12th International Congress on Cleft lip/Palate and Related Craniofacial Anomalies

Orlando, Florida

Congress organized by American cleft palate craniofacial association

Summarized by Jinwara Jirathamopas

The conference was attracted every members of cleft lip/palate and related craniofacial anomalies healthcare teams including plastic surgeons, orthodontists, speech therapists, nurses, social workers etc. from all over the world. The lessons were covered not only in an orthodontics field but also another field of craniofacial anomalies care including anomalies finding, patient evaluation, holistic treatment planning, treatment procedures, treatment outcome, etc. in different point of view. With this knowledge and ideas I would be able to understand more about the treatment strategy, treatment protocols, etc. in order to take good care of the patients.

Since many issues in this field are still controversial, I was encouraged not only the broaden view of treatment are very important, the research in this field are needed. Many ideas from many other doctors have been discussed.

The conference was held in 5 days and many topics have been discussed in different session and symposiums. In this summarized report I gathered some part that I have attended under my interesting point of view and grouped them in different topics as follow.

The Keynote Lesson

The Keynote lesson was presented by Dr. Bill Shaw in the very first day and very first lecture. He is the one who established the Cochrane Collaboration Oral Health Group, and a World Health Organisation Collaborating Centre for craniofacial anomalies.

In this session, Dr. Bill Shaw presented that the research on cleft care is challenging due to a diversity outcomes, sample sizes, duration of follow-up, scarcity of grants, and a common isolation of cleft researchers from established research infrastructure units. Therefore research in clefts has frequently been criticised for weaker design, execution, and objectivity than health research elsewhere.
However cleft research capability could be dramatically improved by better cooperation across individual disciplines, teams, and countries. As he experienced that “friends make good collaborators and collaborating with other disciplines is enjoyable and stimulating”. He also told the audience that while working we do not have to worry about the publications because the successful cooperation could yield increased critical mass of both researcher and patient populations, and could enhance the visibility and credibility of findings and the implementation of results.

ScanCleft outcome

This session talked about the outcome of treatment in the European cleft team. Including dental arch relationship, nasolabial appearance or patient’s esthetics, and speech outcomes.

Dr. Arja Heliövaara from Helsinki University Hospital, Helsinki, Finland compared dental arch relationship at age 5 years using study models of 418 patients (272 boys, 146 girls), at mean age 5.1 years (range 4.7-6.9) from multicenter in Europe. Since they found that several theories concerning maxillary growth have influenced surgical repair of the palate such as delaying closure of the hard palate; designing flaps to minimize denuded bone; altering the sequence of closure; avoiding use of vomer flaps; reducing the extent of trauma at any one time by performance of surgical closure in small incremental stages, such as three or four operations rather than one or two; assuming that presurgical orthopedics/soft tissue molding would facilitate surgery and improve the long term result; assuming that concentrating surgery on high volume surgeons would achieve better outcomes. However, there is certainly a lack of clear evidence to be gained from the current literature. After study their results arising from the three trials do not provide statistical evidence that one technique is better than others.

Dr. Kirsten Molsted from Copenhagen Cleft Palate Center, Copenhagen, Denmark found that at 5 years of age there are relatively few differences in nasolabial appearance. The speaker and some of the audience however suggested that the follow-up will be continued because 5 years of age is quite short period of time.

In the study of alveolar bone grafting most of the author assessed the dental arch relationship with the GOSLON Yardstick. And some said that early alveolar bone grafting seems not to have negative influence on dental arch relationship.
Americlef left outcome

This session was similar to the “Scancelft outcome” but they mentioned about the treatment outcome from the treatment protocol in North America.

Intercenter orthodontic outcome studies in North America through The Americleft Project was expanded to include a speech outcomes component. It has been presented that across all centers, hypernasality was judged to be absent (52%) or minimal (19%) for an overall total of 71% of the sample. 37% of children were judged to be "difficult" or "impossible" to understand, but 17% were judged as having "normal" intelligibility. 60% of children had two or fewer "cleft" speech characteristics. 58% of children were judged to be in need of speech/language intervention.

For the study compare dental arch relationship outcomes show that average Goslon scores ranged from 2.46 (best) to 3.77 (worst). Of the 5 centers averaging better than 3, indicative of the most favorable dental arch relationships, 3 used only primary lip and palate surgery with no ancillary procedures. Of the 5 centers with the worst Goslon averages, 3 carried out primary repair of the infant alveolus. Center using PSIO without primary bone grafting had Goslon averages across the range of scores. The outcome studies cannot be used to identify cause and effect relationships between protocol features and specific outcomes, but can begin to identify areas of greatest controversy and interest to spur more definitive clinical trials research.

Another topic quite interesting is “lessons learned from inter-center outcome assessments”. The speaker summarized their experience gained and provided recommendations for standardization of records prospectively collected by other centers worldwide so as to facilitate future studies of this kind. They concluded some of the key elements for successful inter-center collaborations as

1. The commitment and dedication of the study investigators to the goals, conditions, and parameters of the study, with no personal attachment to a particular technique or protocol
2. The availability of adequate comparable, standardized serial records on a large sample of consecutively treated individuals with non-syndromic complete UCLP or BCLP
3. The availability of validated, specific and sensitive outcome measures that can be applied universally with little ambiguity
4. The realization that given the extensive variability in the presentation and treatment of CLP and the type of data that we have available, it is impossible to establish a cause-and-effect relationship between any given protocol feature and a specific outcome.

**Orthognathic surgery**

Dr. John Polley from Rush Craniofacial Center encourage the use of Virtual Surgical Planning (VSP) technology for orthognathic surgery and introduced an Orthognathic Positioning System (OPS) to increase the accuracy of orthognathic surgery. CAD/CAM technology for orthognathic surgical planning is now the gold standard of treatment because it proved more precise and accuracy plan and outcome. It also eliminates traditional techniques of indirect measurements, two-dimensional cephalometry, face bow transfer, utilization of articulated stone model surgery and exposure to laboratory chemicals.

VSP can be transferred to the patient at the time of the surgery using CAD/CAM technique. This technique can create computer generated surgical splints traditionally used in OGS. In addition, with this approach a new intraoperative Orthognathic Positioning System (OPS) has been developed. The OPS eliminates some of the most difficult steps in OGS such as the need for intraoperative intermaxillary fixation; intraoperative autorotation of the maxillo/mandibular complex; intraoperative measurements to correct final vertical dimension; and guessing intraoperative condylar centric relation.

Since 2010 the OPS has been used in 25 patients with various diagnosis including dentofacial deformities (12), Facial asymmetry (2), Cleft lip/palate (4), Hemifacial Microsomia (2), Craniosynostosis Syndromes (3), Micrognathia (1) and Tumor reconstruction (1). The performed osteotomies in his cohort include: 1 piece Le Fort I (13), 2 pieces (8) and 3 pieces (2); Sagittal splits (27), Inverted L (1); Mandibular sub-apical (2) and genioplasties (13). The OPS introduced in this presentation bridge the gap between VSP and actual OGS.

**Distraction osteogenesis in craniomaxillofacial deformities**

Distraction osteogenesis in craniomaxillofacial deformities is one of the major topics that was arranged in the symposium. Many audiences attended in this session. All of the speakers in this session are one who are very famous in this field. And the audiences also gave a lot of opinions and discussion right after lectures.
The first speaker was Dr. Joseph G. McCarthy from New York University, Langone Medical Center, Institute of Reconstructive Plastic Surgery, New York. He is very famous in the field of distraction osteogenesis. His topic is “twenty five years of craniofacial distraction.”

He mentioned that the first craniofacial distraction was performed in 1989. It was performed in a case of unilateral mandible in craniofacial microsomia. And because this unilateral mandibular distraction was successfully demonstrated in the human, surgeons undertook bilateral mandibular distraction, especially in patients with obstructive sleep apnea. The clinical results were impressive as tracheotomies were avoided or tracheotomized patients were decannulated. Moreover, greater mandibular advancements were achieved with less evidence of relapse and fewer complications.

Later on another set of canine studies has been performed and the midface distraction with buried and external devices was also successfully undertaken in humans, especially pediatric patients. The length of the surgical procedure, hospital stay and complication rate were significantly reduced, as compared to the traditional Le Fort III advancement. The need for bone grafts and plates and screws was obviated.

In his patients the cranial vault was also distracted, as in the monobloc osteotomy. And this type of distraction was associated with a significantly lower infection. Therefore he concluded that all components of the craniofacial skeleton are amenable to the distraction technique with reduced morbidity and relapse rates, as well as shorter hospital stays.

The second speaker was Dr. Fernando Molina from Mexico. He also supported that distraction osteogenesis is becoming the treatment of choice for the surgical correction of mandibular hypoplasias. It represents the first tissue engineering surgical technique applied into the craniofacial field. Deficiencies in the growth of the mandible may result from condylar fractures suffered at an early age affecting growth centers or severe sepsis with secondary condyle resorption resulting with temporomandibular joint ankylosis and micrognathia. Congenital deformities such as Goldenhar’s syndrome, Nager’s syndrome, craniofacial scoliosis, Pierre Robin sequence, and hemifacial microsomia may present with mandibular hypoplasia of varying severity. The mandibular distraction is a technique less invasive and time-intensive and has a significantly decreased morbidity rate compared with traditional methods of mandibular reconstruction.

The next speaker was Dr. Alvaro Figueroa from Rush Craniofacial Center and Rush University, Chicago. He mentioned about the 3 traditional treatment of craniofacial deformities were
Craniofacial surgery, Orthognathic surgery, and Orthodontic treatment. The surgery for the treatment of severe maxillary deficiency is Orthognathic surgery. However the overall LeFort I Osteotomy risks (Kramer et al 2004) was 6-10 % (non-cleft and cleft patients), 1% can have ischemic complications and risk for complication is lower in non-cleft patients (4%) than cleft patients (25%). Moreover long term relapse were from 22-38% because difficult fixation of hypoplastic maxilla and the scarring from previous surgery and flaps.

Therefore distraction osteotomy is an alternative treatment. He described the Orthodontic/Surgical procedures to properly apply Rigid External Distraction to manage maxillary and midface deficiencies. His results showed that RED can advance the maxilla from 7 to 17 mm and relapse 0-34% while the orthognathic surgery can advance maxilla 3-8 mm and relapse 21-40%. He also mentioned about the indication for early distraction in unilateral craniofacial microsomia as absolute and relative. The absolute treatment should be performed in patients with airway problems, feeding problems, and severe dysmorphism. The relative treatment should be performed in patient with moderate dysmorphism.

The key factors for successful distraction osteogenesis in mild to moderate unilateral craniofacial microsomia are adequate bone stock and proper vector selection. The critical roles of orthodontist in the treatment of patient with craniofacial microsomia are to assessment of craniofacial growth and development, bite block, cross tongue elastics, and maxillary expansion.

In his conclusion, Rigid External Distraction (RED) is a viable alternative to manage moderate to severe maxillary and midface deficiencies in patients with dentofacial deformities, cleft and craniofacial syndromes.

Dr. Jaime Gateno from The Methodist Hospital, Houston, Texas, illustrated the use of Three-dimensional computer-aided surgical simulation (CASS) adjunct to distraction osteogenesis treatment. Since the distraction Osteogenesis is complex. Good outcomes are the result of careful planning, the selection of distractors capable of achieving the desired geometric movement, the availability of distractors capable of resisting the biomechanical demands of stabilization, distraction and consolidation, the precise execution of the plan during surgery, uncomplicated postsurgical phase can enhance distraction surgical outcomes by facilitating the first 4 steps. With three-dimensional computer-aided surgical simulation (CASS), Dr. Jamie Gateno could determine the final distraction outcome and to calculate of distraction paths. Also he demonstrated how the distractors are selected or customized.
And finally, he showed how CAD/CAM splints and templates can enhance the precise execution of the plan at surgery.

**Nasoalveolar molding**

The nasoalveolar molding is quite interested me because the one who manipulate this treatment in almost craniofacial center are orthodontists.

The European groups (Eurocleft) do not believe in the effectiveness of nasoalveolar molding because the burden of care and the outcome are not balanced (Although the esthetic outcome in NAM groups are better than nonNam group but the burden of care are needed such as the patient’s visit are higher in NAM than NonNam)

However Dr. Barry Grayson from New York University who invented nasoalveolar molding technique and Dr. Eric Liou from Chang Gung craniofacial center, Taiwan tried to persuaded the advantages of nasoalveolar molding over the burden of care. Such as nasoalveolar molding can reduced parent’s anxiety. Although it might be hard but after getting used to the parent will master with the technique, and after parent see the improvement of their baby it could empowerment their healthcare. Moreover it is easy for surgeon to operate and gain better surgical outcome with less required surgical revision at the age of 6.

The midface cephalometric morphology in the patient who recieved NAM therapy also shows better or equal projection and convexity than the mean values reported in the Eurocleft and Americleft studies which mean NAM might has potential benefits for facial growth. And it was less expense because the patient who did not receive NAM required more surgical revision which surgical cost care are much higher.

**Dental anomalies**
Most of dental anomalies were discussed in the poster. Here are some conclusion I have been found among those posters presented in the conference regarding dental anomalies found in cleft lip/palate and related craniofacial anomalies:

- The occurrence of hypodontia or hyperdontia of the maxillary lateral incisor in the deciduous dentition strongly influenced the occurrence of similar alteration in the permanent dentition. These data allow better counseling of parents of cleft lip and palate children, avoiding unnecessary radiographic exposures at early ages.
- Dental anomalies are strongly related with cleft lip and palate, and the radiographic diagnosis of these dental anomalies contributes to the individual treatment planning of these patients.
- Delayed tooth calcification was observed in the mandibular molar region more often on the affected than non-affected side in Hemifacial microsomia patients.
- Patients with complete cleft lip and palate are born with an increased anterior dimension of the maxillary dental arch compared to non-cleft patients but there was no significant difference between unilateral and bilateral cleft lip and palate.