Case Report

Treatment of Class II division 2 malocclusion with orthodontics and surgical combined syngeritic approach

ABSTRACT

A 21-year-old male presented with irregularily placed upper front teeth, skeletal Class II relation and also Class II molar relation with 100% overbite, retroclined upper central incisors, and proclined right lateral incisor. Nonextraction treatment was planned to correct the malccusion on the diagnosis and treatment planning. Intrusion arch was used to intrude and procline the upper central incisors. Correcting the axial inclination of retroclined incisors caused unlocking of the mandible, presurgical orthodontics was carried out. Followed by surgically correcting the posteriorily positioned mandible, bilateral sagittal split osteotomy mandibular advancement and genioplasty was proformed Posttreatment incisors inclination was corrected, bilateral Class I molar relation was achieved, and canine in its position by postsurgical orthodontics. The smile arc was improved along with mentolabial sulcus and facial profile.

Keywords: Class II division 2, deep bite, intrusion arch, orthognathic surgery

INTRODUCTION

Class II malocclusion is a frequently observed clinical problem, occurring in about 10% of Indian population.[1,2] Treatment of Class II malocclusion in adolescents has always relied on growth modification. The majority of treatment modalities, such as functional appliances, are directed at stopping or redirecting maxillary growth and simultaneously stimulating mandibular growth.[3-5]

On the other hand, in adult patients with severe Class II malocclusions, generally involving extremely deficient mandibles, orthognathic surgery is often the only possible treatment.[6] Many investigators have pointed out that a Class II molar relation occurs in a variety of skeletal and dent al configurations.[7,8]

Class II division 2 malocclusion is characterized by a Class II molar relation coupled with retroclination of central incisors and overlapping by the lateral incisors.[9] The treatment objectives must include the chief complaint of the patient, and the mechanics plan should be individualized based on the specific treatment goals.

Class II malocclusions can be managed with diverse treatment methods such as functional appliances, extraoral traction, fixed appliances, extraction procedures, and surgery.

These patients also tend to exhibit problems with the upper and lower occlusal planes, such as deep curves of Spee. The soft-tissue drape of the lips often conforms to the malocclusion, so that the lips may be redundant with a deep mentolabial sulcus.

Because of the deep bite and supraeruption of the maxillary incisors, the gingival margins of the maxillary anterior teeth are usually malaligned, and the lingually inclined

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Received: 16-Dec-2020 **Revised:** 28-Feb-2021
Accepted: 01-Mar-2021 **Published:** 07-May-2021

Access this article online	
Website: www.orthodrehab.org	Quick Response Code
DOI: 10.4103/ijor.ijor_48_20	

How to cite this article: Shetty VG, Shetty KP. Treatment of class II division 2 malocclusion with orthodontics and surgical combined syngeritic approach. Int J Orthod Rehabil 2021;12:32-6.

mandibular incisors may have excessively high gingival margins.

These cases are usually characterized by severe, traumatic deep overbite with lingually inclined maxillary incisors. The first step of treatment in such cases is usually to start correcting the deep bite by intrusion and proclination of the incisors, extrusion of the molars, or both.[10]

This article describes our treatment of Class II, division 2 adult patients requiring mandibular advancement surgically. Division 2 cases are often characterized by severe deep bites inclined upper central and lower incisors, and labially flared maxillary lateral incisors.

CASE REPORT

A 21-year-old male reported with the chief complaint that his upper front teeth are irregularly placed. During presented with a similar malocclusion. No relevant medical history was reported.

The clinical examination showed convex facial profile, square facial form, horizontal growth pattern, deep mentolabial sulcus, reduced chin prominence, and competent lips [Figure 1]. Intraoral examination showed retroclined upper central incisors and proclined right lateral incisor. The patient presented an Angle's Class II molar relation on the left side, and also on the right side, and 100% deep bite. The lower incisors were elongated, and the curve of Spee was steepened by 4 mm [Figure 1].

Figure 1: Pretreatment (a) extraoral photos (b) intraoral photos

Panoramic radiograph showed the presence of 38 and 48 teeth without bone loss mesioangular positioned. It indicated full complement of teeth. A lateral cephalometric analysis [Table 1] revealed normal maxilla with Sella, Nasion, Point A (SNA) −82°, retrognathic mandible with SNB − 72°, a skeletal Class II jaw base relationship with ANB - 10°, and Wits appraisal 5 mm. The effective mandibular length (Co-Me) was 106 mm and GO GN-SN 19° indicative of a horizontal growth pattern. Upper incisors were lingually inclined with U1 − SN 88°. Lower incisors were inclined ideally over the basal bone with L1 - MP 95° [Figure 2].

Diagnosis and treatment objectives

The case was diagnosed with an Angle's Class II division 2 subdivision malocclusion on Class II skeletal jaw bases with a severe deep overbite. The treatment objectives included improvement of the deep overbite by means of leveling the

Table 1: Cephalometric value comparsion

Variable	Standard	Pretreatment	Posttreatment
Skeletal			
SNA (°)	82±2	82	82
SNB (°)	80±2	72	79
ANB (°)	2	10	3
SN-GO GN	32	30	32
Dental			
U1-SN (°)	102±2	88	102
U1-NA (°/mm)	4/22	−4/10	4/22
L1-NA (°/mm)	4/25	4/25	4/25
IMPA (°)	92±2	95	96
Interincisal angle (°)	131	132	135
Soft tissue			
Nasolabial angle (°)	90-110	95	100
U lip-S line (mm)	0	0	1
L lip-S line (mm)	0	0	1

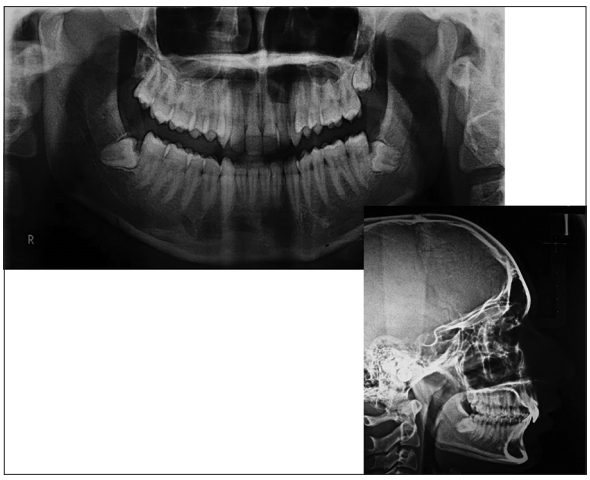

Figure 2: Pretreatment radiographs OPG and lateral cephalogram

upper and lower arches, correction of posteriorily positioned mandible skeletal class ii by mandibular advancement of mandible surgically, correction of Class II molar relation on the both side, and attainment of an esthetically pleasing profile and functionally stable occlusion.

Treatment plan

The treatment plan was nonextraction with MBT appliance to align and level the arches. Class II division 2 malocclusions require the correction of interincisal angle, to achieve Class I incisor relationship and stable overbite relation. Intrusion arch was planned in the upper arch to correct extruded and retroclined upper central incisors. Upper incisors were proclined. Presurgical orthodontics were carried out, followed by mandibular advancement by bilateral sagittal split osteotomy (BSSO) surgically. Postsurgical orthodontics to finish and level the occlusion. Bondable lingual retainer was decided for posttreatment stability.

Treatment progress

MBT appliance 0.022 × 0.028″ slots (American orthodontics, USA) were used. Presurgical orthodontics were carried out. Intrusion arch was used to intrude the upper incisors and proclined the upper incisors and correct deep bite [Figure 3]. Fifty grams of force were used to intrude central incisors. After deep overbite correction, alignment and leveling in the maxilla were accomplished with the following sequence of arch wires: (a) 0.014 nickel–titanium (NiTi) archwires, (b) 0.016 014 nickel–titanium (NiTi) archwires, and (c) 0.017 × 0.025 niti archwires.

MBT brackets were bonded on the mandibular dentition. After initial alignment and leveling, both the arches were coordinated on 0.019 × 0.025 stainless steel archwires. Palatal root torque of 11 and 21 was incorporated in 0.021 × 0.025″ titanium molybdenum alloy archwires to correct torque of upper incisors. Finishing was accomplished on 0.021 × 0.025″ braided stainless steel arch wires [Figure 4].

Followed by BSSO surgery for mandibular advancement and genioplasty was done.

Figure 3: Protrusion and intrusion arch

After 1.5 months surgery [Figure 5], postsurgical orthodontics was carried out to level and finish the occlusion [Figure 6]. Post treatment Ortho Pantomo Gram (OPG) and lateral cephalogram was taken [Figure 7].

Gingivotomy was performed before bracket removal to improve the gingival contour of 11 and 21. Composite restorations of incisor crowns were done to achieve ideal height-width ratio. At the debond visit, bonded lingual retainers were placed. The patient is being followed every 6 months for follow-up.

Treatment results

The total active treatment period was 16 months. The treatment objectives set in the pretreatment planning were achieved. The retroclined incisors, overbite, and steep curve of Spee were corrected. The skeletal class II was corrected into a Class I and also molar relation on the both side by surgical BSSO and genioplasty.

The mandibular plane angle and lower anterior facial height showed minimal changes [Figure 6]. The posttreatment, X-ray, and photographs showed axial inclination of upper and lower incisors corrected [Figure 7]. The posttreatment orthopantomogram showed parallelism of roots. The gingival-tooth relationship was improved for the upper central incisors. Overall micro esthetics were achieved after

Figure 4: Presurgical orthodontics completed (a) extraoral photos (b) intra oral photos

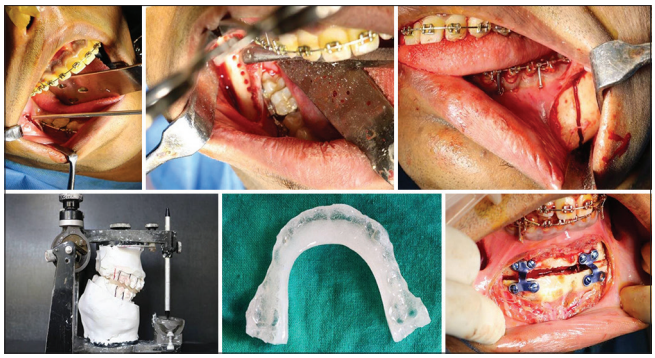

Figure 5: Mock surgery, splint fabrication and surgical procedures

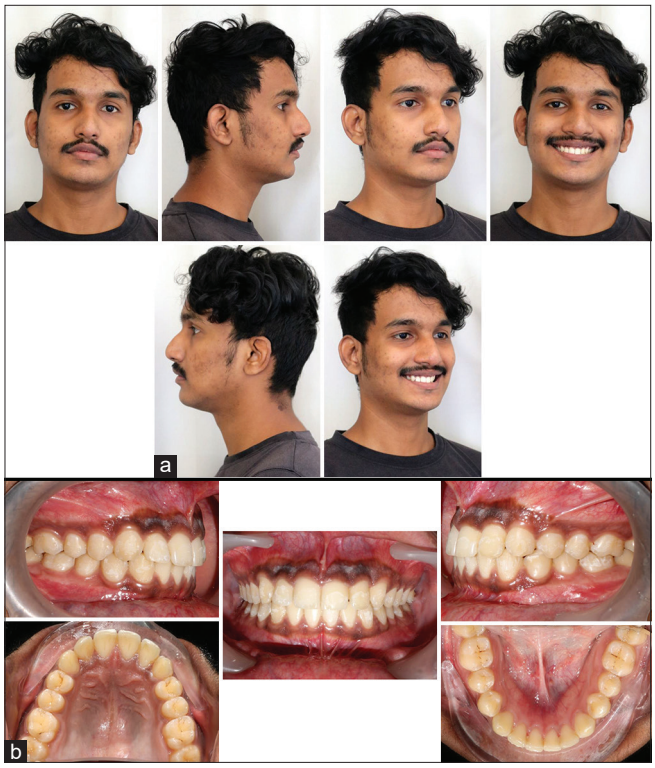

Figure 6: Posttreatment (a) extraoral photos (b) intraoral photos

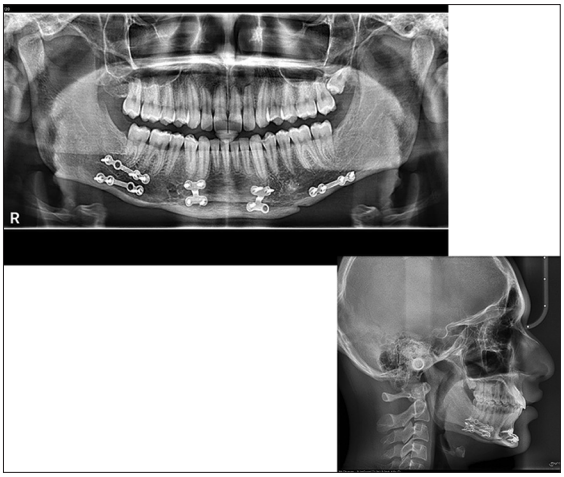

Figure 7: Posttreatment radiographs OPG and lateral cephalogram

gingivotomy and composite restoration was done. At the end of treatment, the patient had a harmonious profile and functionally stable occlusion, along with a pleasing smile and improved smile arc.

DISCUSSION

Class II division 2 malocclusion is characterized by permanent mandibular incisors occluding posterior to the cingulum of retroclined permanent maxillary incisors. It frequently presents with reduced overjet and increased overbite. Classically, the permanent maxillary central incisors are retroclined and the maxillary lateral incisors are proclined.[11]

Combination of hyperactivity of the labial musculature and a higher resting lip line is thought to cause maxillary incisor retroclination. Most of the Class II division 2 malocclusions manifest with a severe deep bite.[12]

Various treatment options and appliance designs have been advocated for the correction of excessive overbite According to Nanda, the correction of deep overbite can be achieved by four types of tooth movement, i.e., intrusion of incisors, proclination of anterior teeth, extrusion of posterior teeth, and surgical methods.[13]

Deep bite was corrected by intrusion and proclination of upper central incisor in this case.

In cases presenting during the growth period, the forward growth of the mandible can be used to improve the anteroposterior discrepancy with the maintenance of an adequate vertical skeletal relationship. However, adult patients no longer experience catch-up growth and often need a surgical approach for sagittal correction.[14]

In our case, we corrected axial inclination of retroclined upper central incisors which allowed mandible to unlock the mandible and moved it in the forward direction. The skeletal Class II was corrected into a Class I and also molar relation on the both side by surgical BSSO and genioplasty.

Overall micro esthetics were achieved after gingivotomy and composite restoration was done. At the end of treatment, the patient had a harmonious profile and functionally stable occlusion, along with a pleasing smile and improved smile arc.

CONCLUSION

Treatment of Class II, division 2 malocclusion in adults is always challenging. Applying sound biomechanical principles

to execute the mechanics plan is the surest way to achieve predictable results with minimal side effects.[13] By using the biomechanical concepts with specific objectives in mind, the clinician can achieve the desired goals. Deep-bite correction helps in unlocking of mandible which corrects Class II relation by surgical correction The interincisal angle must be normalized which gives long-term treatment stability.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil

Conflicts of interest

There are no conflicts of interest.

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