A SURGERY- FIRST APPROACH FOR CORRECTING SKELETAL CLASS II MALOCCLUSION WITH GUMMY SMILE

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Abstract

This case report illustrates a surgery-first approach for correction of Class II malocclusion. A 31-year-old female, presenting a chief complaint of increased gum visibility, came to seek treatment. She had skeletal Class II and dental Class II malocclusion with 7 mm excessive overjet. Intraoral examination revealed mandibular curve of Spee of 4 mm. Treatment was performed with a surgery-first approach, moving the dentition towards edge-to-edge bite.

***Key words**: Surgery- first approach, Skeletal Class II , Gummy smile, Orthognathic surgery*

The dentofacial anomaly of skeletal Class II malocclusion is based on two components, excessive growth of the maxilla and deficient growth of the mandible. Surgical-orthodontic treatment is aimed to correct these jaw deformities; however, it still presents some challenges in both diagnosis and facial esthetics concerns. In traditional presurgical orthodontic phase, dental decompensation and removal of dental interference are planned. Chewing function might become compromised and there is a progressive deterioration of lateral profile preoperatively.

In 2009, Nagasaka presented surgery-first approach combining skeletal anchorage system for skeletal Class III malocclusion correction.[1] Skeletal anchorage was emphasized to compensate surgical error or skeletal relapse.

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By this technique, patients might improve facial esthetics and occlusal function early in the treatment. Thus, swallowing and speech functions would largely improve right after the surgery.[2] Among all the advantages, the most important benefit of surgery-first approach is efficient orthodontic tooth movement. It shortens the overall treatment time to 1 or 1.5 years.[3] This was reported as the regional acceleratory phenomenon (RAP) in orthodontic treatment by Wilcko et al., in 2001.[4] Tissue reactions including cellular activities and alveolar remodelling were accelerated during healing process. Lee also mentioned that porosity of cortical bone was increased during surgery, which led to decreasing resistance of tooth movement and increasing blood supply.[5] Hence, bone turnover was facilitated. Consequently, orthodontic tooth movement was more favourably performed after the surgery.

In this case report, we present a skeletal Class II malocclusion case with gummy smile and excessive overjet treated with surgery-first approach. Lefort I osteotomy and advancement genioplasty were performed for maxillary set back. Post-operative orthodontics included curve of spee relief, transverse dimension correction, and finishing and detailing.

CASE REPORT

A 31-year-old female presented with a chief complaint of increased gum visibility while smiling. At the first consultation, the patient expressed great concern about her smile. She had past medical history of drug allergy to analgesics.

Clinical findings

Patient's frontal view revealed a symmetric profile (Figure 1). Patient had gummy smile. In three-quarter view, normal infraorbital prominence was revealed. In lateral view, convex profile with acute nasolabial angle and retruded chin was noted. Her dental manifestation presented Class II incisor relation and end-on molar relationship on left side, with an excessive 7 mm overjet and 4 mm overbite. The upper dental midline coincided with the facial midline, while the lower dental midline was deviated to her left by 2 mm. Both arch forms were ovoid. She had a partially edentulous area in relation to 16.

The panoramic radiograph showed an intact bilateral condyle cortex (Figure 3). Right upper third molar was impacted, 25 was root canal treated and 48 was missing. The lateral cephalometric radiographic analysis revealed a skeletal Class II malocclusion and average mandibular plane angle (SNA 89, SNB 78, ANB 11, and SN-MP 34) (Table 1). Her upper incisors were proclined (U1-SN 110), and lower incisors were proclined (L1-MP 106).

Diagnosis

Class II malocclusion on class II skeletal base and average growth pattern with vertical maxillary excess, increased overjet, proclined upper and lower anteriors, rotations in relation to 22,23,12,34,44, supraeruption of 46,deep bite and deviated lower dental midline to left side.

Treatment objective

(1) To level and align all teeth
(2) To establish normal overjet and overbite
(3) To finish in bilateral Class I canine relation
(4) To achieve solid inter-digitation and stable occlusion
(5) To improve facial profile

Treatment plan

From the treatment diagnosis and treatment objectives, together with patient's expectation, we provided treatment option as orthodontic treatment with surgery-first approach. Virtual planning of surgical movement was carried out with the Dolphin Imaging® software: for the maxilla 4 mm impaction, and 4 mm reduction; genioplasty of horizontal advancement 3 mm. Surgical treatment suggested was Lefort I osteotomy with upper second premolar extraction and advancement genioplasty. Followed by orthodontic correction using pre adjusted edgewise 0.022 slot brackets.

Treatment progress

The treatment options and benefits were explained thoroughly to the patient. Following the planning, orthognathic surgery was performed under general anaesthesia, without complications. In the postoperative clinical checkup, the patient presented a satisfactory evolution in the period with an improvement in facial harmony, masticatory, respiratory function, and absence of pain in the temporomandibular joint, reduction of the overjet and overbite. Orthodontic treatment was started 3 months after surgery using preadjusted edgewise bracket of 0.022 slot. During outpatient visits, the patient showed an improvement in behaviour and self-esteem.

DISCUSSION

For correcting skeletal Class II problem in adults, there are two different treatment modalities: camouflage orthodontic treatment by retracting maxillary and mandibular incisors, and orthognathic surgery. According to the patients lateral profile and cephalometric reading, she had Class II jaw relationships with large overjet and retruded chin. Camouflage treatment with both arch extraction and maxillary incisors intrusion was proposed to her for correcting large dental overjet and overbite. But the patient selected surgery-first approach because of the immediate result. The routine extraction pattern to facilitate anterior retraction is first premolars extraction. However, atypical extraction pattern was given when considering periodontal-endodontic problem, compromised tooth structure, impacted or ankylosed individual tooth. In this case, 25 was endodontically treated. So the chosen extraction pattern in the maxillary arch changed to second premolar on the both sides.

While considering maxillary anterior teeth retraction, soft tissue changes should also be included. Relation

Figure 1: Pre treatment photographs

retraction has been discussed as well as pre-treatment lip morphology and ethnicity. Several studies have evaluated the change of lip position in response to incisors movement. Patients with thin lips undergo more significant soft tissue change than those with thick lips, while white females had little changes in lip thickness with incisors retraction when compared with the males.[6]

Overall, lip prominence improves after premolar extraction and anterior teeth retraction. The ratio of maxillary incisors retraction to upper lip retraction in Class II division I was reported to be 1.44-2.9:1 in Caucasians,[7] whereas relatively large 1.5-1.75:1 in African Americans.[8] In the study of Japanese, the

Figure 2: Pre treatment ceph

Figure 3 : Pre treatment OPG

	Pre-Treatment	Norm	Post surgery
SNA	89	80-84	84
SNB	78	78-82	80
ANB	11	0-4	4
SN-MP	34	28-36	26
SN-OP	24	14	16
U1-NA	25	22	25
U1-NA(mm)	4	4	7
L1- NB	39	25	35
L1-NB(mm)	11	4	11
Interincisal	109	131	114

TABLE 1: Cephalometric values

Figure 4 :Post surgical ceph

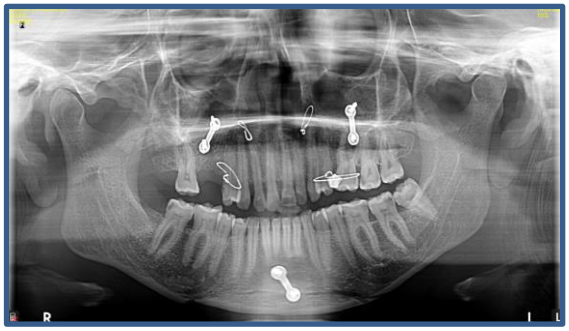

Figure 5 :Post surgical OPG

Figure 6 : Post surgical photographs

ratio presented to be 2.22:1,[9] which was similar to Caucasians. Furthermore, it was speculated that nasolabial angle would also be increased, with an average of 10.5 degree increment when maxillary incisors are retracted 6.7 mm.[10]

CONCLUSION

This case showed favourable results of gummy smile correction by surgery-first approach followed by orthodontic treatment. The facial profile, occlusion, and oral function were concomitantly improved. Pleasing outcomes were achieved with patient's psychosocial satisfaction.

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Conflict of Interest: *None Decl*ared