INTRODUCTION

Surgical intervention to realign the jaws and or reposition dento alveolar segments becomes necessary and sometimes the only possibility to treat patients whose orthodontic problems are so severe that growth modification and camouflage offers little support. Surgery is not a substitute for orthodontics in these patients, in fact if properly co-ordinated with orthodontics and other dental treatments would offer almost perfect overall results. The advances made in recent years have made it possible to combine treatment to correct these severe malocclusions that simply were not treatable a few years ago.[1]

Here is a case report of an adult female patient who presented to us with severe skeletal Class II malocclusion with anterior open bite and further complicated by hyperdivergent growth pattern, i.e., the maxilla and mandible growing in different direction. According to adult orthodontic patients’ classification, she fell into the category of case type 5 (under this category, characteristics of major problem areas are skeletal, dental and neuromuscular disharmonies of moderate to severe degree). Her medical, dental and childhood history did not have any significant findings. However, family tendency to similar features were seen in her mother and aunts.

The main clinical findings are summarized below:

Extra-oral examination

Preoperative frontal and profile view of patient [Figure 1].

- Convex profile
- Potentially incompetent lips
- 6 mm exposure of upper incisors below upper lip line at rest
- Gummy smile
- Increased lower anterior face height
- Acute nasolabial angle and deep mentolabial sulcus

Combined orthodontic and surgical correction of adult skeletal class II with hyperdivergent jaws

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ABSTRACT

A case of severe Class II skeletal malocclusion with anterior open bite having vertical growth pattern and matching soft tissue profile is presented. Considering age of the patient and the severity of the malocclusion, it was decided to combine orthodontic treatment with surgery. A 0.022 Roth Pre-adjusted Edgewise Appliance was chosen for the orthodontic correction and Le-Fort 1 differential vertical impaction of maxilla with mandibular autorotation and augmentation genioplasty was considered as the treatment plan. The main aim was to reduce the gummy smile and correct the class II profile.

Key words: Anterior open bite, divergent growth pattern, orthognathic surgery, pre-surgical orthodontics, skeletal class II
Intra-oral examination
Preoperative Molar and canine relations [Figure 2].
• Molar and canine relation were end-on on right side with class I on left
• Overjet was almost 0 mm (edge-to-edge bite)
• Anterior open bite of 1.5 mm
• Upper and lower dental midlines shifted to the left of the facial midline
• 41 was geminated
• Mild lower anterior crowding
• Generalized fluorosis

All routine orthodontic investigations were carried out at pertinent cephalometric findings
• Severe skeletal class II with matching soft tissue profile
• Retrognathic mandible (though the size was normal, the downward and backward rotation of mandible resulted in the retrognathism)
• Severe vertical growth pattern (palatal plane tipped cranially and mandibular plane downward and backward)
• Upper and lower incisor proclination with increased upper incisor exposure
Problem list
- Severe skeletal class II with matching soft tissue profile
- Hyperdivergent growth pattern
- Increased anterior face height
- Increased incisor exposure at rest
- Gummy smile
- Anterior open bite
- Proclined upper and lower incisors
- Dental midline shifts
- Canine and molar relationships on right side
- Mild lower anterior crowding
- Acute nasolabial angle and deep mentolabial sulcus

Treatment plan
Considering the age of the patient and severity of skeletal class II and the vertical growth pattern, a combined surgical–orthodontic plan was formulated.

Mechanotherapy
- Extract all 1st premolars to level, align and retract anteriors.
- Appliance – 0.022 Roth pre-adjusted edgewise appliance with critical anchorage.

Surgical treatment
Maxillary Le-Fort 1 down fracture and differential vertical impaction. Anterior maxilla was impacted by 4 mm and posterior impaction by 6 mm to correct the tipped palatal plane. Mandible was then auto-rotated and an augmentation genioplasty was carried out i.e. chin moved forward and upward by 2 mm [Figure 3].

Treatment progress
- All first premolars were extracted and orthodontic appliance placed
- Pre-surgical orthodontics to level, align and retract the upper and lower anterior by progressive nitinol and stainless steel arch wires.
- Patient was prepared for surgery at the end of 10 months. Both upper and lower arch wires 0.019 × 0.025 stainless steel with crimpable hooks for intermaxillary fixation were placed.
- Mock surgery was carried out on the models transferred to 3-point Hanau semi-adjustable articulators and the surgical splints were prepared.
- Post surgically anterior cross elastics to correct the mild dental mid-line and settling elastics were given to achieve good interdigitations in the buccal segments.
- Hawley’s retainer in the upper arch and banded lingual arch in the lower for mild molar correction were placed.
- Total treatment time – 1 year and 10 months.

Treatment results
At the end of the treatment, we were able to achieve normalization of skeletal pattern with a pleasant smile thus significantly improving the overall facial profile. The upper and lower incisors were aligned and retracted. Molar and canine relationships were corrected to Class I with appropriate overjet, overbite and midlines were achieved [Figures 4 and 5].

DISCUSSION
Combined surgical–orthodontic treatment can now
be carried out successfully for patients with severe dentofacial problems of any type. Interestingly, orthognathic surgery does not rate high on discomfort/morbidity scales. Mandibular ramus surgery requires about the same medications as extraction of impacted 3rd molars; maxillary surgery is tolerated better than that. Often psychological evaluation of the patient before the surgery is mandatory and carefully preparing the patient for their surgical experience would benefit the patient to adapt to the significant facial changes.\[1\]

Superior repositioning of the maxilla via maxillary ostectomy has proved to be useful method of treating patients with vertical maxillary excess. It is indicated primarily in patients with lip incompetence, excessive exposure of maxillary anterior teeth, long lower facial height, contour-deficient chin, and either Class I or Class II malocclusion. Clinically, the over-all improvement in facial appearance and the predictability and stability of the results have made this a most versatile and effective procedure when carried out with good planning, proper execution and attention to detail. In the hierarchy of
surgical stability, maxillary impaction is among the most stable of all orthognathic surgical procedures.[2]

Careful diagnosis and treatment planning combined with inter-disciplinary discussions on planning the surgical aspects determine the success of orthognathic cases. It is said that orthodontist talk in millimeters and angles whereas the oral surgeon thinks in centimeters. Hence, periodic assessment of the patient through the treatment progress by both teams would ensure that the case falls on track. Attaining the pre-surgical goals with rigid arch wires in place and preparation of surgical splint are steps that need careful detailing. The presented case is an example of good understanding between the specialists concerned as well as the patient. [3]

CONCLUSION

This case illustrates the importance of proper diagnosis and treatment planning. A team approach with the orthodontist, surgeon, and other disciplines all having input before the initiation of treatment is the best way to achieve stable, functional, and esthetic results. Through this combined approach, the patient had a dramatic skeletal, dental, and occlusal improvement. As an added benefit, the patient has reported a better self-esteem and a greater degree of pleasure related to her appearance.

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