ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at: www.ijdsir.com

Volume – 6, Issue – 1, February - 2023, Page No. : 238 - 244

Non-extraction treatment of a skeletal Class II division 2 malocclusion with Burstone intrusion arch - A Case Report

[1]Dr. Shresthanu Saha, Consultant Orthodontist, West Bengal.

[2]Dr. Soumen Khan, Consultant Orthodontist, West Bengal.

[3]Dr. Arkajit Goswami, Consultant Orthodontist, West Bengal.

[4]Dr. Md. Golam Hasan, PGT, Dept of Orthodontics & Dentofacial Orthopaedics, Dr R Ahmed Dental College & Hospital, Kolkata.

[5]Dr. Arunava Chatterjee, Govt. Dental Surgeon, Diamond Harbour Govt. Medical College & Hospital, West Bengal.

[6]Dr. Pinaki Roy, Associate Professor, Dept of Orthodontics & dentofacial Orthopaedics, Dr R Ahmed Dental College & Hospital, Kolkata.

Corresponding Author: Dr. Soumen Khan, Consultant Orthodontist, West Bengal.

Citation of this Article: Dr. Shresthanu Saha, Dr. Soumen Khan, Dr. Arkajit Goswami, Dr. Md. Golam Hasan, Dr. Arunava Chatterjee, Dr. Pinaki Roy, "Non-extraction treatment of a skeletal Class II division 2 malocclusion with Burstone intrusion arch - A Case Report", IJDSIR- February - 2023, Volume – 6, Issue - 1, P. No. 238 – 244.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Treatment of Class II div 2 malocclusion is challenging, and orthodontists frequently struggle to determine the choice of treatment. Several treatment modalities have been proposed for correcting these types of malocclusions.

The aim of this case report is to present dentoalveolar and facial outcomes achieved using Burstone intrusion arch combined with fixed appliances in an growing female patient presenting with Class II div 2 malocclusions. Treatment outcomes show improved dental esthetics and functional stability.

Keywords: Burstone intrusion arch, Class II div 2 malocclusions.

Introduction

Class II div 2 malocclusion is a unique type of malocclusion with features like retro lined incisors and strong inheritance pattern[1,2].

The subjects with class II division 2 malocclusion have round or square face and craniofacial features of horizontal growth and distinct dental features, which are unique and differentiates it from all other types of malocclusions to the extent to be categorised as a syndrome[3].

The class II division 2 is characterised specifically also by distal occlusion of the teeth in both lateral halves of the lower dental arch, indicated by the mesiodistal relations of the first permanent molars, associated with

retrusion instead of protrusion of the upper incisors[4]. The deep bite is due to the infra occlusion of the molars, the molars have failed to erupt to their normal length, allowing the lower incisors to come in contact with the vault of the maxillary arch, while the cutting edges of the upper incisors pass beyond the gingival margins of the lowers.

There is a wide range of severity of class II div 2 malocclusions, some exhibiting minimal characteristics of the classification, with only dental manifestations of the malocclusion.

Case report

The patient presented for initial examination at the age of 14 years and 7 months in good general health and no history of serious illness or injury. Her complaint was related to the fact that the incisors were mispositioned with significantly altered inclination and presence of irregularly placed lower anterior teeth.

Diagnosis

The patient presented with an Angle Class II, Division 2 malocclusion, a 100% overbite, sharp retroclination of teeth 11, 21, and labioversion of tooth 12, 22. (Fig 1). The lower arch exhibited moderate crowding, but with a pronounced Curve of Spee.

The side profile X-ray and cephalometric tracing showed: Incisor up righting (1-NA = 7°); (Table 1) Class II skeletal pattern, ANB angle = 4º, (SNA = 81° and SNB = 77º) and normal mandibular growth in the horizontal orientation (SN-GoGn = 23°, FMA = 23.5º and Y-axis = 55°).

A facial evaluation showed a straight side profile (UL = -2 mm and LL = -2.5 mm), with passive lip seal, absence of significant asymmetries and proportional facial thirds. (Fig 2)

Fig 1: Pre-treatment intraoral photos

Fig 2: Pre-treatment extraoral photos

Treatment goals

Considering that this is a growing patient with a harmonious facial profile, the author attempted to maintain the vertical, transverse and anteroposterior position of the bone bases. As regards maxillary dentition the intent was to change the Class II molar relation to class I molar relation with loss of anchorage, overbite correction and upper incisor inclination. The specific goal for the mandibular dentition was to level the Curve of Spee while maintaining the intercanine and intermolar widths. Thus, it was anticipated that upon treatment completion correct guides would be achieved for the canines with adequate overbite and overjet, promoting a significant improvement in smile aesthetics.

Treatment plan

To achieve the proposed goals the patient was informed that the treatment plan involved the non-extraction treatment plan. In the following step, an orthodontic appliance Burstone intrusion arch (0.017x0.025-inch TMA)[5,6] fixed to the upper arch teeth and a fixed bite plate were fitted in the upper arch for correcting the

complete deep bite. After achieving the correct proclination of both the upper central incisors MBT metal pre adjusted edgewise appliance was bonded in upper arch and starting from round Ni-Ti 0.014 to 0.016 -in arch wires were used for alignment and levelling of the anterior and posterior segment. Whenever possible, based on this projection of the upper incisors, the orthodontic appliance was bonded to the lower arch and a series of 0.014 to 0.016 Ni Ti -in straight arch wires installed for levelling. As there is a moderate crowding in lower arch so there is a need for proximal slicing in lower anterior teeth.

For anchorage loss the use of Class II elastics was also planned. The case was finished using upper and lower 0.019 x 0.025-in arch wires with individual bends, as needed. Upon completion of the active treatment, the author used, as planned, an upper removable bite plate retainer, and on the lower arch, an intercanine fixed lingual retainer. The patient was duly instructed, verbally and in writing, about the necessary cares in handling the retention appliances, as well as their oral hygiene.

Treatment progress

Pre-welded to orthodontic bands, which were fitted to the first and second molars and a fixed anterior bite plane was installed on teeth 16 and 26. The preadjusted Edgewise metal brackets (MBT) (slot 0.022 x 0.028-in)—standard were bonded in 11 and 21. Sectional arches were used to start the alignment and levelling on the right- and left-hand sides of central incisors.

To promote incisor alignment canines were moved slightly distally with help of less back which is extended from both side canine to both sides first molar. Simulta neously, a Burstone intrusion utility arch (0.017x0.025-inch TMA) (Fig. 3) was initially applied only to achieve central incisor projection which later utilized a force of 20-30gms to intrude the incisors.

As soon as possible the lateral incisors were included and alignment and levelling proceeded up to a 0.016 Ni Ti arch wire. To intrude the anterior teeth 0.018-in stainless steel wire was used as a stabilizing arch, including all upper teeth except the canines—which were bypassed.

In the lower arch, alignment and levelling were performed using 0.014 to 0.016 Ni Ti arch wires. The use of Class II intermaxillary elastics was prescribed to promote the growth of the mandible. The treatment was completed using ideal stainless steel 0.019 x 0.025-in arch wire on the upper and lower arches and the use of Class II elastics (Fig. 4).

Third molar extraction was prescribed. After ensuring that all the intended goals had been achieved the orthodontic appliance was removed and the retention phase began. To this end, we used a removable anterior bite plane retainer and a lower fixed bonded retainer from 33 to 43.

The patient was recommended to wear the upper retainer 24/7 for the first year and after that period, twelve hours a day for six months, and finally, just nights for another six months. The lower intercanine retainer was prescribed indefinitely.

Fig 3: Burstone intrusion arch in place

Treatment results

In reviewing the patient's final records, it becomes clear that the goals were attained. In the maxilla, the bone base was kept at a vertical and transverse position, with a small anteroposterior change reflected in the slight movement of point A, due to the correction of incisor inclination (Fig 5). This resulted in a Class I skeletal pattern with the ANB angle changing from 4° to 2° (Table 1)., the 1-NA angle underwent a major change from 7° to 28° and the linear positioning of the incisors (1-NA, mm) increased by 2 mm, increasing from -3 mm to 4 mm.

This change was made to allow overbite correction, considering that the initial retroclination precluded intrusion owing to the proximity of the incisors' root apex to the cortical bone of the maxilla.

The intercanine and intermolar widths were maintained. In the mandible, there was no change in the position of the bone base. There was an increase in incisor inclination, reflected in alterations in the 1-NB measurements (from 8° to 26°) and the IMPA angle (from 76° to 95°). Thus, the interincisal angle underwent a significant change from 161° to 123°. Similarly, to the maxilla, the intercanine and intermolar widths remained unchanged.

Fig 4: Treatment progress

An analysis of the panoramic radiograph (Fig 7) revealed adequate root parallelism. There was also a slight apical blunting of the upper incisors, compatible with the significant movement performed in these teeth.

The dental occlusion showed an improved posterior intercuspation on both sides and the treatment was finished with a Class I relation on the molars, occlusion key on the canines, as well as adequate overbite and overjet. Facial aesthetics did not change significantly while the facial profile was maintained. The smile, however, improved significantly due to the proper alignment and levelling of the anterior teeth (Fig 6).

Fig 5: Post treatment intraoral photos

Fig 6: Post treatment extraoral photos

	PRE	POST
Maxillary component		
Sna(degree)	81	80
Co-A(mm)	72	76
Mandibular Component		
Snb(degree)	77	78
Snd(degree)	75	76
Maxillomandibular Relationship		
Anb(degree)	4	2
Wits	+2	-2
Vertical and Horizontal component		
Fma(degree)	23.5	24.5
Sn. Ocl(degree)	23	17
Sn. Gogn (degree)	23	25
LAFH (mm)	49	50
Dentoalveolar Component		
Mx1 .NA(Degree)	7	28
Mx1 .NA (mm)	-3	+4
Md1.NB(Degree)	8	26
Md1.NB(mm)	-2	+4
IMPA(Degree)	76	95
Overjet (mm)	0	+1.5
Overbite (mm)	6	+2
Nasolabial Angle	117	107

Table 1: cephalometric treatment changes

Fig 7: Pre-treatment opg and lateral cephalogram.

Fig 8: Post treatment opg and lateral cephalogram.

Discussion

Angle Class II, Division 2 malocclusion is characterized by retroclination of central incisors usually associated with a pronounced overbite. Van der Linden[1]

further classified the Class II division 2 malocclusion into the following three types.

Type A, in which the maxillary central and lateral incisors are retro lined but the retroclination is not severe.

Type B, in which maxillary lateral incisors overlap with the retro lined maxillary central incisors.

Type C, in which the maxillary central and lateral incisors are retro lined and overlap with the maxillary canines.

This case can be described as type B. To correct this anomaly in adult patient's professionals often rely on the extraction of first premolars[4]. In our case, the patient was in a growing phase so non-extraction treatment was chosen and required adequate anchorage loss to ensure an appropriate relation between the canines.

In this case, the author resorted to the Burstone sectional arch mechanics where it was possible to keep anchorage under control by means of specific biomechanical principles and to achieve the goals laid down at the start of treatment.

The correction of severe overbite was performed by a set of well-planned tooth movements that initially included the projection of the upper incisors by means of an uncontrolled tipping movement.

so as to allow the apex of these teeth to move away from the labial cortex. Only then was intrusion performed, as required. With the increasing inclination of upper and lower incisors the interincisal angle's final value was very close to the ideal as showed in superimposition the initial and final cephalometric phases (Fig 9).

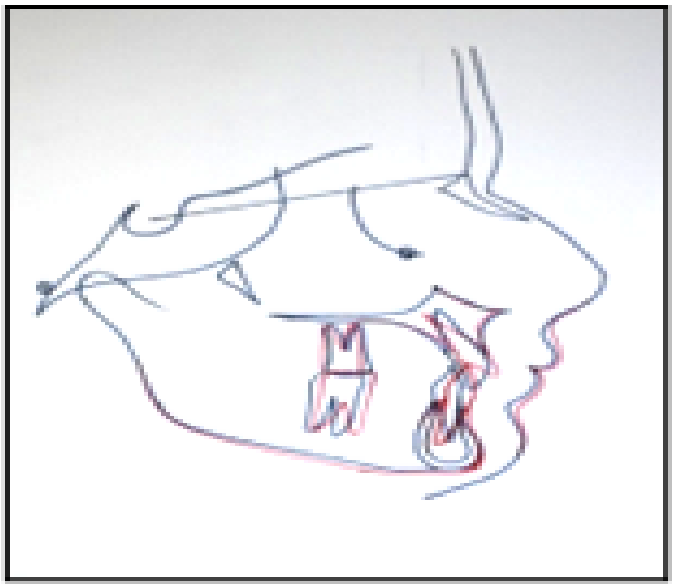

Fig 9: Superimposition

Conclusion

Class II division 2 malocclusion is considered to be difficult to treat and is prone to relapse[7]. A meta-analysis by Millett et al[7] showed highly biased prospective and retrospective evidence apparently favoured non-extraction treatment and indicate that overbite correction is reasonably stable in the short term. In case of growing patients, an anterior bite plane like appliance was required to maintain the maxillary incisor inclination and to induce anterior mandibular growth rotation. Comparisons of various retainers showed no significant difference on maxillary incisor stability at a mean of 3.5 years post treatment. However, Uribe and Nanda [8] recommended a lower bonded 3-3 retainer to ensure a stable result. Minor overbite relapse should be expected as the correction involves some amount of posterior extrusion. Therefore, some over correction is suggested to achieve good long-term results.

References

1. Van der Linden FPGM. Development of the dentition. Chicago: Quintessence; 1983.

2. Millett, Declan T., et al. "Treatment and stability of class II division 2 malocclusion in children and

adolescents: a systematic review." American Journal of Ortho dontics and Dentofacial Orthopedics 142.2 (2012): 159-169.

3. Hitchcock HP. The cephalometric distinction of Class II, division 2 malocclusion. Am J Orthod 1976;69: 447–454.

4. Lee, Kun-Feng, et al. "Orthodontic Correction of Class II Division 2 Mal occlusion." Taiwanese Journal of Orthodontics 30.3 (2018): 2.

5. Burstone, Charles J. "The mechanics of the segmented arch techniques." The Angle Ortho dontist 36.2 (1966): 99-120.

6. Mc Namara, J. A. "Utility arches." Journal of clinical ortho dontics: JCO 20.7 (1986): 452-456.

7. Millett DT, Cunningham SJ, O'Brien KD, Benson PE, de Oliveira CM. Treatment and stability of Class II Division 2 malocclusion in children and adolescents: A systematic review. Am J Orthod Dentofacial Orthop 2012; 142:159–169.

8. Uribe F, Nanda R. Treatment of Class II, Division 2 malocclusion in adults: bio mechanical considerations. J Clin Orthod 2003; 37:599–606.