The average procedural radiologic follow-up was 1.95 months for RPC and 25.1 months for ESC. In Group 1 (RPC) the average pre- and post-op cranial indices (CI), and length and width measurements were: average CI from 0.71 to 0.82 (p=0.001), average cranial length from 144 mm to 150 mm (p=0.050), and average cranial width from 102 mm to 122 mm (p=0.0001). In Group 2 (ESC) the average pre- and post-op CI, and length and width measurements were: average CI from 0.68 to 0.75 (p=0.0001), average cranial length from 138 mm to 157 mm (p=0.000), and average cranial width from 94 mm to 118 mm (p=0.0001). In Group 1 the average pre- and post-op nasofrontal angle increased from 134.3 to 139.6 degrees (p=0.011). In Group 2 (ESC) the average pre- and post-op cranial width increased from 127 to 132.2 degrees (p=0.002).

Postoperative cranial indices were significantly higher in the RPC group (0.11 vs. 0.07, p=0.0009). The change in nasofrontal angles between groups was not significant (p=0.974). All patients in Group 1 (RPC) and Group 2 (ESC) were treated with a single operation.
CONCLUSIONS: The overall rate of cranioplasty after cranial vault reconstruction for the indications for cranioplasty was most commonly both functional and aesthetic (11.5%). Mean age at the time of cranioplasty was 5.6 years (SD=2.6). The rate of cranioplasty for coronal craniosynostosis (19.5%). The rate of cranioplasty for the remaining patterns of craniosynostosis, type of cranial vault reconstruction, age at cranioplasty, and associated syndromes were extracted from the patient’s medical record. RESULTS: Coronal craniosynostosis had the highest rate of cranioplasty (21.4%) and multiple suture synostosis (3.1%). The overall rate of cranioplasty was low, however it is more common for patients with coronal craniosynostosis. METHODS: A retrospective chart review was performed to find consecutive patients with sagittal synostosis who underwent surgical correction between January 1, 1993 and June 30, 2013, at our pediatric medical center. Clinical, operating, and process of care variables and their associated specific costs were analyzed and statistical analysis was employed. RESULTS: 328 patients who underwent surgical correction for sagittal synostosis were identified: 88 underwent TCV, 133 SS, and 107 ES. The operative times were 285 minutes for TCV, 56.6 minutes for SS and 67.9 minutes for ES. The transfusion requirements were 74.4% for TCV, 13.8% for SS, and 21.4% for ES. The average length of stay was 5.6 days for TCV, 4.2 days for TCV, 2.2 for SS and 1.2 for ES, with ICU days 1.2 days for TCV, 0.1 day for SS and 0.25 day for ES. The surgical revision rates were 8.9%, for TCV, 17% for SS, and 2% for ES. The hospital cost was $40,808 for TCV, $18,094 for SS, and $21,503 for ES. CONCLUSIONS: The TCV was the procedure with the highest cost to the hospital, longest LOS, and highest number of ICU days. SS and ES procedures had similar outcomes and costs, with statistically significant differences in length of surgery and rate of complications.

125 IS THE NEED FOR CRANIOPLASTY DEPENDENT UPON PATTERN OF CRANIOSYNOSTOSIS?

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BACKGROUND & PURPOSE: Patients with craniosynostosis may require a cranioplasty after cranial vault reconstruction to repair persistent cranial defects or to improve the contour of the cranial vault. This study reviewed the pattern of craniosynostosis as well as the rate and type of cranioplasty on all cranial vault reconstructions performed in a busy craniofacial practice in the last 10 years. METHODS: Two hundred and sixty patients with craniosynostosis (279 cranial vault reconstructions) from 2003-2013 were retrospectively reviewed. Patterns of craniosynostosis, type of cranial vault reconstruction, age at cranial vault reconstruction, age at craniotherapy, type of craniotherapy, and associated syndromes were extracted from the patient’s medical record. Patients were divided by pattern of craniosynostosis (sagittal, metopic, coronal, lambdoid, multiple) and the rate of cranioplasty for each pattern was determined. Indications for cranioplasty were divided into 3 groups: functional (bony defect), aesthetic (contour irregularities), and both functional and aesthetic. The rate of each indication was determined. RESULTS: Coronal craniosynostosis had the highest rate of cranioplasty (19.5%). The rate of cranioplasty for the remaining patterns of craniosynostosis included: sagittal (12.4%), metopic (9.6%), lambdoid (7.1%), and multiple suture synostosis (3.1%). The overall rate of cranioplasty was 11.5%. Median age at the time of cranioplasty was 5.6 years (SD=2.6). The indication for cranioplasty was most commonly both functional and aesthetic (52%), followed by functional only (32%) and aesthetic only (16%). CONCLUSIONS: The overall rate of cranioplasty after cranial vault reconstruction is low, however it is more common for patients with coronal craniosynostosis. The majority of cranioplasties are performed to repair residual bony defects, with few performed for aesthetic improvement alone. These results will help guide post-reconstruction expectations for both the family and surgeon and will aid in patient-centered counseling and decision-making.

126 AN EVALUATION OF A NOVEL CRANIOFACIAL SKILLS LABORATORY CURRICULUM: AN AID TO PLASTIC SURGERY RESIDENT MILESTONE ACHIEVEMENT

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METHODS: A prospective study was designed to evaluate 1) instrument identification, 2) time/accuracy of burr hole placement, 3) time/accuracy of craniotomy resection, and 4) time/accuracy of 4-hole plating before and after the skills laboratory. Minimal classroom training and extensive laboratory training was provided regarding monobloc, biparietal, Lefort III, Lefort I, and mandible osteotomy on fresh cadaver specimens but no direct training in the defined tasks was provided. The R4 group had not yet rotated on the craniofacial service, whilst the R5 group had during the previous year. RESULTS: The R4 (n=6) group mean time in seconds pre/post-task 1, 2, 3, 4 was 117/28, 6.3/4.3, 77.3/27, 133/98.6 respectively. Percent improvement for task 1, 2, 3, 4 was 76%, 54%, and 26% respectively. The R5 (n=6) group mean time in seconds pre/post-task 1, 2, 3, 4 was 62/44, 6/4, 32/22, 108/82 respectively. Percent improvement for task 1, 2, 3, 4 was 29%, 33%, 30%, and 23% respectively. R4 group post-training times were not significantly different than R5 pre-training times (p > 0.05) for each of the four tasks respectively. Accuracy testing with instrument recognition demonstrated the greatest improvement from 82% to 100% (p<0.05) for the entire cohort. CONCLUSIONS: A single craniofacial skills laboratory period in standard facial osteotomies measurably improved residents performance on specific tasks by indirect training. Most importantly, R4 residents after the skills laboratory curriculum surpassed the pre-lab R5 residents who had already performed these tasks in the traditional training environment of the operating room. Craniofacial related skills may be used to assess a trainee’s readiness for performing them in the operating room and may aid in proper identification of milestone attainment.

127 ADULT QUALITY OF LIFE POST CLEFT PALATE REPAIR: A COMPARISON OF TWO TECHNIQUES

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BACKGROUND & PURPOSE: In 1989, CPCI published the first randomized prospective cleft surgery study, comparing the Kierns intravelar veloplasty (IVV) with a non-IVV two-flap repair. Results in that and follow up publications yielded no difference between the two groups for need for secondary velopharyngeal management. The subjects have now reached adulthood. This study was designed to ask: Is there any difference between the groups in the long term socioeconomic status? METHODS: Enrollees from the original published study were invited to participate in a survey. Subjects responded to questions about speech therapy and speech satisfaction, additional surgery, breathing patterns, sleep quality, sleep disorder, dental occlusion. Demographic information, and information on education level, profession, and socio-economic status were queried. Student’s t-test and Fisher’s exact test were used to compare results. RESULTS: Forty-two of the original 312 patients (22 Krien’s IVV, 20 non-IVV) chose to participate. Average age at survey was 25 ± 3 years. Analysis yielded no difference between the two surgery types in need for secondary velopharyngeal management. There were no differences in speech outcome and satisfaction (eight questions, 0.30 < p < 0.97), sleep concerns (3 questions, 0.16 < p < 0.39), and dental occlusion (p = 0.69). Equivalent proportions of the two groups had been in speech therapy (p = 0.131, 0.597, 0.597, 0.790) respectively. Accuracy testing with instrument recognition demonstrated the greatest improvement from 82% to 100% (p<0.05) for the entire cohort. CONCLUSIONS: The original randomized prospective trial suggested that there was no difference between the two surgery types in need for secondary velopharyngeal management, an important outcome. The more important outcome, however, is the patient as an adult. This long-term survey study suggests that in young adulthood, the two groups have similar outcomes in terms of education, speech satisfaction, dental occlusion, and sleep disorder.

128 10 YEAR EXPERIENCE OF SURGICAL TREATMENT OF VELOPHARYNGEAL INSUFFICIENCY IN THE PATIENT WITHOUT A CLEFT PALATE

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BACKGROUND & PURPOSE: Plastic Surgery Graduate Medical Education has transitioned to a model of milestones. The objective measurement of surgical skills and technical knowledge remains understudied. Surgical skills curricula have been created for microsurgery, but an educational model for training the unique technical skills for craniofacial surgery has not been defined or validated. The aims of this study are to present and validate a novel educational craniofacial skills laboratory and compare outcomes between traditional on-patient training and simulated laboratory training. METHODS: A prospective study was designed to evaluate 1) instrument identification, 2) time/accuracy of burr hole placement, 3) time/accuracy of craniotomy resection, and 4) time/accuracy of 4-hole plating before and after the skills laboratory. Minimal classroom training and extensive laboratory training was provided regarding monobloc, biparietal, Lefort III, Lefort I, and mandible osteotomy on fresh cadaver specimens but no direct training in the defined tasks was provided. The R4 group had not yet rotated on the craniofacial service, whilst the R5 group had during the previous year. RESULTS: The R4 (n=6) group mean time in seconds pre/post-task 1, 2, 3, 4 was 117/28, 6.3/4.3, 77.3/27, 133/98.6 respectively. Percent improvement for task 1, 2, 3, 4 was 76%, 54%, and 26% respectively. The R5 (n=6) group mean time in seconds pre/post-task 1, 2, 3, 4 was 62/44, 6/4, 32/22, 108/82 respectively. Percent improvement for task 1, 2, 3, 4 was 29%, 33%, 30%, and 23% respectively. R4 group post-training times were not significantly different than R5 pre-training times (p > 0.05) for each of the four tasks respectively. Accuracy testing with instrument recognition demonstrated the greatest improvement from 82% to 100% (p<0.05) for the entire cohort. CONCLUSIONS: A single craniofacial skills laboratory period in standard facial osteotomies measurably improved residents performance on specific tasks by indirect training. Most importantly, R4 residents after the skills laboratory curriculum surpassed the pre-lab R5 residents who had already performed these tasks in the traditional training environment of the operating room. Craniofacial related skills may be used to assess a trainee’s readiness for performing them in the operating room and may aid in proper identification of milestone attainment.
METHODS: All patients with BWS and macroglossia who underwent TRS by a pharyngeal flap or sphincterplasty were identified, all with a cleft palate. Fifty-two of these had pre and post-operative speech evaluations. Six qualities of speech, including hypernasality and velopharyngeal function, were quantified on a 6 point scale (1 = within normal limits; 6 = severe). Quantitative nasalance scores using standard nasometry were measured. A two-tailed, paired students t-test was used to compare means.

RESULTS: Fifty-two children, mean age 7.3 years, were included in the speech outcomes analysis. 60% were male. Twenty-one different conditions were identified with VPI, the most common was 22q deletion (28%). Other conditions not typically described with VPI were Mobius syndrome, Nager and Prader-Willi syndrome, in addition to children with previous pharyngeal surgery. 50/52 (94%) underwent an initial pharyngealplasty, 2 (6%) underwent a pharyngeal flap. Pre-operative qualitative speech assessment revealed a mean hypernasality score 2.4±1.2 (mod-severe hypernasality) with inadequate VP function 2.7±0.5. Quantitative orally loaded-nasalance scores on sustained nasal sound normal oral loads was 55.6±15.6% initially. Post-operative hypernasality score was 1.8±1.3, (normal- mild hypernasality) with adequate VP function 1.3±0.6. The mean oral nasal load nalance score was 27.3 ±15.9% post-operatively . All differences between pre and post-operative speech outcomes were statistically significant (p<0.05). 14/52 (27%) underwent a revision of the pharyngealplasty an average of 338 days after initial surgery. The most common cited reason revision for revision was upper airway obstruction, 11 in consecutive hypernasality, and one dysarthria. CONCLUSIONS: VPI in the patient without a cleft palate occurs in a diverse spectrum of medical conditions and syndromes. Pharyngealplasty was efficacious in this diverse group of presentations in objectively and subjectively improving speech. Further analysis is underway to identify variables predictive of revision.
A MATHEMATICAL MODEL PREDICTS THAT ANATOMICAL VARIABILITY INFLUENCES THE EFFICACY OF PALATE REPAIR PROCEDURES

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BACKGROUND & PURPOSE: A long-standing question in cleft palate repair research is how anatomic variability affects, or should affect, the selection or application of a particular surgical procedure. Furthermore, understanding the effects of specific anatomic parameter variations on velopharyngeal (VP) function is vital for the development of subject-specific surgical procedures. This study quantifies the effects of i) anatomic variability (i.e., patient’s anatomy) alone on VP closure force and ii) anatomic variability on the efficacy of various surgical procedures, measured by VP closure force.

METHODS: We created a three-dimensional (3D) line segment model that includes representations of the levator veli palatini (LVP) muscle, velum, and posterior pharyngeal wall. Model parameters were acquired from the literature. MRI-derived dimensions for the model were taken from 10 normal adults (ages 19-22 years) and 10 normal children (ages 4-9 years). The dimensions were used to validate the model and estimate anatomic parameter variations. This variability was then used to simulate thousands of random (but anatomically realistic) child anatomies using Monte Carlo simulation techniques. The randomized anatomies underwent the simulated surgical procedures of 50% LVP retrodisplacement with velar lengthening, and 50% midline LVP overlap (i.e., shortening the intravelar length by 50%), separately and in combination. Corresponding VP closure force was calculated.

RESULTS: The computational model predictions of closure force from the normal adult measurements compare favorably with the experimental data from the literature. Anatomic variability in the simulated randomized anatomies produced closure forces ranging from 0.271N to 0.620N for the middle 80% of the data. Independent variations of individual parameters revealed that LVP major axis (long axis of muscle belly), VP port distance, and extravelar LVP muscle length were the most influential variables on closure force within their measured anatomical ranges. Simulated procedures of retrodisplacement, overlap, and the combination produced VP closure force increases of 13-37%, 14-40%, and 26-82%, respectively. Some anatomic variations benefited more from one treatment than retrodisplacement and vice-versa.

CONCLUSIONS: The results of this study reveal that i) some anatomic variations are more influential on VP closure force than others and ii) the efficacy of different surgical techniques is highly dependent on the patient’s anatomy. Despite this dependence on anatomy, the procedures of retrodisplacement and overlap alone always increased VP closure force regardless of anatomy and the combination was even more effective. Research using patient-specific MRI data combined with modeling is a powerful means for functional outcome assessments related to the effects of surgical options such as scar tissue patterns, relaxing incisions, suturing methods, and repair of other palate muscles. These research advancements will optimize patient-specific selection of surgical procedures.

LONG-TERM HEAD SHAPE AFTER TREATMENT FOR DEFORMATIONAL PLAGIOCEPHALY: A LONGITUDINAL COHORT STUDY

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BACKGROUND & PURPOSE: Deformational plagiocephaly (DP) is a misshapen head in an infant that arises at birth, or shortly thereafter, due to an asymmetry of the skull. There are two treatment methods available for DP: helmeting and repositioning. Little is known about the long-term outcomes of these two treatment options. The purpose of this study was to examine children who received helmeting or repositioning therapy for DP as infants and compare the long-term head shape outcomes of the two groups.

METHODS: A longitudinal cohort study design was used to evaluate change in head shape of children that used both helmet therapy (n=50) and repositioning (n=50). Anthropometric skull measurements taken as infants were compared with measurements taken for this study. Inclusion criteria was initial clinic visit at age 6 months or younger, evaluation by the same practitioner and current age 2-10 years. Head symmetry was assessed using caliper measurements.

RESULTS: Data from 100 children were evaluated for this study. Two measures were used to evaluate head shape, cephalic index and cranial vault asymmetry. The mean change in cephalic index and cranial vault asymmetry were both significant with p-values of 0.003 and 0.001, respectively, demonstrating those children that used helmets had a more symmetric long-term head shape.

CONCLUSIONS: To our knowledge, this is the largest long-term outcomes study comparing children that used helmets to treat their DP as infants had more symmetric head shapes at age 2-10 years of age.

THE EFFECT OF TORTICOLLIS ON HELMET THERAPY FOR DEFORMATIONAL PLAGIOCEPHALY

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BACKGROUND & PURPOSE: Children with deformational plagiocephaly frequently have some degree of relative neck muscle imbalance, or torticollis. It is unclear whether torticollis leads to positional preference in sleeping, or the preferential sleep position limits neck flexibility, but it is commonly thought that concomitant torticollis makes deformational plagiocephaly treatment more refractory. Among patients undergoing helmet therapy for deformational head shape problems, we compared between those diagnosed with torticollis and those that did not have torticollis.

METHODS: Patients with deformational plagiocephaly who underwent helmet orthotic treatment from 2006 to 2013 were retrospectively reviewed. The helmet orthotist recorded standard cranial measurements at each helmet adjustment visit, and only patients who completed their treatment course with final measurements were included. Continuous variables were compared with parametric tests (t-tests), and categorical variables were compared with chi-square tests.

RESULTS: 157 patients met the inclusion and exclusion criteria. Torticollis (T) was seen in 59.9% (94/157), and no torticollis (NT) was found in 40.1% (63/157), p=0.098. Helmet therapy was initiated at age in months adjusted for prematurity: T 6.14, NT 6.7, p=0.069. Asymmetry was measured by transcranial difference (TCD) between frontozygomatic-to-eurion diagonals in millimeters, with initial TCD: T 1.18, NT 8.3, ***p=0.001; final TCD: T 3.9, NT 3.1, ***p<0.001; change in TCD: T 7.9, NT 5.2, ***p<0.001. The duration of therapy in months was: T 3.91, NT 3.5, p=0.019; with rate of TCD change (mm/month) being: T 2.33, NT 1.60, **p<0.001. 47.3% (70/148) of torticollis patients underwent physical therapy (PT) for neck exercises, and their average final TCD (in mm) was 3.8, compared to those who did not get PT at 3.3, P=0.212.

CONCLUSIONS: Our data suggest that torticollis does not significantly affect effectiveness or duration of helmet therapy. Although torticollis patients had greater initial transcranial differences (TCD) as would be expected, they ended with similar final TCD measurements (statistically different, but clinically 3.9 and 3.1 mm are quite similar), and surprisingly, helmet therapy duration was similar despite the worse initial asymmetry. This greater rate of TCD change is not explained by the similar age at initiation of helmet therapy. In addition, infants with torticollis who received physical therapy did not have improved final transcranial differences as compared to those who did not receive physical therapy. These results suggest that although torticollis and deformational plagiocephaly often occur hand in hand, once the decision to proceed with helmet therapy has been made, their outcomes appear to proceed independently. Therefore, treatment can remain independent, with each treatment for the deformational plagiocephaly, and physical therapy for the torticollis.

DIAGNOSTIC YIELD OF CERVICAL RADIOGRAPHS IN INFANTS WITH DEFORMATIONAL PLAGIOCEPHALY

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BACKGROUND & PURPOSE: When evaluating infants with a diagnosis of deformational plagiocephaly, some providers routinely obtain infant cervical radiographs in demonstrating cervical anomalies in a population of infants. The purpose of this study was to determine the diagnostic yield of cervical radiographic exam in identifying cervical anomalies in a population of infants referred to a tertiary craniofacial center with deformational plagiocephaly (DP).

METHODS: After obtaining IRB approval, all patients with diagnosis of DP who underwent cervical radiographs between the years of 2011 to 2012 were reviewed. Cervical radiographic findings as determined by radiologist report,
perinatal data, and physical exam findings were recorded, and descriptive statistics were generated.

RESULTS: Electronic medical records of 339 patients with diagnosis of DP were reviewed. Abnormal findings were recorded in 6.48% of cervical radiographs (n=22/339). Of those with abnormal findings, 45% (n=10/22) demonstrated osseous abnormalities including: fracture (n=2), bony fusion (n=5), asymmetric clavicle (n=1), hypoplastic posterior elements of C1 (n=1), and rudimentary ribs (n=2). Those with non-osseous abnormalities (n=12/22) included head tilt (n=2), abnormal curvature (n=10), hypertrophic tonsils (n=1). The other 97% of the study population were without osseous abnormalities.

CONCLUSIONS: There is a fairly low diagnostic yield in ordering cervical radiographs in patients with deformational plagiocephaly. Considering the radiation exposure and cost associated with the practice of ordering routine cervical radiographs in all patients presenting with this DP, an inspection of its inclusion as a necessary step in the diagnostic algorithm is warranted.

DEFORMATIONAL SCAPHOCEPHALY RESULTS IN INCREASED THERAPY DURATION AND LESS EFFECTIVE CRANIAL INDEX CORRECTION THAN OTHER TYPES OF DEFORMATIONAL PLAGIOCEPHALY

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BACKGROUND & PURPOSE: Scaphocephaly, or long head shape, can be due to deformational or craniosynostotic etiologies. If the etiology is purely deformational, repositioning may be difficult because this requires balancing on the narrow posterior aspect. Therefore, some patients will undergo helmet orthotic therapy. Our aim was to look at our population of infants treated with helmet therapy, and compare those with deformational scaphocephaly versus those without scaphocephaly.

METHODS: Patients with deformational plagiocephaly who completed helmet orthotic treatment from 2006 to 2013 were included. Cranial Index (CI) was defined as calvarial width divided by calvarial anterior-posterior length, with mesocephalic (normal) range as 0.76 to 0.81, with scaphocephalic less, and brachycephalic greater. Asymmetry was measured by transcranial difference (TCD) between frontozygomatic to eurion diagonals in millimeters. Patients with incomplete data or did not finish therapy were excluded. Continuous variables were compared with nonparametric tests, and categorical variables compared with chi-square analysis.

RESULTS: 208 patients with deformational plagiocephaly met our criteria: scaphocephalic 9 (4.3%), mesocephalic 14 (6.7%), brachycephalic 185 (88.9%). The duration (in months) of helmet therapy: scaphocephalic 4.87 (3.27-11.67), n = 9; mesocephalic 13 (11-17), n = 14; brachycephalic 13 (11-17), n = 185. Final CI: scaphocephalic 70.30 (±5.0), mesocephalic 79.23 (±12.5), brachycephalic 91 (±9.0). Difference between final and initial CI: scaphocephalic 0.90 (1.19-4.7), brachycephalic -3.55 (-6.8-8.9), **P<0.001. Rate of change in CI per month: scaphocephalic 0.185 (-0.20,0.59), mesocephalic -0.68 (-2.18,1.34), brachycephalic -1.00 (24.59,62) ***P=0.001. Final TCD: scaphocephalic 1.0 (0.40), mesocephalic 3.0 (1.010.0), brachycephalic 4.0 (1.11), **P=0.002. Final CI: scaphocephaly 71.68 (60.075.7), mesocephaly 78.79 (74.58,82.58), brachycephaly 87.10 (80.43,100.0), ***P=0.001.

CONCLUSIONS: Deformational scaphocephaly appears to have a difference response to helmet therapy than non-scaphocephalic deformational plagiocephaly. Treatment lasts almost 1.5 months longer, yet still has significantly less change in CI, and in fact median final CI remains scaphocephalic. This is despite the fact that deformational scaphocephaly patients are more frequently premature and may present younger. Parents and providers need to refer these patients early to improve their chances of response to helmet therapy.

LONG-TERM SATISFACTION AND PARENTAL DECISION MAKING ABOUT TREATMENT FOR DEFORMATIONAL PLAGIOCEPHALY

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BACKGROUND & PURPOSE: The incidence of deformational plagiocephaly has increased greatly over the last two decades since the recommendation of supine sleeping. Currently, there are two treatment options for deformational plagiocephaly, helmet therapy and repositioning therapy. This research investigated factors that influenced parental decision making about treatment choice and long-term satisfaction with head shape.

METHODS: A retrospective chart review identified 1660 children, now ages 2 – 10 years old, seen in the deformational plagiocephaly clinic meeting inclusion criteria. Questionnaires were mailed to all eligible families. Four-hundred and fifty-six completed questionnaires were returned. Questionnaires evaluated demographics of the family, factors that influenced treatment choice and satisfaction with current head shape.

RESULTS: Most respondents had Caucasian (93%), male (70%) children. Mother’s age at time of childbirth was 31 years, most mother’s had a college degrees or greater (77%) and household incomes over $76,000 (52.6%). Fifteen factors were used to evaluate which ones were significant in influencing parental treatment choice. Severity of the deformational plagiocephaly and time off work for follow-up appointments were the only two factors identified that significantly affected treatment choice.

CONCLUSIONS: More parents that used helmet therapy reported they were satisfied with their child’s long-term head shape and would choose the same treatment again (p = 0.002) compared with those that used repositioning therapy.

A COMPARISON OF DIRECT AND DIGITAL MEASURES OF CRANIAL VAULT ASYMMETRY FOR ASSESSMENT OF PLAGIOCEPHALY

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BACKGROUND & PURPOSE: Measurement of cranial vault asymmetry (CVA) is a common feature in the treatment of patients with deformational plagiocephaly (DP). In many cases, this measure is the primary marker of improvement. CVA is typically measured with calipers and is subject to inter-rater variability. There is little research comparing results of calipers with those of three dimensional (3D) photogrammetry.

METHODS: 59 caliper only visits were made by 51 children previously diagnosed with DP. 38 were male and 13 were female. 31 of the visits included a 3D photo. Direct measures were obtained by two independent, experienced anthropometrists and included head length, width, circumference, and CVA. Their results were compared to digital measures including measures unobtainable with calipers: asymmetry of head circumference and global asymmetry.

RESULTS: The inter-rater reliability of all caliper measures was excellent (Intraaclass correlation coefficients > 0.94). The caliper and digital measures of length, width, cephalic index, and circumference were strongly correlated (Pearson’s R² > 0.90). There was a consistent bias, caliper measures being 1 – 4 mm shorter than their digital analogues. Caliper measured CVA was highly correlated (R² > 0.90) with the directly corresponding digital measures taken 30 degrees off of the caliper. It was poorly correlated with measures of overall hemispheric asymmetry (R² = 0.10).

CONCLUSIONS: The cranial measurements of children with DP taken independently by two experienced anthropometrists showed excellent inter-rater reliability. Caliper measures are consistently smaller than the digital measures, presumably due to pressure of the calipers and/or the use of skullcaps during photography. Like circumference and other measures, cranial vault asymmetry correlates well with its corresponding digital measure.

AGE OF INITIATION OF HELMET THERAPY FOR DEFORMATIONAL PLAGIOCEPHALY DOES NOT SIGNIFICANTLY AFFECT TREATMENT DURATION, CORRECTION RATE, OR FINAL OUTCOME

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BACKGROUND & PURPOSE: It is commonly thought that helmet therapy for deformational plagiocephaly is more effective the earlier the age of initiation, but this did not seem the case for our patients. We therefore sought to compare age of initiation with helmet therapy outcomes.

METHODS: Patients with deformational plagiocephaly who underwent helmet orthotic treatment from 2006 to 2013 were retrospectively reviewed. Asymmetry was measured by transcranial difference (TCD) between frontozygomatic to eurion diagonals in millimeters. Analysis of variance was used to compare groups; results in means (standard deviations).

RESULTS: Patients were stratified into 6 groups (G1,5,6,7,8,9), by age in months: G1, <5 (n=13); G5, 5 (n=40); G6, 6 (n=52); G7, 7 (n=46); G8, 8 (n=23); G9, 9 (n=33). Initial TCDs: G1 11.1 (±4.0), G5 10.3 (±3.6), G6 10.8 (±4.1), G7 11.0 (±3.2), G8 9.30 (±4.5), G9 9.30 (±4.5), P=0.260. Final TCDs: G1 3.10 (±2.7),
learners will be able to: - Describe increased knowledge about research and EBP. 

Rounds will be conducted. Participants will then be divided into small groups.

Evidence-Based Practice” using the “Great American Cookie Experiment” is an innovative teaching approach used since 1987 with nursing students and staff nurses. This technique successfully provided education and improved attitudes towards research.

METHODS: We developed “Brownie Rounds: An Introduction to Research and Evidence-Based Practice” using the “Great American Cookie Experiment” methodology. To date, “Brownie Rounds” has been presented to 106 healthcare professionals (81 RNs) at a freestanding children’s hospital with outpatient clinics. The participant tastes two different brownies and chooses which he/she likes better. Data are collected regarding their brownie choices. Participants are taught about ways in which they participated in research and how the findings could be applied. Participants then identify an area of patient care they think could be improved. The faculty member leads them through designing a study to address a research question. Participant evaluations by RNs revealed favorable responses to the following three statements: “I was actively engaged during the program (99% agreed or strongly agreed),” “I have a more positive view towards research (90% agreed or strongly agreed),” and “I gained new knowledge about research (93% agreed or strongly agreed).” During this presentation, Brownie Rounds will be conducted. Participants will then be divided into small groups.

With coaching by the presenter, each group will identify a research question and formulate a preliminary design for a study. Each small group will present their research design to all participants. At the completion of this presentation, learners will be able to: - Describe increased knowledge about research and EBP. - Express a more positive attitude towards research. - Discuss a preliminary design for a research study aimed at improving patient-centered outcomes for people affected by a cleft or craniofacial condition.
perioperative anthropometric lip measurements, as well as standard orthodontic diagnostic records including radiographs at the age of 6 or older, were included in this retrospective study. Anthropometric lip measurements were made by a single examiner immediately prior to lip repair. Radiographs and other diagnostic records were used to assess the presence of dental anomalies in the permanent dentition. The presence of associations between anthropometric lip measurements and prevalence rates of different dental anomalies were determined using logistic regression analyses.

RESULTS: In the 122 included patients, the cleft lateral lip element was deficient in height in 80% and in transverse length in 84% of patients. Patients with more deficient cleft side lateral lip height and less deficient cleft side lateral lip transverse length were more likely to present with cleft side maxillary lateral incisor agenesis. On the other hand, patients with a less deficient cleft side lateral lip height and more deficient cleft side lateral lip transverse length were more likely to present with a cleft side supernumerary maxillary lateral incisor. When looking only at incomplete clefts, cleft side lateral lip transverse length deficiency was more predictive of the presence of supernumerary maxillary lateral incisors (p=0.030) while for complete clefts, cleft side lateral lip height deficiency was more predictive of the presence of maxillary lateral incisor agenesis (p=0.035).

CONCLUSIONS: In patients with unilateral clefts, cleft lip anthropometrics have a predictive role in determining the occurrence of dental anomalies.

144 THE STABILITY OF COMBINED MAXILLARY AND TRANSPALATAL DISTRACTION IN PATIENTS WITH CLEFT LIP AND PALATE
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BACKGROUND & PURPOSE: Maxillary hypoplasia is a common developmental problem in patients with cleft lip and palate and normally occurs with reduction in anteroposterior and transverse dimensions. The authors of this paper have done combined Maxillary and transpalatal distraction to correct severe anteroposterior and transverse deficiencies by using rigid external distractor and hyrax transverse expander. The main purpose of this study is to evaluate the changes in maxillary position in anteroposterior and transverse dimensions after combined Maxillary and transpalatal distraction.

METHODS: Retrospective longitudinal study design. 12 consecutive patients with non-syndromic repaired cleft lip and palate aged average 14 years (range 13-17 years) who underwent combined Maxillary and transpalatal distraction by rigid external distractor and hyrax transverse expander device were included in the study. Cephalograms were used to measure the Maxillary position in anteroposterior and transverse dimensions immediately after distraction, 1 year after distraction.

RESULTS: After combined Maxillary and transpalatal distraction with external frame device and hyrax transverse expander the Maxilla (A point) on average moved forward by 13.5 mm and transversely by 5.85 mm. The maxilla moved backwards by 1.5 mm and transverse relapse was 1 mm at the end of one year.

CONCLUSIONS: The combined Maxillary and transpalatal distraction using an external frame device and hyrax transverse expander is an effective technique to treat patients with severe Maxillary hypoplasia three dimensionally. There is a constant relapse rate at the end of one year in both anteroposterior and transverse dimension. This potential relapse needs to be compensated by overcorrection during distraction phase.

145 COMPARISON OF CEPHALOMETRIC MIDFACE FORM IN UCLP PATIENTS TREATED WITH TRADITIONAL OR NO PSIO (AMERICLEFT AND EUROCLEFT STUDIES) AND PATIENTS TREATED WITH NASALOVELOAR MOLDING.
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BACKGROUND & PURPOSE: Interest has arisen regarding the effect of Nasalovelolar molding (NAM) on midface growth. The purpose of this study was to determine if NAM imparts a negative, positive or no effect on midface growth in UCLP patients.

METHODS: This retrospective cohort study includes 61 consecutive nonsyndromic Caucasian patients with UCLP, ages 6 -11 years, treated with NAM. 28 cephalometric landmarks identified and measured by two examiners. The mean value of cephalometric measurements were compared to analogous data sets from Americleft and Eurocleft using T-test.

RESULTS: NAM Group comparison with Americleft: No significant difference in mean values of SNA and ANB between NAM group and Centers B,D,E (P > 0.10). NAM group had significantly larger soft tissue AN'B' than Center B (P=0.016) and no significant difference compared to centers D and E (P > 0.34). The NAM Group showed significantly larger Ba-N-ANS angle than Centers B, D and E (P=0.0001) and no significant difference compared to center C. NAM Group comparison with Eurocleft: No significant difference in mean values of SNA between NAM Group and Center B (P=0.150). There was no significant difference in mean ANB between NAM Group and Centers B,D,E and F (P > 0.161 ). Center A showed a larger mean ANB than the NAM Group (P=0.023). NAM Group showed significantly larger mean A'N'B' (soft tissue) than Centers D and E (P < 0.0075), and no difference compared to Centers A,B and E (P > 0.600 ).

CONCLUSIONS: The NAM Group showed no difference or statistically significant positive differences compared to 8 (out of 9) Eurocleft and Americleft Centers. The NAM Group showed greater midface soft tissue convexity than Americleft B,D,E and Eurocleft D,E Centers. No significant difference was shown compared to Americleft Center C and Eurocleft Centers A, B, F. The NAM Group does not appear to have had negatively affected midface growth, compared to a 9 year old population in Americleft and Eurocleft centers.
BACKGROUND & PURPOSE: NAM is well known in patients having UCLAP to increase aesthetic and functional results. In contrast the effects of NAM on dentoskeletal relations, breathing, and speech are not well known. Long-term comparisons are necessary to find out additional advantages of NAM.

METHODS: In a prospective study 91 patients (UCLAP) from 3 cleft centres were observed from birth up to 8 years of age. In one third of patients (I) NAM was carried out from birth up to lip surgery using a dynamic appliance combined with a presurgical plate for dentoalveolar development. In the second third (II) a presurgical plate was used only. In this centre patients underwent postoperative NAM using a static appliance for 3 months. In another third of patients (III) nothing was done. In centre I (surgery: Pfeifer) and centre II (surgery: Millard) lip closure was performed within 6 months, in centre III (surgery: Pfeifer) within 3 months of age. In all patients outcome were examined using standardized minimum records from birth up to 5 years of age: Orthodontists have observed bicellular dental casts (transversal/sagittal) and 3D images were available for viewing by each rater allowing for complete rotational control for viewing the images from all aspects. 2D and 3D ratings were done separately and the next day with the order reversed. Interrater and intrarater reliabilities were calculated using weighted kappa statistics. Correlation of 2D and 3D ratings was determined using Bland-Altman plots.

RESULTS: Surgical observations revealed significant differences of results when comparing patients from 3 centres: Preoperative NAM has influenced wideness of clefts and lip length as well as position of ala on the cleft side. Orthodontists: In patients of centres I and II NAM had no negative effects on dentoskeletal relations. Preoperative and postoperative NAM have shown no negative influence on the position of the premaxilla. Speech pathologists have observed significant differences: Cleft patients without NAM showed no negative influence on the position of tongue and postoperative NAM, nonphysiological tongue position than the other.

CONCLUSIONS: Preoperative NAM has significant effects on aesthetic results of white lip and nose. This may be influenced by surgical techniques. NAM has no negative influence on dentoalveolar development. NAM has positive effects on primary and secondary functions of the orofacial system.
among the raters that the method simplified the method and gave them more confidence in their ratings.

CONCLUSIONS: The use of the Q-Sort methodology with rating cards rather than a powerpoint of photos matched but did not improve reliability in this study compared to previous studies using the original Asher-McDade method, but all raters preferred this method due to the ability to continuously compare photos and adjust relative ratings between patients. We believe that development of an age-appropriate yardstick, standardized records, and formal calibration session used with this method will result in an improvement in inter and intra rater reliability.

151 USING EXCEPTIONAL CHILDREN'S SERVICES: THE EXPERIENCE OF CHILDREN IN NORTH CAROLINA BORN WITH ISOLATED OROFACIAL CLEFTS
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BACKGROUND & PURPOSE: Children with orofacial clefts (OFCs) may experience academic and communicative difficulty requiring the support of exceptional children’s (EC) services, yet utilization of these services on a population level is unknown. The purpose of this study was to examine patterns in EC service use between children with and without OFC in North Carolina.

METHODS: We used a retrospective cohort design consisting of 712 children with OFC born between 1997 and 2003 identified from the NC Birth Defects Monitoring Program, and a random sample of 6,822 children without a structural birth defect identified from birth certificates and born during the same time. Children with OFC were classified according to cleft type (cleft lip alone (CL), cleft lip with cleft palate (CLP), cleft palate only (CPO)), and according to whether the cleft was isolated or associated with other congenital anomalies. We matched study subjects to NC Department of Public Instruction records to obtain information on EC status and eligibility classification. Children had to be enrolled in NC public schools for at least one time point between 2006 and 2013 (3rd-9th grade) to be included in the study. We calculated prevalence estimates, prevalence ratios and 95% confidence intervals, and used generalized estimating equations to calculate the odds of EC enrollment over time.

RESULTS: In grades 3-5, 36% of children with an isolated OFC received EC services compared to 13% of the comparison children. Children with isolated CL or CPO were twice as likely to receive EC services relative to the comparison children (PR: 2.74, 95% CI: 2.34, 3.22) and (PR: 2.03, 95% CI: 1.61, 2.57), respectively. EC service use among children with isolated CL was no different than that of children in the comparison group (PR: 1.01, 95% CI: 0.70, 1.47). The difference in the odds of use of EC services between children with an isolated OFC and the comparison children declined over elementary and middle school.

CONCLUSIONS: The prevalence of EC service use among children with an isolated OFC depends on the cleft phenotype. Receipt of EC services declined over time, possibly indicating a decreased need for services as the children aged.
BACKGROUND & PURPOSE: Pediatric cleft lip and palate surgery can be stressful for both the child and the parents. Limited pain knowledge and experience, the presence of a registered dietitian and occupational therapist are invaluable for successful management of these patients. This preliminary study aims to quantify and assess our team practices with regard to nutritional support.

METHODS: A retrospective study of 100 consecutive newborn patients with a diagnosis of cleft lip and/or cleft palate. Data was collected from the first team visit regarding birth weight, gestational age, cleft type, initial team weight measurements, feeding practices, and recommended nutritional interventions.

RESULTS: Of 100 patients, 3 were excluded for incomplete records. 36 had isolated cleft lip (CL), 33 had cleft lip with cleft palate (CLP), and 28 had isolated cleft palate (CP). 100% were assessed by a registered dietitian and occupational therapist. Average age (in days) at the first visit was similar for each cleft type: CL=27.9, CLP=26.9, CP=27.4. Average birth weight was CL=3.29kg, CLP=3.08kg, CP=3.44kg. Average % birth weight was CL=123.3%, CLP=115.2%, CP=108.3%. The calculated age (in days) for return to birth weight was CL=14.7, CLP=15.21, CP=23.4. Exclusive use of breast milk was CL=50%, CLP=30.3%, CP=21.4%. Exclusive formula use was CL=30.6%, CLP=39.4%, CP=67.9%. 31 detailed nutritional interventions were made at the first visit: CL=2, CLP=14, CP=15. These interventions included specific increase in goal intake volume (12), concentration of caloric density of milk (15), or specific change in feeding method (3). 1 patient required inpatient admission for feeding assistance.

CONCLUSIONS: Distinct differences exist in neonatal weight gain between cleft types. There is a slower return to birth weight for isolated cleft palate patients and significantly greater total weight gain of CL patients at their first visit. CL patients required far fewer interventions at the initial assessment and were more likely to be provided breast milk exclusively or in combination with formula (69.4%). CP infants were far less likely to receive any breast milk (24.5%). Both CLP and CP patients required frequent nutritional interventions (42.4% and 53.6%, respectively).

FACTORS AFFECTING PARENTAL ANXIETY AND POSTOPERATIVE PAIN IN INFANTS UNDERGOING CLEFT LIP OR PALATE REPAIR

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BACKGROUND & PURPOSE: Pediatric cleft lip and palate surgery can be stressful for both the child and the parents. Limited pain knowledge and certain parent psychological traits are associated with increased parental anxiety around surgery in older children. Increased parental anxiety has been associated with increased child pain, decreased ability of the child to cope with pain and worse outcomes in other surgical settings. Little is known about parental anxiety and child pain in preverbal children undergoing cleft lip and palate repair. The objectives of this study were to explore possible sociodemographic factors contributing to parental anxiety in the immediate postoperative period and to determine if there is a relationship between parental postoperative anxiety and infant postoperative pain.

METHODS: Cross-sectional pilot study, semi-structured interview. Eight mothers of children under 18 months of age undergoing cleft lip/palate (CL/P) repair at an urban craniofacial center were recruited. Semi-structured interviews about their experience with their infant's surgery were conducted. The interviews included questions about demographics, experience, and feelings about the surgery. In addition, mothers were asked to rate their anxiety using the Hospital Anxiety and Depression Scale (HADS), a self-report measure of anxiety and depression. Mothers were also asked about their child's pain, using the Face, Legs, Activity, Cry, Consolability scale (FLACC scale), which is a validated scale for assessing pain in children.

RESULTS: Mothers who were healthcare workers were more likely to have borderline/abnormal anxiety scores (HADS) than mothers who were non-healthcare workers (p=0.05) on POD1. Mothers of infants undergoing a bilateral CL/P repair tended to be more anxious than mothers of infants undergoing a unilateral CL/P repair (p=0.00). Infants of anxious mothers tended to have more variation in pain scores, more pain scores recorded (95% CI -1.74, 4.0) (p=0.19) and more pain medication given (95% CI 2.59, 5.82) (p<0.07), compared to infants of non-anxious mothers.

CONCLUSIONS: Many factors contribute to parental anxiety, which may affect infant pain level and surgical outcomes. This pilot study elucidated possible factors contributing to parental anxiety, validated the prevalence of postoperative parent anxiety and informed the groundwork for a current, larger prospective study examining parent and child factors correlated with parent anxiety and child pain around CL/P repair.
continued to improve and be maintained over a follow up time of 6-30 months. Mean OR time, blood utilization, hospital stay, and cost are all comparable to children treated for scaphocephaly with open spring placement. There has been on child who required early spring removal for asymmetry and one child who required CVR for under correction and asymmetry and no mortalities associated with this treatment protocol.

CONCLUSIONS: Since beginning our clinical study in 2001, SAS has become our treatment of choice for children 7 months or younger with scaphocephaly. In 2011 we added the endoscopic approach to our treatment protocol and have found the OR times, blood loss, and complication rate not significantly different from the open approach for spring placement. Spring-assisted surgery offers a safe, effective, and less invasive option for the treatment of craniosynostosis. The addition of the endoscopic approach does have a learning curve associated with it but has comparable clinical results as well as no significant difference in perioperative morbidity and mortality.

THE ROLE OF DISTRACTION OSTEONEGENESIS IN THE MANAGEMENT OF CRANIOSYNOSTOSIS: A SYSTEMATIC REVIEW
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BACKGROUND & PURPOSE: Distraction osteogenesis (DO) has been proposed as an alternative to craniofacial remodeling surgery (CRS) for craniosynostosis, but technique descriptions and outcome analyses are limited to small case series. This systematic review summarizes operative characteristics and outcomes of DO for craniosynostosis. A secondary aim is to identify advantages and disadvantages of this approach and formulate guidelines for recommending its use over CRS.

METHODS: Two independent assessors undertook a systematic review of the literature using Cochrane, PubMed, Scopus, Google Scholar, and Web of Science databases. Studies that reported descriptive analysis, operative technical data, outcomes, or post-operative complications of DO for craniosynostosis were included. Studies that reported concomitant midface or mandibular distraction were excluded.

RESULTS: Twenty-two eligible manuscripts, totaling 292 cases, were identified. In 267 cases DO was the primary procedure while 25 had previous operations. There were 93 cases of syndromic craniosynostosis, most frequently Apert (38) and Crouzon (21) syndromes. The remaining 199 were nonsyndromic, the most common deformities being plagiocephaly (56), scaphocephaly (40), and brachycephaly (23). All comparison studies found mean operative time, blood loss, and intensive care unit (ICU) length of stay to be less than CRS, some with statistical significance. Only 19 patients (6.5%) required any blood transfusion whereas in CRS transfusion is almost universal. Treatment protocols included: latency period of 4.7 ± 1.6 d, distraction rate of 1 millimeter/d, distraction period of 20.4 ± 6.1 d, and consolidation period of 59.6 ± 22.8 d. There were complications in 46 (16%) cases, but most of these were minor, such as superficial infections, cerebrospinal fluid leaks requiring no intervention, or hardware issues. Footplate loosening or hardware malposition was highly variable and dependent on surgical technique. There were no post-operative deaths. Serious complications associated with CRS such as meningitis, epidural abscess, or significant resorption were not observed after DO. With reasonable follow-up (23.6 ± 21.6 months, range 6 to 130), there have been zero reports of bony relapse, including when DO was used to treat relapse after CRS. In 291 cases, post-operative improvement was observed in the form of decreased intracranial pressure, resolved headache or papilledema, improved aesthetic appearance, increased cranial volume, or other measurements of endocranial angulation or proportion.

CONCLUSIONS: DO is a useful adjunct to treat craniosynostosis with low morbidity and durable results. While DO can be labor-intensive and requires at least two procedures, its efficacy and safety profile suggest it can be considered an efficacious alternative method for the treatment of craniosynostosis. DO may be particularly advantageous in posterior vault expansion or to manage craniosynostosis following CRS.

A NOVEL METHOD OF PHOTOGRAMMETRY AND ANALYSIS OF FACIAL AND NASAL LANDMARKS FOLLOWING CLEFT LIP/PALATE REPAIR
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BACKGROUND & PURPOSE: Cleft lip and/or palate defects occur in 16 of every 10,000 neonates born in the U.S. Precise measurements are often used by plastic surgeons and orthodontists in the repair of these congenital abnormalities. Photographs taken pre- and intra-operatively enable the surgeon to calculate anthropometric measurements related to the reconstruction. Two- and three-dimensional photogrammetry methods are currently available for this purpose. While three-dimensional photogrammetry provides the best facial analysis, this method is costly and involves extensive user training. On the contrary, the contemporary two-dimensional technology is not as effective in encompassing facial structures and contours, in addition to having high rates of user error.

METHODS: In this study, we propose and assess the accuracy of a novel two-dimensional photogrammetric method for analyzing facial and nasal landmarks. Our technique involves the use of two widely available computer programs, Adobe Photoshop and Microsoft Excel, to analyze pre- and intra-operative photographs. We tested the precision, comparing our method to calculate ten different facial measurements on 35 pre-operative and intra-operative photographs of 13 unilateral and bilateral cleft lip and palate patients. Each of the ten measurements on each photograph was performed in a random manner and was repeated five times. Statistical analysis using ANOVA, Cronbach’s Alpha, and Intraclass Correlation Coefficient was then performed on the data.

RESULTS: All ten facial measurements demonstrated precision at a significant level (p<0.001), indicating that the technique repeatedly gave similar measurements for the different landmarks.

CONCLUSIONS: Our proposed two-dimensional photogrammetric method for analyzing craniofacial landmarks is cost-effective, user-friendly, and capable of significant precision in its calculations. We feel that it provides an excellent alternative to existing photogrammetry methods.

WHAT TO DO WHEN PEOPLE STARE WORKSHOP TEACHES INDIVIDUALS WITH DISFIGURING CONDITIONS TO CONTEND WITH STARING AND TAKE MORE CONTROL OF SOCIAL INTERACTIONS
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BACKGROUND & PURPOSE: Facial disfigurement caused by any reason can be a barrier to communication, cause social isolation, and decrease quality of life. Contenting with staring is one of the most frequently reported concerns of patients and families. There are no programs in the U.S. to help disfigured individuals adjust to an altered appearance, understand the science of staring, and learn communication skills. The What To Do When People Stare workshop educates attendees about the science of staring based on the research of Ectoff,1999,and incorporates specific interactive exercises to demonstrate communication skills. Since the workshop’s inception in 2000, more than 796 burn survivors and family members have participated in the workshop as well individuals with disfiguring dermatological conditions, and craniofacial anomalies. In 2011, we created an Interval Scale Survey with 10 questions to measure the effectiveness of the program. This study focuses on the 46 individuals with disfiguring conditions including, burns, dermatological, and craniofacial conditions who anonymously completed the survey.

METHODS: Of the 46 individuals, 12 had burn injuries; 15 had disfiguring dermatological conditions, and 19 had craniofacial anomalies, or were the parents of children with craniofacial conditions. The instructor, who has a facial difference, discussed her injury and experience and reviewed the science of staring, influence of media, history of beauty, and asked open ended questions to elicit feelings and beliefs about why people stare, and how it feels to be the object of a stare. Participants practiced eye contact, and communication skills, and developed one sentence statements to describe it feels to be the object of a stare. Attendees received a Seminar Completion Certificate and one dollar bill, which is placed on the cover of the booklet. Attendees were asked to rate their difference to a stranger as shown to be effective by Partridge,1990. After the workshop, participants rated their experience by answering questions like, “Having completed the seminar, to what extent do you feel better prepared to contend with staring?” They rated their responses on an Interval Scale from 1 being (Same) to 7 being (Much Better). Attendees received a companion brochure that we created, What to Do When People Stare to summarize the workshop and 12 actions to use in social situations.

RESULTS: Of the burn survivors, all 12 reported that they felt better prepared to manage staring, and had a better understanding about the motives of staring. Of dermatological patients, 12 reported that they felt better prepared to manage staring, and 11 reported better understanding of the motives of staring. Of the individuals with craniofacial conditions and parents of children with these conditions, 13 felt better prepared to cope with staring, and 15 reported a better understanding of the motives of staring.

CONCLUSIONS: The self reported outcome shows that individuals with disfiguring conditions feel better prepared and empowered to contend with staring and communicate with confidence after participating in this workshop.
PAIN MANAGEMENT IN ALVEOLAR BONE GRAFTING SURGERY
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BACKGROUND & PURPOSE: The purpose of this was to project the public to determine what is known about the care of the individual with a cleft palate.

METHODS: Eighty three participants responded to the survey. The majority of participants were age 45 and over (n= 70) and had completed at least an Associates degree (n=66). Sixty seven percent of the participants chose the correct response for the definition of cleft palate while only 14% were aware of variation in cleft type. “I don’t know,” was the most frequent response for the questions regarding cause (54%), occurrence (79%), ethnic group (72%), and prevention (63%). The American Dental Association (86%), the American Medical Association (87%) and Operation Smile (59%) were the most frequent choices for professional organizations by the participants.

CONCLUSIONS: Results suggest that participants were not aware of the cause, types, occurrence, and prevention of cleft palate nor were they aware of the most affected ethnic group. With regard to treatment, participants had an idea of what kinds of problems individual with cleft palate experience (with the exception of hearing) and where in general to go for help. Many of the participants indicated that their sources of information about cleft palate came from television, school, or family/friends. Few participants were aware of some of the major organizations devoted to the care of the individual with cleft palate.
METHODS: Samples were obtained from human fetal cranium (gestation day 94-103). After isolating RNA from cell cultures gene expression was assessed using microarray technology and paired comparisons analyses were performed on the expression of each tissue type.

RESULTS: The analyses revealed that the frontal and parietal bones had the most distinct expression profiles. Among all the possible comparisons between these four compartments, two comparisons, frontal bone versus metopic ISM and parietal bone versus sagittal ISM, showed the least difference. This result was unexpected, due to the similarity of tissue type we expected the bones (frontal and parietal) and intrasutural mesenchyme (metopic and sagittal) to have a high degree of similarity in expression patterns. Instead, we found more similarities in gene expression in tissues of like origin (e.g. frontal bone most similar to metopic ISM). Our analysis also found that the most consistently upregulated transcripts in the frontal and metopic cell lines were TFAP2A and TFAP2B, known transcription factors involved with neural crest development.

CONCLUSIONS: Cranial compartments maintain distinct gene expression patterns related to their embryonic origin with tissues of like origin having more similar expression profiles than like tissues (e.g. bone vs. unmineralized ISM). We will discuss potential implications of these results as they relate to the pathogenesis of craniosynostosis.

165 DESIGN AND FABRICATION OF A NOVEL CAD/CAM SURGICAL GUIDES COMBINED WITH SINGLE-SPLINT TECHNIQUE FOR CLEFT-ORTHOGNATHIC SURGERY
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BACKGROUND & PURPOSE: This study proposed a novel design of computer-aided design and manufacture (CAD/CAM) surgical guides combined with single-splint technique in cleft-orthognathic surgery and demonstrate the feasibility and validity of our method.

METHODS: Two types of custom-made surgical guides were designed and fabricated by using CAD/CAM technology to guide Le Fort I osteotomy and position the maxilla for translation of the 3D virtual surgical planning to actual orthognathic surgery. All operations were performed by the same surgeon. A cone-beam computed tomography (CBCT) was taken preoperatively and postoperatively, and used in surgical planning and evaluating the accuracy of the presented method. The measurements between maxillary hard landmarks and reference planes were used to compare the differences between the virtual plan and postoperative surgical result.

RESULTS: Eight patients who underwent orthognathic treatment combined with two-jaw orthognathic surgery were performed in this study. One patient did not use the osteotomy guide in surgery, and was thus excluded from analysis. The Wilcoxon rank-sum test showed no significant difference between the virtual plan and postoperative surgical result in maxilla and condyle measurements. (P < 0.05) The experimental results showed that the proposed method was clinically accurate precision for the position of the maxilla ranged from 0.04 to 1.46 mm and condyle ranged from 0.06 to 1.61 mm.

CONCLUSIONS: Our CAD/CAM surgical guides combined with single-splint provide a clinical feasible and reliable method for translation of the virtual planning to actual surgery. This study showed that the proposed approach is less complicated design, low-cost fabrication and easy-to-use for surgeon.

166 CRANIOTRACIAL TRAINING FOR CLEFT TEAM SLPS: A MODEL FOR SLP EDUCATION AND EXPANDING ACCESS TO SPEECH THERAPY SERVICES
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BACKGROUND & PURPOSE: The volume of patients with cleft palate requiring speech therapy supersedes the number of SLPs with training in resonance and compensatory articulation disorders. Results from past US surveys of SLPs indicate a need for further education regarding treatment of children with clefts (Bedwinek, 2010), since SLPs have an obligation to provide services in every area and satellite clinics in the surrounding suburbs. This has resulted in the ability to meet the demands of the cleft palate speech therapy caseload, improve patient accessibility to quality therapy services, and also provide depth to cleft team speech services.

METHODS: This poster will discuss the specific components of our training protocol including (1) directed readings and a conference call with the lead team SLP to review reading content and questions, (2) an annual cleft palate speech educational retreat, (3) observation of therapy sessions, (4) mentored treatment planning and therapy sessions with direct instruction provided by team SLPs, and (5) advanced training opportunities for transition into the full cleft team SLP evaluation role. Since 2012, this cleft palate speech training program has resulted in training 6 SLPS who have now met core cleft palate speech therapy competencies. In addition, this training approach has allowed our team to now have a minimum of four SLPS, at any given time, trained in evaluation of resonance and compensatory articulation disorders to serve on the Cleft Palate Team.

167 THE EFFECTS OF ANCHORS ON THE RELATIONSHIP BETWEEN NASALITY RATINGS AND NASALANCE SCORES
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BACKGROUND & PURPOSE: This investigation explored the relationship between nasalance scores and nasality ratings when perceptual anchors were placed at different points along a 7-point scale used to rate nasality.

METHODS: One hundred speech samples and nasalance scores were obtained simultaneously from 95 children followed by a cleft palate team and 5 non-patient speakers. The speech samples were randomized and duplicated to make six different sets of 100 samples each. Listeners (N=129) were randomly assigned to one of six listening groups and each group rated nasality on a seven-point scale that ranged from “1” normal nasality to “7” severe nasality. Five groups heard single or multiple anchors; but the anchors were located at different points along the perceptual continuum for each group. One group did not hear anchors.

RESULTS: Correspondence between median nasality ratings and mean nasalance scores differed for different listening conditions. Group 4 heard anchor stimuli representing “3”, and “5” on the rating scale and this resulted in the best correspondence between nasality ratings and nasalance scores (r=0.48). The poorest correspondence was for Group 1 which did not hear any anchor stimuli (r=0.41). A median rating was computed across listeners for each of the 100 samples in order to assign a single rating to each sample and these were compared to the mean nasalance scores. Mean nasalance scores were essentially the same for all stimuli rated “1” (26.4%), “2” (26.9%), or “3” (26.7%). In other words, it appeared that listeners made distinctions on the mild-moderate end of the perceptual scale that the Nasometer did not. Mean nasalance scores increased only about 3% from scale value “3” (26.76%) to scale value “4” (29.72%) and increased again about 6% from “4” to “5” (36.4%). Nasalance increased substantially for scale values “6” (44.05%) and “7” (41.28%) but there was little difference in nasalance for speech samples at the high end of the scale.

CONCLUSIONS: Correspondence between nasality ratings and nasalance scores is influenced by different placement of perceptual anchors. Nasalance scores increased in a step-wise fashion relative to listener ratings rather than linear.

168 RENAL AND SPINE SCREENING IN SUB-PHENOTYPIC POPULATIONS OF PATIENTS WITH CRANIOFACIAL MICROsomIA
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BACKGROUND & PURPOSE: Craniofacial microsomia (CFM) is among the most common craniofacial conditions; however, there has been no standardization of clinical care nor consensus on surveillance for extra-craniofacial anomalies. The reported prevalence of spine and genitourinary anomalies ranges widely; 24%-42% and 4-15%, respectively. Timely diagnosis of these anomalies is
essential for safe and comprehensive care, given that many children undergo multiple surgeries and procedures. The goal of this study is to understand the prevalence and type of oral and spine anomalies in CFM and identify phenotypic subpopulations at risk.

METHODS: One hundred children with CFM were enrolled from four US craniofacial centers between 2011-2012. Participants were identified using clinical, billing and scheduling databases. Demographic, phenotypic, and clinical data, including birth, medical and surgical histories were ascertained from study visits, parental interview, photographs and medical records review.

RESULTS: One hundred case participants, 56% males, mean age: 8.2 years, were enrolled and grouped by facial phenotype: a) isolated microtia (18%); b) facial asymmetry and preauricular/facial tags (tags) without microtia (2%); c) facial asymmetry and tags or microtia plus other features (epibulbar dermoids, microstomia, tags) (76%); d) other features excluding facial asymmetry or microtia (4%). Renal ultrasounds had been performed in 62 participants, and spine radiographs in 39. Of the total group, 8% had a renal anomaly (all unilateral, 66% in right side), and 21% had vertebral anomalies (all from phenotypic groups c and d). Renal ultrasounds and spine radiographs were significantly greater post-operatively as compared to pre-operatively (p=0.02). Volume of oral intake, weight, and weight percentile were significantly less post-operatively as compared to pre-operatively. Use of anti-reflux medications were similar before and after surgery. Distraction osteogenesis (MDO) is the only surgical modality that definitively corrects the pathology of PRS. While the literature supports improvement in speech-language characteristics and mothers’ interaction style from pre- and post-intervention phases; pre-intervention test, small group parent training, administration of standardized language tests and collection of 20-minute language samples while mothers interacted with their children in their homes. Researchers who were blinded the purpose of the study, group type, and testing phase transcribed and analyzed the language samples and provided mothers’ and children’s measures. The maternal measures involved the length and complexity of language and communication style. The children’s measures included the percentage of communication modes (gesture, vocalization, and imitation) in the measure of utterance length (MLU), the number of true consonants in the phonetic inventory excluding glottal consonants, and the number of different syllable structures. Children’s speech-language characteristics and mothers’ interaction style from pre- and post-intervention tests and between the two groups were compared.

CONCLUSIONS: The findings of the study suggest that the parent-implemented intervention is effective in improving speech-language performances of children with cleft palate and language stimulation and interaction skills of mothers. The study has implications for establishing models for the delivery of early intervention program in the population.

BACKGROUND & PURPOSE: Pierre Robin Syndrome (PRS) is classically described as micrognathia, glossoptosis, and airway obstruction. Infants with PRS frequently suffer from feeding difficulties due to airway obstruction and severe reflux, leading to poor weight gain and slow growth. Mandibular distraction osteogenesis (MDO) is the only surgical modality that definitively corrects the pathology of PRS. While the literature supports improvement in airway obstruction with MDO, feeding behaviors following mandibular distraction in PRS have not been described. The aim of this study is to explore whether MDO affects oral intake and growth in infants with PRS.

METHODS: A retrospective study was performed at our institution to analyze MDO performed between 2013 and 2013. Patient charts were identified using CPT codes for segmental osteotomy and external fixators. Patients without PRS were excluded from the study. Hospital charts were reviewed for associated genetic syndromes, co-existing cleft palate/lip, airway assessment via direct laryngoscopy, presence of gastroesophageal reflux symptoms, use of anti-reflux medications, feeding method(s) and amount, and weight percentiles. These variables were compared before and after MDO to detect any differences.

RESULTS: 21 infants with PRS were included in the study. 18 patients (86%) had an associated cleft palate and 1 patient (5%) had tracheomalacia on laryngoscopy. 12 patients had isolated PRS and 9 patients had syndromic PRS. The average age at surgery was 3.0 months. Average follow-up time was 14.0 months (range 1.5 - 42.0 months). Gastroesophageal reflux symptoms and the use of anti-reflux medications were similar before and after surgery. Significantly more infants tolerated oral feedings after MDO as compared to before surgery (p=0.02). Volume of oral intake, weight, and weight percentiles were significantly greater post-operatively as compared to pre-operatively.

THE EFFECTIVENESS OF PARENT-IMPLEMENTED INTERVENTION FOR YOUNG CHILDREN WITH CLEFT PALATE

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BACKGROUND & PURPOSE: The purpose of the study was to examine the effectiveness of a parent-implemented intervention program for children with cleft palate younger than 3 years on the speech and language development.

METHODS: A parent-implemented intervention program had been developed based on literature review and opinions of parents and clinical service providers in cleft palate clinics. The intervention program included four phases; pre-intervention test, small group parent training, administration of parent-implemented intervention in children’s home for 3 months and post-intervention test. Seventeen children with cleft palate aged 12 to 30 months and their mothers participated in the entire sessions of the intervention program. To investigate the effectiveness of the intervention more validly, 7 children with cleft palate and their mothers involved in the study as a control group and they participated in only test sessions and did not voluntarily receive parent training. Testing procedures involved administration of standardized language tests and collection of 20-minute language samples while mothers interacted with their children in their homes. Researchers who were blinded the purpose of the study, group type, and testing phase transcribed and analyzed the language samples and provided mothers’ and children’s measures. The maternal measures involved the length and complexity of language and communication style. The children’s measures included the percentage of communication modes (gesture, vocalization, and imitation) in the measure of utterance length (MLU), the number of true consonants in the phonetic inventory excluding glottal consonants, and the number of different syllable structures. Children’s speech-language characteristics and mothers’ interaction style from pre- and post-intervention tests and between the two groups were compared.

CONCLUSIONS: We report a ten-fold higher frequency of renal anomalies and three-fold higher frequency of spine anomalies in CFM patients compared to the general population. These prevalences are likely underestimates given incomplete screening. Our data support renal and spine imaging in the standard clinical care patients with CFM.
CONCLUSIONS: Mandibular distraction osteogenesis is an effective treatment for feeding difficulties in infants with PWS. Surgical treatment of PWS can improve oral feeding behaviors, increasing the amount of nutrition consumed orally and enhancing weight gain.

RACIAL/ETHNIC DIFFERENCES IN BULLYING, AGGRESSION, AND SOCIAL SUPPORT AMONG SCHOOL-AGE CHILDREN IN A PEDIATRIC CRANIOFACIAL CLINIC

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BACKGROUND & PURPOSE: Despite growing literature on the psychosocial impact of craniofacial anomalies in pediatric populations, research addressing the relationship between racial/ethnic differences and psychosocial concerns in this population is limited. The current study examined psychosocial factors in a pediatric craniofacial population, particularly as they related to race and ethnicity.

METHODS: Data were collected during in-person clinic visits and via medical chart reviews. Chi-square analyses were conducted to examine the relationships between ethnicity and other demographic and psychosocial variables. The total sample included 278 children and adolescents, ages 5-17 years (mean age=9.78 years; Hispanic= 52.6%).

RESULTS: Chi-square analyses revealed that racial/ethnic differences were significantly related to reported rates of bullying/teasing, with 61.5% of Black/Non-Hispanic respondents endorsing bullying/teasing compared to 34.8% of Hispanic patients and 39.5% of White/Non-Hispanic patients. Racial/ethnic differences were significantly related to reported rates of aggression, with 40.7% of Black/Non-Hispanic respondents endorsing bullying/teasing compared to 34.8% of Hispanic patients and 39.5% of White/Non-Hispanic patients. Finally, racial/ethnic differences were significantly related to reported rates of social support, with 22.2% of Black/Non-Hispanic respondents endorsing lack of social support, compared to 6.5% of Hispanic respondents and 5.1% of White/Non-Hispanic respondents.

CONCLUSIONS: These findings indicate significant racial/ethnic differences in reports of bullying, aggression, and social support by children and families in this particular sample. Future research should focus on the extent and effects of these disparities on the psychosocial wellbeing of children and adolescents with craniofacial anomalies.

FACIAL SOFT-TISSUE ASYMMETRY IN 3D CONE BEAM COMPUTED TOMOGRAPHIC IMAGES OF CHILDREN WITH SURGICALLY CORRECTED UNILATERAL CLEFTS

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BACKGROUND & PURPOSE: Cleft lip with or without cleft palate (CL/P) is a common craniofacial malformation that disrupts bony and soft-tissue development of the labialnasal facial regions. Individuals with CL/P typically undergo multiple surgeries to close the cleft and improve appearance and tissue development of the labionasal facial regions. Individuals with CL/P and subsequent craniofacial surgeries can cause scarring and muscle pull and can result in soft-tissue depth asymmetries across the face.

METHODS: We tested the hypothesis that bilateral facial tissue depths of children with surgically repaired unilateral CL/P exhibit differences in symmetry. Following IRB approval (study # 1210009813), reliability studies were carried out to assess intra-class correlation (ICC) and technical error of measurement (TEM). A total of 28 bilateral tissue depths were measured by one investigator on cone beam computed tomography (CBCT) images from orthodontic records of children with unilateral CL/P (n = 55) who have been surgically repaired, aged 7-17 yrs., using Dolphin software (v 11.5). Paired t-tests were used to determine whether the tissue depths on each side of the face were significantly different, and a p-value of ≤ 0.05 was considered significant.

RESULTS: ICC was high (0.99) and indicates that tissue depth measurements are reliable. TEM was low (0.20 mm) and indicates that measurement error is adequately low. Significant differences in tissue depth symmetry were found around the cutaneous upper lip and nose, with tissue depths on the clefted side being significantly increased by (0.6 - 1.6mm).

CONCLUSIONS: Despite the best efforts of plastic surgeons there is usually residual facial asymmetry from CL/P, although these asymmetries are small. Surgeons can quantify asymmetry using 3D CBCT images and 3D imaging software to develop individualized treatment plans for patients after evaluating the anatomical relationship between the hard- and soft-tissues of the craniofacial complex.

DELETIONS OF EFTUD2 IN PATIENTS WITH FACIAL DYSOSTOSIS: A USEFUL CONSIDERATION IN A DIFFERENTIAL DIAGNOSIS

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BACKGROUND & PURPOSE: Mandibulofacial dysostosis is a clinically and etiologically heterogeneous group of disorders characterized by significant malar and mandibular hypoplasia. Recently, heterozygous loss-of-function mutations of the EFTUD2 gene on 17q21.31 were identified in a rare syndromic craniofacial condition termed mandibulofacial dysostosis with microcephaly (Mandibulofacial dysostosis, Guion-Almeida type; MFDM). We present two patients with deletions at 17q21.31 encompassing the EFTUD2 gene illustrate the importance of including this condition in the differential diagnosis of other human facial dysostosis syndromes.

METHODS: Chromosome microarray analysis was done using Agilent technologies 400K CGH+SNP array and Affymetrix Gyrosord®. * RESULTS: Patient 1 was diagnosed prenatally with a cleft palate and ventriculomegaly. Postnatally, she was noted to have low weight, microcephaly, microretortagnathia, and midface hypoplasia. Musculoskeletal findings included proximal placed thumbs, overlapping toes and limited forearm supination. X-rays documented bilateral radialuldar synostosis and 11 ribs. Brain imaging revealed thinning white matter with heterotopias. By 5 months of age, the patient continues to have significant microcephaly and displays developmental delay. Patient 2 is a 4 year old female with a history of a submucosal cleft palate, epilepsy, and speech apraxia. By physical exam, she was noted to have a small mouth, hypertelorism and micrognathia. Examination of her extremities did not reveal abnormalities and her anthropometric measurements were normal, including head circumference. Testing for both patients revealed deletions at 17q21.31 involving EFTUD2.

CONCLUSIONS: Three previously reported patients with deletions involving EFTUD2 were microcephalic, like Patient 1. Patient 2 was notably not microcephalic, which is consistent with the assertion that microcephaly is not a unifying feature. In fact, the relative milder developmental impairment of Patient 2 provides evidence for the relationship between a lack of absolute microcephaly and favorable neurodevelopmental outcomes. On the other hand, Patient 1 is the first documented case of radioulnar synostosis in this condition. This provides further evidence of the clinical overlap among human facial dysostoses. The variable phenotype among patients with alterations of the EFTUD2 gene indicates that MFDM should be considered among the differential diagnosis for facial dysostosis.

EXPLORING COMMUNICATION ATTITUDE AND ITS RELATIONSHIP TO COMMUNICATION APPREHENSION, AND SPEECH SEVERITY IN CHILDREN WITH VELOPHARYNGEAL INSUFFICIENCY (VPI)

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BACKGROUND & PURPOSE: Speech-associated attitudes may influence the communicative functioning of children with velopharyngeal insufficiency (VPI). Specific to children with speech disorders, attitude may be defined as children’s perceptions and feelings as they pertain to speech. Negative speech-associated attitudes have been shown to develop at an early age in children with a variety of speech disorders. These negative communication attitudes (CA) are likely to interact with one’s cognitive processes, affective states, and behavior during communication situations. The purpose of the present study is to evaluate CA and its association with speech severity, satisfaction with speech, and communication apprehension, in children with VPI.

METHODS: 20 children with VPI (7-14 years), and 20 typically developing children matched on age and gender participated in this study. Study participants completed: the Communication Attitude Test (CAT), a 35-item measure of CA, the Measure of Elementary Communication Apprehension-Revised (MECA-R), a 16-item measure of communication apprehension, and a single-item measure evaluating speech satisfaction. In addition, perceptual evaluations of the speech of children in the experimental group were performed by a Speech Language Pathologist using the American Cleft Palate Association Data Entry Form (ACPA). The experimental questions posed were: 1) Do children with VPI experience more negative attitudes towards speech than controls?, and 2) Does a relationship exist between CAT scores and
MECA-R scores, speech severity scores (ACPA scores), and speech satisfaction? RESULTS: On average, children with VPI experienced more negative attitudes towards their speech than controls. Furthermore, moderate to strong correlations were observed between CA and communication apprehension, speech satisfaction, and speech severity variables (nasal air emission, and overall intelligibility). CONCLUSIONS: Children with VPI experience negative internalized appraisals of their speech abilities. These attitudes towards communication may be associated with their speech functions and overall communicative functioning. As such, the present data allows for further understanding of limitations in communicative participation in children with VPI.

177 QUANTIFICATION OF MAXILLARY SINUSITIS IN UNILATERAL CLEFT LIP AND PALATE
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BACKGROUND & PURPOSE: Cleft lip and palate (CLP) perturbs osseous and soft-tissue development of the nasolabial regions, often resulting in chronic maxillary sinusitis. The purpose of this preliminary study is to quantify maxillary sinusitis in children with surgically repaired unilateral CLP.

METHODS: We hypothesize that maxillary sinusitis is increased in children with surgically repaired CLP relative to controls. We define “sinusitis” as the difference between the entire maxillary sinus volume (including non-bony obstruction, e.g. fluid, mucous, inflammation) and airspace volume. Cone beam computed tomography (CBCT) images of 8-14 yr. old age- and sex-matched unilateral CLP patients (n = 10) and controls (n = 10) were obtained from orthodontic records with IRB approval (#1210009813). Reliability was assessed using intra-class correlation (ICC). Left and right maxillary sinus and airspace surface area (SA) was measured on each individual CBCT slice in coronal view by one investigator (15,578 measurements). SA measurements were summed and multiplied by voxel size (0.4mm) to obtain a volumetric value for each measurement per individual. Paired t-tests determined whether maxillary size, airspace, sinusitis (i.e. maxillary size - airspace), and percentage of sinusitis (i.e. 1 - airspace/maxillary size) differed between the two samples. A p-value of ≤ 0.05 was considered significant.

RESULTS: ICC was high (0.99) and SA measurements reliable. Significant differences were found for several measurements: Maxillary airspace (non-cleft p-value 0.002; cleft-side p-value 0.004), sinusitis (cleft-side p-value 0.009), and percentage of sinusitis (non-cleft p-value 0.002; cleft-side p-value 0.002). Maxillary airspace was decreased by 30% on the non-cleft side and by 35% on the cleft side. Percentage of average sinusitis was 37% on the non-cleft side and 46% on the cleft side of CLP patients, but only 10% on each side in controls.

CONCLUSIONS: Surgically repaired CLP patients exhibit decreased maxillary airspace and increased sinusitis relative to controls. CLP deformities appear to encourage the presence of sinusitis, which may perturb maxillary pneumatization during morphogenesis and growth to disrupt physical respiration, or vice versa.

178 CRANIAL BASE IN HEMIFACIAL MICROsomia: AN OBJECTIVE CRANIOMETRIC ANALYSIS
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BACKGROUND & PURPOSE: The abnormal growth pattern in patients with Hemifacial Microsomia (HFM) results in noticeable craniofacial asymmetry. The focus of most reports has been abnormal mandibular morphology with less attention paid to the midface. Thus far, no studies have evaluated the degree of asymmetry of the cranial base in HFM. The aim of this study is to evaluate the endocranial morphology of the anterior and middle cranial base in HFM.

METHODS: Consecutive patients with HFM treated at a major craniofacial center from 2000 to 2012 were included and classified according to the degree of severity using the Kaban-Pruzansky classification. Patients were excluded if they were diagnosed with bilateral HFM, were less than 1 year of age, underwent a surgical intervention, had an incomplete medical record or lacked a 3D-CT scan of the head. Transverse craniometric measures and lateral facial measurements were reported and used to calculate mean ratios between affected and unaffected sides. Statistical analysis was performed on craniometric measurements using Kruskal-Wallis and Wilcoxon signed-rank tests.

RESULTS: 30 patients (14 males and 16 females) were included. Patients were on average 7.47 years of age (range: 1.09 - 15 years). 4 patients were classified as mild, 12 patients as moderate, and 14 patients were considered severe. The mean cranial base angle was found to be between 179 and 180 degrees in all severity groups without a significant difference between the cohorts. There were no significant differences in transverse measurements between the severity classes including bi-hypoglossal canal, bi-IAM, bi-lateral carotid canal and bi-medial carotid canal distances. The average ratios of the lateral measurements did not vary significantly, except for one measure, the infraorbital foramen to mental foramen distance which varied significantly between the classes (0.98 ± 0.036, 0.86 ± 0.10, 0.89 ± 0.06; p = 0.026).

CONCLUSIONS: Although HFM patients display facial asymmetry, the cranial base axis is not deviated and there exists little difference in endocranial morphological measurements. Moreover, there was no difference with regards to the endocranial morphology among HFM patients with different degrees of severity. This data is surprising given the cranial base’s role in facial growth and interesting given the varying hypotheses regarding mechanism of the pathology.

179 IMPACT OF VISIBILITY ON PSYCHOSOCIAL FUNCTIONING AMONG YOUTH WITH CRANIOFACIAL DIFFERENCES
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BACKGROUND & PURPOSE: Facial appearance plays a crucial role in social interactions (Cole, 1998). Facial differences frequently result in negative life experiences for children and adolescents. Thus, visible facial differences can negatively affect early parent-child interaction and attachment (Speltz, Enderig, Fisher, Mason, 1997) or make children prone to being teased (Hunt, Burden, Hepper, Stevenson, Johnston, 2006). In the present study we examined the impact of visibility of facial differences on socio-emotional functioning in a sample of children with various craniofacial anomalies.

METHODS: The present study involved 163 children and adolescents and their parents receiving treatment at the multidisciplinary craniofacial clinic. The range of diagnoses included cleft lip, cleft palate, cleft lip and palate, craniosynostosis, and vascular birthmarks. The mean age of participants was 8 years (SD=4.42). The parents reported the children’s level of psychosocial adjustment on the Strengths and Difficulties Questionnaire (Goodman 1997). Participants were in 11 years and older (N=34) were additionally administered a self-report version of the Strengths and Difficulties Questionnaire. All participants gave consent/assent to be in the study, and all procedures were approved by the Institutional Review Board at our institution.

RESULTS: Findings based on hierarchical regression analyses indicated no significant relationship between visibility of facial differences and total difficulties in parent reported or self-reported data. Likewise, parent and self-reported versions of four subtests measuring emotional symptoms, conduct problems, hyperactivity/inattentiveness, and peer problems respectively were not related to visibility of facial differences. Interestingly, visibility was found to be positively related to prosocial behaviors based on parent reports. A similar but non-significant trend was also seen for self-report data.

CONCLUSIONS: Findings of this study indicate that youth with visible facial differences were more likely to show prosocial behaviors such as caring, sharing, being considerate, kind and helpful as observed by parents. This finding has important implications for identifying psychosocial interventions for this population.

180 POSTERIOR CRANIAL VAULT ASYMMETRY IN LAMBDOID CRANIOSYNOSTOSIS AFTER OPEN AND ENDOSCOPIC REPAIR
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BACKGROUND & PURPOSE: Lambdoid craniosynostosis causes an asymmetric deformation of the posterior cranial vault, resulting in ipsilateral occipital flattening and contralateral parietal bossing. Traditional open posterior cranial vault reconstruction seeks to restore normocephaly. Endoscopic-assisted suturectomy followed by molding helmet therapy is a minimally invasive alternative offered to patients younger than 6 months of age. Given lack of published data comparing open and endoscopic repairs of lambdoid craniosynostosis, the purpose of this study is to quantitatively analyze the effectiveness of two procedures in correcting asymmetry of the posterior cranial vault.

METHODS: Patients with isolated unilateral lambdoid synostosis with
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preoperative and 1-year postoperative three-dimensional computed tomography scans were included in this study. Using Analyze image analysis software, three-dimensional reconstruction of the skull was performed to determine the volumes of the parietal regions. Synostotic and nonsynostotic sides were compared and postoperative change was recorded. Patients treated with open reconstruction (n=6) were compared to those treated endoscopically (n=4).

RESULTS: Statistically significant postoperative improvements in posterior cranial vault asymmetry were found in both the open (p=0.016) and endoscopic (p=0.021) groups. Mean preoperative asymmetries for the open (27 percent) and endoscopic (31 percent) groups were statistically equivalent (p=0.548); mean postoperative asymmetries were 16.7 and 17.1 percent (p=0.934), respectively. Preoperatively, all patients had a larger parietal cranial vault on the nonsynostotic side and all had postoperative improvement in parietal asymmetry.

CONCLUSIONS: Open cranial vault remodeling and endoscopic-assisted suturectomy equally improved posterior cranial vault asymmetry for children with unilateral lambdoid synostosis, suggesting that endoscopic surgery can be an effective option for eligible patients. Neither procedure achieves complete symmetry of the cranial vault.

181 VOLUMETRIC COMPARISON OF MAXILLARY SINUSES IN PATIENTS WITH UNILATERAL CLEFT
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BACKGROUND & PURPOSE: Authors have debated the incidence, prevalence and underlying causes of sinusitis in pediatric cleft patients. Sinus anatomy has relevance to multiple areas in craniofacial care, including orthodontics, oral surgery, plastic surgery, dental, as well as otolaryngology. Studies have proposed that both maxillary sinus development and nasal septal deformities play a part in the health or disease of the sinuses. Findings vary in the literature, with regard to the diagnosis of sinusitis in the cleft patient. Prior studies have been mostly descriptive in nature, though the cross-sectional area of the sinuses was determined in a previous study, with findings of no significant difference in size from side to side.

METHODS: This study examines the 3-D volumes of maxillary sinuses in a group of 8-12 year old patients with unilateral cleft lip and palate who received cone-beam CT scans as part of their work-up for alveolar bone graft. Mimics 16.0 software was used to render the full volume of the left and right maxillary sinuses and these volumes were compared. A total of 15 scans were reviewed, with a comparison made between the cleft and the non-cleft side. A control group of 10 scans of 10-12 year old non-cleft patients, presenting for routine orthodontic care, was used.

RESULTS: Findings in our study were that significant variability (p=0.002) existed between maxillary sinus volumes in patients with unilateral cleft lip and palate. This variability was greater in the study group than in the control group of unaffected patients. The variability, though present, was not predictable. The maxillary sinus volume on the cleft side was sometimes smaller and sometimes larger than the non-cleft side.

CONCLUSIONS: This study finds a significant difference between cleft and non-cleft patients in terms of maxillary sinus volume. More variability exists between the right and left maxillary sinus volume in patients with unilateral cleft lip and palate than in unaffected control patients. Maxillary sinus abnormalities have relevance to the multi-disciplinary care of patients and have specific importance in orthognathic surgery, where entry to the sinuses is common and complications of infection can be problematic. Further studies are anticipated in examining the sinuses of patients with craniofacial conditions.

183 THE PATH OF THE SUPERIOR SAGITTAL SINUS IN UNICORNAL SYNOSTOSIS
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BACKGROUND & PURPOSE: The sagittal suture of the skull is frequently utilized as a landmark designating the location of the superior sagittal sinus (SSS). However, when significant asymmetry exists, as in the case of uncorrected unicoronal synostosis, the relationship between the sagittal suture and the SSS cannot be presumed. This study investigates the anatomical relationship between the SSS and the sagittal suture in infants with uncorrected unicoronal synostosis. The morphology of the SSS is also evaluated postoperatively to assess whether normalization of intracranial structures occurs following reconstruction.

METHODS: The study sample consisted of 20 computed tomography scans (10 preoperative, 6 postoperative, and 4 unaffected control patients) obtained at St. Louis Children’s Hospital between 2001 and 2013. The SSS and the sagittal suture were outlined using Analyze imaging software. These data were used to measure the maximum discrepancy between the SSS and sagittal suture and to assess for any change in the morphology of the SSS pre- and postoperatively.

RESULTS: In children with uncorrected unicoronal synostosis, the SSS deviates to the side of the patent coronal suture posteriorly and tends to follow the path of the sagittal and metopic sutures. The discrepancy between the SSS and the sagittal suture ranged from 5.0 mm to 11.8 mm, with a 99.9% upper prediction bound of 14.4 mm. The curvature of the SSS was statistically decreased following surgical intervention though it remained significantly greater than in unaffected controls.

CONCLUSIONS: The SSS follows a predictable course relative to surface landmarks in children with unicoronal synostosis. When creating burr-holes for craniotomies, the SSS can be avoided in 99.9% of cases by remaining at least 14.4 mm from the outer edge of the sagittal suture. Postoperative changes in the path of the SSS provide indirect evidence for normalization of regional brain morphology following fronto-orbital advancement.

184 COMPARATIVE EVALUATION OF NASOPHARYNGEAL AIRWAYS OF UNILATERAL CLEFT LIP AND PALATE PATIENTS USING THREE-DIMENSIONAL METHODS
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BACKGROUND & PURPOSE: Nasal deformities due to congenital defects or resulting from various prior operations are frequently encountered. Atresia and folds in nostrils and mucosal hypertrophies usually decrease the nasal
cavity dimensions and hinder nasal airflow in patients with orofacial cleft. The production of speech with a balanced oronasal resonance is known to require adequate nasal and pharyngeal patency. Although volumetric nasopharyngeal investigation of different skeletal patterns and various facial heights has been carried out using 3D reconstruction of CBCT images, there has been no investigation assessing the volumetric capacity of nasopharyngeal airways of patients with orofacial clefts. The aim of this study was to compare nasopharyngeal airways of patients with UCLP with a control group of orthodontic seeking patients.

METHODS: This study examines the 3-D volumes of nasal (NV) and oropharyngeal (PV) airways in a group of 8-12 year old subjects with UCLP who received cone-beam CT scans as part of their work-up for alveolar bone graft. Additional 15 scans of orthodontic seeking treatment subjects with ages 8-12 year old were also reviewed as a non-cleft control group. The airway images were rendered and volume was measured in mm3.

RESULTS: The mean PV of the UCLP subjects was 6.0 mm3 and the mean NV was 10.9 mm3. Control group presented mean PV = 8.1 mm3 and the mean NV = 11.6 mm3. Student T test showed statistically significant difference when PV was compared (p=0.03). No significant differences were observed in NV.

CONCLUSIONS: Evaluation of the nasopharyngeal airways of cleft and non-cleft patients showed that the NV airways showed no difference between the cleft and non-cleft adolescent child. It is interesting to postulate that the reported septal and nasal abnormalities do not have a significant effect on the overall volume, at least as shown in our study sample. As for PV, it was statistically significant different between the two groups were compared. This inadequacy can be interpreted as either due to the underlying palatal defect in the cleft patient or to an effect of the surgery on the soft palate. We hope to address these issues with further study.

185 USING SYNCHRONIZED AUDIO MAPPING TO PREDICT VELAR AND PHARYNGEAL WALL LOCATIONS DURING DYNAMIC MRI SEQUENCES
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BACKGROUND & PURPOSE: Studies have used machine learning techniques (Nattkemper et al., 2005) which utilizes visual features to feed a supervised or unsupervised training model to predict structural location. Traditionally, movements of the velopharyngeal structures require manual tracings for image segmentation (Bae et al., 2011). Velar and pharyngeal movement tracking systems provide a significant benefit for the analysis of speech movements obtained from dynamic magnetic resonance imaging (MRI). The purpose of this study is to illustrate a methodology to track the velum and pharynx from a sequence of magnetic resonance images using the Hidden Markov Model (HMM) and Mel-Frequency Cepstral Coefficients (MFCC) by analyzing the corresponding produced audio signals. The trained model was then used to predict the location of the velar and pharyngeal structures based upon the audio signals.

METHODS: One adult male subject was imaged using a fast-gradient echo Fast Low Angle Shot (FLASH) multi-shot spiral technique to acquire 15.8 frames per second (fps) of the mid sagittal image plane during the production of “ansa.” The nasal surface of the velum and the posterior pharyngeal wall was tagged (selected pixel) using a novel circular tagging system in Matlab. Audio extraction was accomplished using MFCC and feature discretization was used to convert the continuous audio signals into features. After the audio and visual features were extracted and the computerized model was trained by the researcher, a HMM (Rabiner, 1989) was used to predict velar and pharyngeal wall boundaries relative to the audio signal. The error rate was measured by calculating the accumulation error and through visual inspection.

RESULTS: The proposed model traced and animated dynamic articulators during the speech process in real-time with an overall accuracy of 81% considering one pixel threshold. The predicted markers (pixels) successfully segmented the structures of interest in the velopharyngeal area and were able to predict the velar and pharyngeal configurations when provided with the audio signal.

CONCLUSIONS: This study demonstrated a potential method for using audio signals to determine velopharyngeal positioning during speech production. Although this study demonstrates a single case study, the findings illustrate a novel model which includes training and evaluation protocols that can be applied to any speech task for normal or cleft palate anatomy. The potential clinical applications will be discussed.

186 INTEGRATING THREE-DIMENSIONAL DIGITAL DENTAL MODEL INTO CRANIOFACIAL SKULL COMPUTED TOMOGRAPHY BY AUTOMATIC SUPERIMPOSITION OF INTRA-ORAL FIDUCIAL MARKERS

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BACKGROUND & PURPOSE: Obtaining a detailed dentition image was the most important step during 3-dimensional (3D) virtual simulation of orthognathic surgery. The purpose of this study was to introduce a method by automatic superimposition of intra-oral fiducial markers for integrating 3D dental model images to cone beam computer tomography (CBCT) maxillofacial image and evaluate the accuracy of tooth image replacement.

METHODS: A dry plastic skull model was used in a preliminary test, and six patients with complete dentition were enrolled in this study. A palatal plate with 4 attached fiducial markers which CBCT scans were performed on patients bonded with metal brackets and wearing the intraoral appliance. 3D digital data of dental models were obtained by CBCT or laser scanner, including upper dental model with the intraoral appliance, model in occlusion and lower dental-model. The digital dental models were integrated to maxillofacial CT by fusion method of the fiducial markers. 3D Euclidean distances on the occlusal surfaces at both superimposed images were measured to evaluate the registration errors.

RESULTS: Automatic fusion of palatal fiducial markers was achieved. The preliminary skull model test revealed high accuracy. In the 6 patients, mean distance of surface difference were 0.03 ± 0.02 mm in maxillary dentition, 0.16 ± 0.02 mm in mandible dentition on CBCT dental model images, and 0.08 ± 0.03 mm in maxillary dentition, 0.22 ± 0.03 mm in mandible dentition on laser-scanned dental model images. The results showed high accuracy.

CONCLUSIONS: The results of this study confirmed high accuracy of the proposed intra-oral appliance superimposition method, and indicated that it could be routinely used in clinical practice.

187 CHANGES IN MANDIBULAR PROXIMAL SEGMENT AFTER SURGICAL CORRECTION OF MANDIBLE DEVIATION AND THE RELATION WITH MANDIBULAR FUNCTIONAL ALTERATION
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BACKGROUND & PURPOSE: The aims of the present study were to access the alteration of mandibular proximal segments in patients with skeletal Class III malocclusion after orthognathic surgery (OGS), and to investigate the 6 month post-surgical outcome of jaw motion analysis in relation with the changes of mandibular proximal segments.

METHODS: Twenty-one adult patients with skeletal Class III malocclusion were accessed; the mandible deviation was greater than 4 mm at Menton. All the patients underwent two-jaw OGS. The records included cone-beam computer tomography (CBCT) before (T1) and within one month after OGS (T2), jaw motion analysis (JMA) data obtained 6 months after OGS, and TMJ examination. 3D CBCT skull images were constructed and further measured with software Simplant®. The differences in morphology between the deviated and non-deviated sides were tested with paired t-test. The Pearson correlation test was performed to assess the relationship between the surgical changes and outcome of JMA.

RESULTS: The skeletal changes demonstrated decrease in the mandibular body at both sides after OGS. The ramus axis to the coronal plane became more upright bilaterally, while the gonial angle on the deviated side showed increased at both sides after OGS. The ramus height also became more balance as it decreased on the non-deviated side, and increased at the deviated side. For the JMA, the condylar range of motion at the deviated side demonstrated significant improvement in transverse and vertical direction, while the range of movement became limited in anteroposterior direction. The non-deviated side showed improvement in the anteroposterior dimension after the OGS.

CONCLUSIONS: The visualization of 3D model clearly detected the amount of changes in the proximal segment after the OGS. The condylar range of motion did show relationship with the skeletal changes of the proximal segments in Class III patients; the improvement appeared mainly at the deviated side.
**VELOPHARYNGEAL INSUFFICIENCY IN CHILDREN WITH PRADER-WILLI SYNDROME AFTER ADENOTONSILLECTOMY**

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**BACKGROUND & PURPOSE:** Prader-Willi syndrome (PWS) is a rare genetic disorder with an incidence rate of 1 in 10,000-30,000. PWS patients have a high rate of obstructive sleep apnea (OSA) and adenotonsillectomy has been advocated as a first line approach for treatment. Veloopharyngeal insufficiency (VPI) is a known complication of adenotonsillectomy. The objective of this study is to review the occurrence of VPI in patients with PWS after adenotonsillectomy for OSA.

**METHODS:** A retrospective review of all patients with PWS and OSA from a tertiary pediatric hospital was performed between the years of 2002-2012. Pre- and post-operative sleep studies and sleep disorders breathing symptoms, post-operative VPI assessment, and VPI treatments were evaluated.

**RESULTS:** Nine patients (five males and four females), fitting the inclusion criteria, were identified. The age of the patient at the initial otolaryngologic evaluation ranged from 2 to 9 years. All patients underwent adenotonsillectomy for sleep disordered breathing. Of these, four patients were diagnosed with post-operative hypernasality after assessment by a speech pathologist. The hypernasality ranged from mild to moderately severe. Of the four patients with hypernasality, two were found to have structural issues requiring surgery (pharyngeal flap). Both of the surgical patients experienced significant improvement in their VPI after surgery. The remaining two patients were found to have articulation error patterns that were considered more developmental in nature and both responded to speech therapy. All patients had improvement in their polysomnogram or sleep symptoms after adenotonsillectomy. However, three patients continue to require continuous positive airway pressure at night, including one of the patients who underwent a pharyngeal flap.

**CONCLUSIONS:** Adenotonsillectomy is frequently used to treat OSA in patients with Prader-Willi Syndrome, however monitoring for OSA should be continued after surgery due to persistence of OSA in this patient population.

Furthermore, the families should be counseled of the risk of VPI after surgery, and the potential need for operative intervention to correct this.

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**SENSORY RETRAINING FACILITATE SENSORY RECOVERY AFTER BILATERAL SAGITTAL SPLICE OSTEOTOMY – PRELIMINARY STUDY**

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**BACKGROUND & PURPOSE:** The bilateral sagittal split osteotomy (BSSO) is one of the most common surgical procedures to correct mandibular skeletal deformities. The incidence of inferior alveolar nerve injury in this procedure is 1-3 months postoperatively.

**RESULTS:** After BSSO, forty one patients identified as sensory disturbance at 1 month and 3 months. All patients had the subjective and objective sensory test was recovered equally well in 90% at postoperative 3 months, no matter sensory retraining was applied or not. Sensory retraining could accelerate sensory recovery and should be found using subjective test from 1-3 months postoperatively.

**CONCLUSIONS:** Sensory retraining of perioral region could improve subjective feeling, but not objective assessment, of sensory recovery of mandibular nerve after BSSO.

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**EFFECTS OF NASOALVEOLAR MOLDING (NAM) ON INFANT GROWTH VELOCITY AND TIMING OF PRIMARY BILATERAL CLEFT LIP REPAIR.**

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**BACKGROUND & PURPOSE:** NAM proponents report the following benefits in patients with bilateral cleft lip and palate (BCLP): alignment of maxillary lip and alveolar segments, columellar lengthening and improved nasolabial esthetics. Randomized controlled studies in patients with UCLP demonstrate no positive or negative effect in feeding with a molding plate. We report the effects of NAM on feeding and timing of primary lip repair in patients with BCLP.

**METHODS:** We performed a retrospective chart review (n=77) based on hospital administrative data (CPT code 40701) from 2005-2012 at a single institution. Inclusion criteria included patients with BLCP and repair prior to 1-year of age. Exclusion criteria included use of TPN or feeding tubes. Data included gestational age, age at time of primary lip repair, weight and Body Mass Index (BMI). Corrections for age were made based on gestational age. Age and weight at time of surgery are reported as a mean ± standard deviation; statistical comparisons were made with a Mann-Whitney two sided t-test. A linear regression model was used to compare the growth velocities (kg/day) and (BMI/day) of the NAM and non-NAM groups.

**RESULTS:** Fifty-five patients met the inclusion criteria, of which 6 underwent NAM. The age (days) at time of primary cleft lip repair in NAM patients was 124.2 ± 31.5; the non-NAM group was 120.1 ± 50.45 (p = 0.300). The weight (kg) at presentation at time of surgery in the NAM group was 6.19 ± 0.87 and in the non-NAM group was 5.58 ± 1.24 (p = 0.094). The weight growth velocity (kg/day) of the NAM group was 0.02418 ± 0.0030, while the non-NAM group was 0.01738 ± 0.00112 (p = 0.096). The BMI growth velocity (BMI/day) of the
NAM group was 0.04066 ± 0.00713 and the non-NAM group was 0.01554 ± 0.00263 (p = 0.007).

CONCLUSIONS: This study attempts to explore the relationship between the selective use of NAM, pre-operative weight gain, and timing of primary lip repair. We did not detect a statistically significant difference between the NAM and non-NAM group in terms of age and weight at time of repair, or in weight growth velocity. BMI growth velocity was different between the two groups, with the NAM group having a greater increase in BMI with increased age.

192 EFFECTS OF NASAL ALVEOLAR MOLDING (NAM) ON INFANT WEIGHT GAIN AND TIMING OF PRIMARY UNILATERAL CLEFT LIP REPAIR

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BACKGROUND & PURPOSE: Proponents of nasal alveolar molding (NAM) report that the technique facilitates surgical repair of the severe unilateral cleft lip by narrowing the cleft width, aligning the alveolar segments, lengthening the columella, and improving nasal tip projection. They also suggest improvement in feeding. The impact of selective use of NAM on infant weight gain and timing of primary lip repair was evaluated in a cohort of patients with unilateral cleft lip and palate (UCLP).

METHODS: We performed a retrospective review of consecutive patients presenting to our institution with UCLP between 2007 and 2013. Inclusion criteria included patients with UCLP with lip repair performed at a single institution. Exclusion criteria included lip repair after 1 year of age and use of parental or non-oral feeding. Data included gestational age, age at time of primary lip repair, weight, and body mass index (BMI). Corrections for age were made based on gestational age. All data are reported as a mean ± standard deviation. Statistical comparisons were generated using a Mann-Whitney test with significance set at a p value < 0.05.

RESULTS: Of the 177 patients presenting to our institution during the study period, 116 patients met the inclusion criteria, of which 11 underwent NAM. The age in days for primary cleft lip repair in NAM patients was 117.5 ± 15.65 and in the non-NAM group was 127 ± 45.24 (p = 0.8174). The weight in kilograms of patients at time of lip repair in the NAM group was 6.08 ± 0.65 and in the non-NAM group was 6.37 ± 1.24 (p = 0.5155). The BMI at time of lip repair in the NAM group was 16.10 ± 1.41 and in the non-NAM group was 16.59 ± 1.79 (p = 0.3625).

CONCLUSIONS: This study attempts to explore the relationship between the selective use of NAM, preoperative weight gain, and timing of primary lip repair in patients with UCLP. NAM did not significantly affect weight gain, BMI or age of the patient at time of repair. This data suggests that infants with NAM and non-NAM were similar in weight gain and timing to lip repair.

193 STOP-GAP DURATION OF PERSIAN PLOSIVES IN MID AND FINAL WORD POSITIONS IN THE SPEECH OF CHILDREN WITH CLEFT LIP AND PALATE

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BACKGROUND & PURPOSE: In early studies on the temporal integration of speech in children with cleft lip and palate (CLP), Brooks, Shelton, and Youngstrom (1965; 1966) hypothesized that compensatory articulation might change the temporal characteristics of speech. The purpose of this study was to examine stop-gap duration (SGD) of Persian plosives in mid and final word positions produced by children with CLP.

METHODS: 11 children with repaired BCLP (5 M, 6 F; mean age= 9.0 years, SD=2.8) and 20 non-cleft healthy children (11 M, 9 F; mean age= 9.2 years, SD=2.1) participated in the study. None of the children with CLP had known hearing loss or any syndrome. None had oronasal fistula and only one had alveolar bone grafting. Moreover, all of the children with CLP were undergoing maxillary expansion with removable orthodontic appliances. All participants were native speakers of Persian. All recordings were made using a microphone and CSL in a sound-attenuated room. Children with CLP removed appliances during recordings. The speech stimuli consisted of 14 monosyllabic (7 CVVC and 7 CVVC) real and nonsense words spoken in isolation. SGD of all plosives including /p, b, t, d, k, g/ in both mid and final positions were measured manually using PRAAT software.

RESULTS: Results showed that children with CLP had prolonged stop-gap durations. t-tests revealed significant differences between the two groups in the duration of stop gaps for all plosives in mid-word position (p<0.001) and all plosives in final-word position except for /b/ (p<0.05).

CONCLUSIONS: This study provides acoustic evidence to support the idea that children with CLP tend to prolong stop-gap duration. The cause of prolonged SGD may be due to a) a compensatory response to increase perceptual distinction of phonetic segments, and/or b) reduced tactile feedback due to scarring in children with CLP.

194 COMPARISON OF SPEECH OUTCOMES: SLUSH AND FILIPINO LANGUAGES AFTER PALATOPLASTY OR PRIMARY PHARYNGEAL FLAP VERSUS PALATOPLASTY AMONG TEENAGE TO YOUNG ADULT PATIENTS WITH CLEFT LIP AND PALATE

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BACKGROUND & PURPOSE: Filipino children with cleft lip and palate have grown to their teenage and even into adulthood left un-operated due to poverty and failure to access even charity surgical service. They still harbour the burden of this defect with ill-developed speech due to velo-pharyngeal insufficiency (VPI). The dilemma of speech improvement for VPI cases primarily due to cleft palate is well managed by a team of multi-specialities providing multiple surgical procedures to synergistic efficency. However, it is not feasible in our condition. Speech improvement is possible with repair of VPI using primary palatoplasty with primary pharyngeal flap therapy to this age group. Pharyngeal flap surgery can be just as effective in eliminating VPI in adults as it is in children (Hall, et al. 1991). Lowest possible cost for a successful treatment approach includes surgery utilizing palatoplasty with primary pharyngeal flap followed by speech therapy.

METHODS: This is a 2 year multi-center single blind randomized controlled trial done to compare the effectiveness of two-flap palatoplasty with primary superior-based pharyngeal flap versus two-flap palatoplasty alone in terms of speech outcome for both English and Filipino languages in terms of resonance ratings, voice disorders, nasal emission or turbulence, articulation errors, speech understandability and speech acceptability. Speech evaluation was done for each sample during the following post-op periods: 1 month, 6 months, and 1 year post-operative period.

RESULTS: A total of 44 sample patients were included in the study (n=22 for Group A – palatoplasty, n=22 for Group B - palatoplasty with primary pharyngeal flap). No hoynasality and voice disorder were recorded for all patients both for pre-op and post-operative evaluations. Comparison of hypernasality ratings of both groups presented with no significant statistical difference for pre-op evaluation and all follow-up periods. Further statistical analysis of the hypernasality ratings within the group comparing each post-operative follow-up period to baseline data showed significant statistical differences. This was observed for both groups, with increasing improvement during post-operative course. Speech understandability and speech acceptability for English and Filipino languages were evaluated in terms of resonance ratings, voice disorders, nasal emission or turbulence, articulation errors, speech understandability and speech acceptability. Speech evaluation was done for each sample during the following post-op periods: 1 month, 6 months, and 1 year post-operative period.

CONCLUSIONS: Surgical management of teenage to young adult patients with cleft using either palatoplasty or palatoplasty with a primary pharyngeal flap can be accomplished with improvement of speech outcome parameters in terms of hypernasality, speech acceptability and understandability for English and Filipino languages.

195 NASAL CHANGE WITH MAXILLARY REPOSITIONING: A NOVEL THREE-DIMENSIONAL CT-BASED METHOD FOR ASSESSMENT

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BACKGROUND & PURPOSE: The LeFort I maxillary osteotomy is the standard surgical procedure for cutting and then repositioning the maxilla in patients with skeletal discrepancy of the jawbones due to congenital, developmental, and postraumatic dentofacial skeletal deformities. This procedure is conducted to improve occlusion, symmetry, and harmony between the midface and surrounding face. Repositioning of the maxilla is often accompanied however by morphologic change of the nose, as the maxilla is the skeletal foundation for the lower portion of the nose. As such, subsequent
rhinoplasty is sometimes required to restore the original nasal appearance. Previous studies have attempted to quantify this change in nasal morphology through the use of cephalometric landmarks and linear measurements using two-dimensional images. The goal of this study is to develop a method for quantitatively describing the nasal morphologic changes using three-dimensional cone beam CT scan via exploring the full potential of 3D medical image analysis, including feature analysis and volumetric analysis.

METHODS: A series of patients in whom the maxilla was repositioned with LeFort I osteotomy was selected and their archived CBCT scans were collected with IRB approval. For each, preoperative hard and soft tissue 3D forms were superimposed with 1-year postoperative 3D forms. SimPlant Pro 2011 (Materialise Dental NV, Leuven, Belgium) and MIMIC v 15 software (Materialise Dental NV, Leuven, Belgium) were used for the investigations. Three-dimensional skeletal maxillary movement was quantified by direction and by degrees of rotation. Change in nasal morphology was quantified based on a set of landmarks, linear measurements, and angular measurements that we developed. Local curvature of the nose was fitted using a spline technique, and volumetric analysis was performed on the soft tissue of the nose and corresponding airways.

RESULTS: Changes in nasal morphology was quantified three-dimensionally, corresponding to the movement of the maxilla in typical maxillary repositioning procedures. The linear measurements recorded in this study agreed with those previously published in the literature. Quantitative results of our newly developed 3D quantification parameters (features and soft tissue volumes) are in agreement with qualitative clinical observations.

CONCLUSIONS: A three-dimensional CT based method has been developed to describe the nasal morphologic change as a results of maxillary repositioning. Data obtained through this methodology supplements the existing literature and provides a broad 3D-based data set. This approach is feasible for future outcome studies.

**197 CURVILINEAR BONE TRANSPORT OSTEONEGLIGENCE DEVICES FOR TREATMENT OF LARGE CALVARIAL DEFECTS: AN ALTERNATIVE TO CONVENTIONAL CALVARIAL RECONSTRUCTION AND LINEAR BONE TRANSPORT IN A PRE-CLINICAL SHEEP MODEL**


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**BACKGROUND & PURPOSE:** Bone transport osteogenesis (BTO), distraction of a portion of bone across a defect, offers a vascularized, autologous solution to large cranial defects that may allow treatment without use of permanent bone substitutes or hardware implants. Previous studies of calvarial BTO have not investigated the use of complex, curvilinear distraction vectors that mimic native calvarial contours. This study establishes a sheep model to evaluate the substitutes or hardware implants. Previous studies of calvarial BTO have not large cranial defects that may allow treatment without use of permanent bone

**METHODS:** The progress of the transport segment across the defect. After a 6-8 week curvature (N=3) or linear (N=2) cranial distractors. Periodic x-ray monitored segment (3.5 x 2cm) traversed the defect at 1 mm/day using semi-buried native calvarial contours. This study establishes a sheep model to evaluate the substitutes or hardware implants. Previous studies of calvarial BTO have not large cranial defects that may allow treatment without use of permanent bone

**RESULTS:** Changes in nasal morphology was quantified three-dimensionally, corresponding to the movement of the maxilla in typical maxillary repositioning procedures. The linear measurements recorded in this study agreed with those previously published in the literature. Quantitative results of our newly developed 3D quantification parameters (features and soft tissue volumes) are in agreement with qualitative clinical observations.

**CONCLUSIONS:** This experiment provides proof of concept for bone transport osteogenesis for large calvarial defects in a sheep model using a complex curvilinear distraction device for improved three-dimensional contouring of regenerate bone. There was a high complication rate with semi-buried devices in the cranial location in sheep; such device complications have not translated to humans.

**Gift (e.g.materials and/or equipment):** This study was funded in part by a grant from Synthes CMF Inc.

**198 MINIMAL ACCESS CRANIAL VAULT REMODELING FOR SAGITTAL CRANIOSYNOSTOSIS: ANALYSIS OF SURGICAL RESULTS AND AESTHETIC OUTCOMES**

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**BACKGROUND & PURPOSE:** Cranial vault remodeling (CVR) for sagittal synostosis has lower recurrence rates and improved aesthetic outcomes compared to strip craniectomy. However, total CVR techniques utilize complex approaches accompanied by increased operative time, blood loss and hospital stay. Purpose: The aim of this study was to examine inter-relationships among outcomes and safety measures of minimal access CVR for the management of sagittal synostosis.

**METHODS:** 31 Patients (25 boys and 6 girls) ages 3.1-18.9 mo (mean 6.6 mo) with isolated sagittal synostosis were treated with minimal access cranioplasty followed by helment therapy. Surgical access was via a single 3-4 cm zigzag vertex incision. Following subgaleal dissection, a malleable lightsourse allowed direct visualization of strip craniectomy. In 26 patients, barrel stave cuts and wedge excisions were made with bone scissors to an associated scaphocephaly, frontal bossing and occipital bathrocephaly. In 5 patients (ages 4.5-18.9 mo), the completion of the cranial cuts required 85 Midas and rongeurs. Helmet therapy was started 1-3 weeks after surgery and continued for 9.9 ± 4.5 weeks. Omega tracer scans were obtained postoperatively and at completion of helmet treatment. Cranial width, length and cephalic- and symmetry ratios were used as objective measures of headshape. Parents were sent a questionnaire to obtain a subjective assessment of aesthetic outcome and level of satisfaction.

**RESULTS:** Blood loss (mean ± SD = 192 ± 198 ml), transfusion volume (179 ± 167 ml), procedure duration (2.4 ± 1.3 hrs) and postoperative hospital stay (2.5 ± 0.7 days) compared favorably to national practices. Significant positive correlations were found between age and blood loss (r=0.56, p<0.01), duration of operation and blood loss (r=0.70, p<0.001), blood loss and hospital stay (r=0.57, p<0.001) and operation duration and hospital stay (r=0.70, p<0.001). One patient required re-operation for restenosis. Both the objective cranial index measures and the parental evaluation of postoperative cranial shape were excellent.

**CONCLUSIONS:** Minimal access CVR followed by helment therapy is safe and efficacious for the surgical correction sagittal synostosis. This procedure is best performed < 5 months of age. Compared to traditional CVR, transfusion requirements are lower and hospital stay is shorter. Compared to endoscopic procedures, the approach is simpler, leaves a smaller scar and yet allows for superior visualization and surgical control.

**199 OPERATIVE AND POST-OPERATIVE OUTCOMES FOLLOWING USE OF DENTO MAXILLARY APPLIANCE FOR INFANT ORTHODOPEDIC TREATMENT IN PATIENTS WITH UNILATERAL COMPLETE CLEFT LIP AND PALATE**

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**BACKGROUND & PURPOSE:** The objective of the current study is to examine outcomes following infant orthopedic treatment with a Latham type Dentox Maxillary Appliance (DMA) which is placed under general anesthesia in patients with unilateral cleft lip and palate.

**METHODS:** The current study is a retrospective analysis of 40 consecutively treated unilateral complete cleft lip and palate (UCCLP) patients who had a comprehensive set of pre and post-operative records. IRB approval was obtained prior to conducting the study. The primary outcome variables of interest included width of the alveolar cleft following treatment with DMA, performance of gingivoperiosteoplasty and intra-operative complications. Multivariable logistic regression models were used to examine the effects of several patient and surgeon related factors on outcomes.
RESULTS: The study included 40 patients including 17 with right UCCLP and 23 with left UCCLP. Nine patients were females. The average age at the time of DMA insertion was 11 months. The average cleft width prior to DMA was 10.8 mm. The mean time of placement of DMA was 6 weeks. The mean cleft size following treatment with DMA was 2.1 mm (average reduction in cleft width was 8.6 mm). Two surgeons performed the cleft lip adhesion/repair and gingivoperioplasty (GPP) procedures. A total of 33 patients had GPP. In the multivariable analysis, the significant factor associated with post-DMA cleft width reduction was the pre-operative cleft width (p <0.0001). Wider clefts were associated with significantly higher reductions in widths following DMA. Post-DMA width size was the significant factor associated with performance of GPP (p=0.01). Close to 69% of patients did not have any blood loss, 23% had 1 cc of blood loss, while 8% had a blood loss of more than 1 cc (maximum loss was 5cc). The mean oxygen saturation levels immediately following DMA were 98.8%.

CONCLUSIONS: Use of DMA is associated with a significant reduction in the width of the cleft and outcomes are predictable without any major adverse events or complications. Those whose post-treatment clefts were 1 to 2 mm in size were associated with a higher odds of having a GPP.

200 CONNECTING FAMILIES PEER TO PEER MENTOR PROGRAM
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BACKGROUND & PURPOSE: Connecting Families mission is to help create family-to-family partnerships that promote healthy lifestyles and enhance the quality of life for the child and their family. A family with a child diagnosed with a cleft lip or palate will benefit from the connection to a peer experiencing the same diagnosis. Mentees often feel overwhelmed trying to make sense of their child’s diagnosis. Healthcare teams diagnose, educate, support, treat and often cure, but they cannot normalize the every day experience of living with a diagnosis. Connecting Families Mentors will be trained volunteers who can help families navigate increasingly complex medical healthcare systems. Our social work coordinator provides mentor orientation, ongoing training and psychosocial support.

METHODS: A peer mentor program for families facing a new diagnosis of cleft lip and/or palate will be offered a connection with a peer mentor at diagnosis. Ideally mentees will be matched based on similarities in diagnosis, demographics and culture. We began in May 2013 and we currently have eight trained mentors and have matched nine mentees successfully. We recently trained a young adult with cleft lip or palate will benefit from the connection to a peer experiencing the same diagnosis. Mentees often feel overwhelmed trying to make sense of their child’s diagnosis. Healthcare teams diagnose, educate, support, treat and often cure, but they cannot normalize the every day experience of living with a diagnosis. Connecting Families Mentors will be trained volunteers who can help families navigate increasingly complex medical healthcare systems. Our social work coordinator provides mentor orientation, ongoing training and psychosocial support.

RESULTS: We have matched eight mentors with nine mentees. We have four additional mentees getting trained this month including a hispanic couple and a young adult mentor (Age 22).

CONCLUSIONS: Having a active parent volunteer mentor program increases family satisfaction and overall quality of life and enhances the interdisciplinary team’s reach of care.
onset of CSCs, we are planning to conduct a further gender-segregated study with an increased number of subjects.

204 SPECTRAL ANALYSIS OF WORD-INITIAL /S/ AND /SH/ IN PERSIAN SPEAKING CHILDREN WITH BILATERAL CLEFT LIP AND PALATE AND MAXILLARY COLLAPSE

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BACKGROUND & PURPOSE: Children with clefts of lip and palate (CLP) are known to have misarticulation problems, especially for the alveolar and palatal sounds. The current study examined articulation of /s/ and /sh/ sounds in Persian-speaking children with CLP using spectral moment analysis (SMA).

METHODS: Participants were 10 children with repaired CLP (6 M, 4 F; mean age= 8.60 years, SD=2.95) and 25 normally developing children (11 M, 14 F; mean age= 8.96 years, SD=2.28). None of the children with CLP had known hearing loss or any syndrome. None had oronasal fistula and one had alveolar bone grafting. Moreover, all of the children with CLP were undergoing maxillary expansion with removable appliances while those with normal development were native speakers of Persian. The speech stimuli consisted of the nonsense words /sis/ and /shish/. All recordings were made using a microphone and CSL in a sound-attenuated room. Children with CLP removed appliances during recordings. Spectral moments of initial /s/ and /sh/ sounds were determined using TFS32 software. Mean first spectral moment differences between /s/ and /sh/ were also calculated.

RESULTS: SMA revealed that children with CLP had significantly reduced first spectral moment of /s/ and /sh/-/sh/ difference. Mean spectral moment differences between /s/ and /sh/ were 0.33 kHz (SD= 0.42) for the children with CLP and 4.38 kHz (SD= 0.89) for the controls. T-test results showed statistically significant differences between the groups for the first (mean), third (skewness) and forth (kurtosis) spectral moments of /s/ and /sh/ (p<0.001). For the /sh/ sound, however, there was only a significant difference between the groups in skewness (p=0.05).

CONCLUSIONS: Reduced first spectral moment for /s/ by children with CLP and maxillary collapse is consistent with retruded tongue position. Reduced maxillary arch dimensions and/or structural anomalies of the oral cavity may be contributing factors in the misarticulation of alveolar sounds.

205 CHILDREN BORN WITH CLEFT LIP AND PALATE DEFORMITIES EXPERIENCE FELT, INTERNALIZED, ENACTED, FELT NORMATIVE, AND SYMBOLIC STIGMA

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BACKGROUND & PURPOSE: Cleft lip and palate are the most common craniofacial birth defects and one of the most common congenital abnormalities in humans. Anecdotal evidence suggests that stigmatization is a common “phenomenon” experienced by families of children afflicted with cleft lip and palate deformities. This study aimed to explore the stigmatization experienced by families with children born with cleft lip and palate deformities from family members, friends, and the community, as well as health-care givers.

METHODS: The study was carried out at the surgical outpatient cleft clinic of the Lagos University Teaching Hospital, Lagos, Nigeria. This was a cross-sectional descriptive study among mothers of children born with cleft lip and palate deformities, using both interviewer-administered questionnaire and a semi-structured interview.

RESULTS: A total of 27 mothers of subjects with cleft lip and/or palate deformities participated in the study. Most respondents (35%) believed cleft deformity was an “act of God”, whereas others believed it was either due to “evil spirit” (3.7%), “wicked people” (18.5%). About 82% of the mothers were ashamed of having a child with cleft deformities. Two of the respondents wanted to abandon the baby in the hospital. About a quarter of the respondents wished the child was never born and 70% of the fathers were ashamed of having a child with cleft deformity. Fifty-six percent admitted that their relatives were ashamed of their affected children, and 37% admitted that their friends were ashamed of their children. Also, 37% of the respondents admitted that they have been treated like an outcast by neighbours, relatives and friends because of the defect of their children. When asked about refusal to carry the affected children by friends, relatives and neighbours, 33% of respondents said “Yes”.

206 SECONDARY CRANIAL VAULT REMODELING WITH DISTRACTION

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BACKGROUND & PURPOSE: Cranial Expansion by Distraction (CED) is investigated as an alternative to Secondary Vault Expansion with Exchange Cranioplasty (SVEEC). Long term results are presented as well as technical modifications for differential multisegmental and multivectorial remodeling.

METHODS: Retrospective query of prospectively collected data at a tertiary center Craniofacial Clinic. These results were compared to historical controls and similar reports in the literature.

RESULTS: 324 patient-charts followed at the Craniofacial Clinic were queried. 21 patients that underwent CED were identified. Three were excluded do to short follow up (<1 year).Eighteen patients were identified, with a mean follow up of 3.4 years (Range 1-8). Eight patients underwent cranial expansion with Monobloc lateral distractor, 5 with classical biparietal distraction, and 5 underwent Multiple Segment Differential (MSD) cranial vault and frontal remodeling with hinge plates and counter-lever arms activated by a single driving distractor. A second procedure was performed 4-6 months later for device and hardware removal and closure of residual defects with autogenous Calvarial Lamellar Grafting (CLG). Intraoperative blood loss was 15.6cc/kg (range 0-35) and an additional 6.4cc/kg (Range 0-10) was transfused in the first 24 hours. Ossification of the defects was found to be 85% at the time of distractor removal and 99% after CLG. 2 patients had mechanical distractor failure while the most common complication was minor wound contamination (44%). Operative times averaged 122 minutes (range 90-150 minutes). Neurodevelopmental indicators showed marked improvement in headaches: 17 patients had severe to debilitating headaches pre-operatively and all showed resolution of headaches in the immediate aftermath. Only two patients had papillledema preoperatively. Neurodevelopmental scores and z-scores did not show significant changes 6 months post-operatively. All patients were encouraged to participate in sports activities. No significant cranial trauma was reported during the observation period.

CONCLUSIONS: Multisegmental Cranial Expansion by Distraction may shorten operative times and result in more favorable anatomical/biophysical properties of the Cranial Vault at the expense of a second procedure. Papilledema is an unreliable finding in the younger patient while clinically suggestive headaches should raise a high index of suspicion. Favorable Calvarial Regenerate does not preclude future participation in sports.
images for each subject at rest and during production of each phoneme in the sample. Measurements included LVP origin, length, and thickness.

RESULTS: Preliminary findings are based on quantitative measurements of ten participants at rest. Average LVP length was longer in adults with normal anatomy than those with repaired cleft palate with mean values of 46.52 mm (SD = 3.05 mm) and 43.54 mm (SD = 4.72 mm), respectively. The normal anatomy group demonstrated less variability between participants in LVP length and distance between origin points. Distance between origin points was shorter in adults with repaired cleft palate than those with normal anatomy with mean values of 55.08 mm (SD = 4.02 mm) and 60.65 mm (SD = 2.79 mm). Preliminary results suggest similar average angle of origin and LVP thickness measurements between adults with repaired cleft palate with mean values of 54.19° (SD = 3.74°) and 3.93° (SD = 4.77°) and adults with normal anatomy with mean values of 53.95° (SD = 3.41°) and 4.09° (SD = 5.1°). Data collection is currently ongoing to increase the sample size to 16. Statistical analyses will enable between and within group comparisons at the conclusion of data preparation.

CONCLUSIONS: Findings suggest variations between individuals with repaired cleft palate and adults with normal anatomy. These findings are in agreement with prior studies related to normal and abnormal anatomy in adults (Ettema et al., 2002; Ha et al., 2007). Further data collection will provide improved statistical model.
multiple, comminuted and impacted unstable fractures, necessitating operative intervention. To date, rigid internal fixation is the mainstay of surgical treatment of pediatric facial fractures. Disruption of facial growth is a primary concern in the long term sequelae of pediatric facial fracture management. We catalogue our experience with severe midface pediatric fractures at a major pediatric teaching hospital with cephalometric analysis of midface skeletal growth following injury.

METHODS: A retrospective chart review was performed on all patients with facial fractures. Patients with multiple orbit and midface fractures were included. Lateral cephalograms at longest-term follow up were traced, digitized, and averaged. Seven cephalometric landmarks of the midface (A point, ANS, orbitale, bridge of nose, distal U6, upper lip, stomion superius) were identified for comparative measurements with age and gender-matched superimposed Bolton norms as controls. Differences in x and y axes between test and control metrics were measured. Clinical significance was defined as a 2mm discrepancy from the norm. Statistical significance for each patient was determined using t-tests of the x and y arrays of patient values versus normal controls.

RESULTS: Seven patients met the inclusion criteria for severe midfacial trauma with mean age of 8.9 years (range 3-14 years) at time of injury. All patients underwent initial open reduction and internal fixation and subsequent revision surgeries. Mean cephalometric follow up was 4.6 years (range 2-10 years). Considering all landmarks for all patients, mean deficiency in growth was 3.7mm (range -4.0mm to 13.7mm) in the x axis (p<0.001) and 2.9mm (range -1.1mm to 8.8mm) in the y axis (p<0.001). Six out of 7 patients (86%) showed growth discrepancy from the norm. Statistical significance for each patient was determined using paired t-tests and two-sample t-test showed that cleft width changes between the two groups were significant (P = .03). CONCLUSIONS: The presence of teeth in the cleft site influenced timing of ABG, but this was not affected by the use of RME. Teeth retained in the cleft site after ABG had quite high retention rates at 1 and 5 years post ABG. Future multi-fac torial analyses looking at these and other potential influences will be useful in the planning for ABG repair of clefts.

**213** EFFECTIVENESS OF DYNACLEFT FOR PRESURGICAL ORTHOPEDICS FOR PATIENTS WITH UNILATERAL CLEFT LIP AND PALATE
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BACKGROUND & PURPOSE: Cleft lip and palate care typically involves the use of presurgical orthopedics (PSIO) as an adjunct to the overall management of the defect and to approximate the alveolar segments prior to surgical repair. The specific aim of this project was to assess the efficacy of Dynacleft as a presurgical orthopedic device on infants with a unilateral cleft lip and cleft palate who used an oral obturator.

METHODS: Data was collected from 25 infants diagnosed with a unilateral complete cleft lip and palate. The infants were all of comparable age. Eight patients underwent Dynacleft therapy (Group Alpha) 17 patients had no presurgical orthopedics. Two maxillary impression casts were obtained from each patient: the first at the time of initial evaluation and the second at the time of cleft lip repair. Cleft width as well as the intersegment, intercleft, and maxillary retraction distances were measured and recorded from the maxillary casts. Measurements were based on a coordinate system involving the tuberosity, canine, alveolar crest, premaxillary segment, and incisal points. Casts were measured twice by one observer using a Carrera Precision digital caliper. Differences in alveolar cleft width was compared within and between the two treatment groups.

RESULTS: Group Alpha began treatment on an average age of 24.25 days and Group Beta an average of 15.35 days of age. The average cleft width of Group Alpha was 8.13 mm and after treatment it was 4.59 mm. The average cleft width of Group Beta was 8.09 mm and 6.92 mm after treatment. Results of paired t-tests and two-sample t-test showed that cleft width changes between the two groups were significant (P = .03).

CONCLUSIONS: Dynacleft significantly decreases the size of the alveolar cleft width compared to infants who do not undergo Dynacleft therapy. Gift (e.g., materials and/or equipment): Canica, the company that produces Dynacleft donated the medical device to treat 5 patients.

**214** FACTORS INFLUENCING TIMING OF ALVEOLAR CLEFT REPAIR
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BACKGROUND & PURPOSE: The objectives of this retrospective study were 1) to assess dental factors influencing timing of bone grafting for alveolar clefts and 2) to determine the viability over time of retained teeth in the cleft region after grafting.

METHODS: This study was a retrospective review of records of 76 patients treated with alveolar bone grafting (ABG) by our cleft palate team. We assessed whether 1) the dentition in the cleft region or 2) the use of rapid maxillary expansion (RME) prior to ABG were associated with the timing of ABG. In addition, the viability of teeth remaining in the cleft region was evaluated at 1 and 5 years post ABG. Differences were assessed using t-test comparisons.

RESULTS: There was a statistically significant difference (p <0.05) in the ages of patients at time of ABG between those with (n=26) and without teeth in the cleft (n=50), mean age 8.0 years and 9.5 years respectively. Mean age at ABG was unaffected by RME (p-value = 0.1568); RME (n=45) 8.4 years of age and no RME (n=30) 9.8 years of age. Patients with teeth present in the cleft site prior to the alveolar bone graft had 1 year and 5 year post ABG retention rates of 85% and 71% respectively.

CONCLUSIONS: The presence of teeth in the cleft site influenced timing of ABG, but this was not affected by the use of RME. Teeth retained in the cleft site after ABG had quite high retention rates at 1 and 6 years post ABG. Future multi-fac torial analyses looking at these and other potential influences will be useful in the planning for ABG repair of clefts.

**215** RELATIONSHIPS AMONG BULLYING AND OTHER PSYCHOSOCIAL FACTORS IN CHILDREN WITH CRANIOFACIAL CONDITIONS
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BACKGROUND & PURPOSE: Evidence suggests that children with craniofacial conditions may be at greater risk for impairment in areas such as emotional and academic functioning, cognitive and language development, and interpersonal relations in comparison to their peers (Hunt et al., 2005). The current study examined psychosocial variables in a pediatric craniofacial population, particularly with regard to bullying.

METHODS: Data were collected during clinic visits and via medical chart reviews. Chi-square analyses were conducted to examine the relationships between bullying and other demographic and psychosocial variables. The sample included 292 children and adolescents, ages 5-20 years (mean age=10.09 years; 55.5% Hispanic or Latino; 43.8% female).

RESULTS: Chi-square analyses revealed significant relationships (p < .05) between bullying and multiple areas of development and functioning, including language and cognition, mood and emotional functioning, social relations, and psychosocial quality of life as measured by the PedsQL.

CONCLUSIONS: These findings suggest that children and adolescents with craniofacial abnormalities who report being bullied may be at increased risk for difficulties in other areas of developmental and psychosocial functioning. Future research should focus on exploration of protective factors in this population in order to inform interventions.

**216** PRIMARY NOSE REPAIR IN UNILATERAL CLEFT LIP PATIENTS: “CLOSED TRIPLE SUTURE” TECHNIQUE
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BACKGROUND & PURPOSE: The correction of the nasal tip together with the lip repair is the treatment of choice in the primary management of unilateral cleft lip patients. The repositioning of the deviated columella and the correction of the laterally and inferiorly displaced ipsilateral alar cartilage are the main elements of the nasal surgery. In this study a new technique is presented for the correction of the nasal deformity accompanying unilateral cleft lip.
METHODS: Thirty-four out of 119 unilateral cleft lip patients treated in our institution between 2009 and 2012 were operated by the same senior surgeon using the “Triple Suture Technique”. The absorbable sutures were removed during the palate repair or left to be absorbed. 9 patients with an average age of 6.5 months completed a thorough postoperative follow-up period. Surgical Technique: During the preparation of the local flaps for the lip repair the caudal two third of the nose is dissected and the alar cartilages are exposed in the subperichondrial plane. Following the completion of the lip repair the curved needle of a 3/0 PDS suture is straightened with a needle holder and the needle is passed on the ipsilateral cleft side through the nasal mucosa, the posterior edge of the alar cartilage, dorsal septum, contralateral upper lateral cartilage and the skin, respectively. The exit point of the needle on the skin is slightly enlarged with the tip of a 30 G needle. Thereafter the needle of the PDS suture is put back through this orifice passing through all the above-mentioned structures in a reverse fashion and tied. For the second suture the flattened nostril roof of the cleft side is elevated with a skin hook and the suture is placed transmucosally starting from the contralateral nostril at the level of the nasal dome to level the peak points of both medial crura. The third suture is placed for the correction of the free edge of the inferiorly displaced lateral crus at the cleft side. The needle firstly pass through the nasal mucosa on the cleft side, exits from the skin, reintroduced in a reverse fashion and tied above the nasal mucosa.

RESULTS: The mean follow-up period was 11.7 months and the postoperative healing period was uneventful. Postoperative photographs were analyzed to evaluate the position of alar cartilages, the symmetry of the nasal domes as well as the diameter and shape of the nostrils, all of which were recorded to be as pleasant and satisfactory as the results of cases operated by the senior surgeon.

CONCLUSIONS: Various studies in the literature as well as our study results clearly demonstrate that unilateral cleft lip patients treated with simultaneous primary nose repair during the cleft lip surgery have superior results for nasal appearance. The “Triple Suture Technique” promises to be a useful technique yielding a pleasant appearance of the nasal tip with symmetrical nostrils and a well-established curvature of the alar cartilage.

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CONCLUSIONS: Results of our cleft OSCE demonstrate that medical knowledge regarding the evaluation, management, and surgical repair of patients with a cleft is less in mid-level learners relative to junior and senior residents. All residents expressed an interest in earlier exposure to pediatric patients in training. Although a cleft OSCE does not replace clinical rotations, it is a valuable adjunct to training and evaluation of trainees, particularly for junior residents.

220 THE OCCURRENCE OF PREMAXILLARY REPOSITIONING SURGERY IS DECREASED IN PATIENTS WITH COMPLETE BCLP TREATED WITH NAM AND PRIMARY GINGIVOPERIOSTEOPLASTY

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BACKGROUND & PURPOSE: Premaxillary repositioning (PMR) with alveolar bone grafting (ABG) is a controversial yet frequently performed procedure in individuals born with BCLP. It has been demonstrated in the literature that PMR negatively affects long-term midface growth. The purpose of this study was to determine if NAM in combination with primary gingivoperiosteoplasty (GPP) reduces the need for PMR later in life.

METHODS: Consecutively enrolled (1996-2006) nonsyndromic patients (n=53) with BCLP, who underwent NAM and primary GPP (unilateral or bilateral), were studied. Patients were assessed clinically and radiographically for the need of PMR and secondary ABG. The comparison group included consecutively enrolled nonsyndromic patients (n=27) with BCLP who had no history of NAM and primary GPP. Detailed review of medical records was performed to determine the incidence of PMR in these two groups.

RESULTS: Of the 53 patients who underwent NAM and primary GPP, 52 (98.1%) did not require PMR and 1 (1.9%) did. Moreover, 20 (37.7%) did not even require secondary ABG surgery. Of the 27 patients that were not treated with NAM and primary GPP, 17 (63%) did not require PMR and 10 (37%) did. However, 100% of these patients did not require secondary ABG surgery.

CONCLUSIONS: Patients with BCLP treated with NAM and primary GPP were significantly less likely to need PMR than those that did not have this treatment (p<0.01). The importance of this may go beyond the technical aspects of the procedure and its inherent risks. The descended and mobile premaxilla, with its impact on function and facial esthetics, may have an effect on the patient’s quality of life (QOL), which requires further study.

221 POSTOPERATIVE STEROIDS IMPROVE HOSPITAL STAY IN CLEFT PALATE AND SPEECH SURGERY WITHOUT AFFECTING WOUND HEALING AND SPEECH OUTCOMES

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BACKGROUND & PURPOSE: Cleft palate and secondary speech operations at our pediatric hospital from 2010 to 2012 were included. Patients with concurrent operative sites that could influence pain scores were excluded. Length of stay (LOS) was discharge time minus procedure end-time. Postoperative speech was assessed by Pittsburgh Weighted Speech Score. Steroids were recorded as discharge time minus procedure end-time. Postoperative speech was assessed by Pittsburgh Weighted Speech Score.

METHODS: Cleft palate and secondary speech operations attempt to restore velopharyngeal competence, but risk postoperative retropharyngeal swelling. Although steroids may decrease swelling, they are not routinely used due to concern for wound healing problems. We retrospectively reviewed primary palate and secondary speech operations for postoperative steroid use and outcomes.

RESULTS: Of the 53 patients who underwent NAM and primary GPP, 52 (98.1%) did not require PMR and 1 (1.9%) did. Moreover, 20 (37.7%) did not even require secondary ABG surgery. Of the 27 patients that were not treated with NAM and primary GPP, 17 (63%) did not require PMR and 10 (37%) did. However, 100% of these patients did not require secondary ABG surgery.

CONCLUSIONS: Patients with BCLP treated with NAM and primary GPP were significantly less likely to need PMR than those that did not have this treatment (p<0.01). The importance of this may go beyond the technical aspects of the procedure and its inherent risks. The descended and mobile premaxilla, with its impact on function and facial esthetics, may have an effect on the patient’s quality of life (QOL), which requires further study.

222 EVALUATION AND TREATMENT OF SPEECH DISORDERS ASSOCIATED WITH CLEFT PALATE

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BACKGROUND & PURPOSE: ASHA SIG 5 Continuing Education Committee offers this poster as a practical review of assessment and management approaches for speech disorders associated with cleft palate and/or velopharyngeal dysfunction (VPD). The poster’s simple, concise, yet informative style allows for easily accessible education for students, residents, and professionals from speech and non-speech disciplines.

METHODS: The poster includes an overview of VPD, including types (VP insufficiency, VP incompetency, and VP mislearning) and various etiologies of VPD. Speech disorders associated with VPD are presented with associated definitions and descriptions including resonance disorders, audible nasal emission, and articulation disorders. Obligatory features of VPD are outlined and compensatory articulation errors are described in great detail with associated figures depicting these productions (e.g., glottal stop, pharyngeal fricatives, mid-dorsal palatal stops, etc.). The poster includes a section on assessment with examples of stimuli and techniques for (1) perceptual judgments of resonance and nasal emission and (2) articulation testing. Lastly, evidence-based speech therapy, prosthetic, and surgical treatment options are reviewed. A treatment decision-making algorithm is presented to assist with clinical management. The importance of referral and collaboration with the child’s cleft palate team is emphasized. The poster also includes a final section of references and web resources for the community-based SLP clinician. In sum, this poster serves as an educational tool to aid with assessment and treatment of children with repaired cleft palate and/or VPD.

Salary: Kerry Callahan Mandulak: salary at Pacific University for teaching a cleft palate-related course. Royalty: Kerry Callahan Mandulak: royalty for online evaluation course through Advanced HealthCare Education. Professional: Kerry Callahan Mandulak: serves on ACA Executive Council; serves on the Board of Directors for Smile Oregon

223 ALVEOLAR BONE GRAFTING SURGERY: CURRENT PRACTICES AND PATIENT OUTCOMES


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BACKGROUND & PURPOSE: Techniques and post-operative management of patients undergoing alveolar bone grafting vary, often without evidence-based rationale. The goal of this study was to describe our institutional experience and identify risk factors for unfavorable outcomes in patients undergoing alveolar bone grafting.

METHODS: This study included patients undergoing bone grafting from the anterior iliac crest between January 1, 2011 and April 17, 2013. Retrospectively, negative outcomes and complications including fistula formation, insufficient bone take and need for reoperation were identified and compared with variations in surgical technique and perioperative management. Using SPS,
standard descriptive statistics were conducted. The Mann Whitney U Test and the Fishers Exact Test were used to examine differences.

RESULTS: Eighty-five patients, 53 males and 32 females, averaging 8.8-years-old (+2.9y) were included. Twenty-five (87%) had clefts of the lip and palate, and the remaining had clefts of the lip and alveolus only. 89% underwent secondary grafting once, 8.2% twice, and 2.4% three times. The trap door technique was utilized in 47 patients (55%) and the crest was split in 38 patients (45%). The average time to post-procedure oral intake was 6 hours (+6.5 hours), and 78 (91.7%) were discharged within 24 hours. Complications, including fistula formation, insufficient bone take, readmission, re-operations and infection occurred in 16 (18.8%). There was no correlation related to age, cleft diagnosis, or harvest technique. Patients who had a prior bone-grafting procedure were more likely to develop a fistula post-operatively (p < .001). Additionally there was an increased reoperation rate (p<0.05) in males.

CONCLUSIONS: Our institutional experience is characterized by different operative and periorperrative protocols. Our overall surgical outcomes were favorable. Poor outcomes were associated with number of prior procedures and male gender, but unrelated to other evaluated variables. The information in this study will help cleft teams counsel patients and their families with regards to expectations from bone grafting surgery. Furthermore, given no difference despite various techniques, it argues for standardization of one universal protocol thereby simplifying team dynamics and patient care.

224 A QUALITY IMPROVEMENT INITIATIVE TO IMPROVE FEEDING EDUCATION FOR FAMILIES OF INFANTS WITH CLEFT PALATE
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BACKGROUND & PURPOSE: Feeding a child with a cleft palate can be a challenging experience for families. The Cleft Palate Team typically serves as the primary resource for feeding education and coordinates advanced assessment and treatment, when required. Based on professional and patient feedback, focus groups, and reflection on practices, we discovered that parents of children with cleft palate were receiving variable, and sometimes conflicting, advice from units in the hospital including the NICU, inpatient floors, and clinic setting, which caused confusion. To address these challenges, our team developed a Cleft Palate Feeding Initiative to standardize feeding education and clinical practice, improve communication among specialists, ensure continuity of care, and increase family satisfaction.

METHODS: This poster includes a summary of components of the Cleft Palate Feeding Initiative at our institution. First, the professionals who educate families of infants with cleft palate, including speech pathologists, occupational therapists, nurses, dieticians and lactation specialists, were identified and invited to participate. Each discipline’s role in feeding care was defined and required readings were assigned. Specific “Cleft-Craniofacial Feeding Competencies” were developed, which were modified from existing feeding/swallowing competencies for the pediatric population. The group also devised a cleft palate feeding management algorithm, which provided a step-by-step process for addressing feeding difficulties in infants with clefts. This algorithm includes “care entry” points ranging from prenatal visits through post-operative feeding care after palate repair. A cleft palate feeding kit was also developed as part of this initiative and will be described in the poster. This includes a special diaper bag with samples of cleft palate bottles/nipples, feeding brochures, a Cleftline™ Bear, and Feeding DVD from the Cleft Palate Foundation, which are given to parents of newborns with cleft palate. The kit is typically provided to the family at the prenatal appointment, nursery or NICU stay, so they have access to feeding supplies by the time their baby is born. Lastly, the poster will discuss our efforts to expand education for our institution’s nurses and feeding therapists to standardize feeding management. Next steps will be described, including plans to measure patient outcomes and parent satisfaction.

225 OPTIMIZING THE SURGICAL TREATMENT OF THE INTERNATIONALLY ADOPTED CHILD WITH CLEFT LIP AND/OR PALATE – UNDERSTANDING THE FAMILY EXPERIENCE
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BACKGROUND & PURPOSE: Our center has seen a 5-fold increase in the number of international adoptees with oral clefts over the past 15 years. Treatment of these children is complicated by their age at presentation, their history of prior care, and the newly evolving family relationship. The purpose of our study is to characterize the experience of families going through post-adoption cleft surgery and to identify adoption-, family-, and child-specific characteristics that may help to determine the optimal preparation and timing for surgery.

METHODS: We conducted a qualitative study involving semi-structured interviews with parents of children who were adopted from another country with unrepaird cleft lip and/or palate who underwent surgery within one year following adoption. Families will be recruited until we reach thematic saturation. The study team included a plastic surgeon, craniofacial pediatrician, nurse, social worker, adoption medicine pediatrician, epidemiologist and quality of life researcher. The first 5 interviews were used for open coding from which we developed a coding system. Interviews were then coded in pairs; Dedoose software was used for all analyses.

RESULTS: Fifteen families have been interviewed. Reported parent stressors included the vulnerability of bonding and the possibility of perceived abandonment by their child. Reported child stressors included reminders of institutionalization and communication barriers. Conditions thought to be important before proceeding with surgery included the ability to communicate needs and establishment of at least one parent bond. Several parents reported that surgical recovery was beneficial for family bonding due to realized dependence. No families reported negative effects of surgery on family relationships. In our initial analyses, interviews revealed potentially modifiable stressors included: pre-surgical sedation, early post-operative return to families, avoidance of crib confinement, and accommodation of normal sleep routine. Tools that could reduce stress included: sign language for communication and labels/signs for providers so that hospital staff can appropriately recognize parents of adoptees.

CONCLUSIONS: Although family bonds are considered to be vulnerable early after adoption, surgical recovery was perceived to accelerate family bonding through realized dependence. Our preliminary data has revealed modifiable factors that may improve the family experience. Final analysis may reveal optimal timing for specific children.

226 MSX1 GENE C330T (P. G119G) AND G817T (P. G273C) POLYMORPHISMS IN INDONESIAN PATIENTS WITH NONSYNDROMIC CLEFT PALATE (NS CPO)
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BACKGROUND & PURPOSE: Non syndromic cleft palate only (NS CPO) is one of the most common congenital malformations that affect between 1 in 1000 - 2500 live births worldwide which is considered to be a genetically complex, multifactorial disease. Based on several association studies among the candidate genes with NS CPO, Msx1 gene showed promising candidates in different populations with NS CPO. The purpose of this study was to analyze the relationship between C330T (p. G119G) and G817T (p. G273C) polymorphisms in MSX1 gene and the risk of NS CPO in Indonesian patients.

METHODS: This study was case control design using samples from 22 NS CPO subjects and 43 control subjects. Venous blood samples were collected with informed consent then DNA was extracted and MSX1 gene were PCR-amplified then DNA sequencing from DNA fragments covering exon 1 C330T was performed by Sanger method. Digestion products containing exon 2 G817T were evaluated. Statistical analysis which was used to determine significantly differences from polymorphisms frequency among both subjects was χ2. The odds ratio was used to determine a risk factor of NS CPO. RESULTS: The study results indicated that Single Nucleotide Polymorphisms (SNPs) was identified at C330T and the frequency of T mutant allele was 12.5% in NS CPO subjects and 87.5% in control subjects. This difference wasn’t significant statistically (χ2=3.147, p = 0.05). The odds ratio from all mutant alleles didn’t show significant result statistically means that the risk factor can not be determined. Digestion products showed no positive correlation between G817T polymorphisms and NS CPO patients.

CONCLUSIONS: In conclusion, the polymorphisms of MSX1 gene C330T (p. G119G) and G817T (p. G273C) are not considered to be a risk factor that being an etiological role in CL/P development in Indonesian patients with NS CPO.

228 GROWTH OF CHILDREN WITH CLEFT-LIP PALATE FROM 2 TO 10 YEARS OLD
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BACKGROUND & PURPOSE: Physical growth of infants and children is a key indicator of a health outcome. Inadequate physical growth may indicate a number of concerns that include inadequate nutrition, chronic health condition, genetic condition or a syndrome. Repots indicate that growth and nutritional problems are more frequent in children with cleft lip and palate (CLP) and isolated cleft palate (ICP) than in children with isolated cleft lip (ICL) and typical children. The growth problems in the first years of age have been attributed to environmental factors including the high frequency of infectious diseases and the different degrees of feeding difficulties for the children with cleft palate. After 2 years of age biological factors have a greater influence than environmental factors in regulating growth in normal children. In the literature there are speculations regarding growth hormone (GH) deficiency in children with CLP negatively impacting growth during the second or third year of life. The findings are controversial, with some authors reporting no association between orthognathic surgery and growth. There are many studies in the literature about nutritional status and growth of children with cleft lip and palate with less than 2 years of age but there are few studies in older children, specially from 2 to 10 years of age. Therefore, the purpose is to study the growth of children with cleft-lip, cleft-palate or cleft-lip and palate from 2 to 10 years and 11 months of age and to compare the different types of cleft between themselves and also the group of children with cleft with typical children.

METHODS: Weight and height measurements were collected from 125 children, aged from 2 to 10 years and 11 months, with isolated cleft lip (ICL), isolated cleft palate or cleft palate with or without cleft lip (CLP/C) without associated malformations and/or syndromes in a cross sectional and prospective study. Weight for age (W/A), height for age (H/A) and body mass index (BMI) of these children were compared to World Health Organization 2006/2007 (WHO 2006/2007) reference for typical children. Fisher exact test was used to compare the proportions of children with small body dimensions. The results presented here are preliminary.

RESULTS: Children with ICL (n=21) did not present statistically significant difference of any of the measures studied when compared with children with CLP/ICP (n=104) (p>0.05). When the children of both group (n=125) were compared with WHO 2006/2007 reference only W/A presented statistically significant difference (p<0.001), while the other data did not show significance (p>0.05).

CONCLUSIONS: Children with ICL/CLP presented impaired W/A growth when compared with typical children (children without cleft).

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REDUCTION OF FACIAL SWELLING AFTER ORTHOGNATHIC SURGERY: A RANDOMIZED CONTROLLED TRIAL COMPARING TWO DIFFERENT DOSES OF DEXAMETHASONE

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BACKGROUND & PURPOSE: The aim of this study was to compare the effects of two dosages (5 and 15mg) of dexamethasone for reduction of facial swelling following orthognathic surgery, and to measure the soft tissue swelling using 3D photogrammetry. In addition, we evaluated whether administration of glucocorticoids introduce an increased risk of complications.

METHODS: This was a randomized clinical trial, and comprised 68 patients undergoing orthognathic surgery including LeFort I osteotomy, bilateral sagittal split osteotomy and genioplasty for correction of dentofacial deformities. They were given 5 mg (group 1) or 15 mg (group 2) of dexamethasone at the beginning of operation. The choice of the dose was random and double-blind. For all patients, 3D photos were recorded over five time periods: T0 (preoperative), T1 (36 hours postoperatively), T2 (1 week postoperatively), T3 (1 month postoperatively) and T4 (6 months postoperatively). Out of the 5 patients in group 2, additional 3D photo at 24 hours, 36 hours, 48 hours, 60 hours postoperatively were taken to observe the serial changes of facial swelling immediately after surgery. The amount of facial swelling (in volume) at T1, T2, and T3 was measured by superimposition of 3D image with T4 in all patients. Serial change of facial swelling at 24 hours, 36 hours, 48 hours, 60 hours postoperatively in 5 patients were measured to evaluate the timing of maximal swelling after operation. Possible complications as adrenal suppression, wound dehiscence, and wound infection associated with use of steroid were evaluated after surgery, as well as occurrence of acute postoperative nausea and vomiting.

RESULTS: 68 patients received the orthognathic surgery and enrolled in the study. Among them, 56 patients (25 in group1, 31 in group 2) had adequate photos for evaluation and analysis. There was no significant difference of facial swelling in every period between group 1 and 2 (p>0.05). Average amount of facial swelling in 5 patients showed maximal level at 48 hours postoperatively. There was no significant difference on the occurrence of nausea and vomiting after operation between 2 groups. No patient was noted to have complications such as adrenal suppression, delayed wound healing, and wound infection associated with the steroid use.

CONCLUSIONS: The 3D photogrammetry superimposition is an accurate method to quantify facial swelling after orthognathic surgery. This prospective study did not show further beneficial or adverse effects between 5mg or 15mg of dexamethasone for reduction of postoperative facial swelling.

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THE FUNCTION OF IRF6 IN TGFB3-DEPENDENT PALATAL FUSION

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BACKGROUND & PURPOSE: Cleft lip/palate is a common congenital craniofacial disorder in human. The mutations in the interferon regulatory factor 6 (IRF6) gene cause an autosomal dominant disorder, van der Woude syndrome (VWS), which is the most common form of syndromic cleft lip/palate. In Irf6 knockout mice or Irf6 R84C missense mutation mice show intraoral adhesions between the epithelium, and causes cleft palate. One of the key components in controlling palatal fusion is transforming growth factor beta (TGFβ3). Knockout of the Tgfb3 gene in mice results in cleft palate and knockdown of Tgfb3 by shRNA inhibits the fusion of two palatal shelves. TGFβ3 regulates palate fusion through epithelial mesenchymal transformation (EMT), apoptosis, and lateral migration pathways. To date, biological functions of IRF6 in palate development remain largely obscure. In this study, we investigated the molecular mechanism of IRF6 on palate shelves fusion by mouse palate shelves organ culture.

METHODS: Palatal shelves were dissected from 13.5 C57BL/6 mouse embryo, and cultured with DMEM in a 37 °C incubator. To knockdown Irf6 and Tgfb3, palatal shelves were transferred to a 48-well plate and incubated with lentivirus for 24 hours. After lentivirus infection, palatal shelves were cultured for another 24 hours. The fates of palate and expression of target proteins were analyzed by immunostaining.

RESULTS: TGFβ3 up-regulates IRF6 and promotes IRF6 nuclear translocation in palatal shelves. Knockdown of Irf6 expression delayed TGFβ3-induced palatal fusion. Over-expression of IRF6 enhanced palatal fusion and rescued the shTgfb3-inhibited palatal fusion. These data indicate that IRF6 involves in TGFβ3-mediated palatal fusion. Further molecular analyses showed that knockdown of Irf6 expression decreased the expression of EMT regulators, Zeb1 and Snail2. In addition, knockdown of Irf6 expression restored TGFβ3-inhibited epithelial markers, ZO-1 and Plakophilin expression. Thus, TGFβ3-increased Irf6 expression is responsible for EMT, and Irf6 regulates EMT through Zeb1/Snai2 during palatal fusion. Furthermore, loss of Irf6 protein inhibited caspase 3 activation in medial edge epithelial (MEE) cells, suggesting that Irf6 also involved in apoptosis of MEE.

CONCLUSIONS: Taken together, Irf6 plays an important role in TGFβ3 regulated EMT and apoptosis pathways during palatal fusion.

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DIGITAL IMAGING ANALYSIS OF NASOPHARYNGOSCOPY: ADVANCING THE SCIENCE OF MEASURING VELOPHARYNGEAL FUNCTION FOR SPEECH

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BACKGROUND & PURPOSE: Imaging techniques and measurement methods used for assessment of velopharyngeal (VP) closure for speech have remained unchanged for decades. Currently, the majority of cleft palate centers use flexible nasopharyngoscopy to assess VP function. Most clinicians rely on subjective descriptions of VP physiology such as estimates of gap size (e.g. small, large), or coarse estimates of closure (e.g., 90%). While image quality has improved (e.g., high-definition cameras), methods of measuring VP closure

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have not been revised since first proposed by the 1990 International Working Group (Golding-Kushner et al. 1990). There is a significant need to examine new approaches and technologies that can be adapted to improve VP imaging measurement to benefit surgical planning and outcomes assessment. In this ongoing study, we are examining the validity and reliability of a new method of digital imaging analysis to measure VP closure during speech in children with VPD.

**METHODS:** In this retrospective study, videorecorded nasopharyngoscopic images were selected from 40 children with VPD. 9 participants had pharyngeal flaps. Still image pairs were selected from each exam during accurate oral consonant production: (Image 1) the VP port at rest ("open") and (Image 2) the maximum degree of VP closure during speech ("closed"). A primary and secondary rater traced the VP port in each image using digital imaging analysis software (Image Pro AnalyzerTM). The primary variable of interest was the ratio of VP closure. Additional measures of velar and lateral pharyngeal wall excursion were also obtained. A subset of image pairs was rated to assess intrarater reliability. Intra-class correlation coefficients were computed.

**RESULTS:** Preliminary analysis of 31 image pairs has been completed. Intra-rater reliability ranged from r=0.69-.71 for measurements of VP port area. Inter-rater reliability ranged from r=0.91-98 for VP port area and was r=0.95 for overall ratio of VP closure.

**CONCLUSIONS:** Preliminary results from this study suggest that digital imaging analysis is a reliable method to measure the ratio of VP closure during speech. Phase 2 of this study will include analysis of reliability of additional rater measurements, as well as comparison of VP closure measures to aerodynamic, acoustic, and perceptual indices of VP.

### 233 INTERNET SEARCHES: THE READABILITY OF INFORMATION RELATED TO PARENTING OF A CHILD WITH A CLEFT

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**BACKGROUND & PURPOSE:** In conjunction with physical treatments, multidisciplinary care plans should incorporate support programs focusing on parenting practices that increase children’s confidence and promote continuous problem-solving within the family core. Such programs should be available to families through the cleft team and through several media resources, especially the Internet. Since families are increasingly utilizing self-help electronically-based resources, the questions that come to mind are: Are parents finding information on parenting a child with a cleft? If so, is the information easy to read and understandable?

**METHODS:** A websearch was conducted using the search engine software Google.com for the following terms: “parenting cleft lip and palate.” The first 5 pages of results from Google.com were analyzed. Repeated queries, advertisements, and resources deemed to be irrelevant to the search were excluded. Readability level was determined using an online readability calculator that utilized the Flesch-Kincaid, Fog, and SMOG (Simple Measure of Gobbledygook) scale. Frequencies were reported.

**RESULTS:** Forty-two websites were retrieved, forty were entered into readability analysis and two were excluded because they were protected against copying of information. The majority of websites (85%) were from the US, four from the UK, and one each from Australia and Nigeria. Only 16 websites out of 42 mentioned directly or indirectly guidance for parenting practices. The analysis of the Flesch-Kincaid, Fog scale, and SMOG scale resulted in reading levels ranging from ninth to tenth grade reading level.

**CONCLUSIONS:** Only 36% of the websites analyzed addressed successful parenting practices that should be implemented while raising a child with a cleft. Their average reading scores were above the national’s average literacy score, which is at approximately the eighth grade level. Therefore, it is possible that this material is not fully comprehended by family members.

### 234 VALIDATION OF 3D GAND CLASSIFICATION OF LESSER SEGMENT CONSIDERING THE VOLUMETRIC SHAPE OF THE ALVEOLAR CLEFT

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**BACKGROUND & PURPOSE:** The GAND classification was developed for 3D classification of unilateral cleft palate (UCLP) to help determine treatment strategies based on volumetric and shape analysis of the cleft defect and the position of the lesser segment. The 3D analysis of the lesser segment in relation to the greater segment allows the following classification: G – cleft size; A - Arch form, N – Nasal floor and D – dental assessment. Ten cases demonstrated characteristics of velopharyngeal dysfunction, articulation, and motor speech. Variations included atypical articulation with developmental substitutions/distortions (n=10), one with both obligatory and developmental substitutions/distortions (n=10), reduced jaw stability/control (n=3), and two with both. An additional 50 videos will be reviewed prior to presentation.

**CONCLUSIONS:** Findings from this pilot study suggest mild speech production differences in children with CFM. These findings support the need for additional research to better define these differences and ultimately improve understanding of how craniofacial structure in CFM impacts communicative outcomes.

**Salary:** 10% of my salary is being funded by the T.E.E.N. Endowment through the Craniofacial Center at Seattle Children’s Hospital.

### CRANIOFACIAL MICROsomIA: INVESTIGATING SPEECH OUTCOMES

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**BACKGROUND & PURPOSE:** Children with craniofacial microsomia (CFM) are at increased risk for impaired speech production due to variable combinations of mandibular hypoplasia, malocclusion, velopharyngeal dysfunction, facial nerve palsies, tongue abnormalities, and hearing loss. However, only a few small studies have assessed speech production characteristics in CFM.

Comprehensive evaluation of speech outcomes can identify how speech is impacted by the common craniofacial malformations in CFM.

**METHODS:** Thirty videos of children with CFM and 5 controls were randomly selected from over 100 participants enrolled in a multi-center study (RC1 DE020270) conducted by the Facial Asymmetry Collaborative for Interdisciplinary Assessment and Learning (FACIAL) network. Standardized video of participants included syllable/sentence repetition and counting to assess production of sounds that require specific tongue placement. A speech-language pathologist systematically assessed videos and recorded the presence of structural and functional facial asymmetry, along with characteristics of velopharyngeal dysfunction, articulation, and motor speech.

**RESULTS:** Twenty-eight videos were of adequate quality for inclusion. Participants had a mean age of 9.5 years and included 50% males. Cases had asymmetric facial structure (n=22) and function (n=6), neither of which were present in controls. Ten cases demonstrated characteristics of velopharyngeal dysfunction, including resonance disorders (n=3), velopharyngeal mislearning (n=2), and nasal grimming (n=5). One control had nasal grimming. Thirteen cases demonstrated atypical articulation, including developmental substitutions/distortions (n=1) and one with both obligatory and developmental substitutions/distortions (n=10). Thirteen cases and no controls demonstrated motor speech differences. Variations included atypical labiodental function (n=10), reduced jaw stability/control (n=3), and two with both. An additional 50 videos will be reviewed prior to presentation.

**CONCLUSIONS:** Findings from this pilot study suggest mild speech production differences in children with CFM. These findings support the need for additional research to better define these differences and ultimately improve understanding of how craniofacial structure in CFM impacts communicative outcomes.
BACKGROUND & PURPOSE: Anthropometric measurements are a well- established method of craniofacial evaluation. There is limited data of soft tissue and bony orbital relationships in the pediatric population. Prior anthropometric data was generated by direct measurement and/or plain x-ray. Our aim in this study is to use computed-tomographic (CT) scans to establish soft tissue and bony anthropometric orbital measurements in normal infants and children.

METHODS: We retrospectively reviewed CT scans of 204 children between the ages of birth and 36 months. All scans were obtained with 1 mm or finer cuts. Soft tissue and bone windows were used in the analysis. Any children with known syndromes or craniofacial abnormalities were excluded. All images were oriented in the Frankfurt Horizontal Plane. We obtained Intercanthal (IC), Bony Interorbital (IO), and Bony Lateral Orbital (LO) distances. Statistical analysis included mean, standard deviation, SEM, a 95% CI, and evaluation of the IO to LO ratio.

RESULTS: We stratified patients into age groups: <3, 3-6, 6-9, 12-18, 18-24, 24-30, and 30-36 months. There were average of 25.5 patients in each group (range 25-27). We determined the mean distances for each age group. Intercanthal distance ranged from 16.4 to 35.3 mm. Bony IO distance ranged from 9.8 to 29 mm. Bony LO ranged from 53.7 to 88 mm. (Ratio of IO to LO in different age groups ranged from 25-27). We determined the mean distances for each age group.

CONCLUSIONS: Growth and pubertal development in children with CLP were evaluated. We established normal anthropometric measurements of the orbit in the pediatric population using fine cut CT scans. This has been especially important in infants where data is limited. These measurements will be a useful tool when evaluating hypo- and hypertelorism in children with craniofacial abnormalities.

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*236 COMPUTED TOMOGRAPHIC GENERATED ANTHROPOMETRIC MEASUREMENTS OF ORBITAL RELATIONSHIPS IN NORMAL INFANTS AND CHILDREN

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BACKGROUND & PURPOSE: Cleft lip and palate have been associated to deficiency in the development of the pituitary and to brain structural abnormalities. This association could result in growth impairment or problems in pubertal development which motivated the present study. Purpose: To evaluate growth and puberty in patients with cleft lip and palate (CLP) without associated syndromes, 10-18 years old, and compare them with typical children.

METHODS: We evaluated 212 patients with cleft lip and palate without associated anomalies or syndromes. Values were measured for weight, height, and pubertal stage and the Body Mass Index (BMI) was calculated. Graphs from the World Health Organization (WHO) 2007 were used as reference for body growth. For evaluation of puberty, delayed puberty was considered as the absence of pubertal characteristics in 13-year old girls and older and in 14-year old boys and older, and precocious menarche as the menarche before 9-year old girls. Data from Setian N et al, 2002 were used as reference for puberty. The Fisher’s Exact Test (5% significance level) was used to compare the different types of cleft among them as well as to compare children with CLP with typical children.

RESULTS: These are preliminary data from a cross-sectional study with 113 boys (62.7%) and 79 girls (37.3%). A total of 166 patients (78.3%) had cleft lip and palate or isolated palate (CL+P) and 46 patients (21.7%) isolated cleft lip (IC). There was no statistically significant difference in height between CLP groups (P=1.00) and those with typical children (P=0.62). In relation of BMI 19.8% of patients showed an overweight BMI and 3.8% underweight. There were no statistically significant differences between CL+P and IC (P=1.00) and between children with CLP and typical children (P=1.00). The CLP patients presented puberty similar to typical children.

CONCLUSIONS: Growth and pubertal development in children with CLP were considered normal for the age group studied.
traces were classified as unsteady if sd > 5 RAU.

RESULTS: Among 1,447 vowels produced, 20% were identified as unsteady. Nearly all participants (92%) produced at least one unsteady nasalance trace. Nearly one-third (31%) of the participants had unsteady nasalance traces for 25% or more of the vowels produced. Vowels /o/ and /u/ were significantly more stable than /i, e, ae/ (p=.05). Preliminary analysis of the effect of trial, fundamental frequency, periodicity, and gender were not associated with nasalance stability. RMS signal intensity is related to variance in nasalance (p < .001). An evaluation of potential subject and equipment factors will be included in the presentation.

CONCLUSIONS: These findings suggest that unsteady nasalance traces are common among typical adult speakers. Certain vowels are more likely to yield stable nasalance traces. Further study is needed to evaluate the utility of sustained vowels as a stable, reliable measure of nasalance in clinical and research applications.

239 MEMORY, LANGUAGE AND COGNITIVE FUNCTIONS OF CHILDREN WITH CLEFT LIP AND PALATE

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BACKGROUND & PURPOSE: Children with cleft lip and palate, chronic conditions in rehabilitation, faced with a variety of special challenges that predispose to behavioral and cognitive disorders, justifying sectional and longitudinal studies to determine causality of cognitive and psychosocial factors. This study was proposed to investigate the neuropsychologic functions of memory and language of children with repaired cleft lip and palate (CLP).

METHODS: Participated in this study 72 children with repaired CLP (trans-pre- and post-incisive foramen), both genders, mean age of 10.7y, during fundamental and middle school all under treatment at a specialized center for rehabilitation of craniofacial anomalies. For the investigation the Colored Progressive Matrices, Bender-Santucci Gestalt Teste Visomotor and BANI-TS – Neuropsychologic Assessment Battery Simplified were used. Kruskal Wallis test was used to compare the children grouped according the different types of cleft palate (significance level defined at 0.05).

RESULTS: Findings revealed that 78% of the children performed at intellectual level expected for their ages and 22% performed at borderline normalcy level. General score for neuropsychologic function was found at a mean performance of 70% during tasks, with operational memory found at the lowest performance level (45%), followed by cognitive-linguistic at 53%. Graphic perceptual-motor abilities related to visual-spatial function were found at 58% of performance level expected for the age, with the children in the trans-incisive foramen group performing at the lowest level (32%) when compared with children in the pre- and post-incisive foramen groups. Most efficient performance was found for synesthetic sensations skin and receptive language suggesting preserved input of sensory-motor and cognitive processes.

CONCLUSIONS: There was no statistical significance for the difference found among types of CLP. The individuals in the pre-incisive foramen CLP group had best neuropsychologic performance with scores at 73.2% compared to individuals in the trans-incisive foramen CLP (69.7%) and post-incisive group (67.1%).

240 IMPROVING MANDIBULAR ASYMMETRY ASSOCIATED WITH CONGENITAL MUSCULAR TORTICOLLIS USING AN EARLY INTERVENTION PROTOCOL

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BACKGROUND & PURPOSE: Torticollis is also known as wry neck or stiff neck. It is the third most common orthopedic diagnosis in infants (1). The majority of these patients are treated with physical therapy (PT) and rarely require surgical intervention. Congenital Muscular Torticollis (CMT) affects the sternocleidomastoid muscle (SCM) which acts to ipsilaterally laterally flex the head. In bilateral cases, the SCM muscle imbalance results in a head tilt, which can lead to a lifelong asymmetry of the face and head. Additionally, the excessive tone of the SCM muscle can affect cranial nerve function and speech development. In children with concerns for skull abnormality and/or sutural fusion we obtained 3D CT scans to rule out craniostenosis as a differential diagnosis to DP. In reviewing these CT scans we have identified that patients with MA have made significant improvement after 6 months or more of PT. It has been documented in the literature that patients with MA can lead to long term facial asymmetry after the age of 5 years (2). Currently, children presenting to our DP and CMT clinic under the age of 12 months are treated for DP with aggressive repositioning and/or helmet therapy. Their CMT is treated with PT until they are approximately one year of age or ambulating independently. The 3DCT scans were performed on the day of their initial evaluation or soon after to evaluate for craniostenosis, and the follow up CT was completed approximately 6 months later to evaluate for late craniostenosis. In reviewing the follow up CT, it was identified that the MA had improved in all of the pts.

METHODS: From July 2009 to July 2012 a retrospective study of symptomatic CMT patients treated with early PT for a minimum of 6 months was performed in order to evaluate the outcome of intervention as measured by the degree of improvement in MA. All patients underwent weekly PT treatment utilizing stretching and strengthening. Pre and post-therapy 3DCT scans were obtained to evaluate the degree of ramal height asymmetry (calculated ratio:affected/unaffected) and to rule out craniostenosis. Patients were followed clinically and radiologically for evidence of improvement in MA.

RESULTS: 10 pts met criteria. The average of pt presenting was 5.5 mos (3-9), avg length of PT was 6 mos, avg follow up was 7.5 mos (5.5-9.6). CMT was left sided in 60%, right sided in 40%. MA, 2nd to shortening of the vertical ramal ht (RH) (CT confirmed) correlated 100% of the side of CMT. The pre PT RH ratio (affected/unaffected) was 0.87 and improved to 0.93 after PT. 1 pt had synostosis.

CONCLUSIONS: We identified a unique cohort of infants with MA associated with CMT. These pts uniformly demonstrate decreased ramus height ipsilateral to the affected SCM. PT initiated shortly after diagnosis improved ramus asymmetry, as calculated by RH ratios.

241 SCREENING FOR OBSTRUCTIVE SLEEP APNEA IN CHILDREN TREATED AT A MAJOR CRANIOFACIAL CENTER

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BACKGROUND & PURPOSE: Children with craniofacial differences are often at particular risk for obstructive sleep apnea (OSA). Timely OSA diagnosis helps to ensure adequate support and intervention, when needed, to avoid the adverse sequelae of upper airway obstruction, namely neurocognitive and cardiovascular decline. This study aims to determine the incidence of positive screening for OSA in patients with craniofacial differences.

METHODS: An IRB approved retrospective chart review was performed on consecutive patients cared for by the craniofacial team at a large, urban craniofacial center from January 2011 to August 2013. Patients and families completed the Chervin Pediatric Sleep Questionnaire (PSQ), a validated tool that has a sensitivity of 85% and specificity of 87% in predicting severe OSA in otherwise healthy children. Patients were stratified by clinical diagnoses and screening results were compared by Fisher’s test.

RESULTS: A total of 866 patients completed the PSQ during the study period and 234 children with craniofacial diagnoses met inclusion criteria. The mean screening age was 9.02 +/- 4.72 years (range = 0.31-29.78) and 47% were male (109/234). The overall incidence of positive OSA screening was 29.5% (69/234). The most commonly reported symptoms were mouth breathing (45.3%) and being easily distracted (40.6%). Of the total population, 176 patients had an underlying genetic syndrome (75.2%) while 58 patients were non-syndromic (24.8%). Both groups were at equivalent risk for having OSA screening (29.3% vs 29.0%, p=.1). Also, participants with an orofacial cleft in addition to a craniofacial diagnosis were at equivalent risk for positive OSA screening compared to patients without a cleft (26.8% vs 32.9%, P=.048).

CONCLUSIONS: This preliminary study demonstrates an almost 30% incidence of positive screening for OSA in our pediatric craniofacial patients. Future work will characterize the sensitivity and specificity of the previously validated Chervin PSQ in craniofacial patients by performing routine polysomnography.
BACKGROUND & PURPOSE: In developed countries, cleft lip repair is performed between three months and six months of age, followed by cleft palate repair around the age of one. However, in the developing world, cleft patients present at later ages, changing the time frame of the surgery. Due to speech outcomes, palate repair is a more time sensitive procedure than lip repair, ideally performed before the second year of life. Multiple cleft care authorities have questioned the staging of lip repair before palate repair when working in developing nations. One concern is that patients may not return for cleft palate surgery after the cleft lip has been repaired. This study was designed to determine what percentage of patients with a cleft lip and palate (CLP) at a high volume center in Assam, India return for cleft palate repair after having their lip repaired.

METHODS: The study identified CLP patients who had received primary cleft lip repair at the Guwahati Comprehensive Cleft Care Center in Assam, India between January 2011 and December 2012 (n=718). An overall return rate for palate repair was analyzed. Patients were also stratified by age group (<6 years; 6 – 18 years; >18 years) and the return rate for each group was determined.

RESULTS: The overall return rate for all patients was 24.9% (n=179/718). For each age group, the return rate was as follows: <6 years: 30.1% (n=124/412); 6-18 years: 21.4% (n=37/173); >18 years: 13.5% (n=18/133).

CONCLUSIONS: Three quarters (75.1%) of CLP patients did not return to have their palate repaired after lip repair. This number may be skewed by adult patients in whom palate repair is not considered essential. However, two thirds (69.9%) of CLP patients under 6 years of age, those patients who could benefit most from palate repair, did not return to have this second surgery. The result of this large series provides evidence that patients of Northeast India often do not return for cleft palate repair after repair of their lip. This should encourage consideration to repair the palate first in this population.

THE MATERNAL RISK FACTORS FOR CLEFT LIP WITH OR WITHOUT CLEFT PALATE IN THE PHILIPPINES

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BACKGROUND & PURPOSE: Multiple factors have been identified in the occurrence of CLAP. However, local Filipino data is presently lacking. The identification of modifiable maternal risk factors may contribute measures to reduce occurrence of these malformations in the Philippines.

METHODS: A standardized data from 235 mothers of children with CLAP and 470 mothers of children without congenital anomalies were collected. Univariate and multivariate logistic regression analyses were used to estimate relative risks by odds ratios and 95% confidence intervals.

RESULTS: Univariate results suggest that maternal history of premature delivery, maternal history of GDM, periconceptual corticosteroid use, smoking, and first-trimester alcohol, coffee and soda drinking increased risk of CLAP. Logistic regression showed that smoking (OR 29.54; 95%CI, 9.72, 89.73), coffee drinking (OR 2.0; 95%CI, 1.20, 3.34) and alcohol drinking (OR 22.25; 95%CI, 5.34) of mothers were predictors of having CLAP. Using the backward elimination stepwise logistic regression, smoking (OR 29.54; 95%CI, 9.72, 89.73), coffee and soda drinking (OR 22.25; 95%CI, 5.34) alcohol drinking (OR 2.0; 95%CI, 1.20, 3.34) and alcohol drinking (OR 22.25; 95%CI, 5.34) of mothers were predictors of having CLAP.

CONCLUSIONS: Preconceptual counseling for CLAP risk should focus on history of premature delivery; GDM; periconceptual medication use; smoking; and alcohol, coffee and soda intake in the first trimester. Modifying the occurrence of these risk factors may help in decreasing the occurrence of CLAP.

THREE-DIMENSIONAL COMPUTED TOMOGRAPHY ANALYSIS OF PHARYNX IN ADULT PATIENTS WITH UNREPAIRED ISOLATED CLEFT PALATE

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BACKGROUND & PURPOSE: This study was performed to investigate three dimensional differences of pharynx between adult patients with unrepaired isolated cleft palate (ICP) and normal adults using cone-beam computed tomography (CBCT).

METHODS: CBCT data of thirty-two unrepaired adult patients with non-syndromic ICP and thirty normal controls were acquired. Image processing and analyses were performed using Mimics software program. Linear (Ho-PNS/PNSc, Ho-Ba, Ba-PNS/PNSc, Angle Ba-Ho-PNS/PNSc, C1-PNS/PNSc, C2-T1, C3-T2; D t p, D t c2, D t c3; D pa p, D pa c2, and D pa c3), planar (A_p, A_c2, and A_c3), and volumetric (V_t, V_p, V_p-c2, and V_c2-c3) measurement and comparisons were made on ICP patients and normal adults. The interobserver and intraobserver reliability of 3-dimensional pharyngeal analysis were determined by Pearson correlation coefficient. Statistical analyses comparing ICP patients with normal adults were performed using independent-samples t test, with the threshold of significance set at p=0.05.

RESULTS: Interobserver and intraobserver reliability were high. Pearson correlation coefficients ranged from 0.992 to 0.999 for interobserver measurements, and from 0.994 to 0.999 for intraobserver measurements. Anterior height (p=0.000), total depth (p=0.000), and length of the floor (p=0.034) of bony nasopharynx; posteroanterior diameter of pharyngeal airway at palatal plane (p=0.000); cross sectional area of pharyngeal airway at palatal plane (p=0.000); total volume (p=0.031), volume above palatal plane (p=0.024), and volume between palatal plane and C2 plane (p=0.022) were larger in ICP patients.

CONCLUSIONS: This imaging study revealed an enlarged nasopharynx in sagittal plane and increased nasopharyngeal airway volume at palatal plane in ICP patients.
universal agreement among surgeons regarding which technique least negatively affects maxillary growth. The objective of this study is to evaluate the effect of surgical technique on facial growth in patients with unilateral cleft lip and palate with specific reference to dental arch morphology.

METHODS: A comprehensive search strategy of three major literature databases (Medline, Ovid, Cochrane) was based on key words “cleft palate”, “maxillofacial development”, “cephalometry”, “Facial Growth”, “Malocclusion”.

Results of the search were supplemented by retrospective review of article references and additional studies suggested by experts in the field. Articles excluded from study met one or more of the following exclusion criteria: not in English language, published before 1980, cleft other than unilateral cleft lip and palate, no description or poor description of surgical technique used, two-stage cleft palate repair or simultaneous maxillary and palate repair, unspecified age of surgery, follow-up of less than 4 years, age younger than 9mo, or age older than 24mo at time of repair.

RESULTS: Original search resulted in 491 abstracts after query was filtered by language, date of publication, and limiting search to human studies. After individual abstract review 26 articles were selected by the two principal investigators. A total of 8 articles met inclusion criteria and were included for final review. Retrospective review of references yielded 2 additional articles that met inclusion criteria. Five studies assessed dental arch morphology using casts and measured outcome by the Golson Yardstick method. Six studies assessed facial growth by cephalometric analysis and one by dental cast measurements. The techniques reviewed by selected studies included von Langenbeck, Wardill-Kilner, two-flap palatoplasty, and supraperiosteal pushback. The dental arch morphology as assessed by Golson Yardstick was variable and contradictory across studies for von Langenbeck and Wardill-Kilner techniques. However, there was a trend for improved outcomes in von Langenbeck technique compared to others as measured by Golson scores. None of the techniques was found to be statistically superior in the studies that directly compared them by cephalometric analysis or Golson scores. There was significant variability in methodology, outcome measurements, and low power across studies.

CONCLUSIONS: This systematic review emphasizes the need for further research in this area. There is need for prospective randomized controlled studies comparing different surgical techniques to arrive at conclusions of clinical significance.

SAFETY OF IBUPROFEN IN POSTOPERATIVE PAIN AFTER PALATOPLASTY
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BACKGROUND & PURPOSE: Postoperative pain in patients undergoing palatoplasty is a common controllable symptom typically treated with narcotics (Augspomwan et al., 2011). However, the safety of codeine and hydrocodone use in pediatric patients has recently been questioned with the growing number of fatalities reported among children receiving these medications (Sadhasivam et al, 2012). These deaths are thought to be caused by ultrarapid metabolism of narcotics secondary to a genetic variation of the liver microenzyme CYP2D6. (Sadhasivam et al, 2012). In fact, codeine and hydrocodeone use is now discouraged after tonsillectomy (Nierengarten, 2012). Alternate forms of pain control after palatoplasty would be beneficial. Because hemorrhage is a known postoperative complication after palatoplasty (Rossell-Perry et al., 2013), ibuprofen and other NSAIDs that decrease platelet activation have typically been avoided. Otolaryngologists had employed a similar practice after adenotonsillectomy until multiple studies revealed that ibuprofen caused no increase in postoperative bleeding (Picking et al., 2002; Krishna et al., 2003; Melinche et al., 2003; Cardwell et al., 2005; Jejakumar et al., 2008; Yaman et al., 2011). This may suggest an opportunity to use ibuprofen following palatoplasty, without increased postoperative hemorrhage. No data has been previously published reporting the safety of ibuprofen following palatoplasty. Our purpose was to determine the safety of ibuprofen for postoperative pain control following palatoplasty in pediatric patients.

METHODS: A retrospective chart review of patients from a tertiary-care pediatric hospital was performed on patients who received ibuprofen after palatoplasty from 2010 to 2013. Charts were reviewed for number of doses of ibuprofen given and the presence of postoperative bleeding in the hospital and at a three-week follow-up. Patient’s caretakers were then contacted by phone to ensure no postoperative bleeding had occurred after patients had returned home.

RESULTS: Thirty-two patients (16 male, 16 female) received ibuprofen after palatoplasty. Patients received a mean of 4.8 doses (range 1-17). No patients experienced postoperative hemorrhage before hospital discharge. Charts revealed no post-operative hemorrhage at three-week follow-up. 17 of 32 (53%) of patients caretakers were contacted by telephone and none reported postoperative bleeding.

CONCLUSIONS: Ibuprofen appears to not increase bleeding rates, and may offer a safer alternative to control pain following palatoplasty. Additional prospective studies will be needed to further evaluate its safety and efficacy on a larger scale.

VOICE ONSET TIME OF PERSIAN WORD-INITIAL PLOSIVES IN CHILDREN WITH CLEFT LIP AND PALATE
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BACKGROUND & PURPOSE: Clefts of lip and palate may lead to articulatory and resonance disorders. In this study, Persian word-initial plosives of children with cleft lip and palate were acoustically compared to children without cleft. Index of voice onset time (VOT) as a time-domain parameter was used to characterize the articulatory behavior of the children with cleft lip and palate.

METHODS: Participants consisted of 15 children with repaired BCLP (7 M, 8 F; mean age= 8.2 years, SD=2.9) and 20 normally articulating children (9 M, 11 F; mean age= 7.6 years, SD=2.6). All children with CLP underwent two surgeries to repair the lip and palate at three to six months of age. None of the children had any known syndromes, voice disorders, or hearing loss. Based upon perceptual evaluation, three children with CLP were judged to have hyponasal and two were judged to have audible nasal air emission. None had oronasal fistula and four children had alveolar bone grafting. Moreover, all of the children with CLP were undergoing maxillary expansion with removable orthodontic appliances. All participants were native speakers of Persian. All recordings were made using a microphone and CSL in a quiet room. The speech stimuli consisted of seven monosyllabic CV/CVC real and nonsense words spoken in isolation. VOTs of Persian plosives including /p, b, t, d, k, g/ in word-initial positions were measured manually using PRAAT software. Children with CLP removed appliances during recordings.

RESULTS: Mean VOT values for the voiced plosives /b, d, g/ in the experimental group were less than those of the control group. T-tests indicated that statistically significant differences occurred between the two groups only for the voiced plosives /d/ and /g/ (p<0.001).

CONCLUSIONS: In Persian-speaking children with CLP, there was a tendency for reduced VOT of voiced plosives in general and in particular for /d/ and /g/. Findings are discussed relative to possible velopharyngeal inadequacy that may facilitate voicing and pre-voicing in children with CLP.

PARENTAL AND CHILDREN’S SATISFACTION WITH CLEFT REPAIR AND RELATED ASPECTS IN MONGOLIA
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BACKGROUND & PURPOSE: In Mongolia, children with clefts receive surgical treatments, covered by the national health insurance and multidisciplinary team provides with the follow ups. But no studies of satisfaction among these patients or their families have been published. Thus, the purpose of this preliminary study was to determine parental and children’s satisfaction with treatment and related aspects.

METHODS: Fifteen Mongolian children with cleft lip and palate (male 7 and 8 female) ranging in age from 12 to 16 years (mean age: 9.00 ± 3.45 years), and 15 parents were included in this study. A questionnaire was designed to investigate four variables and used during an interview.

RESULTS: Treatment aspects: Out of total 15 children, 3 omitted to answer this part of the questionnaire. Among 12 (100%) interviewed children, only 2 (11.7%) had all of their pre-operative expectations fulfilled, whereas 10 (88.3%) were dissatisfied. Seven patients received an orthodontic treatment, where as 2 (11.4%) patients and their parents dissatisfied with the results and 5 (88.6%) satisfied. From the total of 15 (100%) patients only 8 (53.3%) received speech therapy, where as 4 (50%) patients and their parents were satisfied with the outcome of the treatment. Facial Appearance and Speech: Only 6 (40%) patients out of 15 (100%) answered the question on the overall...
facial appearance and all of them dissatisfied with, whereas also only 5(33.3%) completed speech related questions with the dissatisfaction with their speech. Emotional and Social Aspects: Out of 12 children, 4(33.3%) did not significantly or emotionally handicapped and receives positive attitude from the classmates and friend; 7 children answered questions on the issue of the relations with the opposite sex and only 2 found difficult in this aspect, where as 5 had boy or girlfriend. Perceived Success of Specialists: All patients and parents felt that the surgeons and orthodontists are very important in the process of holistic treatment but the speech therapy was not mentioned.

CONCLUSIONS: The results suggest that the patients and their parents were generally dissatisfied with the surgical treatment they had received and generally satisfied with the orthodontic treatment. Positive outcome showed in the emotional and social aspects, which might be with relate to the cultural specifics of Mongolians. Also there is a need of promoting information on the interdisciplinary team, especially speech therapy.

CULTURE AND BELIEFS ON ETIOLOGY AND TREATMENT OF CLEFT LIP AND PALATE

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BACKGROUND & PURPOSE: Cleft lip and palate (CLP) occurs worldwide with varying incidences. Cultural background, ignorance, and myth triggers some inaccurate beliefs of its etiology, which, may lead to non-acceptance of proposed treatment plan and/or utilization of untraditional techniques for treatment. Although adequate treatment of CLP leads to total restoration, not all parents are in favor of the traditional treatment regimen established in the North-American culture. In the USA, a conglomerate, of cultures and beliefs, culturally competent providers may be more competent in convening messages on diagnosis and treatment plan to immigrant and/or culturally diverse families.

METHODS: A systematic review of culture and beliefs on the etiology and management of cleft lip and palate was performed. The results for “perceived etiology” are presented by continent and categorized into: (1) supernatural; (2) mother’s fault; (3) environmental; and (4) genetic. The results for “treatment modalities” are presented by continent and categorized into: (1) no care; (2) spiritual care; and (3) traditional surgical care.

RESULTS: Supernatural belief has resulted in either no care or spiritual healing in Africa, South America and Asia. Unfortunately, infanticide has been reportedly associated with this belief in Africa, Asia and some areas of South America. Genetic belief resulted in surgical care in all continents. Mother’s fault resulted in traditional surgical care but with lack of support from family and community, resulting in exacerbated feelings of loneliness and desperation. Populations who tend to believe that causes were environmental (contaminated water, oil spillage and pollution, nuclear plant, chemical facility, smoke from firewood for cooking preserving and processing food) tended to pursue traditional surgical care.

CONCLUSIONS: Health care providers should understand the cultural background of their patients and families in order to establish realistic treatment options and satisfactory treatment results. North-American practitioners should follow the standards of care prescribed by the American Cleft Lip and Palate Association; nonetheless, their approach to the family ought to be culturally sensitive.

SURGICAL ANATOMY OF THE FACIAL NERVE AND INFERIOR ORBITAL NERVE DURING MIDFACE CRANIOFACIAL APPROACHES

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BACKGROUND & PURPOSE: Subperiosteal midface lift was first described by Tessier in 1979. Since then, there have been no publications specifically addressing the anatomical landmarks of the facial and inferior orbital nerves (ION) as they relate to midface re-suspension post craniofacial approaches. This cadaveric study assesses both the position of the buccal branches of the facial nerve (BBFN) as it relates to the facial skeleton and the course of the ION fascicles in the supraperiosteal plane and their impacts on surgical technique.

METHODS: Fourteen human cadavers were performed through a preauricular face-lift incision. A 25 gauge needle with brilliant green dye was used to mark the BBN on the facial skeleton as they entered under the lateral border of the zygomatic major muscle. Marked fasciculation was then carried through a transconjunctival and upper gingival-buccal sulcus incision. The locations of the BBN were documented in relation to the caudal border of the zygomatic-maxillary (ZM) suture. The ION was also identified and its fascicles were dissected in the supraperiosteal plane from the foramen until they pass in continuity into the facial soft tissue.

RESULTS: On average there were 3 branches of the facial nerve innervating the zygomatic major muscle and 1.8 branches entering the muscle superior to the caudal border of the ZM suture. The most superior buccal branch of the facial nerve was found to lie at a mean of 6.8 mm superior to the inferior border of the ZM suture and at 1.1 mm elevation from the bone. The most inferior branch was at a mean of 7.2 mm inferior to the caudal border of ZM suture. On average the ION had 5.2 fascicles. They traveled for an average distance of 10.2 mm above the periorbital before they passed into a superficial plane.

CONCLUSIONS: Midface degliding during craniofacial surgery is common. The surgeon must be aware of the facial nerve anatomy during release of the upper masseteric ligament and inferior orbital nerve fascicles anatomy during placement of the periosteal suspension sutures.

EXPERIMENTAL JUSTIFICATION OF APPLICATION OF A MEMBRANE FROM AN UMBILICAL CORD FOR REPLACEMENT OF DEFECTS OF THE JAW.

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BACKGROUND & PURPOSE: Type of those children, who have a alveolar cleft is the most difficult task in combined treatment of patients with congenital abnormality of maxillofacial area. In this sense, elimination of congenital defects of the alveolar bone is one of the essential stages of surgical treatment of patients with Congenital Cleft Lip and Palate. It allows to normalize the split portions of the upper jaw. Consequently, it reduces the severity of post - surgical deformations. Purpose. Experimental justification of the usage of umbilical cord tissue in bone grafting of the alveolar bone defect in the upper jaw of rabbits.

METHODS: Methodology. In our experiments we used 30 non purebred rabbits at the age of 3-4 months with average weight of 2.0-2.5 kg. In all animals standard bone defects artificially were reproduced in the alveolar bone of the upper jaw at premaxillary-maxillary suture. Experimental reproduction of bone defects were performed according to the following procedure: it was made a linear incision of the mucous of the alveolar bone of the upper jaw, threw back mucoperiosteal flaps in premaxillary - maxillary suture, it was created through bone defect of 10 x 0.5 mm with fissure bur, then took autotransplantation of the ilium and filled the defect. Then mucoperiosteal flaps were laid into place and sewed with polyglycolic sutures. During experiment we used umbilical cord sheath - extraembryonic ectoderm formation with a thin elastic translucent structure, which has a variety of functions such as: promotion of advanced biological processes as well as anti-inflammatory, regenerative functions. Umbilical amnion is a film, which consists of fine fiber network with fibrillar nature, and is covered externally with amniotic membrane, which represented by ectodermal amnion - epithelium whose cells tightly located with each other.

RESULTS: In the first group 120 days after operation low-mineralized tissue, partially filling the defect was detected in the area of the defect as well as thin and discontinuous cortical bone was visible. In the second group the defect was completely filled with bone tissue. Apart of that, the whole area of the defect is covered with dense shadow. By day 120 after surgery we observed that almost completely filling of the bone defect area in the group of animals that were used membrane, whereas in the other group that was not observed.

CONCLUSIONS: Thus, the results of the pilot study suggests the effectiveness of cord membranes in eliminating artificially created defect of the upper jaw, which is expressed not only in getting the bone regeneration, but also in equal filling of the defect in the newly formed bone tissue. Accordingly, we consider that the experimental result that we obtained from our research can be basis for the clinical use of this membrane in children with CLCP during rehabilitation stage.

ASSESSMENT OF ALVEOLAR BONE CLEFT GRAFTING USING SWAG TECHNIQUE IN THE CLEFT CARE CLINIC; EGYPT

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BACKGROUND & PURPOSE: Secondary alveolar bone grafting (ABG) of the cleft alveolar ridge in the mixed dentition is a well-established treatment for patients with cleft lip and palate (CLP) for its well-known
advantages. Overviewing the level of cleft care received by a group of Egyptian patients treated in the cleft care clinic (CC) in 2012 by El-Kassaby A.W. [1], discussing the challenges and ways to improve care. Findings showed that alveolar cleft grafting had received the least attention. In this study, above 9 years of age 85% of the patients didn’t receive the ACG they needed as for the performed; 12% were successful and 13% failed.[1] AIM of the study is to assess the degree of success of ACG in the same clinic in another point of time comparing the alveolar bone (gold standard) and chin bone using the "Standardized Way to Assess Grafts" SWAG technique (Long et al., 1995). [1] El-Kassaby A.W. Overview of the level of cleft care received by a group of Egyptian patients: challenges and ways to improve Egyptian Journal of Oral & Maxillofacial Surgery by 2012, Vol 3 No 2. METHODS: A retrospective study was performed to operated ACG patients all cases were performed by the same surgeon using two different bone sources iliac and chin. Radio graphs were projected and rated by orthodontists using the SWAG method where 0 is no bone, 4 reflects two-thirds fill, and 6 means complete fill. Vertical thirds were also assessed. The SWAG technique was validated for ABG assessment for overall bone (quantity) fill as well as in vertical thirds (location).

RESULTS: Significant improvement in the success rate of ACG in comparison with the previous study. All nasal floors were closed successfully and the SWAG technique is a good scale for assessment and a step for later inter-center comparisons.

CONCLUSIONS: The technique described by the Ameri-cleft is applicable as a bone scale and eases later inter-center comparison. SWAG reveals improvement of ACG.

255 FORMATTING THE SURGICAL MANAGEMENT OF TESSIER CLEFTS 3 AND 4 Sobhan Mishra, MDS, DNB (1), (1) Maaya Cleft Centre, Bhubaneswar, Bhubaneswar Contact Email: sobhan_surgeon@yahoo.com

BACKGROUND & PURPOSE: Tessier Clefts 3 & 4 are rare Craniofacial Clefts and the rarity of the same makes it a challenge for any Craniofacial surgeon to give the best possible result. The lack of well defined guidelines or procedures for management of Tessier clefts 3 & 4 gives us surgeons a basis to search a anatomically correct and reasonably well defined repair. The formatting of the surgical management of Tessier clefts 3 & 4 is a challenge, given the nature of these anomalies and lack of standard guidelines. To achieve a CONCLUSIONS: The surgical management of Tessier 3, 4 is a challenge, given the rarity of the same makes it a challenge for any Craniofacial surgeon to give the best possible result. The lack of well defined guidelines or procedures for management of Tessier clefts 3 & 4 gives us surgeons a basis to search a anatomically correct and reasonably well defined repair. The formatting of the surgical management of Tessier clefts 3 & 4 is a challenge, given the nature of these anomalies and lack of standard guidelines. To achieve a CONCLUSIONS: The surgical management of Tessier 3, 4 is a challenge, given the rarity of the same makes it a challenge for any Craniofacial surgeon to give the best possible result. The lack of well defined guidelines or procedures for management of Tessier clefts 3 & 4 gives us surgeons a basis to search a anatomically correct and reasonably well defined repair. The formatting of the surgical management of Tessier clefts 3 & 4 is a challenge, given the nature of these anomalies and lack of standard guidelines. To achieve a CONCLUSIONS: The surgical management of Tessier 3, 4 is a challenge, given the rarity of the same makes it a challenge for any Craniofacial surgeon to give the best possible result. The lack of well defined guidelines or procedures for management of Tessier clefts 3 & 4 gives us surgeons a basis to search a anatomically correct and reasonably well defined repair. The formatting of the surgical management of Tessier clefts 3 & 4 is a challenge, given the nature of these anomalies and lack of standard guidelines. To achieve a
ORTHODONTIC MANAGEMENT AND FACTORS AFFECTING TREATMENT OUTCOMES OF PERSONS BORN WITH OROFACIAL CLEFTS AT THE UNIVERSITY OF GHANA DENTAL SCHOOL

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BACKGROUND & PURPOSE: Currently, there are two centers in Ghana where multidisciplinary management of clients with Orofacial Clefts includes Orthodontic treatment; these are the Korle-Bu Teaching Hospital in Accra, which is the largest hospital in West Africa and the Komfo Anokye Teaching Hospital in Kumasi The purpose of this study is to highlight the reported burden of this Craniofacial Abnormality in Ghana and the existing approach to orthodontic management. It also aims to identify socio-cultural factors that may influence orthodontic treatment outcomes including community perceptions, attitudes and practices as well as the measures taken to accommodate these factors.

METHODS: This study was undertaken at the Department of Orthodontics and Pedodontics at the University of Ghana Dental School. The records of Clients with Orofacial Clefts treated between the year 1996 to date were reviewed. Factors affecting treatment and management outcomes were recorded.

RESULTS: The total number of clients was 23 with age ranging from birth to 24years. Majority of the clients were in the 5-8yr group (30%) and the 10-14 yr. group (30%). The gender distribution was 43% male and 57% female. 39% of clients had a presenting complaint of malalignment of upper teeth while 26% presented due to their referral from the Cleft Lip and Palate Panel Clinic. Majority of clients (43%) were treated with fixed upper braces only while only 13% were treated with both upper and lower fixed braces.

CONCLUSIONS: Orthodontic treatment with fixed braces is limited not only by cost but also by the clients’ repulsion to the seemingly unaesthetic metal brackets and the lengthy duration of treatment. The clients also tend to have cooperation ‘burnout’ from numerous hospital visits they have had to endure from birth to manage their condition.

259 UTILIZING THE PARASCAPULAR FLAP TO ADDRESS PRUZANSKY III HYPOPLASTIC MANDIBLES: SURGICAL OUTCOMES OF 7 PATIENTS

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BACKGROUND & PURPOSE: Distraction osteogenesis is a well-established approach in correction of the hypoplastic mandible. It has been less successful in the treatment of Pruzansky Class III deformities. Despite early overcorrection, there is poor subsequent growth owing to absence of the condylar growth center. Various free tissue transfers have been utilized for pediatric ramus reconstruction, including rib, fibula, iliac crest, and scapula. Only scapula appears to include a viable growth center. We describe our experience utilizing the parascapular osteocutaneous free flap for mandibular reconstruction.

METHODS: From 1994 to 2013, 7 patients with grade III hypoplastic mandibles were candidates for mandibular reconstruction with a parascapular osteocutaneous flap. Flaps were performed at two different institutions and by two different senior surgeons. The average age at time of initial surgery was 5.3 years old. Distraction was performed on 2 patients in an effort to improve obstructive sleep apnea symptoms. Bone surveillance was conducted through cephalograms and computed tomography at average of 3.5 years follow-up (range 0.2 to 9.3 years). All patients received 1 week of perioperative cephalosporin antibiotic coverage.

RESULTS: All seven patients underwent successful transfer and no bone flap loss with stable clinical fixation noted up to 9.3 years of follow-up. One Goldenhar Syndrome patient underwent bilateral flaps 6 months apart and secondary mandibular distraction 1 year later. Complications include: hematoma (n=1), TMJ limited aperture(n=1), and partial bone resorption (n=1). N=1 syndromic patient was diagnosed within this cohort with Golden Har syndrome (Pruzansky III) and Pierre Robin Sequence.

CONCLUSIONS: There are few reports of long term success in treating the severely hypoplastic mandible with free osteocutaneous scapula transfer. Our results suggest that the parascapular osteocutaneous free flap represents an effective surgical option with minimal donor site morbidity, good long term growth and appropriate qualities to make it our preferred method of mandibular reconstruction.

260 POSTERIOR CRANIAL VAULT DISTRACTION IN A PATIENT WITH OSTEOPETROSIS AND PROGRESSIVE POSTNATAL PAN-CRANIAL SYNOSTOSIS

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BACKGROUND & PURPOSE: We report a case of posterior cranial vault distraction in a patient with osteopetrosis. The purpose of this report is to present the unique surgical considerations in the treatment of craniosynostosis in osteopetrosis patients.

METHODS: Report of a single case

RESULTS: The patient presented at age 13 months with progressive pan craniosynostosis, vision loss, developmental delay, and sleep apnea. Genetic evaluation confirmed autosomal recessive malignant infantile osteopetrosis associated with a homozygous mutation in the TCIRG1 gene. Interval CT scan performed upon referral confirmed progressive synostosis of bilateral coronal, lambdoid and metopic sutures with volcano sign, inner table scalloping, narrowed optic canals, and marked skull base thickening. Bone marrow transplant (BMT) was indicated, but would have necessitated deferral of vault expansion for 6-12 months. Therefore urgent expansion of the posterior vault was performed at 14 months of age to treat elevated intracranial pressure. Two parasagittal distractors were used to distract a biconcave craniostenosis flap at a rate of 1 mm per day after a 3-day latency. Distraction progressed without complication and CT scan 4 months postoperatively showed appropriate bony generate, and the distractors were removed at 4½ months. The longer latency period was implemented given the uncertainties surrounding bone generation in this patient. The patient demonstrated rapid improvement in reaching developmental milestones, resolution and improvement in sleep apnea. He progressed to treatment for bone marrow transplant.

CONCLUSIONS: This is the first report of distraction osteogenesis in a patient with osteopetrosis. The characteristics of osteopetrosis including osteoclast dysfunction, absence of appropriate bone remodeling, bone deformation, sclerosis and fracture, are factors that could complicate distraction osteogenesis which requires guided generation of functional bone during a specified time window. However, craniofacial distraction was successful in this case with attainment of the desired vault expansion stabilized by adequate bone formation. The osteopetrosis patient with craniosynostosis presents a treatment dilemma where the timing of vault surgery must be balanced against that for curative BMT that can reverse many of the bone phenotypes over the course of months to years. In this case vault expansion was urgent at presentation, but early diagnosis and BMT might obviate the need for surgical intervention in the future.

261 MANDIBULAR VOLUMETRIC INCREASE FOLLOWING DISTRACTION OSTEOSGENESIS.

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BACKGROUND & PURPOSE: Mandibular distraction osteogenesis (MDO) for the treatment of Pierre Robin sequence (PRS) enables mandibular lengthening and improves airway and feeding function. It remains unknown how the post-distracted mandibular volume compares to a normal control population. The aim of this study was to analyze mandibular volume and symmetry following bilateral MDO and compare post-distraction measurements to a non-distracted, normal age- and sex-matched control cohort.

METHODS: Demographic information and three-dimensional-computed tomographic (CT) images were obtained from normal control and distracted PRS patients. Mandibular volume and symmetry indices were calculated and results statistically analyzed. P values ≤ 0.05 were considered statistically significant.

RESULTS: 24 CT scans and 48 hemimandibles were analyzed (8 control patients: mean age = 5.6 months, 3 females; 8 distracted patients: mean age post-distraction = 1.8 months, mean age post-distraction = 5.3 months, 3 females). No complications were encountered in the distracted group. The mean pre- and post-distraction volume in the MDO group measured 7238.1 mm3 and 15360.6 mm3, respectively (P = 0.0003) and the mean percent increase in mandibular volume following distraction was 113.3%. The mean symmetry index increased after distraction from 0.91 to 0.95 (P = 0.31). Matched normal control mandibles measured 13488.6 mm3 versus post-distraction mandibles at 15360.6 mm3 (P = 0.40). Normal control and post-distraction symmetry indices were 0.99 and 0.95, respectively (P = 0.68).

CONCLUSIONS: Distraction resulted in a significantly increased mandibular volume and an observed preservation in mandibular symmetry. Post-distraction volume was increased compared to normal controls but remained less symmetrical.
ARE POSTOPERATIVE DRAINS AND CIRCUMFERENTIAL HEAD WRAPS NECESSARY AFTER CRANIAL VAULT RECONSTRUCTION?

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BACKGROUND & PURPOSE: The use of closed suction drains and circumferential head wraps after cranial vault reconstruction is currently based on physician preference and is the accepted standard of practice. This method of dressing and drain use adds to operative time, nursing care and may prolong hospital stay. This study evaluates postoperative outcomes with and without the use of surgical drains or head wraps in pediatric cranial vault reconstruction patients.

METHODS: Two hundred and thirty cranial vault reconstructions from 2006-2013 were retrospectively reviewed. Outcomes included postoperative complications and length of hospital stay. Mean lengths of stay and complication rates were evaluated with student t-test and chi-square, respectively. Patients were also divided into 4 groups (1, no drain or head wrap; 2, head wrap only; 3, drain only; 4, both drain and head wrap) and analyzed with ANOVA, comparing length of stay and complications.

RESULTS: Overall length of stay for all patients was 3.46 (±1.07) days. Closed suction drain use resulted in a longer stay then without a drain (3.66 ±0.90 days) vs 2.86 ±1.34 days) (p=0.00). Patients with a circumferential head wrap had a longer length of stay compared to no wrap (3.74 ±0.89 vs 3.09 ±1.19 days) (p=0.00). Length of stay for the 4 groups of patients were as follows: Group 1: 2.94 ±1.36 days, Group 2: 2.16 ±0.98 days, Group 3: 3.24 ±0.97 days, Group 4: 3.82 ±0.81 days. Patients with both a drain and head wrap (Group 4) were in the hospital 0.57 to 1.66 days longer than all other groups (p=0.00). Use of a drain only was found to have a shorter hospital stay compared to a head wrap only (p=0.013). The overall postoperative complication rate was 1.7% with no significant difference in complication rates between groups.

CONCLUSIONS: These results suggest no clear benefit with the use of a closed suction drain or circumferential head wrap after cranial vault reconstruction. Refraining from drain and dressing use may shorten length of hospital stay.

EFFECT OF LOUDNESS VARIATION ON VELOPHARYNGEAL FUNCTION IN CHILDREN WITH 22Q11.2 DELETION SYNDROME: A PRELIMINARY REPORT

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BACKGROUND & PURPOSE: Many children with 22q11.2 deletion syndrome (22qDS) exhibit velopharyngeal dysfunction (VPD) that persists after surgical intervention. The purpose of this study was to use pressure-flow testing to examine the effect of loudness on the extent and timing of VP closure during speech for children with 22qDS and mild symptoms of VPD. Hypotheses were formulated based on previous studies of individuals achieving greater VP gap closure under increased speaking effort (Fox & Boliek, 2012; McHenry, 2007).

METHODS: A single-case A-B design was utilized. Three females (ages 6, 6, and 14) with 22qDS underwent aeromechanical assessment of VP function and were cued to repeat words at their habitual then at an increased loudness level. Intraoral pressure, nasal airflow, VP orifice area, and duration of the nasal airflow pulse were measured across four stimuli (/p/, /pa/, "hamper," and "I have a hamper"). Descriptive statistics and graphical measures were used to examine differences in VP orifice size and the timing of VP closure in the habitual vs. loud condition.

RESULTS: In general, the extent and variability of VP closure improved for Participant 1 and worsened for Participant 3 across stimuli in the loud condition. For the stimulus "I have a hamper," median VP gap size decreased by 5.8 mm2 for Participant 1. Participants 1 and 3 demonstrated a decrease in median duration of nasal airflow during "hamper" in the loud condition (decreases of 60 and 45 milliseconds, respectively). No trends in the extent and timing of VP closure were observed for Participant 2 potentially due to VP surgical history and/or fluctuating nasal airway resistance.

CONCLUSIONS: This pilot study is the first to examine the effect of loudness on VP function in the 22qDS pediatric population and presents new aerodynamic information regarding the plasticity of VP physiology in this group. Implications for behavioral speech treatment as an adjunct to surgical management of VPD in 22qDS, limitations of the study, and suggestions for future research will be discussed.
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As of March 12, 2014, the following companies/organizations had registered to exhibit at our annual meeting. Those companies that are deserving of special recognition for providing educational sponsorship and support for this meeting have their listings bolded. Please take time to visit the exhibitors and thank them for their interest in participating in our meeting.

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www.biometmicrfixation.com
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www.canfieldsci.com
Canfield is the leading developer of clinical imaging systems for plastic surgery, dermatology, medical research, and skin care.

Dr. Brown’s Medical by Handi-Craft Company
4433 Fyler Avenue • St. Louis, MO 63116
Tel: 314.773.2979
www.drbrownbaby.com/medical
At Dr. Brown’s, we pride ourselves on creating research-based products that benefit babies, moms, and medical professionals. For years we have worked to perfect our bottles and nipples. As we’ve grown, we have continued to develop products in partnership with medical experts like pediatric dentists, lactation consultations, and nutritionists. Our pacifiers, breastfeeding products, and infant feeding line were all developed with the same care, research, and attention to detail that made Dr. Brown’s what it is today.

DynaCleft® by Canica Design, Inc.
36 Mill Street • Almonte, Ontario, K0A 1A0 CANADA
Tel: 613.256.0350
www.dynacleft.com
DynaCleft® is the clinically-proven, non-invasive method of pre-surgically reducing cleft lip and palate for an easier first repair surgery and best possible surgical results.

Elsevier
1600 John F. Kennedy Boulevard, Suite 1800
Philadelphia, PA 19103
Tel: 215.239.3722
www.elsevierhealth.com
Elsevier is a leading publisher of health science publications, advancing medicine by delivering reference information and decision support tools to doctors, health practitioners, and students.

KLS Martin
PO Box 16369 • Jacksonville, FL 32245
Tel: 904.641.7746
www.klsmartin.com
KLS Martin is a company dedicated to producing innovative medical devices for craniofacial surgery including surgical instruments, distraction osteogenesis devices, and power systems.

Medical Modeling
17301 W. Colfax Avenue, Ste 300
Golden, CO 80401
Tel: 888.273.5344
www.medicalmodeling.com
Medical Modeling specializes in patient-specific surgical solutions. Our use of additive manufacturing to create precise surgical planning models of your patient’s anatomy helps provide more confidence for complex reconstructive surgeries. Specializing in Virtual Surgical Planning (VSP®) and production of models, guides, and templates to transfer a digital pre-surgical plan to the operating room. Especially relevant is our VSP® work in reconstruction where we provide solutions for maxilla and mandible reconstruction, distraction, and trauma. Stop by our booth to learn more about our unique product offerings.

Nationwide Children’s Hospital
700 Children’s Drive • Columbus, OH 43205
Tel: 614.355.0884
www.nationwidechildrens.org
The Cleft Lip and Palate Center at Nationwide Children’s Hospital offers children and their families comprehensive care from a multi-disciplinary team of nationally recognized clinicians.

Orthomerica Products
6333 North Orange Blossom Trail, Suite 220
Orlando, FL 32810
Tel: 407.290.6592
www.orthomerica.com
Orthomerica received FDA clearance for the STAR Family of cranial remodeling orthoses for post-operative Craniosynostosis. Thousands of infants have been successfully treated with the STARband.
OsteoMed
3885 Arapaho Rd. • Addison, TX 75001
Tel: 912.677.4735
www.osteomed.com
A highly nimble and responsive company, OsteoMed is a leading global innovator, developer, manufacturer and marketer of specialty medical devices, surgical implants and powered surgical instruments.

PENTAX MEDICAL
3 Paragon Drive • Montvale, NJ 07645
Tel: 800.289.5297
www.kaypentax.com
PENTAX Medical offers a full line of imaging and clinical assessment products for ENT and Speech, including high-definition digital stroboscopy and endoscopy systems. Piezosurgery, Incorporated. 850 Michigan Ave., Columbus, OH 43215 Tel: 888.877.4396 www.piezosurgery.us Piezosurgery® by Mectron features both the Piezosurgery®3 and Piezosurgery® Touch ultrasonic surgery systems, which are specifically designed for osseous surgical applications to deliver incredible precision and safety.

Piezosurgery Incorporated
850 Michigan Avenue • Columbus, OH 43215
Tel: 888.877.4396
www.piezosurgery.us
For more than a decade, the Piezosurgery name has been recognized the world over as the leader in ultrasonic technology for osseous surgery.

Shriners Hospitals for Children – Chicago
2211 N. Oak Park Avenue • Chicago, IL 60707
Tel: 773.385.KIDS(5437)
www.shrinershospitalsforchildren.org
At Shriners Hospitals for Children®, Chicago our expert physicians treat children up to age 18 with orthopaedic conditions, spinal cord injuries, and cleft lip and palate. They are eligible for care and receive all services in a family-centered environment, regardless of the patients’ ability to pay. To make a referral call 1-773-385 KIDS(5437).

3dMD
3200 Cobb Galleria Parkway #203 • Atlanta, GA 30339
Tel: 770.612.8002
www.3dMD.com
3dMD provides high-precision, ultra-fast 3D and 4D facial and craniofacial surface imaging systems and sophisticated 3D image-fusion software for patient measurement, evaluation planning, and outcome simulation scenarios.

The American Cleft Palate-Craniofacial Association extends a Special Thank You to:
KLS Martin Group, Jacksonville, FL • Medical Modeling Inc., Golden, CO • Pentax Medical, Montvale, NJ
Mohammad Mazaheri, MDD, MSc, Lancaster, PA • Nationwide Children’s Hospital, Columbus, OH • Stryker, Portage, MI
for their support at this year’s meeting.

Disclaimer: While the above information is believed to be accurate, neither ACPA, CPF nor the National Office staff accept responsibility for any errors or omissions. ACPA and CPF do not endorse any product or service with respect to the above listed exhibitors.
PLEASE NOTE: Rooms are subject to change at the hotel's discretion. Please check at the registration desk or listen for announcements of room changes.

<table>
<thead>
<tr>
<th>SUNDAY, MARCH 21</th>
<th>TIME</th>
<th>FUNCTION</th>
<th>ROOM</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>4:00PM-7:00PM</td>
<td>Registration</td>
<td>Marriott Foyer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Speaker Ready Room</td>
<td>Phoenix</td>
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<thead>
<tr>
<th>MONDAY, MARCH 24</th>
<th>TIME</th>
<th>FUNCTION</th>
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<tbody>
<tr>
<td></td>
<td>7:30AM-5:30PM</td>
<td>Registration</td>
<td>Marriott Foyer</td>
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<tr>
<td></td>
<td></td>
<td>Speaker Ready Room</td>
<td>Phoenix</td>
</tr>
<tr>
<td></td>
<td>9:00AM-5:30PM</td>
<td>Pre-Con Symposium I: Facial Asymmetries</td>
<td>Marriott 6</td>
</tr>
<tr>
<td></td>
<td>10:30AM-11:00AM</td>
<td>Symposium Coffee Break</td>
<td>Marriott Foyer</td>
</tr>
<tr>
<td></td>
<td>12:30PM-2:00PM</td>
<td>Lunch Break (On Your Own)</td>
<td>Marriott Foyer</td>
</tr>
<tr>
<td></td>
<td>3:30PM-4:00PM</td>
<td>Symposium Coffee Break</td>
<td>Marriott Foyer</td>
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<table>
<thead>
<tr>
<th>TUESDAY, MARCH 25</th>
<th>TIME</th>
<th>FUNCTION</th>
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<tr>
<td></td>
<td>7:30AM-7:30PM</td>
<td>Registration</td>
<td>Marriott Foyer</td>
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<tr>
<td></td>
<td></td>
<td>Speaker Ready Room</td>
<td>Phoenix</td>
</tr>
<tr>
<td></td>
<td>8:00AM-12:00PM</td>
<td>Primer on Team Care</td>
<td>Marriott 3-4</td>
</tr>
<tr>
<td></td>
<td>8:00AM-11:45AM</td>
<td>Pre-Con Symposium I: Facial Asymmetries</td>
<td>Marriott 6</td>
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<tr>
<td></td>
<td>10:00AM-10:30AM</td>
<td>Symposium Coffee Break</td>
<td>Marriott Foyer</td>
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<tr>
<td></td>
<td>12:30PM-2:00PM</td>
<td>Lunch Break (On Your Own)</td>
<td>Marriott Foyer</td>
</tr>
<tr>
<td></td>
<td>12:00PM-1:00PM</td>
<td>Primer on Team Care Lunch (Optional)</td>
<td>Marriott 2</td>
</tr>
<tr>
<td></td>
<td>12:00PM-1:30PM</td>
<td>ACPA/CPF Committee Chairs Meeting/Luncheon</td>
<td>Santa Fe</td>
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<tr>
<td></td>
<td>3:00PM-5:00PM</td>
<td>Exhibit Move-In</td>
<td>Marriott Foyer</td>
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ACPA and CPF Committee Meetings

<table>
<thead>
<tr>
<th>TIME</th>
<th>FUNCTION</th>
<th>ROOM</th>
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<tbody>
<tr>
<td>1:30PM-3:30PM</td>
<td>International Outreach</td>
<td>Santa Fe</td>
</tr>
<tr>
<td>1:30PM-3:30PM</td>
<td>American Left</td>
<td>Marriott 8</td>
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<tr>
<td>1:30PM-2:00PM</td>
<td>CPF DPMF</td>
<td>Austin</td>
</tr>
<tr>
<td>1:30PM-3:00PM</td>
<td>CPF Publications</td>
<td>Marriott 7</td>
</tr>
<tr>
<td>1:30PM-2:30PM</td>
<td>Archives</td>
<td>Boston</td>
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<tr>
<td>1:30PM-3:00PM</td>
<td>Parameters</td>
<td>Columbus</td>
</tr>
<tr>
<td>2:00PM-3:30PM</td>
<td>CPF Scholarship</td>
<td>Austin</td>
</tr>
<tr>
<td>2:30PM-3:30PM</td>
<td>Ethics</td>
<td>Boston</td>
</tr>
<tr>
<td>3:00PM-3:30PM</td>
<td>CPF Awards</td>
<td>Marriott 7</td>
</tr>
</tbody>
</table>

3:30PM-4:00PM | Committee Coffee Break                      | Marriott Foyer 1-4 |

ACPA and CPF Committee Meetings (Cont.)

<table>
<thead>
<tr>
<th>TIME</th>
<th>FUNCTION</th>
<th>ROOM</th>
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<tbody>
<tr>
<td>4:00PM-5:30PM</td>
<td>Education</td>
<td>Santa Fe</td>
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<td>4:00PM-5:00PM</td>
<td>ACPA Membership</td>
<td>Boston</td>
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<tr>
<td>4:00PM-6:00PM</td>
<td>CPF Research Grants</td>
<td>Austin</td>
</tr>
<tr>
<td>4:00PM-5:00PM</td>
<td>CPF Task Force on Adult Care</td>
<td>Columbus</td>
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<tr>
<td>4:30PM-6:00PM</td>
<td>ACPA Data Standards</td>
<td>Marriott 8</td>
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<tr>
<td>4:30PM-5:30PM</td>
<td>Journal Advisory</td>
<td>Marriott 7</td>
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<tr>
<td>5:30PM-6:30PM</td>
<td>ACPA Organizational Alliances</td>
<td>Marriott 7</td>
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<tr>
<td>5:30PM-6:30PM</td>
<td>Task Force on Models of TC</td>
<td>Columbus</td>
</tr>
<tr>
<td>5:00PM-6:00PM</td>
<td>ACPA Honors &amp; Awards</td>
<td>Boston</td>
</tr>
<tr>
<td>5:30PM-6:30PM</td>
<td>ACPA New Member Orientation</td>
<td>Santa Fe</td>
</tr>
<tr>
<td>6:30PM-8:30PM</td>
<td>Welcoming Reception</td>
<td>Marriott 5</td>
</tr>
<tr>
<td></td>
<td>Cash Bar/Hors d’oeuvres</td>
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</tbody>
</table>
## Summary of Events

### Wednesday, March 26

<table>
<thead>
<tr>
<th>Time</th>
<th>Function</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:30AM-6:30PM</td>
<td><strong>REGISTRATION</strong></td>
<td>Marriott Foyer</td>
</tr>
<tr>
<td></td>
<td>Speaker Ready Room</td>
<td>Phoenix</td>
</tr>
<tr>
<td>7:00AM-8:00AM</td>
<td><strong>EYE OPENERS — GROUP I</strong></td>
<td>Marriott 1</td>
</tr>
<tr>
<td></td>
<td><strong>COURSE 1 (COMMISSION ON APPROVAL OF TEAMS)</strong></td>
<td>Marriott 2</td>
</tr>
<tr>
<td></td>
<td><strong>COURSE 2 (JOURNAL MANUSCRIPT)</strong></td>
<td>Marriott 3</td>
</tr>
<tr>
<td></td>
<td><strong>COURSE 3 (AMERICAN LEFT PROJECT)</strong></td>
<td>Marriott 4</td>
</tr>
<tr>
<td>7:30AM-8:20AM</td>
<td><strong>PAST PRESIDENTS’ BREAKFAST</strong></td>
<td>Denver</td>
</tr>
<tr>
<td></td>
<td>Open to past and present ACPA/CPF Presidents</td>
<td>Marriott 6</td>
</tr>
<tr>
<td>7:00AM-5:00PM</td>
<td><strong>EXHIBITS</strong></td>
<td>Marriott 7</td>
</tr>
<tr>
<td>7:00AM-1:00PM</td>
<td><strong>POSTER SESSION A</strong></td>
<td>Marriott 8</td>
</tr>
<tr>
<td>8:30AM-9:00AM</td>
<td><strong>OPENING CEREMONIES — CELEBRATE THE WONDER</strong></td>
<td>Marriott 9</td>
</tr>
<tr>
<td>9:00AM-10:00AM</td>
<td><strong>KEYNOTE SESSION: RJ PALACIO</strong></td>
<td>Marriott 10</td>
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<tr>
<td>10:00AM-10:30AM</td>
<td><strong>EXHIBITS, COFFEE BREAK</strong></td>
<td>Marriott 11</td>
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<tr>
<td>10:30AM-12:30PM</td>
<td><strong>GENERAL SESSION I</strong></td>
<td>Marriott 12</td>
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<tr>
<td>12:30PM-2:00PM</td>
<td><strong>LUNCH BREAK (ON YOUR OWN)</strong></td>
<td>Marriott 13</td>
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<tr>
<td>1:30PM-6:30PM</td>
<td><strong>POSTER SESSION B</strong></td>
<td>Marriott 14</td>
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<tr>
<td>2:00PM-3:30PM</td>
<td><strong>GENERAL SESSION II: MEASURING OUTCOMES</strong></td>
<td>Marriott 15</td>
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<tr>
<td>3:30PM-4:00PM</td>
<td><strong>EXHIBITS, COFFEE BREAK</strong></td>
<td>Marriott 16</td>
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<tr>
<td>4:00PM-6:00PM</td>
<td><strong>DISCIPLINE FORUMS</strong></td>
<td>Marriott 17</td>
</tr>
<tr>
<td></td>
<td>• GENETICS/EDiatrics</td>
<td>Columbus</td>
</tr>
<tr>
<td></td>
<td>• MENTAL HEALTH</td>
<td>Denver</td>
</tr>
<tr>
<td></td>
<td>• NURSING/COORDINATION</td>
<td>Marriott 18</td>
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<tr>
<td></td>
<td>• ORAL-MAXILLOFACIAL SURGERY</td>
<td>Lincoln</td>
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<tr>
<td></td>
<td>• ORTHODONTICS/PROSTHODONTICS</td>
<td>Marriott 19</td>
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<td></td>
<td>• OTOLARYNGOLOGY</td>
<td>Marriott 20</td>
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<tr>
<td></td>
<td>• PEDIATRIC DENTISTRY</td>
<td>Austin</td>
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<tr>
<td></td>
<td>• PLASTIC SURGERY</td>
<td>Marriott 21</td>
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<tr>
<td></td>
<td>• RESEARCH</td>
<td>Boston</td>
</tr>
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<td></td>
<td>• SPEECH-LANGUAGE PATHOLOGY/AUDIOLOGY</td>
<td>Marriott 22</td>
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<tr>
<td>6:00PM-7:00PM</td>
<td><strong>VOYAGE OF DISCOVERY THROUGH LEADERSHIP</strong></td>
<td>Santa Fe</td>
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<tr>
<td>7:30PM-10PM</td>
<td><strong>CPF’S “GOOD SPORTS EVENT”</strong></td>
<td>NCAA HALL OF CHAMPIONS</td>
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</table>

### Thursday, March 27

<table>
<thead>
<tr>
<th>Time</th>
<th>Function</th>
<th>Room</th>
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<tbody>
<tr>
<td>6:30AM-6:00PM</td>
<td><strong>REGISTRATION</strong></td>
<td>Marriott 23</td>
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<tr>
<td></td>
<td>Speaker Ready Room</td>
<td>Phoenix</td>
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<tr>
<td>7:00AM-8:00AM</td>
<td><strong>EYE OPENERS — GROUP II</strong></td>
<td>Marriott 24</td>
</tr>
<tr>
<td></td>
<td><strong>COURSE 5 (SPEECH OUTCOME DATA)</strong></td>
<td>Utah</td>
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<td><strong>COURSE 6 (SPEECH THERAPY: STRATEGIES FOR VPD CORRECTION)</strong></td>
<td>Santa Fe</td>
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<td></td>
<td><strong>COURSE 7 (PRENATAL CLEFT COUNSELING FOR BEGINNERS)</strong></td>
<td>Columbus</td>
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<td><strong>COURSE 8 (PLAY-BASED THERAPY FOR REDUCING COMPENSATORY ARTICULATION)</strong></td>
<td>Lincoln</td>
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<td><strong>COURSE 9 (SYNDROMIC VS NONSYNDROMIC CLEFTING: ROLE OF GENETICS)</strong></td>
<td>Denver</td>
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<td><strong>COURSE 10 (ESSENTIAL ELEMENTS OF MULTI-SITE NURSING RESEARCH)</strong></td>
<td>Austin/Boston</td>
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<tr>
<td>7:00AM-5:00PM</td>
<td><strong>EXHIBITS</strong></td>
<td>Marriott 25</td>
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<td>7:00AM-6:00PM</td>
<td><strong>POSTER SESSION C</strong></td>
<td>Marriott 26</td>
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<tr>
<td>8:00AM-10:00AM</td>
<td><strong>JUNIOR INVESTIGATOR SESSION</strong></td>
<td>Marriott 27</td>
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<td>10:00AM-10:30AM</td>
<td><strong>JUNIOR INVESTIGATOR AWARD PANEL MEETING</strong></td>
<td>Denver</td>
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<tr>
<td>10:00AM-10:30AM</td>
<td><strong>EXHIBITS, COFFEE BREAK</strong></td>
<td>Marriott 28</td>
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</table>
THURSDAY, MARCH 27 — (CONTINUED)

10:30AM-11:45AM  POSTER SESSION C  Denver Foyer
12:00PM-2:00PM  ACPA/CPF ANNUAL AWARDS LUNCHEON  Marriott 5
2:30PM-4:00PM  SHORT COURSES — GROUP I
COURSE A (INTRO TO FEEDING & SWALLOWING CONCERNS)  Santa Fe
COURSE B (ESTABLISHING MENTAL HEALTH SERVICES ON CF TEAM)  Marriott 7
COURSE C (UNILATERAL CLEFT LIP REPAIR)  Denver
COURSE D (ORTHOPEDIC AND ORTHODONTIC TREATMENT)  Utah
COURSE E (CLEFT ORTHOGNATHIC SURGERY)  Marriott 8
COURSE F (MEDICAL MANAGEMENT & SURVEILLANCE PROTOCOLS)  Austin/Boston
COURSE G (PSYCHO-SOCIAL: IMPROVING OUTCOMES)  Marriott 9
COURSE H (SURGICAL MANAGEMENT OF VPD IN 22Q FOR SURGEON & SLP)  Lincoln
COURSE I (LINKING BRIDGE BTW VIRTUAL & ACTUAL ORTHOGNATHIC SURGERY)  Columbus
COURSE J (PLASTIC SURGERY FOR THE REST OF THE TEAM)  Marriott 10
4:00PM-4:30PM  EXHIBITS, COFFEE BREAK  Marriott Foyer
4:30PM-6:00PM  SHORT COURSES — GROUP II
COURSE K (FURLOW PALATOPLASTY: SURGICAL TECHNIQUE & OUTCOMES)  Austin/Boston
COURSE L (SPEECH EVALUATION, THERAPY & COLLABORATIONS)  Denver
COURSE M (DENTAL & ORTHO PREPARATION FOR SECONDARY ABG SURGERY)  Marriott 7
COURSE N (CARE OF CHILD WITH CLEFT: PRENATAL DIAGNOSIS TO FIRST YEAR)  Santa Fe
COURSE O (ADVANCED SKILLS FOR MENTAL HEALTH PROVIDERS ON CF TEAMS)  Marriott 10
COURSE P (NASOGLOVELOAR MOLDING AND COLUMELLA ELONGATION)  Marriott 8
COURSE Q (TECHNIQUE OF PALATE REPAIR)  Marriott 9
COURSE R (PIERRE ROBIN: FEEDING MANAGEMENT ACROSS INTERVENTIONS)  Utah
COURSE S (MANAGING PATIENTS WITH COPY NUMBER VARIANTS/22Q)  Columbus
COURSE T (A KEEN EYE TOWARDS EFFECTIVE TEAM COORDINATION)  Lincoln
7:30PM-10:00PM  71ST ANNUAL GALA — A NIGHT OF WONDER  Indiana Roof Ballroom

FRIDAY, MARCH 28

7:00AM-5:30PM  REGISTRATION  Marriott Foyer
7:00AM-8:00AM  ASCFS BREAKFAST  Marriott 1-2
8:00AM-12:00PM  POSTER SESSION D  Denver Foyer
7:00AM-5:00PM  EXHIBITS  Marriott Foyer
8:00AM-9:00AM  CONCURRENT SESSION A: ASCFS LINTON WHITAKER LECTURE  Marriott 6
CONCURRENT SESSION B: ALVEOLAR BONE GRAFT PANEL  Marriott 5
CONCURRENT SESSION C: BARRIERS TO CLEFT CARE PANEL  Marriott 7-8
CONCURRENT SESSION D: IMPROVING MEDICAL ADHERENCE  Marriott 9-10
9:00AM-10:00AM  ACPA ANNUAL BUSINESS MEETING (MEMBERS ONLY)  Marriott 6
10:00AM-10:30AM  EXHIBITS, COFFEE BREAK  Marriott Foyer
10:30AM-12:00PM  CONCURRENT SPECIALTY SESSIONS (GROUP 1)
CONCURRENT 1 (ASCF  PART I)  Marriott 6
CONCURRENT 2 (CLEFT LIP AND PALATE SURGERY)  Marriott 5
CONCURRENT 3 (PERSPECTIVES)  Marriott 9-10
CONCURRENT 4 (SPEECH)  Marriott 3-4
CONCURRENT 5 (PIERRE ROBIN SEQUENCE)  Marriott 7-8
12:00PM-1:30PM  LUNCH (ON YOUR OWN)  Marriott 1-2
### FRIDAY, MARCH 28 — (CONTINUED)

<table>
<thead>
<tr>
<th>Time</th>
<th>Function</th>
<th>Room</th>
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<tbody>
<tr>
<td>12:00PM-3:00PM</td>
<td>SECOND ACFA COUNCIL MEETING/LUNCHEON</td>
<td>Denver</td>
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<tr>
<td>1:00PM-5:30PM</td>
<td>POSTER SESSION E</td>
<td>Denver Foyer</td>
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<tr>
<td>1:30PM-3:00PM</td>
<td>CONCURRENT SPECIALTY SESSIONS (GROUP 2)</td>
<td>Marriott 6</td>
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<td></td>
<td>CONCURRENT 6 (ASCFS PART II)</td>
<td>Marriott 5</td>
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<td>CONCURRENT 7 (ALVEOLAR BONE GRAFTS)</td>
<td>Marriott 9-10</td>
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<td>CONCURRENT 8 (CRANIOFACIAL BIOLOGY)</td>
<td>Marriott 3-4</td>
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<td>CONCURRENT 9 (PSYCHOSOCIAL)</td>
<td>Marriott 7-8</td>
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<tr>
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<td>CONCURRENT 10 (SYNDROMES)</td>
<td>Marriott 7-8</td>
</tr>
<tr>
<td>3:00PM-3:30PM</td>
<td>EXHIBITS, COFFEE BREAK</td>
<td>Marriott Foyer</td>
</tr>
<tr>
<td>3:30PM-5:00PM</td>
<td>CONCURRENT SPECIALTY SESSIONS (GROUP 3)</td>
<td>Marriott 6</td>
</tr>
<tr>
<td></td>
<td>CONCURRENT 11 (CRANIOSYNOSTOSIS)</td>
<td>Marriott 5</td>
</tr>
<tr>
<td></td>
<td>CONCURRENT 12 (SPEECH SURGERY/VPD)</td>
<td>Marriott 9-10</td>
</tr>
<tr>
<td></td>
<td>CONCURRENT 13 (DEFORMATIONAL PLAGIOCEPHALY)</td>
<td>Marriott 3-4</td>
</tr>
<tr>
<td></td>
<td>CONCURRENT 14 (NURSING)</td>
<td>Marriott 7-8</td>
</tr>
<tr>
<td></td>
<td>CONCURRENT 15 (NAM/ORTHODONTICS)</td>
<td>Marriott 7-8</td>
</tr>
</tbody>
</table>

### SATURDAY, MARCH 29

<table>
<thead>
<tr>
<th>Time</th>
<th>Function</th>
<th>Room</th>
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<tbody>
<tr>
<td>7:00AM-5:30PM</td>
<td>REGISTRATION</td>
<td>Marriott Foyer</td>
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<tr>
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<td>SPEAKER READY ROOM</td>
<td>Phoenix</td>
</tr>
<tr>
<td>8:00AM-10:00AM</td>
<td>CONCURRENT SESSION E: ETIOLOGY, OUTCOMES, QUALITY OF CARE II</td>
<td>Marriott 6</td>
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<tr>
<td></td>
<td>CONCURRENT SESSION F: ASCFS SYNOSTOSIS TREATMENT PANEL</td>
<td>Marriott 5</td>
</tr>
<tr>
<td>10:15AM-10:45AM</td>
<td>COFFEE BREAK</td>
<td>Marriott Foyer</td>
</tr>
<tr>
<td>10:30AM-12:00PM</td>
<td>CLOSING GENERAL SESSION: BACK OF THE BOOK</td>
<td>Marriott 6</td>
</tr>
<tr>
<td>8:00AM-5:00PM</td>
<td>POST-CONFERENCE SYMPOSIUM: IT TAKES A TEAM!- CARING FOR THE INDIVIDUAL WITH CLEFT LIP AND PALATE — FOR ORTHODONTIST AND SPEECH-LANGUAGE PATHOLOGISTS</td>
<td>Marriott 7-8</td>
</tr>
<tr>
<td>12:00PM-1:00PM</td>
<td>IT TAKES A TEAM! LUNCHEON</td>
<td>Marriott 9-10</td>
</tr>
<tr>
<td>3:30PM-4:00PM</td>
<td>BREAK (FOR BOTH SPEECH AND ORTHODONTICS SESSIONS)</td>
<td>Marriott Foyer</td>
</tr>
<tr>
<td>1:00PM-5:00PM</td>
<td>IT TAKES A TEAM — ORTHODONTICS</td>
<td>Marriott 8</td>
</tr>
<tr>
<td></td>
<td>IT TAKES A TEAM - SPEECH</td>
<td>Marriott 7</td>
</tr>
</tbody>
</table>