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CASE REPORT

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Treatment of Skeletal Class II Malocclusion with Obstructive Sleep Apnoea using Orthodontic-Surgical Approach

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Abstract

In the treatment of skeletal class II malocclusion due to retrognathic mandible, the airway should be considered for the progress and outcome of the treatment. Here we present a case of 30 year old male patient having convex profile with potentially incompetent lips, class II skeletal base with maxillary and mandibular dentoalveolar protrusion, crowding in the maxillary and mandibular arch. He had nocturnal choking, difficulty in breathing while lying down and snoring suggestive of obstructive sleep apnoea. The treatment involved orthodontic-surgical intervention to correct the Obstructive Sleep Apnoea. Bilateral sagittal split osteotomy (BSSO) advancement of 8mm and ge-nioplasty of 4mm was done. The post operative orthodontic treatment included settling the bite, monitoring the relapse, and managing the dental space for future.

KEYWORDS

Obstructive Sleep Apnoea (OSA); Class 2 Malocclusion; Hyperdivergent Facial Type; Bilateral Sagit-tal Split Osteotomy (BSSO)

1 | INTRODUCTION

Class II malocclusion is one of the commonest malocclusions and approximately 14.6% of Indians have this malocclusion. This can be due to a combination of factors such as a mandibular deficiency or maxillary excess or both.[1] The treatment involves the correction of jaw discrepancies using functional appliances for growth modification, camouflage using orthodontic therapy, a combination of both or surgical alternatives in non growing patients.

The dentoalveolar position in growing patients may change if functional appliances are used and cause remodelling of the condyles. In Class II adults with skeletal deformities, Orthodontic camouflage or surgical-orthodontic treatment are the standard methods for treating malocclusion. On the other hand, dental compensation is utilized in orthodontic camouflage therapy to conceal the skeletal disparity. Additionally, the skeletal deformity is corrected with jaw osteotomies that rotate counterclockwise and orthodontic detailing in the surgical-orthodontic option.[2] Because surgical-orthodontic therapy promotes greater advancement of the mandible and chin and less retraction of the upper teeth, it is more successful in preserving the upper lip profile.

As a result, patients with a more severe sagittal jawbone discrepancy, particularly those with mandible retrusion, typically undergo it. Notwithstanding the issues with oral function and appearance, patients with retrusive mandibles need to have their airway health taken into account. When an airway is narrow, a lateral cephalometric film evaluation is necessary. When the airway is significantly constricted, the Apnoea-Hypopnoea Index (AHI) and polysomnography (PSG) could be necessary to identify if obstructive sleep apnoea (OSA) is present.[3] This case re-port demonstrates the correction of skeletal Class II malocclusion due to retrusive mandible with am ortho-surgical treatment option.

2 | CASE REPORT

A 30-year-old male patient visited the department of orthodontics and dentofacial orthopedics with a chief complaint of forwardly placed upper front teeth, reduced chin size and difficulty in breathing while lying down, nocturnal choking and snoring. He is internally motivated with positive attitude towards orthodontic treatment. On physical examina-tion, he is moderately built with 168cms in height and weighs 64 kgs with mesomorphic body type. Patient had history of restless sleep, noc-turnal choking and witnessed apnoea during sleep. Patient has also undergone sleep-study with Somno Touch Resp.

2.1 | Clinical Examination

Extra-Oral Examination: There was no evidence of facial asymmetry in the frontal view. The individual had obvious lip incompetence accompanied by a prominent show of upper teeth. His upper dental midline was aligned with facial midline, mesocephalic head, mesoproscopic face, potentially incompetent lips, consonant smile, incisor exposure on smile 7mm width, no gingival exposure on smiling and a mesorrhine nose. In profile view, patient had a convex facial profile with an increased Frankfurt's mandibular plane angle (FMPA), increased lower facial height, straight nasal dorsum with average nasolabial angle, negative lip step, deep mentolabial sulcus, receding chin and a double chin appearance.(Fig. 1)

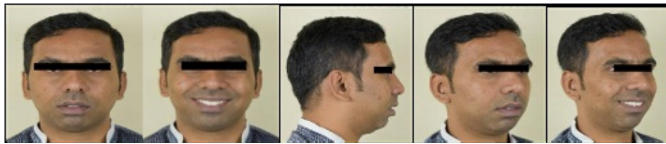

Fig.1: Pre-Treatment Extra Oral Photos

Intra-Oral Examination: On intra-oral examination, the teeth 35, 36, and 46 were missing and hence the molar relationship could not be established. The canine relationship and buccal segment were Class II on the right, end on left side with a deep bite and increased overjet (the overjet measured 9mm, while the overbite measured 6mm) . 16 and 47 were mesially tilted. The patient had a cross bite in relation to 27. The lower dental arch was ovoid and symmetric, while the upper arch was tapered and symmetric. Overall, the patient had satisfactory periodontal health. Spacing was present in upper and lower arch. (Fig.2)

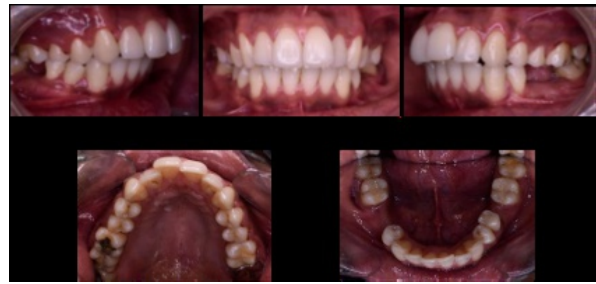

Fig.2: Pre-treatment Intra Oral photo

2.2 | Summary of Respiratory Analysis

Increased Respiratory Effort-Related Arousals (RERA): The individual experiences a higher frequency of Respiratory Effort-Related Arousals, indicating disruptions in sleep due to respiratory events. Desaturation to 85%: Oxygen saturation levels drop to 85%, suggesting significant episodes of oxygen desaturation during sleep. This is a critical concern as it may lead to hypoxemia. Snoring: The presence of snoring indicates potential airway obstruction or restriction during sleep, contributing to respiratory disturbances.

2.3 | Radiographic Findings

OPG reveals a Permanent set of Dentition, missing 36,35,46.

Root canal Treated 17. Restored 17. Mesio-angularly tilted 47.

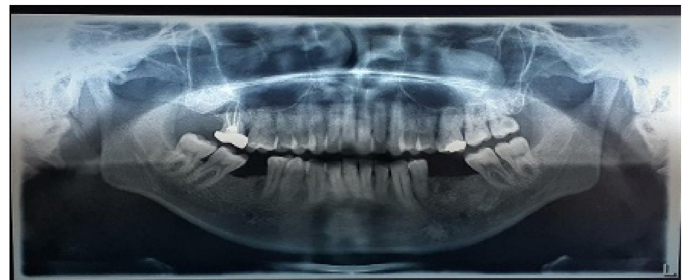

Fig.3: Pre-treatment OPG

2.4 | Cephalometric Findings

On examination of lateral cephalograph (Fig.4), the patient exhibits a Class II skeletal jaw base with posterior divergence, ANB angle 7°, an increased mandibular plane angle of 42 degrees. A vertical growth pattern with increased lower anterior facial height. Both the upper and lower pharyngeal airways are reduced in size. The upper pharynx measures at -14 mm (normal range: 15-20 mm).

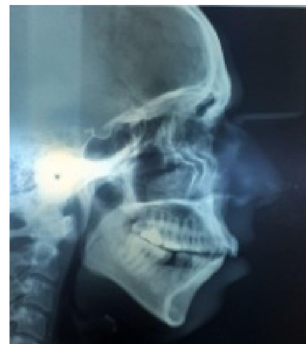

Fig.4: Pre-treatment Cephalograph

The lower pharynx measures at -6 mm (normal range: 11-14 mm). A decrease in mandibular corpus size by 6 mm is noted. The Wits appraisal measures 5 mm, indicating the degree of maxillary and mandibular discrepancy. Schwarz analysis reveals a maxilla to mandible ratio of 2.14:2.86, signifying an increased maxilla and decreased mandible. Maxillary size is decreased by 2.6 mm, and mandible size is decreased by 5 mm.

The patient exhibits a vertical growth pattern, with the maxilla and mandible diverging anteriorly. SN-GO-GN angle is 45°, FMA is 42°, indicating a vertical growth pattern. The Jaraback Ratio is 61%, confirming a vertical growth pattern. Upper and lower gonial angles are 45° and 90°, respectively. Basal plane angle is 43°.The J Angle is 85°. N-ANS measures 46 mm, indicating a decreased middle third of the face by 5 mm. U1 to NF shows extruded incisors by 3 mm. U6 – NF reveals extruded upper molars by 2 mm and intruded lower molars by 2mm. Soft Tissue Relation: The patient has an average nasolabial angle. A deep mentolabial sulcus is observed. Upper lip thickness is 14 mm and lip strain is 3 mm. Lower lip thickness is 14 mm, and lower lip length is 54 mm. The soft tissue profile angle is 148°, indicative of a Class II soft tissue profile. The total soft tissue profile angle is 124°, confirming a Class II profile. The soft tissue facial angle is 79°, consistent with a Class II soft tissue profile.

2.5 | Diagnosis

A 30-year-old, male patient reported to the department of orthodontic and dentofacial orthopedics with a chief complaint of forwardly placed upper front teeth, reduced chin size and difficulty in breathing while lying down, nocturnal choking and snoring. Skeletally, the patient exhibits a Class II maxilla-mandibular relation with soft tissues matching. Patient has a vertical growth pattern and increased lower anterior facial height, decreased mandibular corpus size with divergent jaw bases. Patient had a Class II incisor and canine relation, proclined upper incisors and lower incisors, lower anterior crowding, increased overjet and overbite. Soft tissue features included a convex facial profile, average nasolabial angle, reduced chin thickness, protruded and incompetent lips, obtuse chin throat angle, double chin appearance, and a deep mentolabial sulcus.

PROBLEM LIST Class II maxillo mandibular relation with convex facial profile, vertical growth pattern, incompetent and protruded lips decreased upper and lower pharyngeal airway, double chin appearance, class II incisor and class II canine relation, missing 46,36,35, increased overjet and overbite and crowding in relation to upper and lower interi-ors and proclined upper incisors. The aims and objectives of treatment were to correct skeletal class II base, recessive mandible, proclined upper and lower anteriors. To achieve ideal overjet and over bite and prosthetic rehabilitate 35. To achieve class I molar canine and incisor relation, a pleasing soft tissue profile and ideal dimension of pharyngeal airway.

TREATMENT PLAN 1. Presurgical phase: The orthodontic treatment was initiated with fixed appliance using 0.022 × 0.028 MBT prescription along with a non-extraction protocol. The levelling and alignment was initiated using 014 Niti followed by ,016 niti,018 niti,17x25 niti,19x25 niti,19x25 stainlesss steel wires for both the arches. (Fig. 5,6,7). the arches were stabilized using SS wires (Fig.8). Mock surgery was per-formed (Fig. 9) and pre surgical splints were fabricated 2. Surgical phase: Surgical correction was planned by Bilateral Sagittal Split Osteotomy advancement of 6mm followed by rotational genioplasty (Fig. 10).

3. Postsurgical phase: Post surgical orthodontics was continued after surgery to close residual spaces and finishing and detailing was done. Settling was initiated with intermaxillary elastics to improve the occlusion and neuromuscular function. (Fig.11)

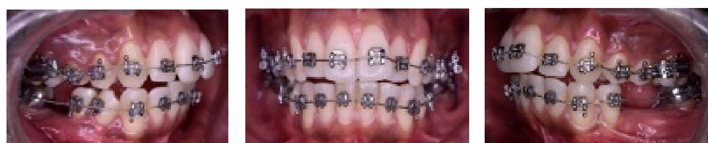

Fig. 5: Levelling and alignment using 0.016 NiTi

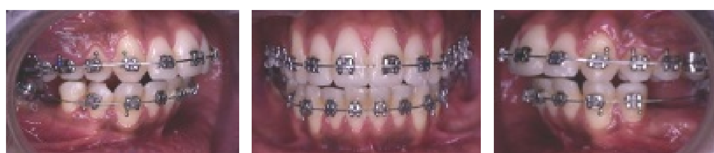

Fig. 6: Levelling and alignment 0.017x 0.025 NiTi

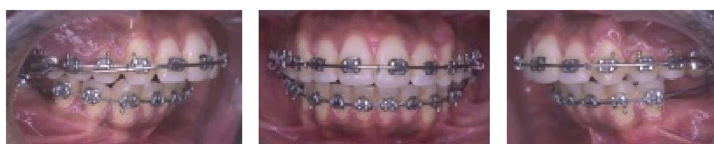

Fig. 7: 0.019x 0.025 Stainless Steel

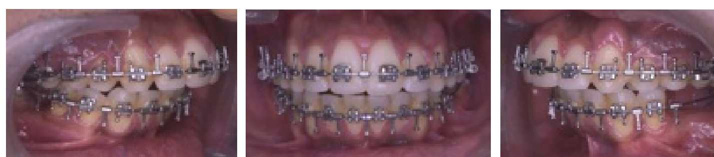

Fig. 8: Arches stabilized

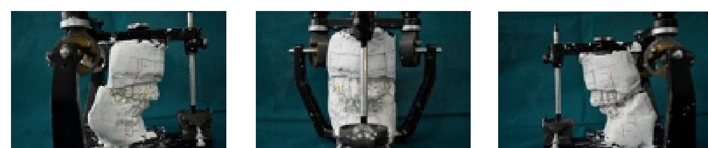

Fig. 9:Mock surgery

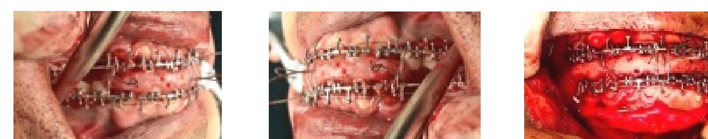

Fig. 10:Surgical phase - BSSO advancement surgery & Rotational genioplasty

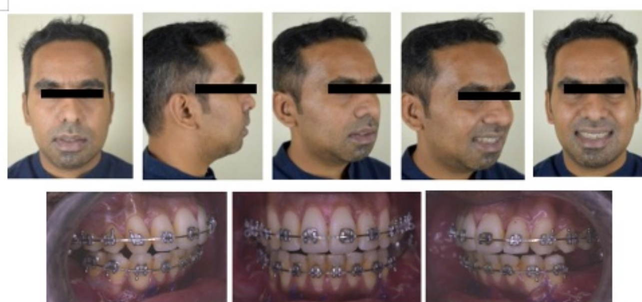

Fig.11: Post Surgical Photos

TABLE 1 Cephalometric Analysis.

Variable	Pre-Treatment	Post-Surgical
SNA	77	81 1
SNB	70	79 1
ANB	7	2 1
Wits Appraisal	5mm	2mm 1
Upper Incisor to Sn	103	102 1
Lower Incisor to Mandibular Plane	97	100 1
Interincisal angle	111	107 1
Maxillary Mandibular Plane angle	43	44 1
Upper anterior facial height	46	51mm 1
Lower anterior facial height	75	77mm 1
Jarabak Ratio	61.5	60 1
Lower incisor to A Pog Line	+10mm	+9mm 1
Lower Lip to Ricketts E Plane	+4mm	+4mm 1

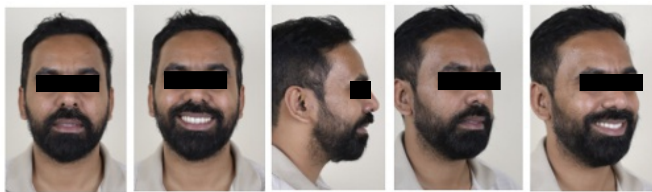

Fig.12: Post debonding photos (extraoral)

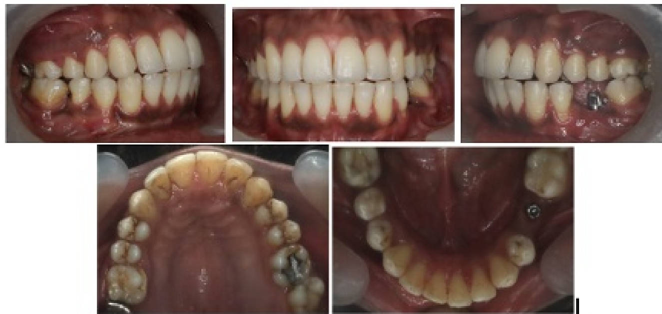

Fig.13: Post debonding photos (intraoral)

3 | RESULTS

The assessment of this case showed well-aligned dentition. Extraorally, the patient demonstrated a well-balanced facial profile and competent lips (Fig.12). The cephalometric analysis [Table 1] pre and post surgery showed improved parameters and harmonious occlusion. Intra-orally post surgery (Fig.13) patient had a good occlusion and Implant prosthetic rehabilitation of 37 is planned to achieve bilateral class 1 molar relation and for the better settling of the posterior occlusion. The retention protocol consisted of a fixed lingual retainer in the lower arch and a Beggs wrap around retainer in the maxillary arch. The treatment duration consisted of 24 months and the patient was highly satisfied with the results of the treatment.

4 | DISCUSSION

A large percentage of orthodontic patients have skeletal class II malocclusion. The only options for adults with skeletal class II are surgery or camouflage.

Even though the primary reason these patients visit is for cosmetic purposes, a deficient mandible, which is an underlying craniofacial abnormality, frequently acts as a significant risk factor for sleep apnoea or breathing disorders during sleep. The likelihood that airway issues will arise in the future and the impact of treatment on the airway should be taken into account when planning the treatment strategy.[4] The Sleep Questionnaire (FOSQ) is a screening tool used for diagnosis of sleep disorders related to breathing. This self-report measure was initially described by Weaver et al. to evaluate the effects of excessive sleep disorders on a variety of daily routine activities, including general activity level, attentiveness etc.[5] For treating OSA, CPAP therapy is considered the gold standard.[6] In addition, candidate cases may be given consideration for soft tissue surgical procedures such as adenotonsillectomy, nasal, palatal, and tongue surgeries.[7] Specifically, maxillomandibular advancement (MMA) was the primary skeletal correction because it could enhance his airway volume and facial profile at the same time. Given the patient's profile and primary complaint, Orthognathic Surgery is regarded as the primary treatment strategy in this case. The patient's airway space widened significantly overall with advancement.[8] Stability during surgery is influenced by the direction of movement, the kind of fixation, the kind of surgical technique, and muscle adaptation.[9] Proffit et al. states that when a patient has rigid internal fixation and their anterior facial height is maintained or increased, the maxilla tends to move upward.[10] Patients with Class II malocclusion experience relapses of surgery in advancements greater than 10 mm. to certain research, the surgical correction of mandible is associated with elongation of the suprahyoid muscle and extension of the pterygomasseteric sling in patients with skeletal Class II malocclusion and high MPA. This may also increase the risk of surgical recurrence. The maxilla was impactioned and rotated counterclockwise as a result of the surgery. These modifications were comparable.[11] Overall, there is still room for improvement in a few areas, like the obvious notching at mandibular margin, a typical sagittal osteotomy side effect progression of the jaw. Lingual proximal segment or ante gonial notch split, thin mandible etc. This can be handled later by another procedure involving lipofilling or bone grafts. An additional factor is that the lip posture was sagging at the bilateral cheilion, providing the patient with a frowny expression whenever he wasn't smiling. The muscle traction may have been the cause of this. During the mandibular advancement, the depressor anguli oris muscle, which originates from the external oblique line, may change in length and rotation in a counterclockwise direction. The hyperactive state of the perioral muscle may cause a frowny expression on one's face.

One could inject type A botulinum toxin to relax these muscles. Consulting with a plastic surgeon can help to alleviate this issue.

5 | CONCLUSION

Because a retrusive mandible frequently causes airway problems, the airway condition needs to be taken into consideration for patients with skeletal Class II who have a retrognathic mandible in addition to aesthetic and functional goals. Additionally, CBCT or an X-ray can be used to confirm the condylar anatomy and assess the likelihood of a relapse following Class II surgical-orthodontic treatment. It may be necessary to overcorrect mandibular advancement in order to make up for the airway patency and skeletal relapse.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES:

1. Sandhu, Sarabjeet & Bansal, Nidhi & Sandhu, Navreet. (2012).Incidence of Malocclusions in India -A Review. J Oral Health CommDent. 6. 21-24. 10.5005/johcd-6-1-21.
2. StatPearls: Obstructive sleep-disordered breathing. (2022). Accessed: September 27,2022
3. Chang HP, Chen YF, Du JK: Obstructive sleep apnea treatment in adults. Kaohsiung J Med Sci. 2020, 36:7-12. 10.1002/kjm2.12130
4. Bailey LJ, Proffit WR.Combined surgical and orthodontic treatment. In:Proffit WR, Fields HW Jr., ed ors. Contemporary Orthodontics. 3rd ed. St. Louis, MO: Mosby; 1999. p. 674-709
5. Weaver TE, Laizner AM, Evans LK, Maislin G, Chugh DK, Lyon K, Smith PL, Schwartz AR, Redline S, Pack AI, Dinges DF.An instrument to measure functional status outcomes for disorders of excessive sleepiness. Sleep. 1997 Oct;20(10):835-43. PMID: 9415942.
6. Paes EC, van Nunen DP, Basart H, et al. “Management of Neonates with Severe Airway Obstruction due to Pierre Robin Sequence: A Systematic Review of the Literature.” Pediatr Pulmonol. 2013;48(5):520-527.
7. J Paunonen M Helminen T Peltomaki Long term stability of mandibular advancement with bilateral sagittal surgeryJ Cranio-Maxillary Surg201846914216
8. Muto T, Yamazaki A, Takeda S. A cephalometric evaluation of the pharyngeal airway space in patients with mandibular retrognathia and prognathia, and normal subjects. Int J Oral Maxillofac Surg 2008;37:228- 231.Proffit WR, Turvey TA, 12.
9. D Mulier LG Romero A Führer C Martin S Shujaat E Shaheen Long term dental stability after orthognathic surgery:A Systematic ReviewEuropean J Orthod2021431104112
10. Mihalik CA, Proffit WR, Phillips C. Long-term follow-up of Class II adults treated with orthodontic camouflage: a comparison with orthognathic surgery outcomes. Am J Orthod Dentofacial Orthop 2003;123:266-278.
11. Phillips C. The hierarchy of stability and predictability in orthognathic surgery with rigid fixation: an update and extension. Head Face Med 2007;3:21
12. Baas Bjork A, Skieller V. “Growth of the maxilla in three dimensions as revealed radiographically by the implant method.” Br J Orthod. 1977;4(2):53-6.

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