International Society of Craniofacial Surgery

ISCFS NEWSLETTER

Volume 1 | Number 4

IN THIS ISSUE:

OCTOBER 2024

MESSAGE FROM THE EDITOR

"This year has been a testament to our community's resilience, adaptability, and commitment..."

As the leaves turn and we move into the fall season, I am delighted to connect with you through this edition of our *ISCFS Newsletter*. This year has been a testament to our community's resilience, adaptability, and commitment to advancing craniofacial surgery, even in the face of ongoing global challenges. It is truly inspiring to witness how our collective efforts continue to push the boundaries of knowledge and innovation in this vital field of medicine.

HIGHLIGHTS AND REFLECTIONS

One of the most exciting developments in recent months was our highly successful webinar on orbital hypertelorism correction. The webinar brought together experts from around the globe, including Past-President **Eric Arnaud** (France), Council member **Cassio Rapposo do Amaral** (Brazil), and long-time member **Mark Urata** (US), to share their insights and latest advancements in the treatment of this complex craniofacial condition. We were honored to have such a distinguished panel of speakers who presented cutting-edge techniques, patient outcomes, and case studies that deepened our understanding of orbital hypertelorism. The event was not only informative, but also fostered an engaging discussion among the many participants, emphasizing the importance of collaborative learning in our field. For those who missed the live session or wish to revisit the presentations, the webinar recording is now available in the new password protected Members' Area of our society's website, www.iscfs.org I encourage all members to take advantage of this valuable resource.

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This season, we also celebrate the remarkable achievements of our members. Whether through groundbreaking research, the development of new surgical techniques, or the successful adaptation of care protocols to ensure patient safety, the dedication of our members is evident. It is through your hard work and passion that we continue to make strides in improving outcomes for patients with craniofacial conditions worldwide.

THE IMPORTANCE OF GLOBAL COLLABORATION

One of the defining strengths of the *International Society of Craniofacial Surgery* is our commitment to fostering a global community of professionals dedicated to improving patient care. In a field as complex and diverse as craniofacial surgery, collaboration and the sharing of knowledge are crucial. Our society serves as a platform for this exchange, facilitating the dissemination of best practices and the development of new, more effective treatment approaches. The recent webinar on orbital hypertelorism correction is a prime example of how virtual platforms can bring together experts from different corners of the world to share their insights and expertise.
As we look forward to our upcoming 21st Congress in Shanghai – **October 27-30, 2025** – I am reminded of the importance of in-person interactions and the unique value they bring to our professional and personal growth. The Congress will offer a much-anticipated opportunity for us to reconnect, learn from one another, and explore new avenues for collaboration with our international colleagues. I am confident that the knowledge and experiences we will gain will be invaluable in shaping the future of craniofacial surgery. I am thrilled to announce that the planning for Shanghai is well underway. It promises to be an extraordinary gathering of craniofacial surgeons, researchers, and allied healthcare professionals from around the world. Shanghai, with its vibrant blend of tradition and modernity, will provide an inspiring backdrop for us to explore the latest advancements in craniofacial surgery, share research findings, and foster international collaborations. The program committee is hard at work curating a diverse and stimulating agenda that will include state-of-the-art lectures, hands-on workshops, and opportunities for young surgeons and trainees to present their work. **Abstract submission will open on November 1**. Mark your calendars for this landmark event and stay tuned for further updates on registration and other key details.

CLOSING THOUGHTS

In closing, I want to extend my deepest gratitude to all of you for your continued dedication to the field of craniofacial surgery. Your passion and commitment to advancing patient care are the driving forces behind our society's success. Whether you are a seasoned expert or a young surgeon just beginning your career, your contributions are vital to our shared mission. I encourage you to stay engaged with our society's activities, participate in our educational offerings, encourage your colleagues to join the ISCFS (**https://iscfs.org/membership/**), and take advantage of the many opportunities available to you as a member. Together, we will continue to shape the future of craniofacial surgery, improving the lives of patients and families around the world.

Wishing you a productive and fulfilling fall season. I look forward to seeing you in Shanghai in 2025!

JESSE TAYLOR
ISCFS Secretary-Treasurer
UNITED STATES

MESSAGE FROM THE VICE PRESIDENT

Dear Colleagues,

Given the tradition of the ISCFS to organize the biennial Congress on the various continents of the world, it is Europe's turn to host in 2027. It is with great honor that I accepted the position of Vice President during our Congress in Seattle in 2023 and to bring the society to The Netherlands.

Craniofacial surgery was introduced to Rotterdam, the Netherlands by ISCFS-founding member Jacques van der Meulen, in close collaboration with Michiel Vaandrager. They were the first to perform craniofacial surgery in children at the Erasmus Medical Center and established the multidisciplinary craniofacial team. To host the ISCFS meeting in Rotterdam is largely their legacy.

Rotterdam is a fabulous city to visit. It has 600,000 inhabitants with over 170 nationalities, outstanding restaurants reflecting the diversity of nationalities, the largest harbor in Europe, and amazing architecture and skyline. We will welcome you in the center of the city at The Doelen, a conference and concert hall which is the home of the Rotterdam Philharmonic Orchestra.

You can easily reach Rotterdam directly by train or by airplane. The trip from Schiphol airport in Amsterdam to Rotterdam by train takes less than half an hour, and the train station is within walking distance of the conference hall and most hotels.

The 22nd Congress of the ISCFS will be held from September 7 to 10, 2027. The goal will be to have an exciting program that brings together all disciplines that are involved in the care of patients with craniofacial disorders. Besides sharing knowledge among plastic surgeons, maxillofacial surgeons, neurosurgeons, orthodontists and scientists, we want to include the expertise of intensive care pediatricians, ENT doctors, ophthalmologists, medical technicians and many others. True teamwork is crucial to achieve the best outcome for our patients and this will be the leading theme of our Congress.

The Rotterdam team is very much looking forward to welcoming you all to Rotterdam.

IRENE MATHIJSSEN
ISCFS Vice President
THE NETHERLANDS

21ST ISCFS CONGRESS

"The city covers a total area of 6,340.5 square kilometers."

Provided by
XIANXIAN YANG
CHINA

SHANGHAI FACTS AND HISTORY

POPULATION

Shanghai had a resident population of 24,758,900 as of the end of 2022, including 14,696,300 registered residents and 10,062,600 migrants. The year saw 108,000 births registered among the resident population, with a birth rate of 4.35 %. The ratio of male to female births per 100 in the resident population was 107.81. The life expectancy of Shanghai's permanent residents in 2022 was 83.18 years which was roughly the same as developed countries in Europe and North America. Japan ranked first globally in life expectancy, at 84.8 years. Shanghai was only 1.6 years behind Japan, and close to Norway and Switzerland.

Source: Shanghai Almanac 2023, Jiefang Daily

GEOGRAPHY AND NAME ORIGIN

Lying between longitudes of 120°51' and 122°12' east and latitudes of 30°40' and 31°53' north, Shanghai is located on the west coast of the Pacific Ocean and the eastern shoreline of the Asian continent. The city sits in the middle of China's north-to-south coastline and at the convergence of the Yangtze and Qiantang rivers. It is bordered to the north by the Yangtze River, to the east by the East China Sea, to the south by Hangzhou Bay, and to the west by Jiangsu and Zhejiang provinces. The city covers a total area of 6,340.5 square kilometers.

Shanghai is abbreviated as Hu (沪), and is also known as Shen (申). It was named after Shanghai Pu, a downstream tributary of the Wusong River. Hu (沪) originates from the Jin Dynasty (265-420 AD) when a fishing tool called a Hu (扈) was used locally. As the "estuary" was then called Du (渎), the lower reaches of the Wusong River were known as Hudu (扈渎) and later on as Hu (滬). Another alternate name of the city is Shen (申) because it was once a fiefdom of Huang Xie, Lord of Chunshen (春申君) in the State of Chu, during the Spring and Autumn Period (770-476 BC) and the Warring States Period (475-221 BC).

Source: Shanghai Almanac 2023

21ST ISCFS CONGRESS

"The submission deadline is April 30. We look forward to reading your abstract(s)."

ABSTRACT SUBMISSION IS OPEN NOW

We welcome readers to submit abstracts for the **21st International Congress of ISCFS in Shanghai, China on October 27-30, 2025**. The submission deadline is **April 30**.

Notification of accepted or rejected abstracts as determined by the Scientific Program Committee will be emailed to submitters on **June 10**.

ABSTRACT CATEGORIES

- Non-Syndromic Craniosynostosis
- Syndromic Craniosynostosis
- Facial Dysostosis
- Craniofacial Clefts or Encephaloceles
- Craniofacial Feminization Surgery and Facial Contouring Surgery
- Cranio-Maxillofacial Trauma
- Breathing Difficulties and Airway Management
- Maxillofacial and Orthodontic Aspects of Craniofacial Surgery
- Craniofacial Team Coordination and Care Pathways
- Simulation Surgical Education
- Virtual Surgical Planning and Surgical Simulation
- Artificial Intelligence, Augmented Reality, Virtual Reality
- Craniofacial Basic Science
- Neurosurgical Considerations in Craniofacial Surgery
- Distraction Osteogenesis of The Craniofacial Skeleton
- Tumors and Microsurgery in Craniofacial Surgery
- Tumors and Vascular Anomalies
- Cleft and Palate - Complicated or Secondary Problems
- Craniofacial Microsomia including Microtia

SUBMISSION RULES:

1. Abstracts are limited to 350 words with no images or tables.
2. Any number of abstracts may be submitted; however, each Congress participant may present only ONE podium presentation and ONE poster.
3. The official language of the Congress is English, both for submission and podium or poster presentations.
4. Additional accepted abstracts may be assigned to another author or withdrawn.
5. Submitted abstracts that have been presented at national meetings will be considered, but first-time presentations are preferred.

SUBMISSION LINKS:

If submitted **by author**

https://app.oxfordabstracts.com/stages/76197/submitter

If submitted **by staff** on behalf of author(s)

https://auth.oxfordabstracts.com/?redirect=/stages/76197/submissions/new?behalf=true

We look forward to reading your abstract(s).

HOW I DO IT: PTERYGOMAXILLARY DYSJUNCTION OF LEFORT I, III, AND MONOBLOC

PTERYGOMAXILLARY DYSJUNCTION - THE OLD AND THE NEW

CHRISTIAN EL AMM
UNITED STATES

Separation of the Pterygomaxillary suture remains a critical step of maxillary osteotomy. This "true" base of skull suture is in close proximity to the descending palatine vessels anteriorly, and the internal maxillary artery and pterygoid venous plexus posteriorly. Angled at 60 degrees antero-medially, an intraoral approach places it almost at 90 degrees to the surgical access.

Lateral access is blocked by the mandibular ramus and coronoid. Furthermore, the initial pass of the osteotome almost always results in an incomplete osteotomy: The height of the suture in adults is 16mm on average, larger than most standard osteotomes, necessitating secondary passes using only tactile feedback ("feeling around" for the remaining bone bridges). While

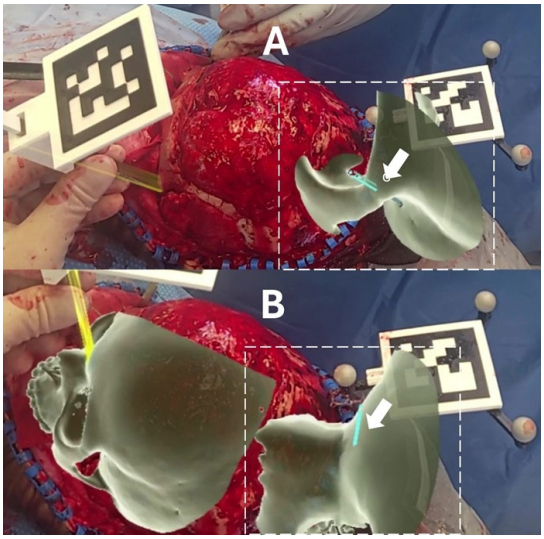


Figure 1: Registration is performed by matching virtual fiducials to the patient's anatomy, and a combination of automated feature detection (computer vision) and surface matching. Tracking accuracy is verified by placing the tip of the tracked osteotome on anatomical landmarks and verifying correspondence on CT-based virtual models. A: Intra-Operative view showing the setup of arrays and trackers used by the AR system. The array on the right is attached to the patient's skull, while the array on the left is attached to the osteotome. The tip of the osteotome is placed at the zygomatico-frontal suture. In this visualization mode, the virtual model is displayed with a 3-factor magnification (dashed white box). The white arrow points to the calculated trajectory and intersection, displayed virtually as a blue line. B: The anatomical model is displayed at scale in overlay mode to the left and matches the patient's osseous contour. The tip of the osteotome is placed at the nasion, and the magnified model on the right (dashed box and white arrow) shows accurate reproduction on the virtual model. Matching two landmarks in this fashion implies accurate registration of the entire model.

"Separation of the Pterygomaxillary suture remains a critical step of maxillary osteotomy."

Click here for 3,5 minutes long Video!

a true "dysjunction" of the suture is possible in pediatric patients, most of our syndromic Crouzon and Apert patients have a fused suture, and cleft patients have post-surgical changes that require a true osteotomy. These anatomical factors are assessed on preoperative imaging.

An osteotomy line that crosses over the maxillary tuberosity or over the pterygoid plates increases the risk of vascular injury and limits anterior movement of the maxilla. In maxillary distraction osteogenesis, this often results in an asymmetrical movement at the end of distraction, which I sometimes observed in my early cases, and continue to observe in some published cases. Blindness, neurologic injury and even death have been reported, emphasizing the importance of "teachability" and transfer of skills.

During a Lefort 1 osteotomy, a curved Obwegeser or Hargis osteotome passed around the tuberosity may be levered over a distal fulcrum to orient the percussive forces antero-medially. That fulcrum may be the surgeon's thumb, or sometimes the mandibular ramus. While that often "works", it is still a blind step, and the surgeon has no true feedback until bilateral osteotomies are completed and down-fracture of the maxilla accomplished. A purpose-designed "Swan-Neck" osteotome may be used for that purpose, but undesirable fractures are still possible. Some authors have proposed "digital fracture" only without osteotomy. While I have found that step may work for non-syndromic teenagers and adults, most of my syndromic and cleft patients have required a targeted pterygomaxillary osteotomy.

During a Lefort 3 or Monobloc osteotomy, most practitioners, myself included, have adopted Posnick and Goldstein's infratemporal approach. Soft tissue dissection is critical: Dis-insertion of the temporalis muscle and subperiosteal dissection of the posterior surface of the maxilla in the infratemporal space, caudally down to the tuberosity, then posteriorly until "dip" of the suture and fissure are identified. A double-gloved finger is placed intra-orally as a guide to the dissection and osteotomy, and opens the occlusion, thus moving the coronoid out of the way, allowing for passage of the osteotome medial to the zygomatic arch. This access to the pterygomaxillary osteotomy is more in line with the angulation of the suture and proceeds in a safer cranio-caudal vector. A drop in pitch of the tapping mallet indicates completion of the osteotomy, as does the operator's finger palpating the tip of the osteotome on the palatal surface.

During my fellowship, Dr A. Denny repeatedly demonstrated the ease and safety of the reciprocating saw for this task. By placing a "cottonoid pledget" medially over the contents of the pterygomaxillary fissure, and distally over the tuberosity mucosa, the reciprocating saw does an excellent job preserving

the soft tissues and avoiding unwanted extensions of the fracture line. (Other authors have recently proposed a transmucosal approach using the piezoelectric osteotome).

While I have successfully used these techniques over the years, with fewer, ahem, "deviations" as I gained experience, the procedure remained "blind" relying on tactile and auditory feedback, did not account for regional critical structures and was difficult to teach. "Feeling around" to complete the osteotomy with secondary passes felt uncertain. I continued to hesitate allowing residents to perform this critical step. More recently, the introduction of augmented reality navigation to our craniofacial practice provided direct visualization of the osseous, vascular and dental anatomy, with accurate overlay, guidance and tracking of instruments. During a "navigated midface osteotomy", a see-through headset displays a cross-sectional plane of CT data at the 3-D location of the tip of the osteotome, while navigation views allow for planning the future trajectory of the osteotome (see photos and video). This has proved particularly useful for pterygomaxillary, orbital floor and vomer osteotomies. The visual feedback, in addition to the tactile and audio cues, simplified this step to the level of a "routine" surgical maneuver. I now feel more confident handing over this critical step to our residents.

P.S.: The attached images and video are synthetic combinations of camera capture and virtual data, representing what the operator sees. The actual headset display is more transparent, and the visibility of grayscale DICOM fine detail under bright OR lighting is sub-optimal, hence the use of colorized 3D models to accentuate anatomical detail.

Disclaimer: The author is the founder of Xironetic®, a surgical augmented reality company.

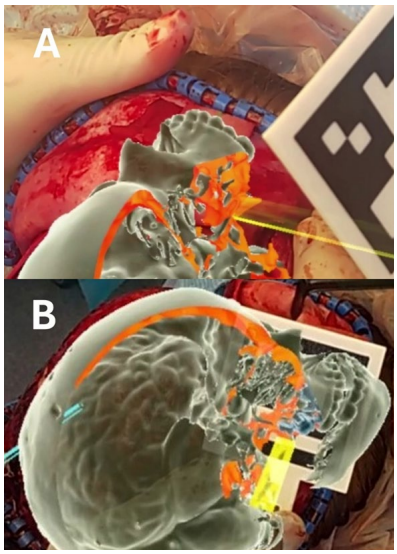


Figure 2: Intra-operative view while performing Pterygomaxillary osteotomy on a 5-year-old child with Crouzon Syndrome. The surgeon's index fingertip is intra-oral, providing tactile feedback. In this visualization mode, a cross-section of the CT scan 3D model is displayed at the tip of the osteotome. Color contrast optimizes visibility of anatomical detail under surgical lighting conditions. Gray colors display the CT-derived bone surface models, the orange colors display the cross-sectional detail, the yellow lines display the tracked osteotome, and the blue colors display the maxillary tooth buds. Multiple participants, including surgeon, assistant resident and others can wear AR headsets and visualize the same scene. A: Assistant's view B: Operator's view.

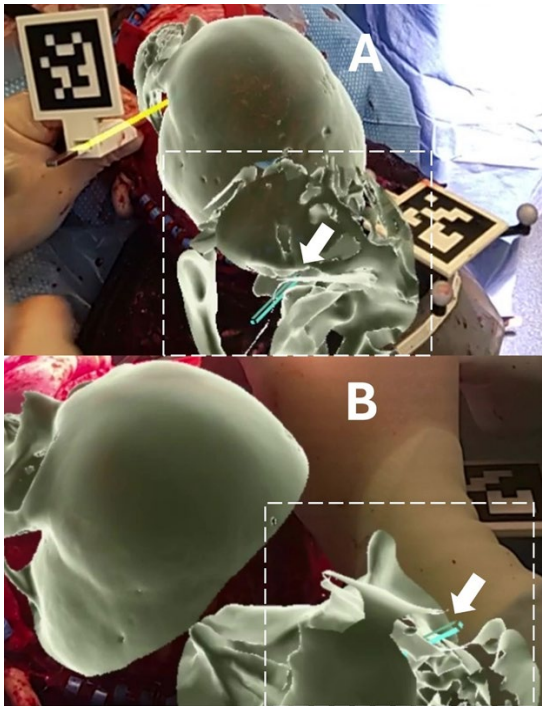


Figure 3: Trajectory planning. The AR system tracking the osteotome calculates and displays the predicted trajectory, allowing the surgeon to visualize the osteotomy before it is performed.
A: Predicted trajectory for the osteotome placed at the left pterygomaxillary suture, with the "magnified view" of the region of interest outlined by the dashed box. The white arrow points to the pterygomaxillary suture. B: Predicted trajectory for the vomer osteotomy. The osteotome is introduced from the base of skull osteotomy. The white arrow inside the dashed box points to the posterior vomer.

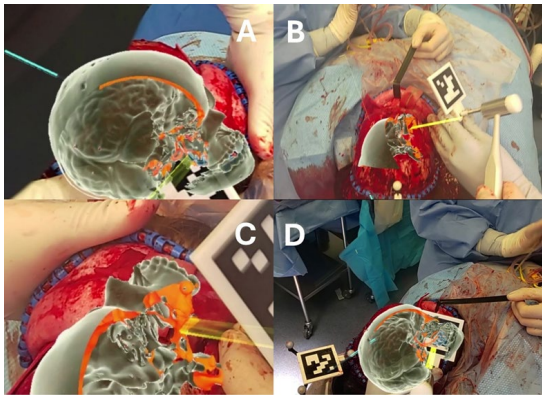


Figure 4: Transfer of skills: A supervising surgeon can directly visualize the performance of this critical step and provide feedback if needed. A,B: Attending Surgeon view, C,D Second Surgeon view. A,C: Attending Surgeon performing pterygomaxillary osteotomy. B,D: Second Surgeon performing a second pass completion osteotomy.

PTERYGOMAXILLARY DYSJUNCTION OF LE FORT III AND MONOBLOC OSTEOTOMIES: ALTERNATIVES TO CLASSIC PTERYGOMAXILLARY DYSJUNCTION AND THE VALUE OF 3D-PLANNING IN TACKLING THE 'BLIND SPOT'

HERMAN JR VERCRUYSSE
BELGIUM/SPAIN

ADAIA VALLS ONTAÑON
SPAIN

JOSEP RUBIO-PALAU
SPAIN

An adequate pterygomaxillary disjunction is crucial for a successful 'en-bloc' Le Fort III or Monobloc osteotomy and its subsequent sagittal distraction. However, it presents several difficulties that can complicate the surgical process and affect patient outcomes. One of the primary difficulties associated with pterygomaxillary disjunction is the limited visibility in the posterior maxillofacial region, making it challenging for surgeons to accurately navigate and perform the disjunction in this 'blind spot'. Therefore, the blind approach with straight osteotomes for the extra-oral part and curved osteotomes for the intra-oral part have been routinely used, but alternatives exist to further reduce the risk of complications such as vascular injuries, fractures of the pterygoid plates, base of the skull or injuries of dental germs.

In our center, every Le Fort III or Monobloc osteotomy is carefully virtually planned and surgical aids are 3D-printed to guide the osteotomy. In a first step, the osteotomy is executed on a virtual mock-up. Care is taken to avoid possible dental germs (as indicated with the red arrows in Figure 1). To aid the manufacturing of a surgical cutting guide for the pterygomaxillary osteotomy, we try to align the pterygomaxillary osteotomy with the osteotomy of the lateral orbital wall, as illustrated by the red dotted lines in ***Figure 1***.

The 3D-printed cutting guide for the lateral orbital wall is

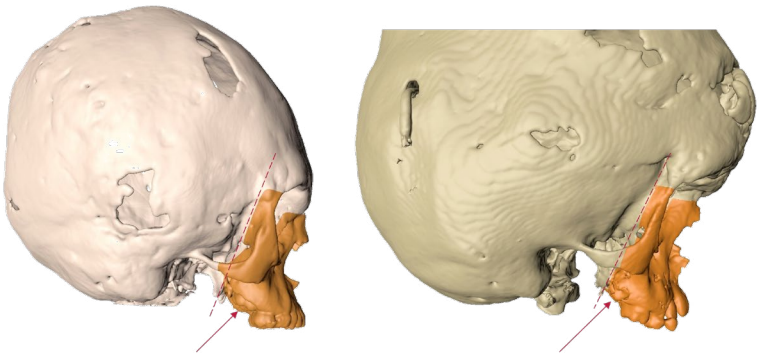


Figure 1

designed with a lateral ledge ***(Figure 2)*** that allows guidance of an osteotome to perform the osteotomy of the (upper) pterygomaxillary region ***(Figure 2)***. To define the end of the osteotomy in the 'blind spot', we mark the total vertical length of the osteotomy on the osteotomes with a small band of sterile tape ***(Figure 2)***. The vertical length of the osteotomy is measured pre-operatively on the virtual planning and checked on a sterile printed 3D-model of the patient. As an additional (and more tactile) control mechanism, the surgeon puts the index finger of his non-dominant hand behind the maxillary tuberosity. The osteotomy is first executed with a 6mm osteotome and later repeated with wider osteotomes once the intra-oral osteotomy is performed.

In an attempt to obtain more accuracy of the pterygomaxillary osteotomy line, our center sporadically uses optical neuronavigation to guide the osteotomy and dissolve the blind spot. The same 3D preparation with cutting guides is performed as explained above, but a skull-mounted reference array is installed once the coronal flap is developed. The 8mm osteotomy is calibrated ***(Figure 3)*** and the progression of the tip of the osteotome can be visualized real-time on the navigation monitor.

The osteotomy path can be verified afterwards with the neuronavigation probe ***(Figure 4)***.

The lowest part of the pterygomaxillary osteotomy is consistently performed via intra-oral access. We therefore divide the pterygomaxillary osteotomy in two parts:

1. The upper pterygomaxillary osteotomy for which 3D printed ledged cutting guides are used to perform the osteotomy via the coronal approach. The osteotomy is executed with a series of straight osteotomes.
2. The lower pterygomaxillary osteotomy for which either a curved Obwegeser pterygoid osteotome is used or a piezotome with curved microsaw.

If a curved Obwegeser pterygoid osteotome is used, a small horizontal incision is made over the zygomaticomaxillary buttress. The index of the non-dominant

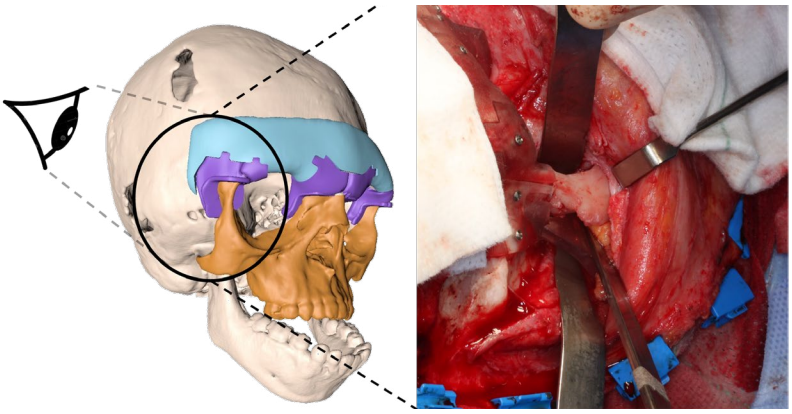


Figure 2

Figure 3

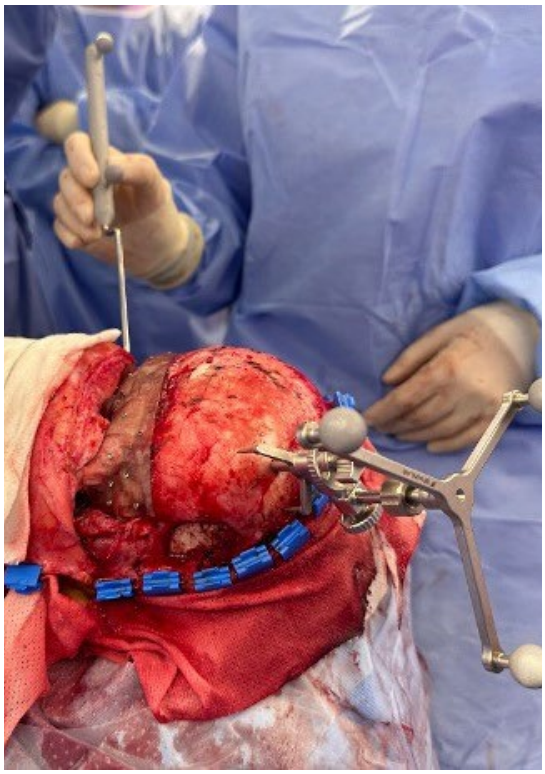


Figure 4

hand of the surgeon serves as a tactile stop during the pterygomaxillary osteotomy.

As an alternative method for the osteotomy of the lowest part of the pterygomaxillary disjunction, a piezotome with a curved microsaw ***(Figure 5)*** or an ultrasonic bone scalpel can be used. Recent studies have shown an advantage in comparison to conventional methods as it leads to a more favorable fracture pattern, probably due to its increased tactile feedback and higher selectiveness to cut only osseous structures. A small horizontal incision of 5mm between the maxillary tuberosity and the pterygoid process ***(Figure 5)*** is recommended before inserting the tip of the piezoelectric microsaw in order to avoid damaging the soft tissues.

After completion of the upper and lowest part of the pterygomaxillary osteotomy, two Rowe forceps are positioned and a 'pull-down' maneuver is executed to complete the pterygomaxillary disjunction. After completing the osteotomy, a Smith separator is inserted to advance the facial structures and gently stretch the soft tissues. The lateral arms of the separator are positioned anterior to the pterygoid plates, while the medial arm applies forward pressure on the maxillary tuberosity.

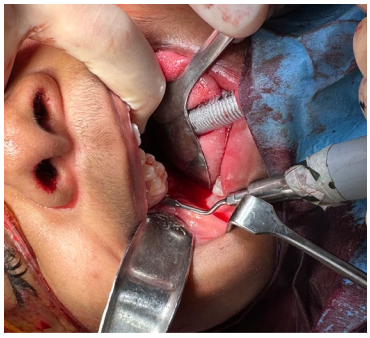


Figure 5

ISCFS NEWSLETTER

Volume 2 | Number 1

MEMBERS! Please write an article on

HOW I DO IT:

Split Calvarial Bone Grafts: How Young and How

To submit an article of 750-1000 words with up to 5 JPG images as needed, send it to admin@iscfs.org no later than Wednesday, December 18.

JANUARY 2025

PTERYGOMAXILLARY DYSJUNCTION FOR LEFORT I, III, AND MONOBLOC

"Unlike the other osteotomies, the Le Fort 1 osteotomy is performed exclusively through an intraoral incision."

RICHARD HOPPER
UNITED STATES

In my practice, the most common conditions requiring a midface advancement with pterygomaxillary (PM) separation are Cleft lip and Palate, Crouzon, Pfeiffer, Apert and Treacher Collins syndromes. I will first focus on the general principles I follow when performing a pterygomaxillary dysjunction for each osteotomy, then conclude with syndrome-specific considerations.

Lefort I osteotomy: Unlike the other osteotomies, the Le Fort 1 osteotomy is performed exclusively through an intraoral incision. Upon completion of the anterior maxillary and naso-septal osteotomies, a pterygo maxillary osteotomy is required for the Le Fort 1 downfracture. Unlike the higher osteotomies, where the maxillary separation from the skull base needs to be as far posterior as possible to protect the unerupted second molars and maximize the thickness at the zygomatico-maxilllary suture, with the Le Fort I osteotomy the separation can be as anterior as the permanent dentition allows. The major complication when performing the Le Fort 1 osteotomy is unfavorable propagation towards the orbital apex. As a result, I attempt to make my pterygomaxillary osteotomy as low and as anterior as possible. When making the posterior maxillary sinus osteotomy from the lateral maxillary buttress with my piezoelectric saw, I angle the cut inferiorly towards the pterygomaxillary junction. This allows me to place the upper corner of an 8mm curved osteotome in this posterior sinus wall cut, so that the osteotome starts at a 45-degree angle. I visualize the pterygomaxillary osteotomy not as a vertical cut, but one that curves anterior into the sinus at its superior portion. After my first osteotome cut at 45 degrees, I then curve the osteotomy into a vertical orientation as I complete the osteotomy inferiorly.

I then use laminar spreaders at the lateral nasal wall cut to gently open the anterior osteotomies <1cm by hinging at the loosened pterygomaxillary junction so that I can visualize the posterior sinus. I remove the bone from the posterior sinus osteotomy towards the pterygomaxillary junction using a 2mm Kerosine angled ronguer. This allows me to visualize the palatine pedicle and ensure that there are no posterior fractures propagating superiorly towards the orbital apex. After this, I place Roe-Kiley forceps around the palate and complete

the downfracture, focusing first on opening the posterior maxillary fracture to avoid compression at the skull base before rotating downwards.

Special consideration must be taken when performing a pterygomaxillary osteotomy from an intraoral approach in conditions with decreased posterior maxillary height. The most extreme example of this is in Treacher Collins syndrome, where the counterclockwise bi-maxillary deformity results in a very short posterior pterygomaxillary height with a small, but thickened bridge of bone immediately adjacent to the orbital apex. ***(Figure 1)*** If care is not taken, an osteotome placed through an intraoral incision will be pointing upwards towards the apex. Cases of craniofacial microsomia, and cleft lip and palate can have this same challenge. A way to minimize this risk is to do a transmucosal approach, directly at the pterygomaxillary junction instead of through your intraoral sulcus incision. Simply by placing a sharp curved osteotome directly in the mucosa in front of the hamulus will allow a more level (less pointing upwards) angle of osteotomy.

Lefort II/III osteotomies: Unlike the Le Fort 1, the Le Fort II/III pterygomaxillary dysjunction can be performed exclusively through the coronal approach. I only dissect the anterior half of the temporalis muscle in a sub-periosteal plane down to the inferior aspect of the orbit, until I can visualize the anterior lip of the inferior orbital fissure (IOF). The IOF is the key landmark when performing an upper-level osteotomy. It will guide your lateral wall, orbital floor and pterygomaxillary osteotomies, since it is the landmark at the border of the face and skull base. From the inferior aspect of the IOF, I use an elevator to stay directly on the bone and create a tunnel across the posterior maxillary sinus, down to the pterygomaxillary junction. I can then place the upper edge of a long, slightly curved osteotome in the IOF on the under-surface of the orbit and progressively create the osteotomy inferiorly toward my finger, which is placed just behind the hamulus. Unlike the Le Fort 1 osteotomy, which I visualize completing as anteriorly as possible, for the Le Fort II/III osteotomy I focus on staying as posterior as possible. My mantra is to "hug the skull base" by pulling the curve of the osteotomy backwards against the skull base as I progressively make the break downwards. This "hugging the skull base" minimizes risk to the unerupted second molar follicles, while also avoiding the vascular structures anterior to the skull base. ***(Figure 2)***.

The reassuring thing with the higher osteotomies is that our osteotome can always point inferiorly towards the hamulus, compared to the intra-oral approach, which always runs the risk of pointing upwards towards the apex. For severe cases of Treacher Collins syndrome however, I try to

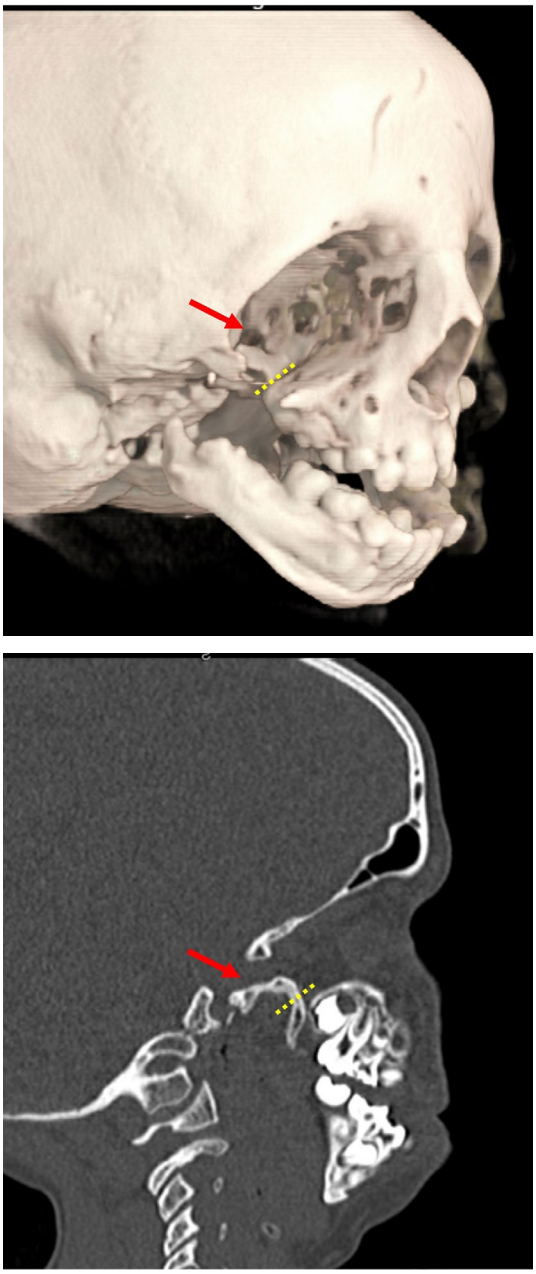


Figure 1. Due to the shortened posterior maxillary height, the pterygomaxillary junction in Treacher Collins syndrome and some cases of craniofacial microsomia is located adjacent to the orbital apex.

directly visualize the thick but short bone bridge between the maxilla and skull base and cut it with a piezoelectric saw instead of using an osteotome due to the proximity of the optic nerve.

Some cases of Apert and Pfeiffer syndrome have abnormal thickening of the pterygomaxillary junction and in some cases do not have maxillary sinuses. In these cases, the approach is the same – a tunnel dissection from the IOF directly on the bone down to the pterygomaxillary junction – but a saw is often required to then complete the separation instead of using an osteotome alone. ***(Figure 3)***.

Monobloc: The lateral dissection and pterygomaxillary osteotomy technique in the monobloc is the same as the Le Fort II/III. An additional approach to the medial aspect of the pterygomaxillary junction is available during a monobloc that can be helpful when there is abnormally thickened bone at the skull base. Once all osteotomies have been completed, including the lateral approach to the pterygomaxillary osteotomy, I place a 5mm straight osteotome through the anterior cranial floor osteotomy at the level of the medial orbital wall cut. Following the medial wall osteotomy downwards will take care of any thickened bone at the junction of the medial wall and orbital floor, and as the osteotome continues to travel inferiorly it will meet the medial pterygomaxillary junction where any bone bridge remaining after the lateral approach can be managed.

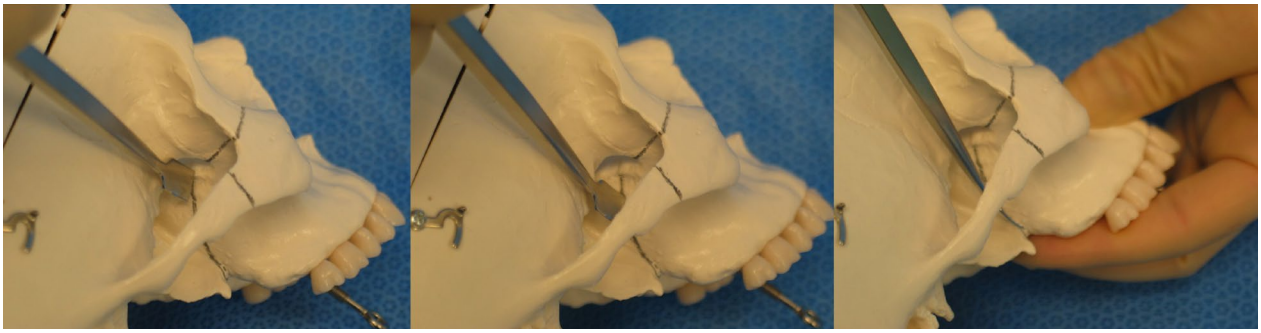


Figure 2. "Hugging the skull base". The anterior lip of the inferior orbital fissure is the key landmark when making any pterygomaxillary osteotomy from the coronal approach.

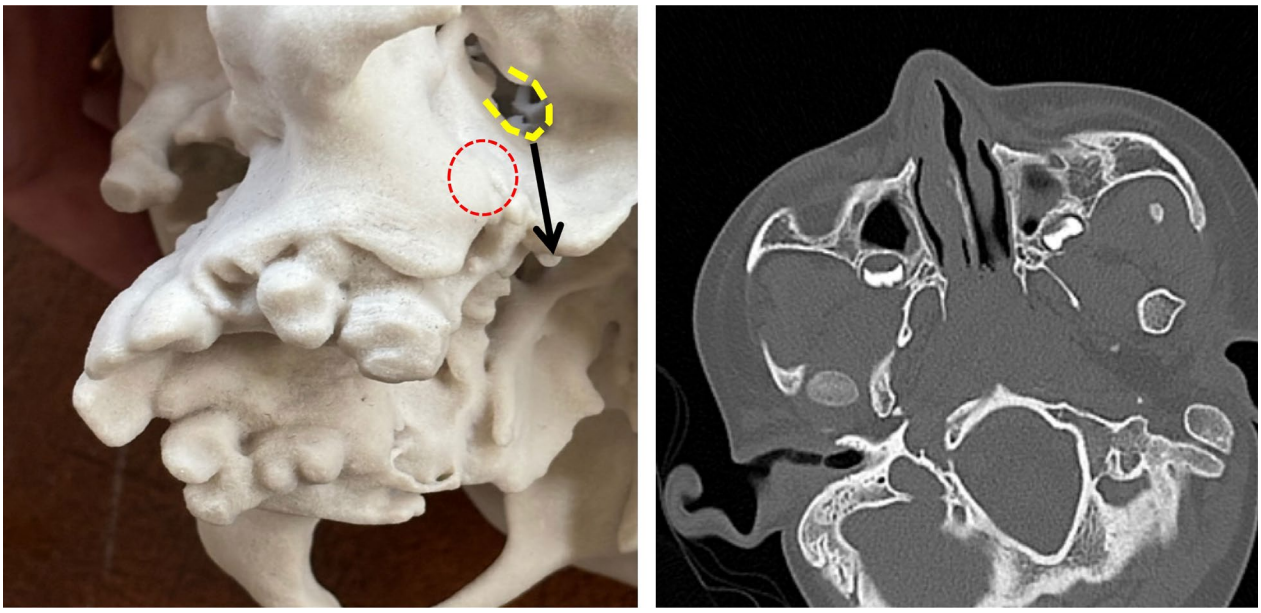


Figure 3. In Apert and Pfeiffer cases, the osteotomy must be posterior to avoid the molar follicles. Despite the orbital dysmorphology in these syndromes, the inferior orbital fissure remains your best landmark.

PTERYGOMAXILLARY DYSJUNCTION FOR LEFORT I, III, AND MONOBLOC PROCEDURES

"Pre-operative review of the imaging will provide familiarity of any unerupted teeth in the tuberosity region."

MARK URATA
UNITED STATES

Pterygomaxillary disjunction (PMD) is typically the final step in order to separate the maxilla from the skull base, specifically the pterygoid plates of the sphenoid bone. The sphenopalatine fossa houses the maxillary artery and its terminal branches including the descending palatine artery. The pterygoid venous plexus and the optic nerve also travel in this region. By convention, the PMD is the last step performed prior to the maxillary down-fracture in order to provide access and visibility to achieve hemostasis. Incomplete separation of the pterygoid from the posterior maxilla is one of the most common challenges encountered when performing frontofacial and midface mobilizations.

The author prefers to utilize an intra-oral technique for all midface pterygomaxillary separations, which includes orthognathic LeFort I procedures, subcranial Lefort III's or combined Lefort III/I's, as well as monoblocs with or without facial bipartition.

In patients undergoing an isolated subcranial LeFort III, for the PMD component, standard local anesthesia is given in the buccal labial vestibule of the maxilla. Then, two incisions are made, one on either side in the region of the maxillary molars. In patients undergoing a facial bipartition or standard LeFort I requiring a separation of the vomer maxilla interface, the vestibular incision is carried across the midline from 1st molar to 1st molar to expose

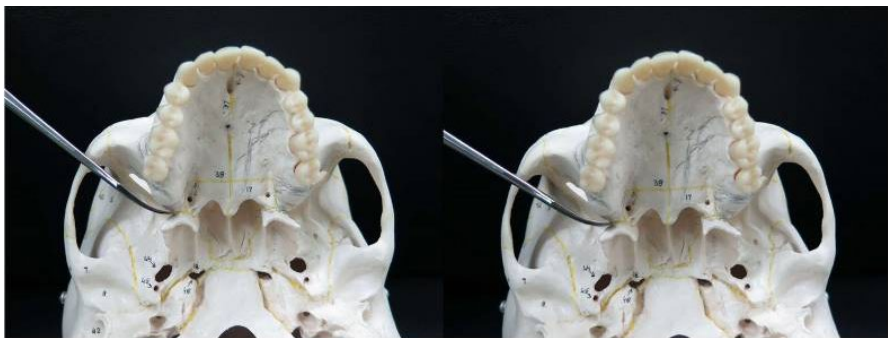


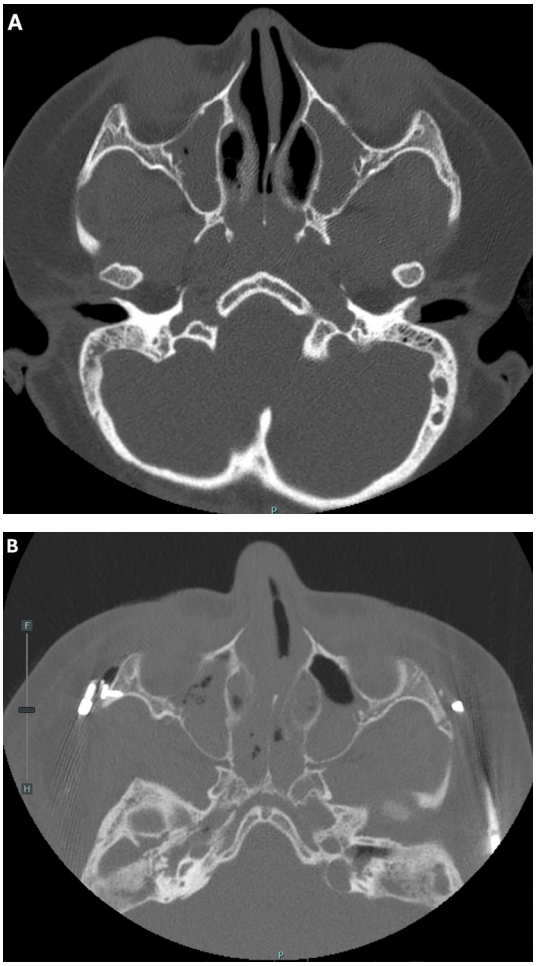
Figure 1: Placement of curved osteotome in the pterygomaxillary junction. Left: 90 degrees to the sagittal plane. Right: 102 degrees to the sagittal plane, a preferred angulation for smooth separation of the pterygomaxillary junction (Chin et al. 2017)

the entire pyriform aperture while simultaneously providing access to the pterygoid region. All maxillary buccal vestibular incisions are made halfway between the depth of the vestibule and the wet-dry vermillion junction to allow a generous cuff of mucosa to suture at the conclusion of the surgery. The incision is performed with electrocautery with a needle tip on cutting just through the mucosa (tip is typically 2-4 mm in length with the rest of the needle protected with a sheath), then the tip is angled caudad and the cut is continued to a sub-periosteal plane lower on the alveolus. This allows the ability to dissect caudad to expose the alveolar ridge in a multi-segment Lefort procedure as well as facial bipartitions. A Molt 9 periosteal elevator or Tessier periosteal elevator is then used to expose the entire anterior maxilla, guiding posterior along the curved posterior tuberosity to the pterygomaxillary junction (PMJ). This requires changing the medial angulation of the periosteal tip as the dissection is continued into the groove. Care must also be exercised in the teenage patient not to violate developing third molar follicles. Pre-operative review of the imaging will provide familiarity of any unerupted teeth in the tuberosity region. If bleeding is encountered during this process, packing with a hemostatic oxycellulose or gauze is performed prior to down fracture. Once hemostasis is confirmed, the separation is resumed.

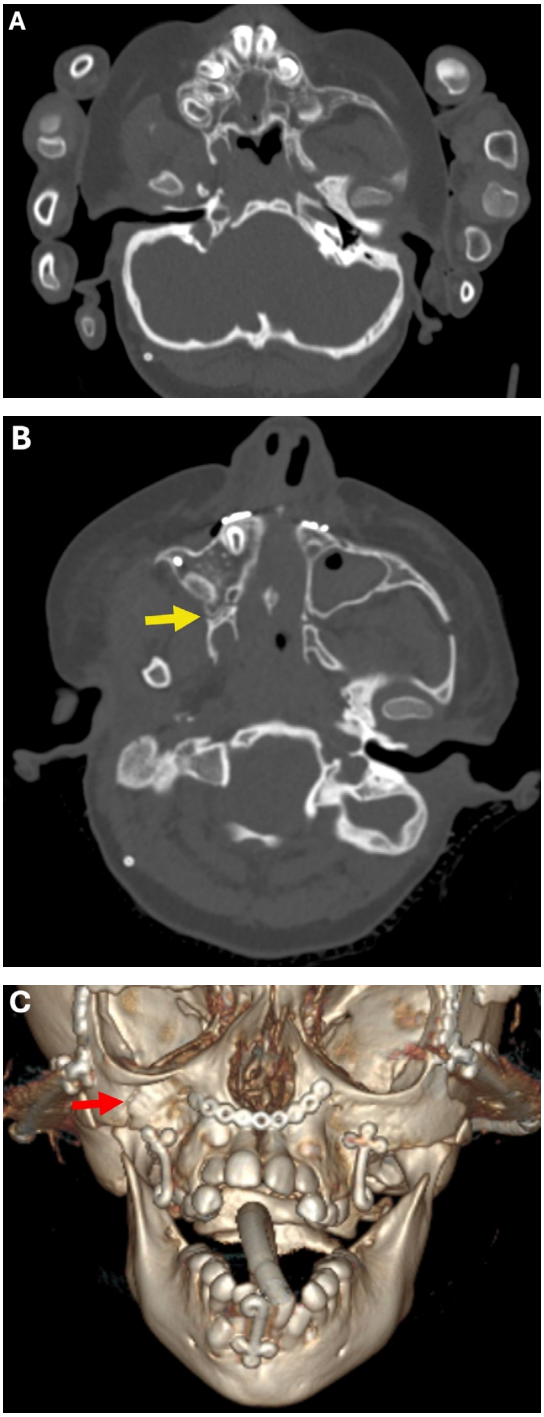
A curved osteotome is selected based on the contour or angulation of the pterygomaxillary interface as reviewed pre-operatively on CT scan. The osteotome is then placed posterior to the maxillary tuberosity so that the cutting surface of the osteotome is pointed slightly inferiorly and medially (requiring lateralization of the osteotome handle against the oral commissure) to guide the osteotome away from the pterygoid and associated vasculature. It has been shown that to minimize the risks of unfavorable disjunction or pterygoid plate fractures, the osteotomy path ideally begins laterally in PTM groove and continues medially along the PTM junction where this line creates an angle with the sagittal plane that is greater than 90° (not perpendicular), demonstrated in Figure 1. In fact, as the osteotome moves medially, a slight anterior angulation is assumed. The curved osteotome tip ideally forms an angle ranged 100-105 relative to the sagittal plane.

The primary surgeon's dominant hand holds the osteotome, while the non-dominant index finger is used to palpate the hamulus. The assistant is responsible for the mallet and performs small, controlled taps by instruction of the primary surgeon while the primary surgeon verifies mobility of the hamulus signifying separation between the maxilla and pterygoid. The tip of the osteotome can also be palpated with the non-dominant fingers as it penetrates medially between the two bones. Violation of the primary surgeon's finger is an indication for a new assistant surgeon operating the mallet!

Since an intraoral exposure is necessary in all midface separations for dissection of the alveolus, lateral nasal walls, and floor as well as the vomer, this approach to PMD simply makes use of an already existing access. The intraoral approach has been shown to be safe and effective in maxillary mobilization,



Figures 2: Figure 2A demonstrates that the pterygoids are slightly medially positioned in relation to the sagittal plane, requiring a slight anterior angulation of the osteotomes in the fissure. Figure 2B is after osteotome separation, showing a space between the maxilla and pterygoids bilaterally.



Figures 3: Figures 3A and 3B represent pre-operative and post-operative axial CT scan slices of a patient with Apert Syndrome undergoing monobloc facial bi-partition distraction. Figure 3C is the post-operative 3D CT of the same patient. Figure 3A demonstrate the pre-operative relationship at the PMJ which shows abnormal anatomy. Figure 3B demonstrates a postoperative complete separation of the left PMJ, but an incomplete separation of the right PMJ. This went unrecognized during the initial stages of distraction which ultimately led to an aberrant fracture at the zygomatically maxillary suture line on the right as demonstrated in Figure 3C.

while being more protective of budding dentition developing in the posterior maxilla,1 which may ultimately affect the vertical dimension of occlusion in the growing face and subsequently the outcomes in orthognathic surgery.[2]

By keeping the dissection subperiosteal, it is the author's experience that the potential for significant hemorrhage is decreased as disruption of the pterygoid plexus and even the internal maxillary artery and branches requires violation of the periosteum, which is relatively thick in the tuberosity region. Further, since many more LeFort I procedures are performed by most surgeons than the other larger separations, it stands to reason that surgeons have much more experience with the intra-oral approach.

The extra-oral approach is still reserved for those patients whose anatomy of the pterygomaxillary junction requires outward rotation of the osteotome handle past what the oral cavity will allow, typically as a result of prior separation or congenital variance of the anatomy in that region. In syndromic patients, the pterygomaxillary junction is often abnormal either due to prior surgery or as a result of a hypoplastic midface that blunts the groove or fissure, making it more difficult to discern with the periosteal elevator and the osteotome. Pre- and peri-operative review of the CT scans will decipher these anomalies and should allow the surgeon to select the appropriate instrumentation and angulation in order to optimize the separation.

As an example, the CT slices below are pre-operative and post-operative axial views of the PMJ from a patient diagnosed with Crouzon Syndrome.

Incomplete separation of the pterygomaxillary junction can be a common challenge in mobilizing the frontofacial or midface complexes. Since an incomplete separation of the pterygomaxillary junction can result in violation of the cranial base or suboptimal fractures of the midface, whether completed intraorally or extraorally, this critical step of separation benefits from image-guided planning and thoughtful stepwise execution. Despite the rare demonstrated complication above, overall, we have found the intraoral approach to provide a safe and reliable method to complete pterygomaxillary disjunction with minimal morbidity.

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WINDOW INTO HISTORY

JOB VAN MEEKEREN (1611-1666)

LIFE – Van Meekeren was born in Amsterdam in 1611. He became a student of the Dutch anatomist Nicolaes Tulp (1593-1674) who is famous for having been painted by Rembrandt van Rijn (1606-1669) in his *Anatomy Lesson of Dr. Tulp* in 1632. By 1635, aged 24, van Meekeren was already registered as a member of Amsterdam's Barber-Surgeons' Guild and practiced there as a surgeon and anatomist all of his life. He gained an excellent reputation as City, Admiralty and St. Peter's Hospital surgeon, (2) showing great interest in hand surgery, and performed cadaveric dissections on many uncommon cases. He died in 1666 aged 55.

During his short but busy life, van Meekeren assembled a considerable number of rare case reports. He gathered them in a book, originally written in Dutch and posthumously issued in 1668, that was then translated into German and later into Latin, with the following title: *Observationes Medico-Chirurgicae*, published in Amsterdam in 1682 (1).

Observationes Medico-Chirurgicae (Medical-Surgical Observations) – In his work, an incredible mine of peculiar case reports, van Meekeren describes the state of the art of surgery in the seventeenth century in the Netherlands. The frontispiece depicts a demonstration of a typical life scene of the period. In the foreground, a standing man with severe skin laxity, later named Ehlers-Danlos syndrome, whose skin of the thorax is easily stretched until it reaches his mouth, raises a curtain with his right hand, unveiling the interior of van Meekeren's consultation room ***(Figure 1)***. Hanging on the wall are the author's surgical armamentarium and a few plates illustrating uncommon pathological conditions to be shown to patients during a consultation, like paracenthesis for abdominal ascites, inguinal hernia, facial tumor, and omphaloceles. In the background, a few sick persons with various dramatic diseases like arterio-venous malformation of the shoulder, orbital tumor, massive endonasal polyposis, and occipital encephaloceles are awaiting van Meekeren's visit.

Report of the First Cranioplasty
In Chapter 1 of his book, van Meekeren refers to the incredible story of a noble Russian soldier named Butterlyn who was

RICCARDO F. MAZZOLA
History Editor
ITALY

"During his career, he amassed an important collection of human anatomical specimens, both normal and pathological..."

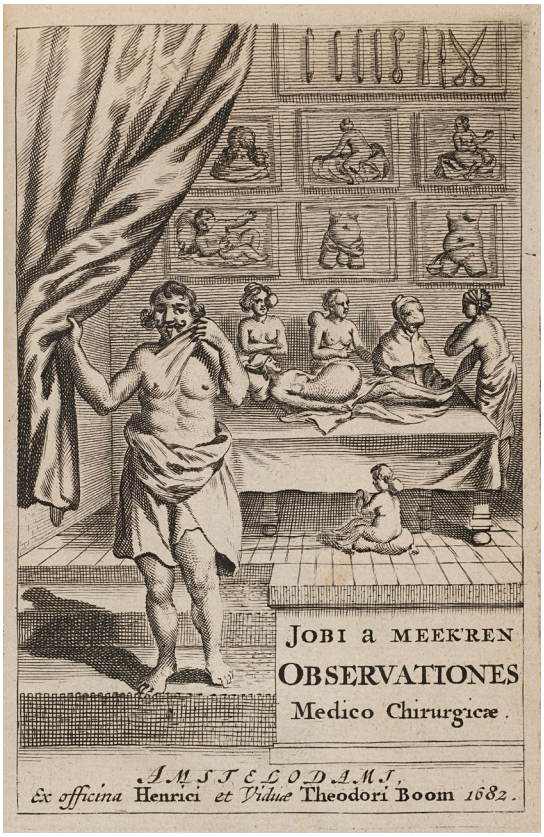

Figure 1 - Frontispiece of Observationes Medico-Chirurgicae by J. van Meekeren, published in 1682.

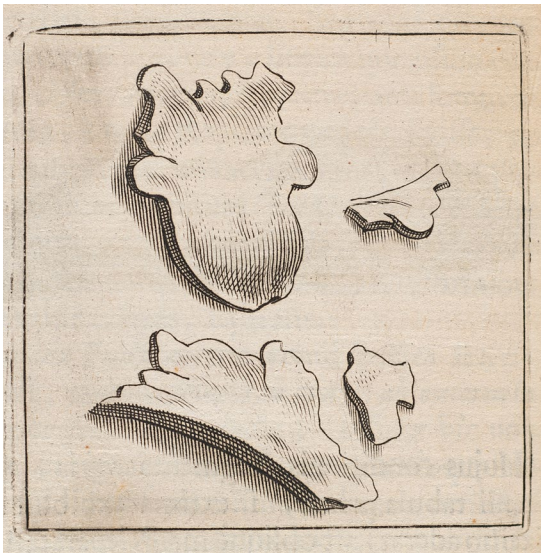

Figure 2 - Different pieces of bone harvested from a dog's skull and transplanted into a cranial defect of a Russian soldier.

operated on in Moscow to fill in a cranial defect, sequela of a coup de sabre received on the battlefield. The operation consisted of the transplantation of a piece of bone harvested from the skull of a dog that had been killed on purpose. The graft corresponded in shape and size to that cut by the sword from the nobleman's head ***(Figure 2)***. The graft took perfectly and the nobleman was restored to health. After this miraculous cure, he joyfully recounted the event to various friends and acquaintances, who in turn communicated it to the theologians and thence to the Metropolitan (the Bishop of the Russian Orthodox Church). They brought about Butterlyn's excommunication and he was forbidden access to the places where Christians met together throughout the whole of Russia – so long as the aforementioned parts of the bone from the dog remained united with the bones in the head of a Christian man. Butterlyn, preferring to be counted among the members of the Church rather than to endure all manner of things for a true cure, ordered the surgeon to remove the fragments of the dog's bone. Thus, he escaped the force of the excommunication by the application of a different treatment.

This interesting account, the first report of a bone graft (xenograft) for cranioplasty in the medical literature, was told to van Meekeren by the Reverend Engelbert Sloot of Sloterdijk (an Amsterdam suburb) who had received a letter in Latin regarding the bone grafting procedure from Johannes Kraanwinkel, a missionary in Moscow.

Craniofacial Deformities – In an added section of the book, van Meekeren reports some rare cases of craniofacial deformities: a bilateral synostosis of the coronal suture, possibly a brachicephaly ***(Figure 3)*** and a midline facial cleft with bifid nose, hypertelorism and encephaloceles ***(Figure 4)***.

Figure 3 - Bilateral synostosis of the coronal suture.

Figure 4 - Midline facial cleft with bifid nose, hypertelorism and encephaloceles.

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ORTHODONTIC CORNER

"The RED system is mostly beneficial for complex malocclusions or craniofacial malformations..."

TREATMENT OF MAXILLARY HYPOPLASIA IN A PATIENT WITH UNILATERAL CLEFT LIP AND PALATE WITH THE RED SYSTEM

ANGELIKI ANNA GKINOSATI
CYPRUS

CHRISTODOULOS LASPOS
CYPRUS

AIM

This case report presents a patient with unilateral cleft lip and palate and maxillary hypoplasia who was treated with a Rigid External Distraction (RED) device. The use of maxillary distraction with the RED system can help clinicians avoid double jaw surgery that is usually necessary in severe cases. Gradual distraction at an early age can correct the deformity of the maxilla in the horizontal, transversal, and vertical planes, with long-lasting results.

INTRODUCTION

A 14-year-old individual born with unilateral cleft lip and palate was presented with maxillary hypoplasia. Maxillary distraction was indicated to treat the deformity at an early age. Facial asymmetry, increased lower anterior facial height (LAFH) and inadequate exposure of upper teeth were present before treatment. Profile was characterized by midfacial retrusion, retrusion of the upper lip, and protrusion of the lower lip. Intraorally, the patient presented with Class III malocclusion reverse overjet of 17mm as well as an anterior open bite.

MATERIALS AND METHODS

Diagnostic records including extraoral and intraoral photographs and lateral cephalometric and panoramic radiographs were taken. The treatment protocol was meticulously planned, incorporating a preoperative orthodontic phase to optimize dental alignment before surgical intervention. The RED system was installed under general anesthesia during the Le Fort I osteotomy and connected to a splint, to enable distraction of the maxilla. A latency period of seven days postoperatively was necessary before the activation of the device. Maxilla was advanced 1mm per day (distraction phase). Elastics were used to control the direction

of the distracted maxilla. After achieving adequate protraction of the maxilla, the device was surgically removed, and the patient continued treatment with fixed orthodontic appliances to establish ideal occlusion for function and esthetics.

RESULTS

The patient had the appliance for a total of 10 Weeks. In all of the distraction cases, an overcorrection of 3-5mm is indicated because of the possibility of relapse after removal of the distractor. Significant protraction of the maxilla leads to correction of the Class III skeletal relationship. Furthermore, a double jaw surgery was avoided, thus avoiding the risk of increased mandibular setback that could potentially induce sleep apnea. The gradual distraction also could prevent the occurrence of velopharyngeal incompetence. The concavity of the profile was corrected, and a stable Class I occlusion was obtained with comprehensive orthodontics. The patient is still under follow-up until today and the treatment results remain stable.

DISCUSSION

Rigid External Distraction (RED) is a surgical technique employed to correct skeletal deformities, mainly maxillary hypoplasia. This is achieved by a process termed as distraction osteogenesis, where a surgical device is used to slowly separate the bony segments, promoting the formation of new bone in the freshly resultant gap. [1] The RED system is mostly beneficial for complex malocclusions or craniofacial malformations when traditional orthodontic treatment combined with orthognathic surgery may not achieve optimum results.

The success of the presented case is mainly attributed to the RED appliance. The main advantage when using this system, is that the device, which has a rigid, strong structure, ensures stability during both the distraction and consolidation phases. [2] This stability is essential to minimize possible procedure-related complications such as dehiscence or inability of the distracted segments to unite, which can arise in other distraction methods found in the literature. [3-5] Additionally, the RED system enables 3D control of the repositioned bone segments, which in turn plays a pivotal role in the achievement of correct anatomical alignment and overall facial balance. [4-6]

In addition, after use of the RED system in this case, both function and aesthetics showed incredible improvement. While performing a post-treatment assessment, significant enhancement in occlusion was clear, which in turn led to enhanced masticatory efficiency. [7,8] Furthermore, many patients report increased self-esteem and better quality of life following the correction of skeletal discrepancies using this appliance at a considerably younger age. [9]

Despite the numerous advantages that the RED system offers, potential complications should not be overlooked. Great attention

Figure 1 (a,b,c) Pre-treatment photographs

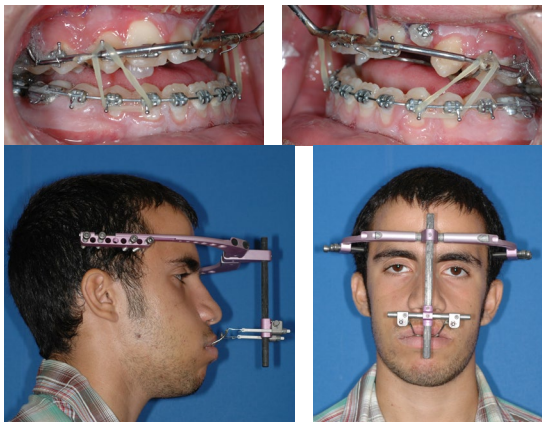

Figure 2 (a, b) Right and Left occlusion during distraction phase (c, d) The RED system

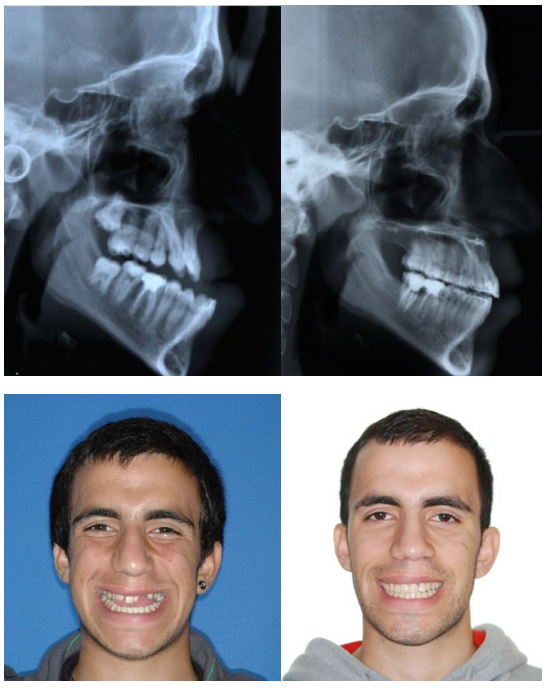

Figure 3. (a, b, c, d) Lateral cephalometric radiographs and photographs before and after treatment

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should be raised to avoid site infections at the device's entry points. [10] Possible discomfort felt by patients during active distraction is a complication with high prevalence, but luckily it can be managed by careful adjustment of the distraction rate or employment of additional pain management techniques such as administration of non-steroidal anti-inflammatory drugs. [11]

Generally, long-term follow-up is vital to evaluate the stability of results although skeletal advancement often remains stable over the years when the method of distraction osteogenesis is used. [12-15]

CONCLUSION

The RED system has good control of maxillary protraction in all three planes of space, thus enabling us to correct the maxillary deformity effectively. The case presented illustrates the effectiveness of this technique in achieving functional and aesthetic improvements while maintaining skeletal stability and mitigating complications. Caution should be taken not to cause velopharyngeal incompetence and speech problems. Thus, a team approach consisting of a maxillofacial surgeon, an orthodontist, an ENT specialist, a psychologist as well as a speech pathologist is always indicated when treating individuals with craniofacial malformations. Future research should continue to explore innovative materials and modifications to the RED system to optimize patient outcomes and broaden the applicability of this treatment approach in orthodontics and craniofacial surgery.

Figure 4. (a, b, c) Post treatment intraoral photographs

Figure 5 Photographs of the patient's profile beginning before treatment (2005) until the post-retention follow-up period (2017).

YOUNG SURGEONS' CORNER

"I am lucky to have incredible mentors in Dr. Amanda Gosman and Dr. Melissa Kanack..."

LUCY SHEAHAN
UNITED STATES

I had a fantastic experience attending the International Society of Craniofacial Surgery Congress for the first time in Seattle last year. The opportunity to travel with our incredible UCSD craniofacial team, explore Seattle, and connect with experts from all over the world was invaluable. Reflecting on my time there, I am struck by the collaborative spirit of the meeting, the innovative insights shared, and the connections I made.

One of the unique aspects of the Congress that I appreciated was how most of the program occurred in one central room, which created an opportunity for uninterrupted dialogue and learning from global experts on different craniofacial topics. It was also fascinating to learn of the diversity of thought and experience on management of craniofacial conditions around the world which demonstrates to me why global collaboration and research on patient outcomes is so crucial to advancing the field.

As I imagine most attendees were, I was extremely inspired by the Dr. Fernando Ortiz Monasterio Lecture presented by Dr. Oleh Antonyshyn (Canada) and reminded of the incredible impact we can have on our patients by striving for untiring and compassionate patient care. Panels like The Effect of Aging on Craniofacial Outcomes similarly reminded me of the unique privilege and joy we have in craniofacial surgery to follow our patients longitudinally and build lasting relationships. Listening to talks by oral surgeons, anesthesiologists, speech pathologists, and social workers dedicated to serving patients with craniofacial conditions also renewed my appreciation for the multidisciplinary team members who care for our patients.

I also had the opportunity to attend the Young Surgeons Committee meeting and hear about the experiences of residents pursuing fellowships, current fellows, recent graduates, and craniofacial surgeons in the first years of their careers. Their passion and excitement for their work further affirmed my desire to pursue a craniofacial fellowship. Dr. Ben Massenburg, who has since become faculty at UCSD, led us in a discussion on how to become more involved in the society, and I am excited

Figure 1 - UCSD craniofacial team in Seattle

Figure 2- The author with Dr. J. W. Choi

to now have him as a mentor as I continue to integrate into the craniofacial surgery community.

I am lucky to have incredible mentors in Dr. Amanda Gosman and Dr. Melissa Kanack who introduced me to their colleagues and friends in the global craniofacial community at the Congress as well. These connections have led to ongoing partnership and collaboration. I was able to explore the Seattle food scene with Dr. Santiago Lozano, an Argentinian craniofacial surgeon, and after our return to San Diego, work with him in the operating room and gain his insights on our facial feminization cases. Almost one year after sitting in on his lectures and panels at the Congress, I was able to spend two days with Dr. Jong-Woo Choi (South Korea) when he came to San Diego as a visiting professor. Speaking with him, a leader in the field, one-on-one about his innovative techniques in managing craniosynostosis and cleft patients was an incredible experience that I will not forget.

Overall, the ISCFS Congress in Seattle was a fantastic experience that expanded my understanding of craniofacial surgery and strengthened my appreciation for the global community of professionals dedicated to this field. The opportunity to learn from others, both from different parts of the world and at varying stages of their careers, was invaluable. The combination of scientific insights, professional networking, and global collaboration made this conference an unforgettable experience. I left feeling inspired and more connected to the broader mission of craniofacial surgery, with a renewed dedication to making meaningful contributions to both research and clinical practice as a future craniofacial surgeon.

Dear Resident and Fellow members of the ISCFS,

We are thrilled to invite you to contribute to the Young Surgeon's Corner of the ISCFS Newsletter! This platform is designed to highlight the perspectives, insights, and achievements of our dynamic and talented members in training. Our goal is to foster a collaborative and supportive community where young surgeons can learn from each other and gain recognition for their contributions. Whether you have a compelling case study, a breakthrough in research, or reflections on your training journey, we encourage you to share your story with us.

To contribute, please contact me at **ben.massenburg@gmail.com**

Join us in making the Young Surgeon's Corner a rich and compelling part of the ISCFS Newsletter!

BEN MASSENBURG, MD
Chair, Residents and Fellows Committee

RESEARCH CORNER

"It is crucial to understand the mandibular growth as it relates to cleft palate as it directly affects the design and execution of end-stage orthognathic correction."

EZGI MERCAN
UNITED STATES

Craniofacial surgery is inherently image-based. Here at Seattle Children's Hospital, our craniofacial team utilizes different modalities of medical images for diagnosis, surgical planning and follow up. Our large image database makes it possible to study craniofacial shape and outcomes in a data-driven and subjective manner. As a computer scientist and a researcher, I am intrigued by the idea of modeling the craniofacial shape as a combination of initial deformity, patient demographics, and growth. My research spans a wide range of topics from quantification of long-term shape outcomes to digital surgical planning and statistical models of craniofacial deformities. In this new installment of *ISCFS Newsletter*, I am happy to write about some of the current projects I am really excited about, and I want to use this opportunity to invite you all to share your ongoing research that will shape the future of craniofacial care.

One of the most exciting developments in treatment of infants with Robin Sequence is the early success we achieved with orthodontic airway plate (OAP, a.k.a. Tübingen Palatal Plate, TPP) treatment for upper airway obstruction ***(Figure 1)***. While the surgery used to be a mainstay for the treatment of severe airway obstruction for these patients, these custom-made nonsurgical devices offer a minimally invasive and alternative approach, and we are the second center in the US to offer this therapy. Our multi-disciplinary team designs and fabricates these devices using a combination of 3D CTs, 4D dynamic airway CTs, flexible laryngoscopy and intraoral impressions/scans ***(Figure 2)***. Even with extensive imaging, the devices may require multiple fittings and adjustments by a craniofacial orthodontist to improve the airway and allow for safe sleep. An ideal OAP device maintains the airway by pulling the base of the tongue forward but also causes minimal discomfort to the infant. One of the research projects I am really excited about is on designing and 3D-printing a guide for fabrication of the initial device, especially the spur that extends into the pharynx. These 3D-printed custom guides will provide orthodontists with a tangible template for the anatomy of the specific patient. As always, our goal is to improve

Figure 1 - Orthodontic Airway Plate

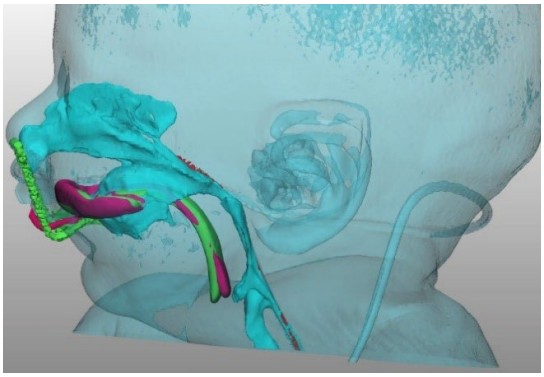


Figure 2 - Intraoral Impressions/Scans

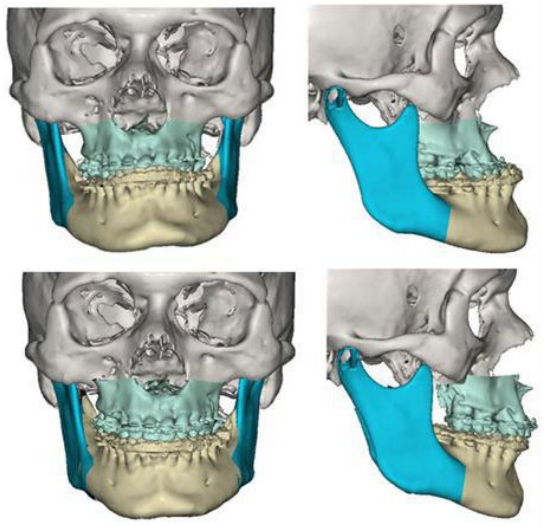


Figure 3 - Repositioning of the lower jaw (bilateral sagittal split osteotomies, BSSO) simultaneously with the midface (LeFort 1, LF1)

quality patient care with a data-driven and patient-centered innovation.

Patients with cleft palate have growth restriction of the midface that warrants surgical correction at skeletal maturity. While the 3D midface deficiency is well characterized in these patients, the coupled deformity in the mandible is not. In our clinic, we see a subgroup of patients that require repositioning of their lower jaws (bilateral sagittal split osteotomies, BSSO) simultaneously with their midface (LeFort 1, LF1) ***(Figure 3)***. We are interested in quantifying the mandibular shape differences and asymmetry, and the relationship between maxillary and mandibular growth restrictions in cleft palate. It is crucial to understand the mandibular growth as it relates to cleft palate as it directly affects the design and execution of end-stage orthognathic correction.

Our craniofacial team has been using 3D photogrammetry for cleft lip and palate for over a decade. We have analyzed these images and published our research on modeling the nasal deformity associated with unilateral cleft lip and/or palate based on initial cleft "severity" ***(Figure 4)***. Although the soft tissue is what patients and families see and easier to digitize (by laser scanners or photography), the primary deformity in cleft palate is in the bone. Our more recent focus is to replicate our cleft severity model in a limited set of CT images of infants with cleft lip and palate. By correlating bony deformity with soft tissue changes, we aim to understand what drives the shape changes we observe around the nose. One direction we are taking is to focus on a small subgroup of patients for whom we have clinical CTs available at different timepoints in their cleft care. By understanding the effects of growth on the shape and the effect of cleft deformity on the growth, we will be able to inform patients better and plan surgical interventions more efficiently.

Our team focuses on standardizing anthropometric analysis by developing templates and measurements that are replicable and generalizable. Craniofacial image analysis research usually suffers from small sample sizes. Multi-center studies and national databases are valuable but rare. Even then, the patient demographics and treatment strategies differ across centers so that there is a "batch effect" when data are combined. These are challenges that are not easy to address. Yet, I believe that we can help bridge the gap by developing and sharing computer vision techniques that are reproducible and intuitive.

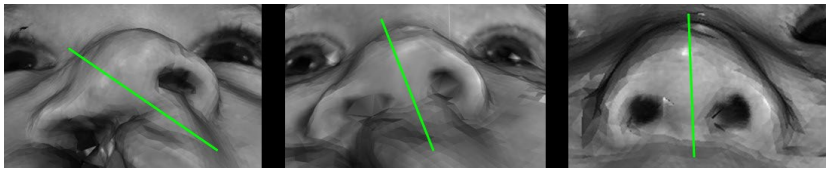
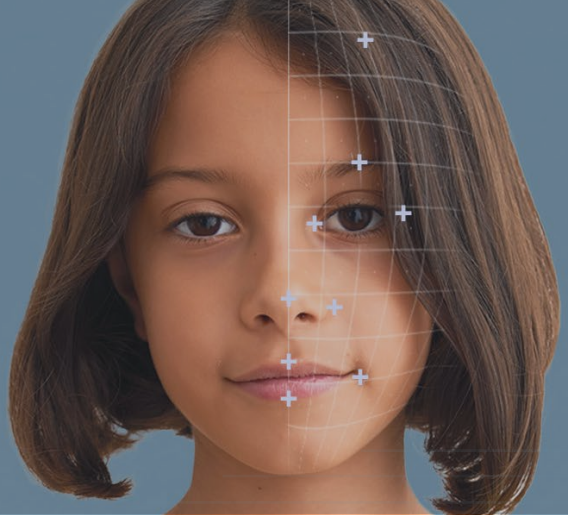


Figure 4 - Modeling the nasal deformity associated with unilateral cleft lip and/or palate based on initial cleft "severity"

BECOME AN ISCFS MEMBER



We welcome membership applications in Active, Associate, Corresponding, Orthodontic, Research, and Resident/Registrar/Fellow categories and have created a simple on-line process. Current member specialties include plastic, craniofacial, oral and maxillofacial surgeons, neurosurgeons, orthodontists, otorhinolaryngologists, dentists, and those involved in related research.

There is a $75 application fee and annual fees are $150 for Active/Associate members and $50 for Resident/Registrar/Fellow members. Our website includes information about qualifications for membership and frequently asked questions at this link: https://iscfs.org/membership/

MEMBERSHIP BENEFITS

- Global Visibility
- International Recognition
- Reasonable yearly membership fees
- Reduced registration fee at the biennial international ISCFS Congress
- Professional networking

JOIN US!

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EVENT CALENDAR

THE 82ND CONGRESS OF KOREAN SOCIETY OF PLASTIC AND RECONSTRUCTIVE SURGEONS

THE 27TH KOREAN CLEFT PALATE-CRANIOFACIAL ASSOCIATION

Location: Grand Intercontinental Seoul Parnas, Seoul, Korea
Date: November 17-19, 2024
Website: www.kcpca.or.kr

AMERICAN CLEFT PALATE-CRANIOFACIAL ASSOCIATION 2025 ANNUAL MEETING

Location: The Westin Rancho Mirage Golf Resort & Spa Palm Springs, California
Date: May 6-10, 2025

with **ANNUAL MEETING OF AMERICAN SOCIETY OF CRANIOFACIAL SURGEONS**

SAVE THE DATE 21ST ISCFS CONGRESS

Location: Shanghai, China
Date: October 27-30, 2025
Website: www.iscfs.org

EUROPEAN ASSOCIATION FOR CRANIO MAXILLO FACIAL SURGERY 28TH CONGRESS

Location: Athens, Greece
Date: September 5-18, 2026
Website: www.eacmfs.org/congress/future-congresses/

ISCFS 2025

Congress registration will open on **December 1**.

NEXT WEBINAR TOPIC JANUARY 13, 2025

Facial Contouring

To submit a meeting to the calendar in our next issue, send the following information to admin@iscfs.org: Meeting Title, Location, Dates, Website.

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Dr. Xiongzheng Mu and Dr. Xudong Wang invite you to Shanghai, China for the 21st Congress of the ISCFS in October 27-30, 2025.

Dr. Xiongzheng Mu
2023-2025 ISCFS President

Dr. Xudong Wang
Assistant Dean, Shanghai People's 9th Hospital

SEE YOU IN SHANGHAI!