Journal of Research in Medical and Dental Science
2023, Volume 11, Issue 12, Page No: 23-29

Available Online at: www.jrmds.in
eISSN No. 2347-2367: pISSN No. 2347-2545

TADS Assisted Camouflage Orthodontic Treatment of Class II Malocclusion in a Non-Growing Patient-A Case Report

Yenika Manchanda*, Merry, Sanjay Mittal, Isha Aggarwal, Abida Parveen

Department of Orthodontics and Dentofacial Orthopedics, Atal Medical and Research University, Himachal Pradesh, India

ABSTRACT

Introduction In individuals with Class II malocclusions, there is an anteroposterior discrepancy between the maxillary and mandibular dentitions, which may or may not be accompanied with a skeletal discrepancy, the most effective treatment option to eliminate is by modified three piece base arch combined with TADS for simultaneous deep bite correction and en masse retraction. Aim The present case report showcases the treatment results and biomechanics involved for en masse retraction and intrusion of anterior teeth using three-piece intrusion arch and temporary anchorage device. Conclusion The modified three piece base arch combined with TADS is effective in controlled translation and intrusion of anteriors and would be a preferable mechanotherapy in low angle case with deep bite, proclined anterior and Class II malocclusion.

Key words: Class II malocclusion, Three-piece intrusion arch, TADS.

HOW TO CITE THIS ARTICLE: Yenika Manchanda, Merry, Sanjay Mittal, et al. TADS Assisted Camouflage Orthodontic Treatment of Class II Malocclusion in a Non-Growing Patient-A Case Report, J Res Med Dent Sci, 2023, 11(12):23-29.

Corresponding author: Yenika Manchanda
e-mail✉: yenikamanchanda14@gmail.com
Received: 27-November-2023, Manuscript No. jrmds-23-116758;
Editor assigned: 30-November-2023, PreQC No. jrmds-23-116758(PQ);
Reviewed: 14-December-2023, QC No. jrmds-23-116758(Q);
Revised: 19-December-2023, Manuscript No. jrmds-23-116758(R);
Published: 26-December-2023

INTRODUCTION

Class II malocclusions are generally described as having either a dental, skeletal and/or functional components or characteristics. It needs to be emphasized that they are often expressed at the same time and to various degrees.

Angle proposed a classification system based on the relationship of the mandibular first molars to the maxillary first molars. He characterized the Class II malocclusions as having a distal relationship of the mandibular teeth relative to the maxillary teeth of more than one-half the width of the cusp. It is characterized two types of Class II malocclusions based on the inclination of the maxillary central incisors.

Class II division 1 malocclusions are described as having labial inclined maxillary incisors, an increased overjet with or without a relatively narrow maxillary arch [1]. The vertical incisor overlap may vary from a deep overbite to an open bite. The Class II division 2 malocclusions are described as having excessive lingual inclination of the maxillary central incisors overlapped on the labial by the maxillary lateral incisors. In some cases, both the central and the lateral incisors are lingually inclined and the canines overlap the lateral incisors on the labial.

An Angle Class II malocclusion in an adult with a skeletal Class II profile with maxillary vertical excess is a difficult problem for orthodontists to correct. This is because the clockwise rotation of the mandible secondary to distalization of the maxillary molars for correction of the molar relationship confounds the skeletal discrepancy and sometimes exacerbates the facial profile. Moreover, in patients with severe gingival exposure due to excessive vertical growth of the maxilla, it would be aesthetically inappropriate to simply depress the maxillary anterior teeth because this procedure worsens the smile arc [2].

Therefore, the most effective treatment option for patients who wish to eliminate their gummy smile requires an orthognathic (surgical) approach. Because some patients are reluctant

to undergo surgery, there is a clear need for a new orthodontic treatment for patients with a deep bite and a gummy smile caused by maxillary vertical excess. Such a treatment should effectively intrude the maxillary dentition and eliminate the gummy smile without surgical intervention [3].

A skeletal anchorage system was recently developed to correct severe malocclusions. Use of this system allows for distal movement of the maxillary molars without unfavorable side effects. Additionally, some reports have described the successful use of temporary anchorage devices to intrude the posterior teeth in both arches and decrease the facial height in adults with a skeletal Class II malocclusion [4].

In the 1970s, introduced the segmental arch technique to intrude the mandibular incisors and thereby flatten the curve of Spee. The wire used in this treatment does not extend from the right molar to the left molar. The intrusion mechanism has three parts Posterior anchoring using buccal stabilizing wires inserted into posterior brackets or tubes from both sides;

Anterior portion of four incisors

There are also intrusive springs on both sides. The present case report showcases the treatment results and biomechanics involved for en masse retraction and intrusion of anterior teeth using three-piece intrusion arch and temporary anchorage device [5].

CASE REPORT

A female patient of age 20 years visited the department of Orthodontics and dentofacial Orthopaedics at Bhojia dental College, Budh Baddi with the chief complaint of forwardly placed upper and lower front teeth. Extra oral examination [Figure 1] showed that she had a leptoprosopic facial form with good facial symmetry, convex profile with posterior divergence, increased facial height, incompetent lips, acute nasolabial angle, deep mentolabial sulcus, high mandibular plane angle, and a non-consonant smile arc [6,7]. No signs/ symptoms of temporomandibular joint dysfunction. Intraoral examination [Figure 2] revealed as Class II molar relation on right side and Class I on left side. The vertical relation showed deep bite (6 mm, 80%); overjet of 8 mm, mandibular midline was coincident. Orthopantomogram [Figure 3] showed full complements of teeth were present.

The maxillary and mandibular anterior teeth presented with extrusion and the deep curve of speed (3 mm). Lateral cephalogram showed [Figure 3] she had prognathic maxilla (90) and orthognathic mandible (80) with ANB (8), Wits (7 mm) depicting a skeletal Class II jaw bases. Patient had a hyper divergent growth pattern on

Figure 1: Pre-treatment extra oral photographs.

Figure 2: Pre-treatment Intraoral photographs.

account of Sn-Go-Gn (39), FMA (33) and Jaraback ratio of 66% [Table 1] [8].

TREATMENT OBJECTIVES

To correct the inclination of upper and lower anterior teeth, obtain optimum overjet and overbite, to correct deep curve of speed, establish Class I molar and canine relation, improve the facial features by obtaining a straight profile with straight divergence, a pleasing smile arc and soft tissue aesthetics [9].

TREATMENT

After analyzing all diagnostic records, the patient was treated with extractions. The maxillary and mandibular teeth were bonded and banded with pre-adjusted 0.022" slot MBT prescription brackets. A 0.9 mm nance palatal arch [Figure 4] was placed to preserve the anchorage and to prevent buccal flaring of molars. The arches were aligned using the following sequence of arch wires; 0.016 Niti, 17 × 25 Niti, and 19 × 25 Nickel Titanium arch wires. Later 19 × 25 stainless steel arch wire. After both the arches were levelled and aligned they were followed by extraction of all first premolars [10].

This was followed by placement of three-piece intrusion arch (0.017" X 0.025" TMA with 2 mm helix was engaged in auxiliary tube and placed in extracted space of 1st premolar in anterior piece of intrusion arch) [Figure 5] in the upper arch to intrude and retract the upper incisors which help to attain a proper incisor inclination, overjet and overbite. Retraction force of 150 gm was given and intrusion force of 60 gm was given This phase was continued for 1 year [11].

After achieving desirable intrusion and retraction three-piece intrusion arch was removed and placement of temporary anchorage device in the region distal to lateral incisor 16 mm away on right side and 17.5 mm away on left side was done [figure 6]. 50 gm intrusive force was added *via* hooks made between 11, 12 and 21, 22 to prevent buccal flaring with intrusion of incisors. This resulted in intrusion of incisors and for canine retraction continuous active tie backs with a force of 200 gm was given, Finishing and detailing were carried out and the appliance

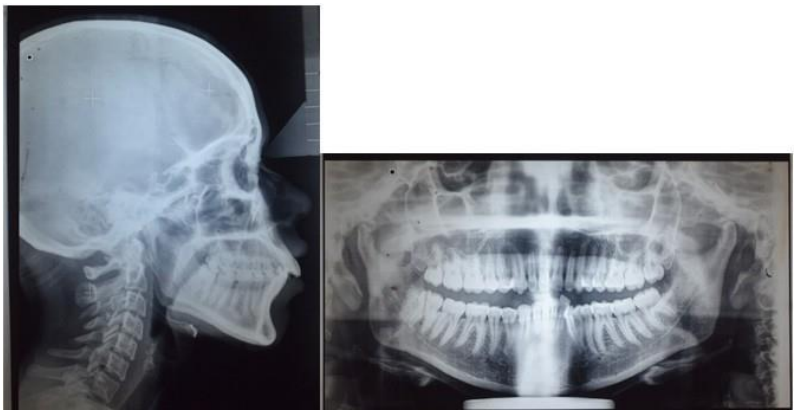

Figure 3: Pre-treatment Radiographs.

Table 1: Pre-treatment Cephalometric Values.

MEASUREMENTS	PRE-TREATMENT
SNA	90º
SNB	82º
ANB	8º
Beta Angle	22º
SN-GoGn	38º
FMA	33º
Jarabak ratio	66%
1 to NA	8 mm
1 to SN	110º
IMPA	99º
Nasolabial Angle	106º
Upper lip to E-Line	2.5mm
Lower lip to E-Line	3.5mm

Figure 4: Mid Treatment Photographs.

Figure 5: Three-piece intrusion arch (0.017" X 0.025" TMA with 2mm [internal diameter] helix was engaged in auxiliary tube and placed in extracted space of 1st premolar in anterior piece of intrusion arch).

Figure 6: TAD in the region distal to lateral incisor 16 mm away on right side and 17.5 mm away on left side.

Figure 7: Posttreatment extra oral photographs.

was deboned. The total treatment time was 19 months [12].

TREATMENT RESULTS

There was remarkable improvement in the patient's profile and facial aesthetics as seen in the post-treatment facial photographs. Facial balance, smile aesthetics, and lip positions were improved [Figure 7]. There was intrusion and retroclination of the upper and lower incisors. Class I molar and canine relationships were established. Overjet and overbite were improved to 0.5 and 2mm respectively [Figure 8]. Cephalometrically the upper incisors were retroclined from 8 mm to 1 mm in relation to NA perpendicular to point A line and lower incisors were retroclined from 99 to 92 (IMPA) [Table 2]. Superimposition demonstrated the treatment changes [Figure 9]. There was a significant intrusion and retraction of maxillary incisors. At the end of treatment, the patient had reduced Interlabial gap with reduced convexity of face. Intraorally, 2 mm overjet, and 2 mm

Figure 8: Posttreatment intraoral photographs.

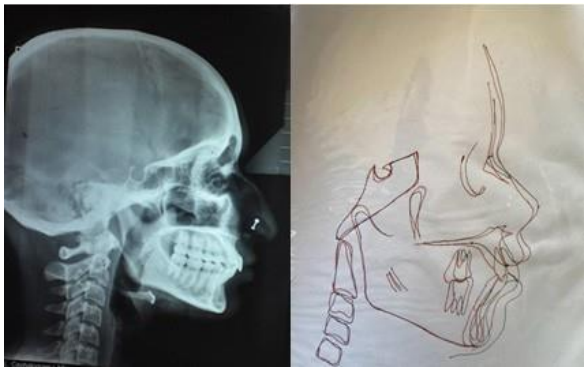

Figure 9: Post treatment lateral cephalogram and superimposition.

Table 2: Post Treatment Cephalometric Values.

MEASUREMENTS	PRE-TREATMENT	MID TREATMENT	POST TREATMENT
SNA	90º	89º	89º
SNB	82º	80º	80º
ANB	8º	9º	9º
Beta Angle	22º	26º	27º
SN-GoGn	38º	38.5º	38.5º
FMA	33º	30º	38º
Jarabak ratio	66%	62%	60.60%
1 to NA	8mm	7 mm	1mm
1 to SN	110º	107º	98º
IMPA	99º	101º	92º
Nasolabial Angle	106º	98º	97º
Upper lip to E-Line	2.55mm	4 mm	4 mm
Lower lip to E-Line	3.5 mm	5.5 mm	5mm

overbite with stable functional occlusion were achieved. Posttreatment orthopantogram (OPG) and lateral cephalogram were taken at the end of orthodontic treatment [13].

DISCUSSION

Absolute intrusion, relative intrusion, and extrusion of posterior teeth are the three methods used for deep overbite correction. Relative intrusion is achieved by preventing eruption of the lower incisors when posterior growth provides vertical space for posterior eruption and the mandible rotates downward and posteriorly without eruption during posterior extrusion. As a general rule, relative invasiveness during the growth phase and absolute invasiveness during the non-growth phase is allowed, while extrusion is undesirable. For patients with everted incisors, our central arch suppression mechanism can perform overbite correction and gap closure simultaneously. The force system applied to the façade depends on the position and direction of the entry force [14].

This segmented approach to intrusion and retraction was developed because it allows simultaneous control of tooth movement in the vertical and anterior posterior plane. The low load bias of the equipment provides constant input power and allows low load levels to be maintained. The design of the device allows the therapist to provide static control that requires minimal seat adjustment. Article evaluated the effect of magnification and inversion curves of Spee mechanics on root resorption of incisors and found that the invasive approach resulted in greater root resorption than observed in the control group.

In contrast, invasion due to root resorption was only negligible. The main difference between these studies is the amount of force used to engage the incisor. Spee Mechanics' reverse protrusion curves provide 100 to 150 grams of intrusion force, while Burstone's intrusion arcs weigh just 15 grams per maxillary incisor. 10-12. The present clinical data of 3 young patients treated and followed up for Class II Class 1 malocclusion. The first and second patients received an early phase of treatment. The third patient underwent two-stage combined dental treatment [15].

They concluded that there was no significant difference between the two methods (one-stage or two stages). Early treatment of malocclusion is important because it normalizes the structure and growth of bones and shortens the duration of subsequent treatment.

General information is analyzed to better understand what is important or new 4 Allows results from many studies, this is particularly important in TAD because large-scale simulations are available to explain treatment outcomes and guide treatment. Decided, but was not included in the review of more known interventions focused on randomized clinical trials. It is clear from this study that the use of TAD can be effective and efficient, but the data support that TAD has advantages over non-TAD anchors [16].

It is conducted a retrospective study of 40 cephalometric interpretations of patients scheduled for four unit extraction. All patients were treated in the same orthodontic clinic with the same protocol using single step retraction after 22 holes and four units of extraction as a Temporary Anchor Device (TAD), including McLaughlin-Bennett-Trevisi (MBT) treatment. While the inclination of the occlusal plane does not change significantly, all tissues related to cephalometric values are reduced, except for the nasolabial angle, according to the relationship of the upper and lower lip segments for the Ricketts aesthetic line (Eline) is reduced. According to both Frankfurt mandibular angle and Frankfurt level, the upper incisor was significantly unrelated to contour changes after dental treatment. Therefore, the use of MBT therapy in combination with TAD based reversal is a good method for the management of complications [17].

A recurring theme in the results is the relationship between the position of the dental guard and the maxillary/mandibular arch, and the effect of TAD and the point of force application. 6-9 Position of TAD In three-dimensional space, the point of application will generate a force vector that causes rotation of the occlusal plane and affects teeth, anatomical relationships, and soft tissue of the face (e.g., nasolabial angle). Understanding the complex interactions described here is important so that clinicians can distinguish between TAD position and number and choose the right application to achieve the desired tooth and reduction. Orthodontists should consider these factors when planning TAD placement and include biomechanics to minimize adverse consequences [18].

A study to evaluate masquerade treatment of patients with severe differential skeletal class II cases. Extraction of four premolars was performed with active vertical control using TAD. IBs of clear aligners.

It is evaluated a study in which both maxillary first premolars were extracted and the cavity was closed using a closed coil spring and elastic chain. Correction of overbites using ISW curves and ISW compression belts. The chin elastic band is used to correct the relationship between the chin. After about 3 years of treatment, symptoms and dental treatment improved. It was concluded that a deep overbite case with Class II bone malocclusion was treated with the ISW technique with good results and the patient was satisfied with the results.

It should also be known that the mechanical process changes when tooth movement occurs and therefore needs to be checked periodically during treatment. This study explores the use of force for TAD-based orthodontic intervention to better understand how to provide the necessary force to achieve effective orthodontic tooth movement while staying within the confines of the bones. Global retraction of anterior teeth and use of TAD intrusion are currently the two most studied topics [19].

CONCLUSION

The three-piece intrusion arch combined with TADS improves Class II malocclusion in different stages of dentofacial development. This study provided a better understanding of the complex interactions and has provided a guide to the level and direction of forces in each type of intervention to aid clinicians in achieving high quality outcomes.

REFERENCES

1. Burstone CJ. The segmented arch approach to space closure. Am J Orthod 1982; 82:361-78.
2. Mulligan TF. Common sense mechanics in everyday orthodontics. CSM Pub 1998.
3. Shroff B, Lindauer SJ, Burstone CJ, et al. Segmented approach to simultaneous intrusion and space closure: biomechanics of the three-piece base arch appliance. Am J Orthod Dentofacial Orthop 1995; 107:136-43.
4. Burstone CR. Deep overbite correction by intrusion. Am J Orthod 1977; 72:1-22.
5. Burstone CJ. Rationale of the segmented arch. Am J Orthod 1962; 48:805-22.
6. Proffit WR, Fields HW, Sarver DM. Contemporary orthodontics 4th ed. PA: Mosby 2007.
7. Nanda RS, Tosun YS. Biomechanics in orthodontics. Princ Pract 2010; 38-9.
8. Nanda R. Biomechanics and esthetic strategies in clinical orthodontics. Elsevier sci 2005.
9. Van Steenbergen E, Burstone CJ, Prahl-Andersen B, et al. The influence of force magnitude on intrusion of the maxillary segment. Angle Orthod 2005; 75:723-9.
10. Nanda R. The differential diagnosis and treatment of excessive overbite. Dent Clin N Am 1981; 25:69-84.
11. Burstone CJ. Integumental contour and extension patterns. Angle Orthod 1959; 29:93-104.
12. Braun S, Sjursen Jr RC, Legan HL. On the management of extraction sites. Am J Orthod Dentofacial Orthop 1997; 112:645-55.
13. Xu TM, Zhang X, Oh HS, et al. Randomized clinical trial comparing control of maxillary anchorage with 2 retraction techniques. Am J Orthod Dentofacial Orthop 2010; 138:544-e1.
14. Thiruvenkatachari B, Ammayappan P, Kandaswamy R. Comparison of rate of canine retraction with conventional molar anchorage and titanium implant anchorage. Am J Orthod Dentofacial Orthop 2008; 134:30-5.
15. Suzuki M, Sueishi K, Katada H, et al. Finite element analysis of stress in maxillary dentition during en-masse retraction with implant anchorage. Bull Tokyo Dent Coll 2019; 60:39-52.
16. Lu W, Li Y, Mei L, et al. Preformed intrusion bulbs on clear aligners facilitate active vertical control in a hyperdivergent skeletal Class II case with extraction: A case report with 4-year follow-up. APOS Trends Orthod 2023; 13:46.
17. Yang CY, Lin CC, Wang IJ, et al. Improved super-elastic Ti–Ni alloy wire intrusion arch for skeletal class II malocclusion combined with deep overbite: A case report. World J Clin Cases 2023; 11:4142-51.
18. Mahmood TM. Occlusal Plane Steepness and Profile Change Following TAD-Based One-Step Retraction on Four-Unit Extraction Cases: A Retrospective Study. Diagnostics 2023; 13:2395.
19. El Aouame A, Bouchghel L, Khamlich K, et al. Management of Class II Malocclusion in Children and Adolescents: A Case Report. Open Access Libr 2023; 10:1-4.