ORIGINAL RESEARCH PAPER
Volume - 12 | Issue - 09 | September - 2023 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

ORTHODONTIC CAMOUFLAGE OF SKELETAL CLASS II MALOCCLUSION USING MINI-IMPLANTS- A CASE REPORT

Dentistry

Rishika EK	PG Student, MES Dental College, Perinthalmanna.
Shahanamol VP	Senior Lecturer, MES Dental College, Perinthalmanna.
Vincy Antony	Professor and Head, MES Dental College, Perinthalmanna.
Prathapan Parayaruthottam	Professor, Govt. Dental College, Kozhikode.
Gazanafer Roshan	Reader, MES Dental College, Perinthalmanna.

ABSTRACT

Class II malocclusion is the second-most common anteroposterior malocclusion and its management is very challenging. In non-growing patients with severe discrepancy, the optimal treatment plan would be combined surgical and orthodontic treatment. Difficulty increases more when vertical dysplasia is also associated with, sagittal discrepancy. With the introduction of mini-implants in Orthodontics, the range of camouflage treatment has expanded. This case report presents a 17-year-old girl with Angle's Class I malocclusion on a Class II skeletal base with prognathic maxilla; retrognathic mandible with vertical growth pattern, upper and lower anterior proclination and protrusion with 5mm overjet. Treatment involved use of five mini-implants for retraction and intrusion of anterior maxillary dentoalveolar segment to obtain normal overjet, overbite and pleasing soft tissue profile.

KEYWORDS

Mini-implants, intrusion, Class II malocclusion, incompetent lips, orthodontic treatment

1.INTRODUCTION

Class II malocclusion is the second-most common anteroposterior malocclusion and its management is very challenging. Growth modification should be the initial option for treating the underlying skeletal deformity in patients with skeletal Class II malocclusion who are still in the growth phase.[1] In non-growing patients with severe discrepancy, the optimal treatment plan would be combined surgical and orthodontic treatment. In moderate to severe skeletal cases, camouflage orthodontic treatment along with mini-implants (temporary skeletal anchorage devices) are used to address the skeletal discrepancy. Mini-implants can provide maximum anchorage to simultaneously retract and intrude the dentoalveolar segments.[2]

The following case report illustrates correction of skeletal Class II Division 1 malocclusion in a 17-year-old female patient with comprehensive fixed orthodontic treatment with 5 mini-implants.

2.Case Report

A 17-year-old female patient reported to the Department complaining of forwardly placed upper front teeth. The patient had no significant medical or dental history. On extraoral examination, patient presented with convex profile, potentially incompetent lips and deficient chin (Figure 1). Intraoral examination revealed an Angle's Class I malocclusion and Class I canine on both sides with upper anterior proclination (Figure 1). The overjet and overbite were 5 mm and 3 mm respectively, and lower midline shifted to right by 2 mm. Panoramic radiographs revealed the presence of all the teeth with erupting third molars whose root formation was yet to be completed. (Figure 1)

Figure 1: Pre-treatment extraoral and intraoral photographs and radiographs

Cephalometric analysis revealed prognathic maxilla and normal mandible with vertical growth pattern (Figure 1). The patient had convex profile, increased overjet and overbite, and acute nasolabial angle. There was proclination of maxillary and mandibular incisors (Figure 1). Bolton's analysis showed overall maxillary tooth material excess by 1.18 mm and mandibular anterior tooth material excess by 1.1 mm.

2.1. Diagnosis

A 17-year-old female presented with Angle's Class I malocclusion on a Class II skeletal base with prognathic maxilla; retrognathic mandible with vertical growth pattern and deficient chin. Other associated problems included proclination and protrusion of maxillary and mandibular incisors with 5mm overjet and lower midline shifted to right by 2mm. Soft tissue parameters revealed convex profile, acute nasolabial angle and incompetent lips. Overall dental health was satisfactory.

2.2 Treatment Objectives

The desired treatment objectives included

- To achieve an esthetic profile
- Simultaneous intrusion and retraction of maxillary incisors to obtain normal overjet and overbite
- To achieve competency of lips and esthetically pleasing smile

2.3 Treatment Plan

The patient was given two treatment options - 1) decompensate the lower arch followed by anterior maxillary osteotomy, 2) camouflage treatment by extraction of all the first premolars along with 2-posterior mini-implants in the maxillary and mandibular arches as absolute anchorage for retraction and one midline mini-implant in the maxillary arch. The patient opted for the camouflage treatment plan with mini-implants.

2.4 Treatment Progress

Pre-adjusted edgewise appliance 0.022" slot MBT prescription (Ormco Mini 2000 brackets) was bonded on the maxillary and mandibular teeth after therapeutic extraction of all the first premolars. Upper and lower 0.016" NiTi archwire was placed. After the initial alignment was complete, the arch wires were sequentially changed to 0.017"×0.025" and 0.019"×0.025 NiTi archwire on the maxillary and mandibular teeth. After aligning and leveling, both arches were coordinated on 0.019 × 0.025" stainless steel archwires along with insertion of mini-implants. Self-drilling type of titanium mini-implants (1.4 mm diameter and 8 mm length) were inserted between the roots of first molar and second premolar bilaterally in both arches and a midline mini-implant was placed between the roots of maxillary central incisors.(Figure 2) Implants were loaded immediately with active tiebacks for simultaneous retraction and intrusion of anteriors into Class I relation. After achieving Class I canine relationship

bilaterally, the mini-implants were removed. The appliance was debonded after 20 months, and the patient was given upper and lower Hawley's retainers with a long labial bow. Pre- and post-treatment lateral cephalometric radiographs were evaluated for various cephalometric parameters (Table 1).

2.5 Treatment Results

Facial balance and smile aesthetics of the patient were improved at the end of the procedure. Overjet was reduced by 3mm. There was a decrease in SNA angle of 2º. Maxillary anteriors were intruded by 2.5mm and maxillary molars by 1.5mm resulting in an overall lower anterior facial height reduction by 3mm. Mandibular plane angle decreased by 5º (Table 1). The lips and chin appeared more esthetic (Figure 3).

Figure 2: Retraction with 0.019x0.025" SS with soldered brass hooks. Implants can be seen in the midline in upper anterior and in upper and lower the posterior region.

Table 1: Cephalometric values

Measurements	Pretreatment	Post treatment
Sagittal Skeletal		
SNA (°)	86	84
SNB (°)	77	79
ANB (°)	9	5
Vertical Skeletal		
LAFH (mm)	62	59
MPA (°)	31	26
Dental		
U1/SN (°)	111	104
IMPA (°)	117	98
U1-NA Angle (°)	32	24
U1-NF (mm)	32.5	30
U1-NA linear (mm)	10	3
U6-NF (mm)	27.5	26
Overjet (mm)	5	2
Overbite (mm)	3	2
Nasolabial angle (°)	77	100

Cephalometric superimposition revealed superior movement of maxillary dentitionand the mandible rotating counterclockwise. Mandibular molar showed favorable anteroposterior change and minimal vertical change (Figure 3). The post treatment panoramic radiograph showed overall parallelism of roots. No significant root resorption was noted.

Figure 3: Post-treatment extraoral and intraoral photographs, Lateral cephalogram, OPG and superimposition.

3. DISCUSSION

When an adult patient has a severe skeletal discrepancy, orthognathic surgery is the only recommended treatment but patients rarely accept surgical orthodontics for aesthetic purposes due to a variety of factors, such as financial limitations, procedure anxiety and potential side effects.[3,4] Class II skeletal cases demand either camouflage with extraction of two maxillary and two mandibular premolars or extraction of only upper first premolars when there is no arch length discrepancy in lower arch.[5,6]By ensuring complete stability of anchorage, orthodontic mini-implants have changed orthodontic anchoring and biomechanics.[7] Since Creekmore and Eklund[8] first described using a metal implant to treat a deep overbite in 1983, intruding incisors have been aided by mini-implants. Mini-implants are commonly utilized nowadays for anterior intrusion to treat deep bite and vertical maxillary excess.

In the Orthodontic clinic, although both titanium miniplates and dental implants have been successfully used for tooth intrusion, the mini-implant has the advantages of immediate loading, multiple placement sites, uncomplicated placement and removal procedures, and minimal expense for patients.[9,10] Our patient had a skeletal Class II malocclusion, vertical maxillary excess and increased incisor visibility. Simultaneous intrusion and en masse retraction was possible with 5 mini-implants for the skeletal and dentoalveolar correction. Space obtained by extraction of first premolars was utilized for both retraction and intrusion of maxillary anterior teeth as a result of which, SNA reduced from 86º to 84º and the ANB reduced by 4º. Mandibular plane angle reduced by 5º which resulted in autorotation of mandible thereby reducing lower anterior facial height. There was a significant change in linear and angular measurements of maxillary incisors as revealed by upper incisor to NA by 7mm and 8º respectively. At the completion of the procedure, reduced interlabial gap and incisor visibility improved the smile. The molar relation and canine were Class I on both sides. Parayaruthottam P and Antony V[11] in their case report had described significant intrusion of maxillary anterior teeth obtained with midline mini-implant. Shahanamol VP et al[12] had also reported correction of severe maxillary skeletal discrepancy with 3 mini-implants. Patient cooperation was not obligatory, and the ease of implant removal after completing orthodontic treatment served as an additional benefit.

4.CONCLUSION

Surgical orthodontics is not a very common and acceptable procedure; however, the range of potential treatment for moderate to severe skeletal dysplasia has been expanded by the use of skeletal anchoring systems. With good control over the direction and amount of force applied, mini-implants were used to produce substantial maxillary incisor intrusion and sagittal correction of malocclusion without relying on patient cooperation. Mini implants now facilitate simultaneous intrusion and retraction of anterior teeth without jeopardizing anchorage and vertical control.

5.Declaration of Patient Consent

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

6. Source of Funding : No source of funding.

7.Conflicts of Interest : There are no conflicts of interest.

REFERENCES

1. Raposo R, Peleteiro B, Paço M, Pinho T. Orthodontic camouflage versus orthodontic-orthognathic surgical treatment in class II malocclusion: a systematic review and meta-analysis. Int. J. Oral Maxillofac. Surg. 2018 Apr 1;47(4):445-55.
2. Qamruddin I, Shahid F, Alam MK, Zehra Jamal W. Camouflage of Severe Skeletal Class II Gummy Smile Patient Treated Nonsurgically with Mini Implants. Case Rep Dent. 2014;2014:382367.
3. Ngeow WC, Ong ST, Siow KK, Lian CB. Orthognathic surgery in the University of Malaya. Med J Malaysia.2002;57(4):398–403.
4. Farrell BB, Tucker MR. Safe, efficient, and cost-effective orthognathic surgery in the outpatient setting. J Oral Maxillofac Surg. 2009 Oct;67(10):2064-71.
5. Upadhyay M, Yadav S, Nagaraj K, Nanda R. Dentoskeletal and soft tissue effects of mini-implants in Class II division 1 patients. Angle Orthod. 2009 Mar;79(2):240-7.
6. Bishara SE, Cummins DM, Jakobsen JR, Zaher AR. Dentofacial and soft tissue changes in Class II division 1 cases treated with and without extractions. Am J Orthod Dentofacial Orthop. 1995 Jan;107(1):28-37.
7. Kim TW, Kim H, Lee SJ. Correction of deep overbite and gummy smile by using a mini-implant with a segmented wire in a growing Class II Division 2 patient. Am J Orthod Dentofacial Orthop. 2006;130(5):676–85.
8. Creekmore TD, Eklund MK. The possibility of skeletal anchorage. J Clin Orthod. 1983; 17(4): 266-9.

9. Umemori M, Sugawara J, Mitani H, Nagasaka H, Kawamura H. Skeletal anchorage system for open-bite correction. Am J Orthod Dentofacial Orthop. 1999;115(2):166–74.
10. Carrillo R, Buschang PH, Opperman LA, Franco PF, Rossouw PE. Segmental intrusion with mini-screw implant anchorage: a radiographic evaluation. Am J Orthod Dentofacial Orthop. 2007;132(5):576.e1–6.
11. Parayaruthottam P, Antony V. Midline mini-implant-assisted true intrusion of maxillary anterior teeth for improved smile esthetics in gummy smile. Contemp Clin Dent. 2021 Jul;12(3):332.
12. Shahanamol VP, Antony V, Roshan G, Ali J. Orthodontic management of skeletal Class II malocclusion using three mini-implants- A case report. IP Indian J Orthod Dentofacial Res 2021;7(4):323-326.