ANNOUNCEMENTS

ASCFS/ASMS Craniofacial Boot Camp for Fellows
August 5-6, 2016
Phoenix, Arizona

ASMS Summer Basic Course
August 19-21, 2016
Chicago, Illinois

ASMS Pediatric Symposia (see program on page 14)
August 26-28, 2016
Pittsburgh, Pennsylvania

ASMS at ASPS
Pre-Conference Symposium: Why do you do it that way? Examining the Evidence in Craniomaxillofacial Surgery
September 22, 2016
ASMS Day
September 25, 2016
Los Angeles, California

ASCFS/ASPN Joint Symposium
January 23-25, 2017
Maui, Hawaii

Do you have a meeting, event, or announcement you would like to share with your colleagues? Use this space to spread the word! Please send us your notices, upcoming meetings, and news from your institutions; anything of interest to your colleagues.
The Journal of the American Society of Maxillofacial Surgeons

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Editor’s Update

This is the second issue of the Journal of the American Society of Maxillofacial Surgeons (JASMS). The February 2016 issue was greeted with 2,633 downloads from the ASMS website (http://www.maxface.org)—a tribute to all of you who shared the launch of the Journal with colleagues and friends.

In this issue, I would like to call your attention to a new addition to the Journal, an Ethics Corner, hosted by Dr. Christian Vercler. The purpose of this series is to highlight potential ethical dilemmas that Plastic Surgeons around the country may face. In the current issue, an article written by John Sherman, Briar Dent, and Christian Vercler, focuses on New York State legislation that has come to be known as the Surprise Law. This bill, which went into effect on March 31, 2015, is aimed at “egregious over-billing by out-of-network physicians.” The law protects patients from surprise, over-billing.

The second ASMS webinar, entitled “Orthognathic Surgery in the Cleft Patient,” and hosted by Drs. Donald Mackay and Jack Yu, was held on March 29, 2016. In this webinar, these ASMS leaders address the basic principles of preparing and executing orthognathic surgery in patients with clefts. Dr. Joe Williams has done an excellent job putting the information together for publication (the actual webinar is available online at http://www.maxface.org/). Please also look for the June 2, 2016 webinar on Frontal Sinus Fractures hosted by Dr. Peter Taub.

I would also like to highlight Dr. Jack Yu’s article about the use of finite element analysis in decision-making for a patient with an occipital encephalomeningocele. In the paper, Dr. Yu follows a single patient from birth to 12-years-of-age, and demonstrates the power of FEA in predicting the forces required during banding of the skull to prepare the child for surgical correction of the skull defect using bone grafts.

As many of you know, the Journal is currently not indexed, meaning that articles published do not appear in PubMed or other online citation sources. Given this situation, the Journal is interested in articles that are similar to Dr. Yu’s: an interesting topic, innovative, the kernel of an idea, but mature enough to put into print. As we move toward indexing the Journal, we should all consider publishing in our Journal. Please send articles to Lorraine O’Grady at logrady@prri.com.

We look forward to including your submissions in future editions of the “Green” Journal.
The ASMS is a tremendous organization, largely due to the initiative and enthusiasm of its members and leaders. What distinguishes the organization is that while it has long been the premier organization to represent Craniofacial Surgery in the USA, the organization does not rest on its laurels, but rather continues to push the frontiers of education, research, and advocacy in the specialty. To further the advocacy arm of the ASMS, we have made a formal request to the American College of Surgeons (ACS) that the ASMS become a recognized society within the College and have a seat on the Board of Governors of the ACS. We are pleased to announce that the ACS has accepted this request, making the ASMS one of 4 organizations in Plastic Surgery with representation on the ACS Board of Governors. The letter of request to the ACS Board of Governors provides a summary of the state of the ASMS today, highlighting the accomplishments the organization has made to develop as a pioneer in maxillofacial research, education, and advocacy. I wish to acknowledge the authors of the following publication from which much of the prior history of the ASMS has been drawn: Cohen MN, Evans GR, Wexler A, Thaller SR, Sadove AM. American Society of Maxillofacial Surgeons, 1997 to 2006: another decade of excellence in education and research. Plast Reconstr Surg. 118(5S):32S-42S, 2006. The ASMS remains such a dynamic society that there has been remarkable progress by each of the major committees within our organization, as well as the development of new task forces that have been initiated in the ten years since the last ASMS history was published. Many of these developments are summarized in my letter to the ACS. So as to remain current, Drs. Doumit, Schubert, and Wexler are preparing a 10-year update on the history of the ASMS to be submitted as a Special Topic in Plast Reconstr Surg. After reading this letter, I would encourage our members to evaluate those aspects of the ASMS to which each of you feel you can contribute. If you wish to participate in one of the committees described in this article, please contact us through Lorraine O’Grady (logrady@prri.com).

Dear Dr. Michelassi:

I am writing to request that the American Society of Maxillofacial Surgeons (ASMS) be granted a seat on the Board of Governors of the American College of Surgeons.

The ASMS is a professional organization whose mission it is to advance the science and practice of surgery of the facial region and craniofacial skeleton. The organization is involved in education, research, and advocacy on behalf of patients and Maxillofacial Surgeons. The ASMS initiatives focus on problems with facial form and function including congenital craniofacial differences, traumatic facial injuries, reconstruction after head and neck cancer, and abnormalities in occlusion of the jaws. The ASMS currently has 1,091 members. Excluding resident affiliate and international members, 534 of our members are Plastic Surgeons who are engaged in the independent practice of Maxillofacial Surgery in the United States, 77% of whom are also members of the American College of Surgeons.

I believe that the ASMS would be a valuable asset to the ACS to enhance representation by surgeons focused on Maxillofacial and Pediatric Plastic Surgery, which is an essential core of reconstructive plastic surgeons. The ASMS was founded in 1947, and early members were largely dual-trained in dentistry and medicine. With the evolution of Maxillofacial Surgery and Craniofacial Surgery as a key component of Plastic Surgery, the active membership of the society is now comprised of individuals who are certified by the American Board of Plastic Surgery, many of whom also hold dual degrees in Dentistry and Oral Surgery. During its development, the society fostered a relationship with the American Medical Association and the American Society of Plastic and Reconstructive Surgery, and we believe that it would enhance our mission to extend this relationship through further leadership within the ACS.

Education of trainees and peers has been an organizational objective since the inception of the ASMS. A significant portion of the program at the annual meeting of the American Society of Plastic Surgeons is developed by the ASMS, to include a day-long Preconference Symposium that has been given each year since 1998. This symposium provides multi-disciplinary education on topics in the field of Craniofacial Surgery for students, surgeons-in-training, and practicing Plastic and Maxillofacial Surgeons. Two days of the annual meeting are focused on panels and scientific presentations developed by the ASMS Program Committee. These panels include the Kazanjian and Converse lectureships, which are endowed lectureships that invite international leaders in Maxillofacial Surgery and its related specialties. The Kazanjian and Converse lectureships are biennial lectureships that alternate with one another such that a named lectureship is provided by the ASMS each year. The ASMS website (www.maxface.org) provides a list of these speakers, who represent the key leaders that have been instrumental in the evolution of Maxillofacial Surgery. Each year the ASMS hosts a summer Board Meeting open to all members of the Board of Directors, committee chairs, and other select ASMS members identified to be potential leaders within the ASMS based on their history of participation. The annual summer board meeting features a key educational initiative of the ASMS. This initiative consists of either a strategic planning session, held every 4 to 5 years, or an annual leadership seminar. The summer leadership seminar is an interactive format consisting of a panel discussion with recognized experts, for which the topics are selected based on relevance to present and future leaders of the ASMS. In 2015, four recognized authorities in health care organization and management presented the topic, “Navigating the Pressures for Mergers and Acquisitions of Health Care Organizations and the Implications for Career Development of Academic Surgeons.” In 2016, authorities from the American College of Graduate Medical Education (ACGME) and surgical simulation technologies will present the topic, “Training the Next Generation of Surgeons: Development, Supervision, and Assessment of Graded Resident responsibility.”

In addition to its contributions to the annual meeting of the American Society of Plastic Surgeons, the scientific and educational contributions of the ASMS continue throughout the year, and have more recently become accessible to its membership continuously through development of the ASMS website. The following is an overview of key developments...
President's Message (continued from previous page)

committees that promote the ASMS mission of service, education, and research within Maxillofacial Surgery.

**Best Paper Award Committee:** This committee reviews all maxillofacial and craniofacial papers published in the Journal of Plastic and Reconstructive Surgery Journal during the previous calendar year and selects the best clinical and best scientific paper for that year.

**Education Committee:** The Education Committee plans activities for the Society and its members in order to increase their knowledge and skills in the areas of Maxillofacial and Craniofacial Surgery. Educational opportunities offered by the committee on a regular basis include the following:
1. **Basic Maxillofacial Course (Friday-Sunday):** Covers the breadth of maxillofacial surgical principles and techniques, including cephalometric analysis, construction of intra-oral splints for planning of orthognathic surgery and surgery for facial trauma, and rigid fixation techniques for the craniofacial skeleton. The course is offered at least twice per year, rotating the east and west coasts and the mid-west, and is attended by the majority of plastic surgery residents prior to completion of their training.
2. **Advanced courses in Maxillofacial and Pediatric Plastic Surgery (Friday-Sunday):** The committee develops an advanced course each year. Every other year this course is focused on maxillofacial trauma and orthognathic surgery, in which participants perform surgical techniques on cadaver heads. During alternate years a Pediatric Plastic Surgery course or a course focused on global health care for delivery of pediatric and maxillofacial surgery is given, with the inaugural course in Pediatric Plastic Surgery to be offered in August, 2016.
3. **Craniofacial Boot Camp (Friday-Sunday):** The ASMS collaborates with the American Society of Craniofacial Surgery (ASCFS) to provide an overview of the primary techniques in Craniofacial Surgery for craniofacial fellows, in which participants perform surgical techniques on cadaver heads. This is offered annually at the beginning of the academic year so that fellows in Craniofacial Surgery are prepared to make optimal use of their fellowship experience.
4. **Webinars in Maxillofacial Surgery:** The committee offers 4 webinars per year, initiated in 2016. These webinars are one hour in length and are open to general membership. They provide interactive learning formats in select topics in Maxillofacial Surgery, with each topic led by two leaders in the field.

**Educational Grants Committee:** The Educational Grants Committee assists with the implementation and the selection of candidates for fellowships and research grants provided annually.
1. **CRANIO Fellowship:** This fellowship is offered to two individuals annually. The fellowship provides a stipend of $5,000 to each of two faculty members in their first 3 years of practice to allow them to visit select centers of excellence.
2. **World Craniofacial Foundation/ASMS/PSF International Fellowship:** This fellowship is offered to one individual per year with a stipend of $9,000. The fellow is selected from an underserved country and is invited to visit Craniofacial Centers of excellence throughout the USA and Canada. Selection of the fellow is done in collaboration with the Plastic Surgery Foundation (PSF). The World Craniofacial Foundation (WCF) provides funding for the fellowship.
3. **ASMS/MSF and Synthes CMF Maxillofacial Research Grants:** These are grants of $5,000 to $10,000 awarded for maxillofacial research.
4. **ASMS/PSF Combined Research Grants:** These are grants of $10,000 each, co-sponsored by the Plastic Surgery Foundation (PSF) and the ASMS. Two grants are offered annually.

**ASMS Journal Committee:** The Journal Committee issues the Journal of the American Society of Maxillofacial Surgery on a quarterly basis. This journal is comprised of newsworthy items related to Maxillofacial and Craniofacial Surgery. Although the journal is currently not indexed in PubMed, the Journal Committee is investigating mechanisms by which to develop the quarterly journal into an indexed journal featuring peer-reviewed publications.

**Scientific Program Committee:** The Scientific Program Committee reviews the abstracts submitted to the American Society of Plastic Surgeons (ASPS) to select those cranio-maxillofacial abstracts for presentation at the annual meeting. During the annual meeting the committee selects one presentation for the Best Clinical Paper Award from investigators under the age of 40, to include presentations by residents and fellows. In addition, the committee liaisons with the ASPS Program Committee to oversee the maxillofacial programs during the annual meeting. These include the Preconference Symposium previously described. The committee also selects panel topics and moderators for the Scientific Program.

**Web Page Committee:** The Web Page Committee assists with the development, enhancement, review, and maintenance of the ASMS web site (www.maxface.org). This webpage summarizes all of the major educational and research offerings of the ASMS. Of note is that key educational offerings of the ASMS that are relevant to all Plastic Surgeons are hosted on the ASMS website as open access to all members of the ASPS to facilitate their dissemination. The summer leadership seminars and the Journal of the American Society of Maxillofacial Surgeons are two educational offerings that are currently open access.

**Visiting Professor Committee:** This committee invites four to five active or senior members to serve as visiting professors annually. Each visiting professor will visit at least 5 to 6 ACGME-accredited Plastic Surgery residency programs.

**Task Force Socioeconomic Issues/Reimbursements:** This task force serves as the advocacy arm of the ASMS and works with ASPS, ACS, and AMA in initiating and supporting socioeconomic and reimbursement issues important to the practice of Craniofacial and Maxillofacial surgery.

**Task Force on the creation of the 2nd Edition of Fundamentals of Maxillofacial Surgery:** The task force has recently completed the publication of the 2nd Edition of the textbook *Fundamentals of Maxillofacial Surgery* (Springer, 2015). The textbook serves as a reference for the ASMS Basic Course and is made available to attendees of the course, the majority of whom are Plastic Surgery residents.

**Task Force on Diversity:** This task force is currently examining the demographics of ASMS members, specifically evaluating the gender, ethnic, and practice distribution of its members. The findings of this task force will be used to actively engage Plastic Surgeons that are from a gender, ethnic, or practice pattern that is underrepresented in the ASMS.

Arun K. Gosain, M.D., FACS
**Ethics Corner**

**SURPRISE LAW ENACTED IN NEW YORK STATE**

by John Sherman, MD, Briar Dent, MD, Christian Vercler, MD

There are several key elements that set a profession apart from a business or trade. Professions are marked by having mastery of a specialized body of knowledge, being self-regulating, having a code of ethics, and being oriented to the betterment of society.1 Surgeons are members of the profession of medicine. As Plastic Surgeons we decide what it takes to become a Plastic Surgeon through bodies like the ACGME and the ABPS exams. Furthermore, we regulate conduct. For example, members of the American Society of Plastic Surgeons pledge to abide by the ASPS Code of Ethics, which states in its preamble:

> The medical profession should safeguard the public and itself against physicians deficient in moral character or professional competence. Physicians should observe all laws, uphold the dignity and honor of the profession, and accept its self-imposed disciplines. They should expose, without hesitation, illegal or unethical conduct of fellow members of the profession.2

However we do not as a group set fees, as these are generally determined by market forces. Nevertheless, the ASPS Code of Ethics states that members who are subject to disciplinary action, including expulsion, for “charging exorbitant fees, particularly of a non-contractual nature (e.g., emergency care). Fees are exorbitant when they are wholly disproportionate to the services rendered.” Unfortunately, when there is a failure of the self-regulation in an aspect of our profession and there is a negative impact on society, outside forces step in to police that activity. This is what has occurred in the State of New York.

In response to a number of well-publicized incidents of egregious over-billing by out-of-network physicians for care delivered to patients both in and outside of the hospital, the state of New York has enacted legislation to protect patients from these so-called “surprise” out-of-network bills. New York State Public Health Law §24, which took effect on March 31st, 2015, is intended to protect patients from receiving separate bills from out-of-network physicians when they receive care at an in-network facility, such as a hospital, ambulatory surgery center, or emergency room.

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References

Repair of clefts of the hard and soft palate can have complications such as a persistent oronasal fistula. The Pittsburgh classification for fistulas (type I, bifid uvula; type II, soft palate; type III, junction of the soft and hard palate; type IV, hard palate; type V, junction of the primary and secondary palates (for Veau IV clefts); type VI, lingual alveolar; and type VII, labial alveolar) has been a useful classification system. When a Maxillofacial Surgeon attempts repair of these fistulas various CPT codes can be utilized.

For a type I fistula (if repair is necessary), refreshing the edges and closure can be performed. Typically, this repair is either performed with a simple closure (mucosa only) or in a layered manner with sutures in the uvular muscle and then mucosa. Although codes 42180 and 42182 describe repair of the palate, they are designated for traumatic lacerations. Depending upon the length of repair, either a simple repair of the oral cavity (codes 1201*) or layered closure code (code 1205*) can be submitted. It is imperative that the surgeon detail in his/her operative note the length of closure.

For types II-V fistulae, the most common code used is 30600. According to the Encoder Manual, this CPT code is described as “The physician closes an opening between the mouth and nasal cavity. The communication is through the maxillary hard palate and the tract is lined with epithelium. Local anesthesia is injected into the mucosa. The physician uses a scalpel to excise the epithelialized tract. An incision is made into the palatal mucosa and a local mucosal flap is developed. The flap is sutured in layers, covering the oronasal tract.” If you read this code carefully, it states the communication is through the maxillary hard palate, thus it does not perfectly fit type II fistula repairs. When I have been confronted with a type II fistula repair, the coders I work with still prefer this code. This code also includes creation of a local mucosal flap for closure. It does not include the placement of an Acellular Dermal Matrix (ADM) into the repair. When using an ADM, the CPT code 15777 (implantation of biologic implant for soft tissue reinforcement) can be added to the billing.

Types VI and VII fistulae involve the alveolar ridge. When performed primarily, as in secondary bone grafting of the alveolus, CPT codes 42205 and 42210 involve closure of the alveolar ridge. CPT code 42205 is described as “palatoplasty for cleft palate, with closure of alveolar ride; soft tissue only.” CPT code 42210 is the same description but adds “with bone graft to alveolar ridge.” Both of these codes describe closure of the hard and soft palatal tissue by development of tissue planes and closure in layers.

For any fistula, when a tongue flap or buccal mucosal flap (e.g. a FAMM flap) is used, then a 15732 code should be included. 15732 and 30600 are not bundled and can be submitted together.
Where did you grow up and what about your childhood was most influential?

I was born and raised about 50 miles northwest of Boston but I never grew up!

Even though I loved my 4 years in the snow at Dartmouth I would have to say that my prep school years at Andover, Phillips Academy, were the most influential in my development. For three years I was surrounded by some of the brightest kids from all over the world and university-level faculty. I learned how to think, how to write, and how to have a wider view of the world.

What is your most memorable training year’s story?

When I entered Plastic Surgery at UCLA I thought I wanted to be a Hand Surgeon. I started with four months on the hand service and hated it and decided I wanted to return to General Surgery. Fortunately Henry Kawamoto pulled me into his room for a LeFort 1 advancement. When I saw him down fracture the lower face I thought, ‘that is pretty cool.’ I could definitely do that.

So do you consider yourself an East or West Coaster?

Though bicoastal, I am at heart a New Englander and expect to spend much of my retirement back home on Cape Cod.

What was your career path?

I started in New Haven, Connecticut with the intent of building a pediatric practice. To fund that however I ended up as the cosmetic surgeon for the largest escort agency in town. Despite the fact that the payments were in cash, and I assume my work enjoyed by many, I did not like devoting half of my time to surgery and the other half to business. I only wanted to practice medicine and I believed that the Kaiser System was the model for the future. I guessed correctly and I have been with Kaiser for the last 26 years.

What is your favorite career story?

I was very fortunate to have operated with Henry Kawamoto for 20 years. During those years I feel I often served as his institutional memory. Henry was always looking for new ways to do things and he might say ‘Let’s try this.’ More than once I would say, ‘Well, you did that 10 years ago and didn’t like the results.” Of course that didn’t mean we didn’t try it again.

What is your favorite maxillofacial diagnosis to operate on and take care of and why?

I think clefts are my favorite case. For me, clefts are the essence of Plastic Surgery: elegant and meticulous, while having the power to change the life of a child and a family.

What challenges do we have today in Maxillofacial Surgery?

To achieve true facial restoration we need to combine our eyes with technology. As we keep advancing technology, we need to constantly remind ourselves to use our aesthetic eye in balance with technology to achieve the best results. It’s not just about putting the pieces together; it’s about making people successful in their social interactions.

What are you most excited about in the future of Maxillofacial Surgery?

I believe tissue engineering will change the ability to achieve our goals of recreating the normal and maybe creating the supra-normal.

What is your most memorable patient?

There was a girl, who like her mother and brother, had significant Treacher Collins deformities. Her mother had never been corrected, but I had done a number of successful operations on her brother. Despite this, the girl always refused my offers of surgery. When she was about 15, I asked her if she refused because she was scared of surgery. She told me, “I am not scared. I look just like my mother, and I think my mother is beautiful.” So much beauty is in the eye of the beholder.

What is the best part of your practice?

That we can share in the joys and difficulties in other people’s lives and we get to make them better. And that for our craniofacial patients we get to grow up with kids and their families over their lifetimes.

What is your favorite surgical instrument that you could not live without in the OR?

MY EYES!
Introduction

In developed countries, encephalomeningoceles are more common in the occipital compared to the frontal region. [Bozinov, 2004] We had the opportunity to care for a child with a very large occipital encephalomeningocele using finite element analysis (FEA) and to follow her for 12 years. The report below details FEA, the management and long-term follow-up of this patient, and the lessons we learned.

Methods

Infants from a twin pregnancy presented at birth with one of the twins having a large occipital encephalomeningocele (Figure 1). Her twin sister was completely normal. The patient did well in the NICU and at 4 days-of-age, the encephalomeningocele was resected, leaving her with a large occipital bony defect. Over the ensuing months, she became progressively more scaphocephalic due to an 80 mm diameter defect in the occipital area (Figures 2 and 3). An axisymmetric ellipsoid finite element model was created based on CT data using ABAQUS (Figure 4). [ABAQUS] We assigned the following material properties for the defect components: elastic modulus (E) = 8.4GPa, Poisson’s ratio (\(\nu\)) = 0.28, and the encephalomeningocele wall was modeled as an incompressible neo-Hookean material equivalent to E = 29.3 kPa, \(\nu\) (=0.50). Intracranial pressure was set at 10 mmHg (1.33kPa). [McLaughlin, 2000] The cranial wall thickness was set at 3 mm with the encephalomeningocele wall set at 4 mm thickness. The effects of external molding using a rigid cranial band were simulated at the Savannah River National Laboratory.
Results

FEA demonstrated high wall stress at the rim interphase where the compliant encephalo-meningocele joined the more rigid cranial bone, with bone \( \sigma \) at the rim = 111.3 kPa, where \( \sigma \) is von Mises stress. Stress is defined as force in N (N = kg x m/sec^2) per unit area in m^2, or N/m^2 which is also known as a pascal (Pa). von Mises stress is frequently used by mechanical engineers to express in a single value the stress in three principle axes. Away from the rim at the region of the midline sutures (metopic and sagittal) \( \sigma = 8.6 \) kPa. Simulation of posterior to anterior compression, using a rigid head band, showed effective redistribution of the wall stress. Wall \( \sigma \) at the rim reduced to 61.8 kPa with a simultaneous increase of 370 % at the near midline suture area to 40.8 kPa. Clinically, the cranial width, eu-eu, increased from 91 mm to 115 mm over 15 weeks, and the cephalic index went from 64 to 72 % (Figure 5). At 9 months-of-age, the patient underwent uneventful osseous cranioplasty using established bone grafting techniques [Vercler, 2014] and has gone on to develop well over the ensuing 12 years with no cranial issues (Figures 6 and 7).

Discussion

This unique case gave us the opportunity to test several hypotheses and make measurements which would be difficult, if not impossible, without this special set of clinical circumstances. 1. The same genotype may lead to a very different phenotype, depending on environmental factors. [Krauss, 2016; Lehner, 2013] This means that the extent to which the genes can dictate morphological development is limited by physical constraints. Exceeding the “control envelop,” deviation becomes inevitable.

2. Wall stress experienced along the cranial sutures must be greater than 8.6 kPa or the sutures cannot perform their nominal function of precise osteogenesis at the ossification fronts just sufficient to compensate for the cranial growth such that sutural width remains constant.

3. An increase of wall stress to 40.8 kPa is able to restore this nominal function, allowing just the right amount of bone formation at the suture fronts to compensate for brain growth without changing sutural width.

4. Extracranial forces imparted by the application of external rigid surfaces can alter the wall stress distribution within the cranium.

5. At least in theory, whether the alteration of wall stress is intrinsic to the suture or extrinsic to the suture, such as secondary to external forces, the perceived effects from the perspective of an intracranial measurement (located anywhere within the cranium) are likely to be identical.

Conclusion

Since this patient has an identical twin sister, we can draw the following conclusions: 1. Genotype cannot rescue cranial phenotype if there is significant mechanical interruption producing abnormal distribution of wall stress. 2. Wall stress with normal ICP is about 40 to 70 kPa. 3. At 25% of this value, cranial growth perpendicular to the suture decreases greatly. 4. External forces induced by rigid cranial bands can achieve beneficial effects.

References


1. What prompted your decision to pursue Craniofacial Surgery? In medical school my mentor was a Pediatric Surgeon, so I initially trained in General Surgery with the intention of doing Pediatric Surgery. While training at Emory I was inspired to pursue Plastic Surgery by my mentors Dr. Jurkiewicz and Grant Carlson. What brought it all together for me was my experience at Boston Children’s Hospital and spending time with John B. Mulliken. Dr. Mulliken’s passion for his work and his intimidating intellect are two components of what make him the exemplar for taking care of these children. I was then lucky enough to train in Craniofacial Surgery from an equally passionate and intimidating individual, Steven R. Buchman.

2. What gets you out of bed for work each day? My patients and their families. Being a Craniofacial Surgeon has so many rewards internal to the practice—the joy of performing technically challenging operations that can lead to a lifetime of happiness for a patient is difficult to express to non-surgeons.

3. What are your current or past positions? I am currently an Assistant Professor of Surgery at the University of Michigan.

I am also Co-Director of the Clinical Ethics Program at the Center for Bioethics & Social Sciences in Medicine at Michigan, which involves chairing the Adult and Pediatric Ethics Committees, as well as formal didactics in ethics for medical students and residents.

I am chair of the ASMS Ethics Committee, co-chair of the ACAPS Ethics & Professionalism Curriculum Committee, and serve on the Education Committee of the ACPA and the Curriculum Committee of the American Society of Craniofacial Surgeons.

4. What are your clinical and/or research interests? I have retained the enthusiasm that I caught from Dr. Mulliken about the rehabilitation of patients born with cleft lip and cleft palate, but I also greatly enjoy being an Orthopedic Surgeon of the craniofacial skeleton—which is a passion instilled in me by my mentor and partner, Steven R. Buchman. I am lucky to have residents skilled in clinical outcomes research and they help me answer some of the questions about how we are doing for our patients.

5. Tell us a little about yourself and your family (spouse/partner, children, parents, siblings, pets, etc.) I grew up on a grain farm in central Illinois. My younger brother took over the farm and still farms it with my father. I also have three younger sisters. The oldest one lives in Addis Ababa, Ethiopia. My wife Kate Kraft is a Pediatric Urologist and is the Program Director of Urology residency program at the University of Michigan. I have two daughters, Jacqueline (3) and Alice (1) who have led me to a true understanding of joy. I also have a standard wire-haired Dachshund named Willie (named by my wife, the Urologist.)

6. What is your favorite pastime/hobby? These days it is spending time with my two young children. I also enjoy reading philosophy, medical history, listening to music, and experiencing art.

7. Tell us something interesting about yourself that others might not know. I teach a Philosophy of Medicine class to undergraduate students at the University of Michigan and am a recurrent guest lecturer in a Sociology of Bioethics and Medical Ethics class. If I get maimed and cannot operate my backup job is as a college professor.

8. What is the best part of your day? This has to have a two-part answer: the best part of the day in the hospital is spent in the operating room. The best part of my day at home is hanging out with my daughters.

9. If there is anything you could change, what would it be? I would prevent untrained ‘dabblers’ from operating on children with cranio-maxillofacial problems. These patients deserve someone who is going to dedicate themselves to their longitudinal rehabilitation.

10. What is the greatest accomplishment you are most proud of so far? In all of life my greatest accomplishment is my children. But that is not a very interesting answer.

As a surgeon one of the things I am very proud of doing is a project I called “Picture This!” Photography is a wonderful medium of expression and many Plastic Surgeons are amateur photographers. In my clinic I have a studio and a professional photographer who photographs every one of my patients. These photos highlight the child’s facial difference.
About Christian J. Vercler

Christian J. Vercler, M.D. serves as Clinical Assistant Professor in the Division of Craniofacial Surgery in the Section of Plastic and Reconstructive Surgery at the University of Michigan. He is a diplomate of both the American Board of Surgery and the American Board of Plastic Surgery and is a Fellow of the American College of Surgeons.

Dr. Vercler received his Bachelor of Science in Biology and Master of Arts in Theological Studies from Wheaton College (IL). He attended medical school at the University of Illinois. He completed general surgery training at Emory University, plastic surgery at Harvard, and an additional fellowship in Craniofacial Surgery at the University of Michigan. During his surgical training at Emory he completed a Fellowship in Clinical Ethics at the Emory University Center for Ethics and earned a Masters of Arts degree in Bioethics. He has taught medical ethics to residents and medical students at Emory University, Harvard, and the University of Michigan.

Corrections for New Member: Jason D. Toranto (February)

University of California, Irvine was a previous position. He moved to Argentina for 7 months and “returned two times after that to live there for extended periods of time.”

Join the Discussion
Add your voice to the Maxillofacial Discussion Group on PSEN

PSEN is a great forum for education and interchange of ideas in maxillofacial surgery.

- Log into the PSEN Portal: http://www.psenetwork.org. Username and password are the same as that used for login to the ASPS website (www.plasticsurgery.org)
- From the homepage, click on the following links: Community – Forum – Maxillofacial Discussion Group
- Click on “Follow this forum” if you would like notification when new topics are posted within the forum

and make them an object of knowledge (Michel Foucault articulated this phenomenon of the “clinical gaze” in his book Birth of the Clinic). In an attempt to upend this power relationship and to show our patients the expressive range of photography, we arranged for 10 of our patients with craniofacial diagnoses to meet with professional photographers from the community, get a lesson in basic photography and how to use professional camera equipment; then, they all spent an afternoon in the Ann Arbor Arboretum. The professional photographers were tasked with capturing the joie de vivre and sense of wonder of each child. The kids were allowed to photograph anything they wanted. The resultant photos were then curated and we published a book of the photos that we gave to the children. We produced several photographs in a large format that have been on display in the hospital art gallery and have now moved to a gallery at the Matthaei Botanical Gardens. Each piece is a diptych of the child photographed in the arboretum juxtaposed with a photo she took. The children and their families seemed to have enjoyed the experience and the exhibit has been well received.
ASMS Pediatric Symposia: August 26-28, 2016
Children’s Hospital of Pittsburgh / Pittsburgh, PA
Program Highlights

Friday, August 26, 2016

**Soft Tissue**

**Facial Reanimation in Children**
- Timing and Role for Neuronotization and Nerve Transfers
  - Samir Mardini, MD
- Free Muscle for Smiling: Options and Techniques
  - Allison Snyder-Warwick, MD
- Improving Outcomes in Cross Facial Nerve Grafting: Electrical Stimulation and the use of Adjunctive Nerve Transfers
  - Greg Borschel, MD
- Innervation of Free Muscle Transfer: Improving Outcomes of Cross Face Nerve Graft
  - Arun Gosain, MD
- Postoperative Rehabilitation following Facial Reanimation: The Role of Therapy and Biofeedback
  - Jackie Diels, MD

**Ear Reconstruction**
- Otoplasty
  - Lorelei Grunwaldt, MD
- Microtia: Modified Nagata Technique
  - Akira Yamada, MD
- Microtia: Modified Brent Technique
  - Charlie Thorne, MD
- Microtia: Use of Medpor and Alloplasts
  - Stephan Scott, MD
- Microtia: Role for Prosthetic Implants
  - Gordon Wilkes, MD

Saturday, August 27, 2016

**Cleft Lip/Plate**

**Unilateral Cleft Lip and Nose Repair**
- Rotation Advancement Repair
  - William Hoffman, MD
- Primary Semi-open Rhinoplasty
  - Joseph Losee, MD
- Extended Mohler Repair
  - Roberto Flores, MD
- Fisher Subunit Repair
  - Karen Wong, MD
- Primary Cleft Lip and Nose Repair
  - Philip Chen, MD

**Palatoplasty Tips and Tricks**
- Buccal Myomucosal Flaps
  - Bob Mann, MD
- Buccal Fat Pad Transfer
  - Steve Buchman, MD
- Levator “Complete Release”
  - Robert Havlik, MD
- Levator Overlap Technique
  - Kant Lin, MD
- Making the Furlow Work for all Palates
  - Joseph Losee, MD

Sunday, August 28, 2016

**Hard Tissue**

**Mandibular Distraction Osteogenesis:**
- Consensus and Controversies
  - Moderator: Raymond J. Harshbarger, MD
- Neonatal MDO: Multidisciplinary Planning and Patient Preparation
  - Jeff Hammoudeh, MD
- Neonatal MDO: Anatomy, Vectors, Surgical Techniques
  - Anand Kumar, MD

**Challenges for Pediatric Plastic Surgery Innovation**
- Soft Tissue Augmentation in Peds Recon
  - Geoffrey Gurtner, MD
- Fat Grafting and Stem Cells
  - Peter Rubin, MD
- Controversies in Growth Factor + Allograft Utilization in Peds
  - Steven Buchman, MD
- Composite Tissue Allografts in Pediatric Reconstruction
  - Bahar Bassiri, MD
Patient Analysis

The basic principle of orthognathic surgery is the combining of surgery and orthodontics to treat a dentofacial deformity. These cases are particularly common with patients who have had a cleft lip/palate repair. In patients who require orthognathic surgery, it is recognized that despite orthodontic compensation of the teeth, the malocclusion will remain and must be treated through surgical intervention. Functional considerations include the following:

1. Mastication
2. Lip incompetence
3. Speech–spitting
4. Oral hygiene
5. TMJ Function
6. Psychosocial impact

The treatment goals are a combination of function and aesthetics. Function in orthognathic surgery is about occlusion, the aesthetics obviously are important and the goal is to obtain balance of both. Stability of the surgery (the ability to maintain the desired occlusion) often dictates the limits of the operation. Patient evaluation should include a general medical overview, as many of these patients will have unusual medical problems. Preoperative evaluation should also include any previous surgery for velopharyngeal incompetence, in particular pharyngeal flaps. The dental condition should be included in the evaluation as well as any psychosocial issues that the patient may have. The diagnosis is made through a combination of the facial aesthetics and the radiological assessment (cephalometric and panorex). As new computer programs are incorporated into model surgery, it is likely that cephalometry is going to become less important; however our eye as plastic surgeons may gain more importance.

The vast majority of cleft patients requiring surgery will be in a Class III dentofacial deformity. Though the differential diagnosis includes either mandibular excess or maxillary deficiency the majority of cleft patients will have the latter. In some rare cases, there may be a combination of both. The other component that is often seen is a vertical maxillary deficiency.

Cephalometric Evaluation

Cephalometric measurements can be utilized to better understand the skeletal relationships of the facial skeleton. The basic components of the sagittal analysis of a cephalogram are fairly simple. From this view one can locate the position of the maxilla relative to the cranial base/cranium (SNA) and the mandible relative to cranium (SNB). The relationship between maxilla and mandible can also be determined including their effective lengths (ANB). Finally the maxillary dentition to the maxilla, and the mandibular dentition to the mandible can be found. In terms of the vertical analysis one can measure the facial height ratios and symphyseal height. These angles can be determined by using the cranial base or the Frankfort horizontal and compared to normative values.

The facial convexity and the inter-dental relationship to either maxilla or mandible can also
be calculated. In a patient with a cleft, the maxilla is relatively underdeveloped, and is characterized as being retro-positioned and vertically short. The dental compensation of the maxillary teeth is to procline or angle anteriorly in an attempt to make contact with the lower dentition. The compensation of the mandibular dentition will be to retrocline or angle posteriorly into the mouth.

These compensations can occur naturally or in a determined manner by the orthodontist if the decision is made to correct the discrepancy by dental movements alone. In this respect, it is critically important that a decision is made early in the orthodontic treatment as to whether the correction can be accomplished through dental movements alone, or whether a skeletal movement will be necessary. In the case of the latter, the orthodontic preparation for surgery will worsen the discrepancies by correcting the dental compensation.

The presurgical occlusion should be characterized as well. One can define the occlusal relationship of maxillary and mandibular first molars by the Angle classification. Overjet is defined as the horizontal relationship of the upper and lower central incisor in occlusion. Overbite can be defined as the vertical relationship of the incisors. The condition of the teeth are also important to note. Any residual dental malposition can make the final occlusion unstable and should be recognized when completing the model surgery. Dental caries that can compromise healing should be addressed prior to surgery. Arch alignment is also important and includes the Curve of Spee and the Curve of Wilson. The Curve of Spee (Spee’s curve or von Spee’s curve) can be defined as the curvature of the mandibular occlusal plane as defined by the tip of the lower incisor, incorporating the buccal cusp of the premolar, terminal molar and ending at the anterior body of the ramus. The curve of Wilson is a mediolateral curve that contacts the buccal and lingual cusp tips of the first molar on each side of the arch. This curve demonstrates the inward inclination of the posterior molars of the mandible (lingual cusps lower than the buccal cusps). The nature of the dental compensation has already been mentioned (retroclined or proclined).

**Facial Aesthetics: The Clinical Exam**

“What’s the most important component of making a diagnosis in orthognathic surgery?”

This question is asked frequently on the in-service testing. In fact the answer is the clinical examination. A typical cleft patient will often have an intra-oral exam that demonstrates a need for major orthodontic preparation, with an extensive push back palatal procedure, massive scarring in the palate, and maxillary wasting with an indentation at the level of the bicuspid.

One can begin the aesthetic evaluation by examining the position of the upper central incisor to the facial midline. The aesthetic considerations include convexity, the zero meridian, the vertical proportions, nasolabial angle and the dental display. In males the dental display is approximately 2mm, in females 3.5mm +/- 2mm.

The contour angle can be obtained by intersecting a line from the glabella to the SN and a line from the PG to the SN. The normal angle should be 12 degrees +/- 4 degrees. The zero meridian is established by cre-
ating a perpendicular line from the Frankfort horizontal to the soft tissue pogonion, known as the relative “Gonzalez-Ulloa” line. The appropriate chin position on profile is in this line. Vertical proportions can be assessed by measuring the various soft tissue landmarks. The classic balance is an equal division of vertical height from the nasion to subnasale and subnasale to the menton. The nasolabial angle is measured at the subnasale with the boundaries of normal ranging from 94 degrees to 110 degrees. Male patients tend to have more obtuse angles. The nasolabial angle becomes more obtuse with LeFort advancements.

After establishing a diagnosis of a Class III Angle relationship, one must determine if the clinical presentation represents a mandibular excess or a maxillary deficiency. In most cases it will be the latter, both a vertical and sagittal deficiency but may contain a small component of a relative mandibular excess.

**Case Study**

This patient presents with a very classic Class III dentofacial deformity after presurgical orthodontic treatment. In this case, there is quite a marked discrepancy, more than can be overcome just moving the maxilla. The orthodontist has the dental arches aligned, and has decompensated the dental position. The study model demonstrates a stable Class 1 occlusion. The analysis shows that in fact the patient does have a very strong mandible in addition to an underdeveloped maxilla primarily in the sagittal plane. The discrepancy is greater than 10 mm, which would be considered unstable. Many surgeons extend the 10 mm limit or complete a distraction first, but this patient also has an excessive mandible as supported by an obtuse mandibular plane angle. The cephalometric analysis demonstrates the surgical treatment objective including an advancement of the maxilla 8 to 9 mm and down grafting 1mm. In this case, the LeFort advancement is dictated by a 2 mm lip-dental show. To get a balanced result the mandible is set back 6 to 7 mm. There is always an advantage to advancing the maxilla as much as tolerated. Significant setback of the mandible will often produce a neck that becomes fuller and older appearing. It is important to complete the surgery after skeletal maturity. Confirmation can be obtained by evaluating the growth plates of the distal radius. Many orthodontists are also using the height and shape of the cervical vertebrae to predict skeletal maturity.

Creating stone models for use in creating a splint requires very accurate reference landmarks to maintain the correct spatial relationship from the patient to the models. A face bow is used to record the bite and the relative position of the maxilla and mandible to the external auditory meatus (a close proximal reference to the TMJ). This information is transferred onto an articulator, including the dental impressions. The stone models are then created with a reproduction of the clinical occlusion found in the patient. Model surgery is then performed based on the patient’s surgical treatment objectives: impact the maxilla, advance it and set back the mandible. Two splints are made when moving both the upper and lower jaw. An intermediate splint is used to position the LeFort segment as referenced to the mandible and the final splint is used to move the mandible as referenced to the now plated and stable maxilla.
The Sagittal Split Osteotomy of the Mandible

The osteotomies for the mandibular setback are made in the sagittal plane of the ramus. There are probably as many different variants of the procedure as there are surgeons doing it. The initial cut is made with a series of small drill holes using a fissure burr. The vertical cut is made with an oscillating saw, and then posteriorly, the Lindemann bur is used. This cut is made above the inferior alveolar nerve. The initial descriptions had this osteotomy extending to the posterior edge of the mandible. Because of the depression and the thinning out of the mandible just above and behind the inferior alveolar nerve this extension is not necessary (natural split occurs along that edge). It is important to actually visualize the inferior alveolar nerve on the lingual surface of the mandible. This technique is very similar to the description given by my mentor Johan Reyneke in his book “Essentials of Orthognathic Surgery.” An unfavorable fracture can often occur if the inferior border osteotomy is not complete. A channel retractor can be used to hook the inner cortex, and then the fissure bur can be used to complete the osteotomy on the inferior border. The Reyneke osteotomes are angled left and right and can help to open up the mandibular cortex which allows visualization of the nerve. As soon as the nerve is visualized, it can be separated from the cortex as needed and protected under direct vision. In order to complete the setback, a J-retractor, or elevator is used to clear off the fibers of the medial pterygoid. Otherwise, the proximal segment will not slide back posteriorly without interference. For fixation one can either use three screws or a plate.

Questions

1. What is your approach for managing the third molars in a patient who will undergo orthognathic surgery?
   **Dr. Mackay:** I am not concerned about the third molars in the maxilla for someone who will undergo a maxillary advancement. I will take them out at the time of the surgery through the osteotomy. Even if your saw cut goes directly through those third molars or they’re impacted in a high position it’s easy to get to them.

   When it comes to the mandible, in most cases I will have someone take out the third molars before doing a sagittal split. Having said that, I’ve worked with a couple of Maxillofacial Surgeons so I was pretty adamant that they had to come out. I would leave about three months at least before doing a sagittal split. However, I worked with one guy who wasn’t concerned at all, and if he had an impacted mandibular third he would take it out at the time and then use plates instead of the screws. I don’t know that it makes as much of a difference as we have made it out to be.

2. How do you incorporate maxillary distraction in the management protocol of patients with a class three malocclusion?
   **Dr. Mackay:** I don’t have a big experience in maxillary distraction; I’ll leave it to you distracting guys to answer that. I tend to do orthognathics in a single stage.

Technical Aspects of the Maxillary Advancement

**Dr. Jack Yu**

The technical aspects of a LeFort 1 osteotomy can be approached by decomposing the surgery into three parts: 1. exposure, 2. mobilization and 3. repositioning and fixation of the maxilla. It is in some ways a more dangerous operation than...
the sagittal split, but it is a very powerful operation. The sagittal split osteotomy is done less now in large part because of the ability to move the maxilla forward 30 to 35 mm with distraction.

It is very important to know preoperatively whether surgeries have been performed for velopharyngeal incompetence, particularly those that are pharyngeal flap based. They tend to make the advancement considerably harder. The alveolar bone graft should be completed, both in the unilateral and the bilateral cases, especially the bilateral. Bone grafting stabilizes the maxilla and allows a much more robust blood flow to the central segment. If the discrepancy between the maxillary position and the mandibular position is very severe, distraction of the maxilla can be utilized. That may sometimes be performed as early as 9 or 10 years-of-age, before achieving skeletal maturity. The conventional maxillary advancement, is reserved for patients who have demonstrated skeletal maturity as confirmed by radiographic analysis of the cervical vertebrae or by wrist films. For females, this occurs usually two years before males and usually a couple of years post menarche. For males, it can be as late as 18 years-of-age. The definitive procedure should not be completed before skeletal maturity because the likelihood of growing out of the surgically established occlusion is much higher.

The teenage years are obviously a very stressful time especially for these patients. The primary function of the face is to look like a face. These individuals have very low self-esteem, tend to overeat and are often overweight. They are often seen with multiple piercings and sometimes they smoke. This is when a teen’s self-concept and self-esteem become very important. Other functional considerations include upper airway obstruction issues: snoring, sleep disturbances. These are often cited when obtaining insurance coverage.

An underbite is very frequent because of the Class III malocclusion; also present is a negative overjet. Speech issues result from the lack of anterior contact and is also very frequent. Morphologically these patients all have an anterior divergent profile, mostly due to the maxillary deficiency. Even if the mandible is slightly supernormal, Dr. Harvey Rosen, my mentor believed that a facial extension procedure is usually much better than a reductive procedure. The columella-labial angle is usually severely reduced because of the lack of projection and incisor show is usually not present. The severe, poorly projecting midface sometimes can give the impression of a lid malposition and exophthalmos. After advancement, the lid-to-globe relationship usually improves greatly.

Pre-surgical preparation:

The most important question is whether the occlusion can be corrected without surgery because the orthodontic work is diametrically opposite in each case. If the malocclusion is a surgical case, the maxillary teeth will be moved posteriorly to correct the proclined maxillary central incisors. This will transiently make the Class III malocclusion worse. The wrong decision may cost the patient several more years of orthodontic treatment.

Initiation of orthodontic treatment starts in the late mixed dentition. The dental evaluation includes the overjet/overbite and the crossbite or the maxillary dental position relative to the mandible. Centric occlusion and centric relation are important. Centric relation occurs when one guides the mandible to the posterior superior position, the so-called “hinge axis.” It’s the only reproducible position of maximum intercuspation in the most cephalic position that a mandible can achieve. There’s usually a discrepancy in cleft patients between the centric occlusion and the centric relation. It is critically important that the two curves between the mandible and the position and causes the mandible to

**Indications**

**Severe maxillary hypoplasia**

- **Functional**
  - Upper airway obstructions
  - Anterior open bite
  - Class III malocclusion
  - Speech issues
- **Morphological**
  - Anteriorly divergent facial profile
  - Reduced columella-labial angle
  - Decreased incisor show
  - Relative or absolute poor lower lid support
maxilla, the curve of Wilson and the curve of Spee are congruent. One cannot fit a teaspoon to a tablespoon, no matter how much repositioning occurs. These goals are accomplished by orthodontic preparation. And of course in addition to the dental evaluation one must evaluate the skeleton. This includes the orientation of the upper central incisor to the basal bone and the orientation of the lower central incisor to the basal bone. Often times they have compensated and the orthodontist’s job is to decompensate the dental position.

Analysis of the skeleton is completed, often using either the McNamara or Steiner analysis. Most of the analyses are completed now by a computer software program like Dolphin.

### Model Surgery

As stated previously, the terminal hinge axis is created by moving the mandible in a posterior and cephalic direction so that the sphenoid fossa is occupied by the condyle. It cannot go any further back. This hinge axis, is used to mount the articulator when completing a facebow transfer. The habitual occlusion is the position of maximum intercuspation, the closest bite. Usually, one will have a posterior, so called “receded contact,” in a class III relationship and then glide back into this position. The stone models should demonstrate the ability to achieve a midline that’s matched with simultaneous right and left contact including both anterior and posterior elements. The maxillary and mandibular curves of Wilson and curves of Spee should be congruent.

The third molars are usually extracted before the LeFort I if the molars have erupted. An intra-operative extraction with compromised gingiva can potentially lead to an oral-antral fistula. Unerupted molars may be removed during the osteotomy. Cephalogram analysis is completed and compared to normative values. In addition to the normative value for a Caucasian patient, data for African Americans and Asians are becoming available. Key measurements include the SNA/SNB, mandibular plane angle, the aesthetic plane, the distance from that to the E-line, the upper and lower lips.

The traditional treatment plan at CHOP included a maxillary osteotomy and advancement, bilateral sagittal split osteotomies with removal of the buckled plates so that the mandible could be stepped back. The bone from the mandible was often grafted to the pyriform aperture, not infrequently an anterior horizontal osteotomy of the mandible or genioplasty was completed to rebalance and correct the position of the pogonion. Today, the sagittal split is rarely completed because of the ability to distract the maxilla beyond the traditional orthognathic envelope.

### Case Study 1

This patient has a severely restricted upper arch with obvious class III molar relationship. Dental caries are controlled, the teeth undergo decompensation and the third molars are extracted to provide completely intact gingival tissue. A fan expander with a hinge posteriorly is placed to expand the anterior arch. This preparation may take months if not years to complete and requires a very cooperative patient. The arch is placed into a nice parabolic shape and a congruent curve of Spee and curve of Wilson is established.

### Case Study 2

This is a patient who has lost the premaxilla. There is increased lower facial height and defacement of the upper lip and face. The patient has been wearing overdentures which caused severe decay. He has lost the
maxillary central, lateral, and additional teeth. The overjet is negative 22, which is quite severe. Cephalometric analysis is completed and it is determined that the amount of movement exceeds that which can be obtained with simple maxillary advancement. Cone Beam CT has been more frequently adopted, has low radiation exposure and can be manipulated to get a very good idea of the alveolar ridge integrity. So in this particular case a fan external distraction is in place. Maxillary canines are the most anterior medial dentition and are extracted. The final models are obtained and the facebow transfer is performed. The model surgery is completed including the current clinical bite and a handheld articulator is used to establish good position of the maximum intercuspation. If the planned occlusion is stable then a splint is not necessary. If the plan includes two jaw surgeries, or if the bite is not good enough, then a splint must be present. Splints should be made thin and reinforced laterally with appropriate holes for securing to the dentition. In this particular case, a mandibular setback was planned.

**Treatment Objectives**
1. Align and level the arches
2. Maxillary advancement to correct the maxilla-manubular discrepancy
3. Inhabilitation of the esthetic zone
4. Improve facial esthetics

**Treatment Plan**
- Generically treat
- UF, full bonding
- END 15's
- RED with skeletal anchorage
- Finishing
- Prosthetic intervention
- Retention

**Face bow transfer**
- EAC, IOF
- Occlusal plane

- Relate the maxilla to skull base
- Allow mandibular cast to be mounted based maxillary position

**Intra-operative Technique**
An actual intra-operative action plan is helpful to allow everyone participating in the procedure to know what will be needed and when it will occur. Clock time begins when entering the room. A nasal endotracheal intubation is completed and secured with a septal stitch. The operating table is usually turned 135°, occasionally but very rarely 180°. Ivy loops are placed (to avoid testing the brackets) using 24-gauge wire for the loops and 26-gauge wire for the interarch. The diagram illustrates where the saw, the electrocautery unit and anesthesia should be located in relationship to the head. The surgeon is usually at the 12 o’clock position.

After the airway is secured, the incision site and pyriform area are injected with epinephrine and local anesthetic. While waiting for the local to work, measurements are made of the mediotemporal point, which is a stable point to the interdental position of the upper central incisors, at, above, or just below the arch wire. That’s the vertical landmark, and then horizontal measurements are made from the external auditory canal to that same point to create a triangle. Ivy loops are placed. A generous cuff of the oral mucosa is maintained to facilitate closure. Once the incision is made a periosteal elevator is used to displace the maxilla across the anterior surface in a subperiosteal plane.

A caudal can be used to strip the nasal floor, avoiding the turbinates and subsequent bleeding. The buccal fat pad is avoided by staying subperiosteal during the lateral buttress dissection. The dissection is carried superiorly to the infra-orbital nerve.

At this point, the osteotomy is marked out with a marking pen and then burned with the bovie cautery. A reciprocating saw is used with irrigation. The saw will move fast through the maxillary antrum and should be controlled. The cut is made medial to lateral from the pyriform aperture. From the cephalogram, one should know how deep the nasal cavity is. One needs to also be acutely aware of the location of the nasal endotracheal tube during the bone cuts to avoid creating a hole in the tube. A double-guarded osteotome is used (recognizing
the depth of the nasal cavity to be usually about 55 to 60 mm) by straddling the septum and using the non-dominant hand to feel the tip of the osteotome in the posterior nasal cavity.

The straight osteotome is used to complete the ostertomy along the medial wall of the sinus and lateral pterygoid plates, resonance becomes very dull as the entire skull becomes the resonance chamber.

The pterygoid osteotomy is completed using a curved osteotome to create the axial separation. The non-dominant hand is placed into the medial aspect intraorally at the junction of the hard and soft palate to feel the tip of the osteotome as it comes through the mediastri pterygoid plate. This is often associated with a release of venous blood because of the large pterygoid venous plexus. The bleeding will usually dissipate. The laminal spreaders are used in key areas to slowly separate and down fracture. Once separation has been completed, down fracturing and mobilization is further extended by using the Rowe Kiley forceps to allow one to accommodate the movement into occlusion. This must be completed without causing any damage to the teeth or palate. The ivy loops can be utilized at this point and the occlusion is established. 1.5 mm plates are then adapted. Four titanium plates are used with four screws each. Self-drilling screws are often used for upper fixation to provide better stability. For the more mobile part, self-tapping screws can be used after drilling. The first bend is downward. The amount of advancement is then created and finally the back is bent upward.

Order Sets

Order sets are generated to standardize pre- and post-operative care. Once a decision is made to proceed with surgery the patient is asked to stop smoking and lose weight if appropriate. Multivitamins with iron is initiated. Oral hygiene is maximized. Splint fitting is important and both intermediate and final splints should be fitted to address any interference. The fitting for the maxilla and the mandible for any given splint will need to be evaluated sequentially because of the malocclusion.

The week before surgery the patient will be asked to shower with antimicrobial soap and shampoo. Patients will also start to practice incentive spirometry.

Case Study

The first case is a very standard unilateral cleft lip. The orthodontist usually requires some finishing orthodontics afterwards. The pre- and post-cephalograms and occlusal views are seen. A distraction device can be used such as a Halo for large movements that cannot be completed with a single operation. The distraction will be completed to allow the upper jaw to move forward adequately. It can then be placed immediately into occlusion and rigidly fixed. This is considered a hybrid approach and can be followed several months later with the nasal reconstruction.

In patients with a bilateral cleft lip repair, one must be very careful with the osteotomy and ensure that an adequate bone graft is present. If the bone graft is deficient, the incision should end just

Order Sets

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lateral to the gap and the premaxillary mucosa maintained to provide the blood flow. Post-operative photos with occlusal views are seen after a maxillary advancement. Post-operative orthodontic treatment is usually required.

Questions

1. Is there a role for the use of the DeClerk retraction system in a patient with a Class III malocclusion?

Dr. Yu: Well some people have tried that and I have tried it as well. In my limited experience it doesn’t work very well. For discrepancies that are not that big, it may work. Some people have just put in the bone anchors. It will require months, sometimes years, to try and ride the prepubertal growth spurt. I don’t recommend that. If you’re going to do it you might as well do the osteotomy and then use the elastic to pull. That works better. In other words, you complete the osteotomy without the down fracture, and then you place a big plate, one on each side, along the upper buckle buttress site avoiding the canines and the premolars.

2. Can you speak to the role of a female with minimal dental show and is short in size and length?

Dr. Yu: A common problem. So in that case, sometimes I would complete a gingivectomy to increase the crown length. You have to have a normal crown length because otherwise you think you have excessive gingiva show but all you really have is just hypertrophied gingiva.

3. What is the role for virtual modeling?

Dr. Yu: I think there is a role but they are so costly. If you get the pre-fabricated plate locators, it is a substantial amount of cost. I still believe that the traditional method, the way that I’m describing is very easy to do. Just take your time and step by step decompose it into those 3 elements. The exposure, the mobilization and then the fixation. I’m not 100% sure whether the virtual modeling is a hammer looking for a nail or eventually this will become our universal approach to all jaw cases. To complete this virtual modeling, one really has to sit down with an orthodontist.

Dr. Mackay: I think I disagree somewhat with Jack about virtual modeling. I think at the moment it’s expensive, but it is so new and this technology is improving. You can take the basic analysis of the appearance of the human face which is what we’re trying to do better than anybody. You can take a scan or a facial skeleton and put the bones in the right place knowing where the relationship of the soft tissue is to the bone. You can do this literally on a computer. And you will get the measurements that you need to perform a surgery. You’ll know what you need to do to the maxilla and the nose. You’ll get the information as to what you need to do to the mandible. And everything that has sort of moved we will have at our finger tips. I think that our basic analysis in putting everything back in a position that looks good is what gets us back in a big way.

Dr. Yu: The technology is good to have, but at the end of the day I think the soft tissue response is not always predictable. Skeletal advancement versus changes in the soft tissue are not always directly correlated, as you know. And I think there is a difference between younger surgeons—who are more savvy with digital technology—compared to baby boomers.

4. What is your recommended way to reconstruct an absent premaxilla if bone graft fails due to inadequate soft tissue coverage?

Dr. Yu: You have to do this in stages if that is possible. I try to do it staged and let it heal. You may need to do it again. Then do it again. Alternatively this may require vascularized tissue transfer. It’s a miserable situation.

The American Society of Maxillofacial Surgeons (ASMS) is proud to have initiated an educational Webinar series open to its members. Our goal is to cover topics of relevance to ASMS members, and to allow our members to participate in interactive, case-based discussions with experts in the field.

The webinar on Complex Frontal Sinus and Nasoethmoidal Fractures was held on June 2 and will be covered in the next issue of the ASMS Journal.

Watch your email for information on the next ASMS Webinar!