Modification of LeFort I Osteotomy for Correction of Severe Maxillary Cant Associated With Fibrous Dysplasia

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Abstract: Differential superior reposition of maxilla following LeFort I osteotomy in the correction of maxillary cant poses a greater challenge especially when associated with the pathology like fibrous dysplasia which completely obliterates the antrum. Purpose of this paper is to highlight the modification of LeFort I osteotomy and hypothesis is to assess its difficulty index in modifying the standard steps, in executing the maxillary separation at various to correct the gross facial asymmetry to achieve a favorable outcome. Multiphased management involved scrupulous clinical planning, advanced imaging by computed tomgraphy scans, stereolithographic models to debulk the lesion. The second phase included pre surgical orthodontic evaluation along with correction of severe maxillary cant adopting a modified LeFort 1 osteotomy technique and standard bilateral sagittal split osteotomy, thereby simultaneously attaining functional stability and esthetic harmony.

Key Words: fibrous dysplasia, orthognathic surgery, stereolithography, subciliary incision

Fibrous dysplasia (FD) is a benign, non-neoplastic, non-hereditary lesion characterized by replacement of normal bone with fibrous tissue and abnormal (woven) bone. The altered bony architecture is relatively weak and causes diffuse deformations leading to asymmetries.[1] Contributing to 5% to 7% of benign bony tumors of the craniofacial region, they often present as isolated asymptomatic lesions. The bone disease presents as monostotic or polyostotic forms.[2] Maxilla is the commonly affected with tendency in first and second decades of life[2] Craniofacial FD affecting the maxilla during the growth results in deformity and asymmetry, that is, the maxillary occlusal cant. This case report is of FD with severe maxillary cant corrected by the modification of LeFort I osteotomy. The purpose of this report is to highlight the modification in LeFort I osteotomy technique when the maxillary antrum is obliterated with FD extending to pterygoid region.

CASE REPORT

A 12-year-old boy reported to craniofacial unit with asymptomatic diffuse swelling involving middle third of the face on the left side, that was progressive in nature. Clinically it was extending to all corners of face. Intraorally, a diffuse nontender hard swelling in the buccal vestibule and severe maxillary cant was noted. Differential diagnosis of FD and ossifying fibroma was thought of. Computed tomgraphy revealed obliteration and opacification of left maxillary antrum extending to left zygomatic body, infraorbital rim and floor resulting in mild orbital dystopia with no evidence of visual disturbances. Biopsy report confirmed FD and patient was noncompliant for treatment at this stage.

At 19 years the patient revisited with gross facial disfigurement and asymmetry. Clinical and computed tomgraphy scan (DICOM) format (Figs. 1, 2) along with 3D print for stereolithographic models were done to study the extent of the lesion.

A multiphased management was proposed. In the intial phase surgical debulking and cosmetic contouring using intraoral crevicular and subciliary incisions was performed. Following a brief period of teeth alignment, surgical correction of maxillary cant was done in the second phase using modified LeFort 1 osteotomy. Differential osteotomy of 2 mm on right and 6 mm on left above the conventional marking along the anteroposterior walls of maxillary sinus for osteotomy cuts (Fig. 3). The complexity was to

FIGURE 1. Clinical presentation.

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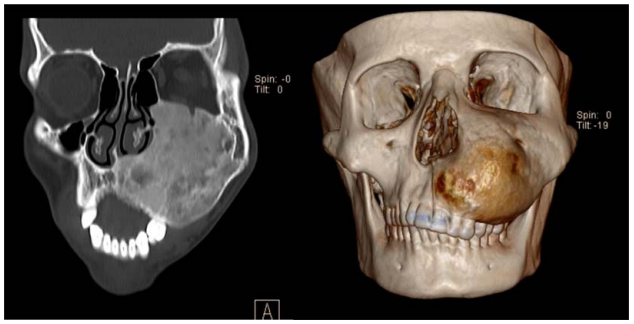

FIGURE 2. Computed tomgraphy coronal and 3D views showing the extent of fibrous dysplasia and maxillary cant.

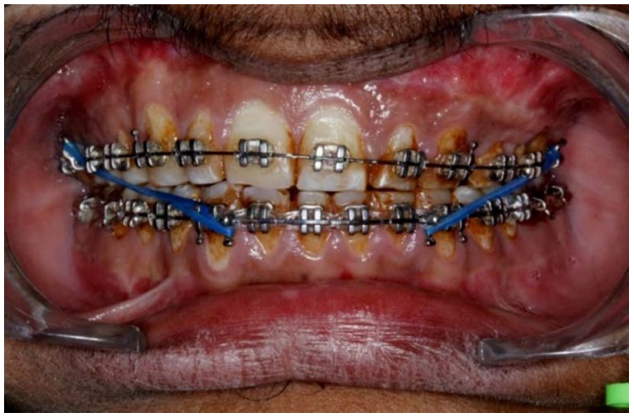

FIGURE 3. Post operative Occlusal Cant Correction with modified Lefort I osteotomy

achieve 6 mm uniform osteotomy cut due to complete obliteration of sinus with the FD managed by using 6 mm size bone cutting round bur (Fig. 4). Compared with the conventional LeFort I,

FIGURE 4. One year Follow Up showing good stability and residual soft tissue expansion

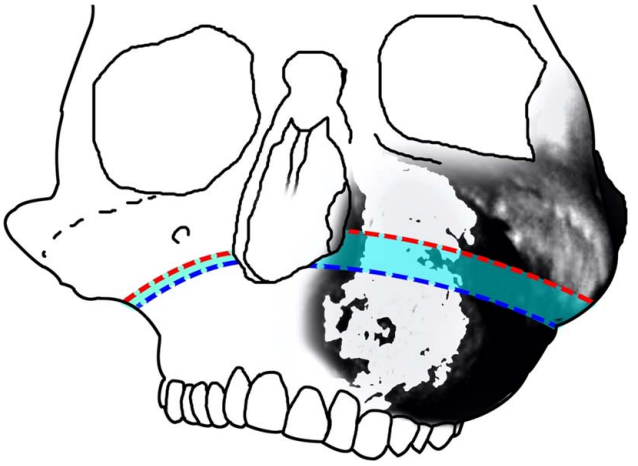

FIGURE 5. Lefort I osteotomy marking.

down fracture of maxilla was more complicated as there was no definitive anatomical landmarks. Hence vigilant and gradual trimming of fibrous tissue to avoid any untoward bleeding from posterior part of maxilla was performed. Adding to the above difficulties, pterygomaxillary disjunction on the left side was laborious as there was no cleavage to engage the osteotome which was resoluted by careful debulking using burs in the distorted anatomy thus preventing life threatening complications such as hemorrhage resulting from pterygoid plexus or internal maxillary artery. Posterior interferences were removed following down fracture of the maxilla to ensure the accurate fit of the intermediate splint. Fixation of maxilla on the left side was challenging as zygomatic buttress and pyriform were filled with fibrous and soft bone which could result in loosening of screws leading to instability and relapse. Hence locking plate and screw system with longer screw were used and for 2 mm screw fixation, 0.8 drill bit was used (Fig. 5) ensuing the fixation uneventful. Mandibular advancement with bilateral sagittal split osteotomy to autorotate thus minimizing the occlusal discrepancy. Patient was

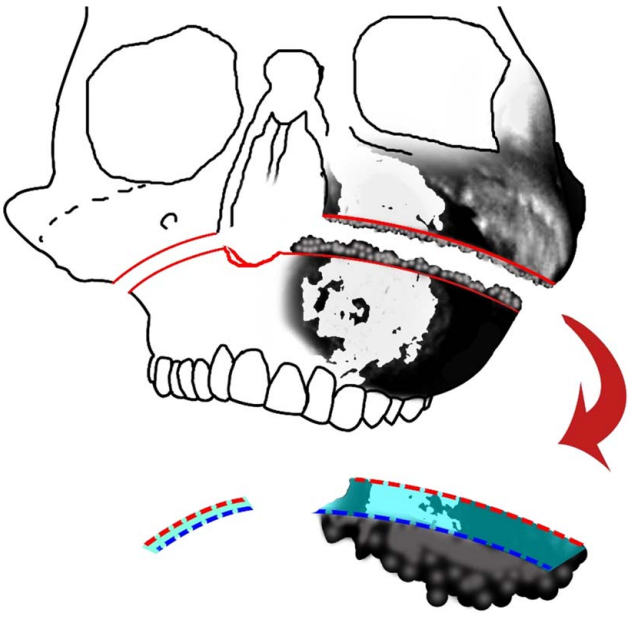

FIGURE 6. LeFort I Osteotomy Markings and cuts.

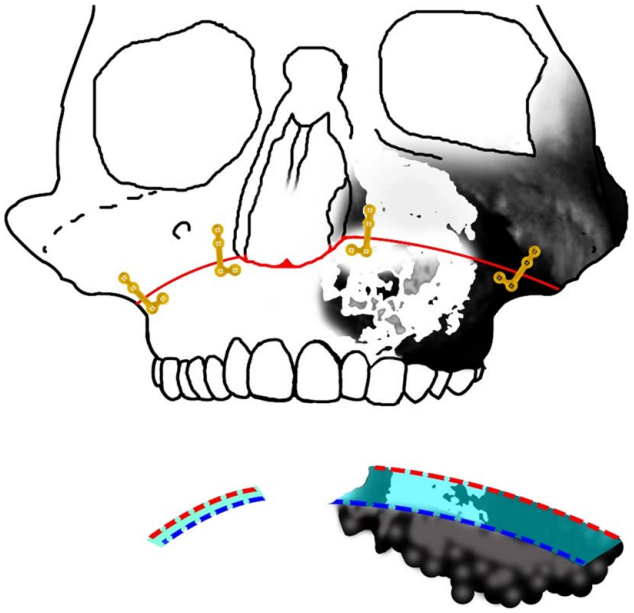

FIGURE 7. Rigid Internal Fixation with Locking plating system.

subjected to postsurgical orthodontics to settle the occlusion. One year follow-up showed no evidence of pathology or relapse of maxillary cant which was assessed clinically and with lateral cephalogram readings at 3, 6 months, and 1 year. Patient was reassured regarding the residual excess flabby soft tissue (Figs. 6, 7).

DISCUSSION

Comprehensive surgical treatment plan for FD craniofacial region is difficult to establish. The primary goal is to intervene such that cosmetic debulking can be done without causing functional deficit and to correct malocclusion and asymmetry. Although differences in treatment opinion are published from conservative treatment to radical resection[1,3–5] Orthognathic surgery plays an important role[6–8] LeFort I osteotomy in FD of maxilla as viewed by Yeow and Chen[6] is not a safe procedure owing to variations in the anatomy. Navigation was used by Matsuao et al[9] and Heiland et al[10] with a contradictory conclusion for safety and limitation of its application. A review done by Udaykumar et al[11] in 2018 only 15 cases are reported of FD with dentoskeletal asymmetry correction. Gross facial deformity with social problems may be an indication for an early intervention but it is suggested to intervene for debulking after the skeletal maturity and secondary correction only after orthodontic decompensation to rule out interferences during maxillary cant correction. This case report highlights the procedural challenges encountered in the modified LeFort I osteotomy and also methods adopted to tackle them and achieve satisfactory outcome.

CONCLUSION

LeFort I osteotomy has a definite role in the correction of severe maxillary cant in patients with FD. It should be always considered as a secondary procedure to rule out recurrence before correcting maxillary cant. The consternation in modification observed are completion of osteotomies to down fracture, repositioning of maxilla accurately as it will be differential, fixation issues, role of adjuvant procedure like mandibular osteotomies, stability and relapse. The present case management showed good bony union with evidence of functional stability and esthetic harmony.

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A Rare Case of a Large Ameloblastoma and Cervical Lynphoepitelial Cyst Treated Simultaneously by an Intraoral Approach and Immediate Reconstruction

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Abstract: Ameloblastoma is a benign locally aggressive odontogenic tumor of epithelial origin with unlimited growth

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