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Orthodontic camouflage treatment of skeletal class II malocclusion with severe maxillary dentoalveolar protrusion



Ramamurthy Suresh [a,*], *Kalidass Priya* [b]

[a] *Reader, Department of Orthodontics, Adhiparasakthi Dental College and Hospital, Melmaruvathur 603319, Tamil Nadu, India*

[b] *Senior Lecturer, Department of Orthodontics, Adhiparasakthi Dental College and Hospital, India*

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ABSTRACT

This case report describes the orthodontic treatment of a 14-year-old male patient who presented with prognathic maxilla, severe dentoalveolar proclination, deepbite and retained deciduous tooth. We selected headgear and fixed appliance to correct malocclusion but cooperation towards headgear was found less during treatment. So we chose orthodontic camouflage treatment to correct dentoalveolar problems without altering the skeletal base relation. The final treatment results were good and patient had improvement in esthetic and function.

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1. Introduction

Class II malocclusions are considered to be the most frequent problem encountered in orthodontic practice.[1] It occurs due to problem in skeletal and dental structures. Skeletal reasons are maxillary prognathism, mandibular retrognathism and combination of maxillary prognathic and mandibular retrognathic. Whereas dental reasons are mesialization of maxillary first molar, distally positioned lower first molar and abnormal habits.[2] Class II malocclusion can be managed in three different ways, growth modification, orthodontic camouflage and orthognathic surgery.[3] Factors which decide treatment options are timing of treatment, severity of skeletal and dental problems and cooperation of the patient.

This paper report a case of orthodontic camouflage treatment of skeletal class II malocclusion with severe dentoalveolar protrusion.

2. Diagnosis and etiology

A 14-year-old male patient presented to our clinic with a complaint of protruding upper front teeth. Dental history revealed that he had undergone endodontic treatment of lower permanent tooth and extraction of over retained upper deciduous tooth, 6 months back. On extraoral examination he was found to have symmetrical face, brachycephalic head, mesoprosopic facial form, convex profile, acute nasolabial angle, potentially competent lips and deep mentolabial

* *Corresponding author*. Tel.: +91 9894556456 (mobile).
E-mail address: sureshortho11@gmail.com (R. Suresh).

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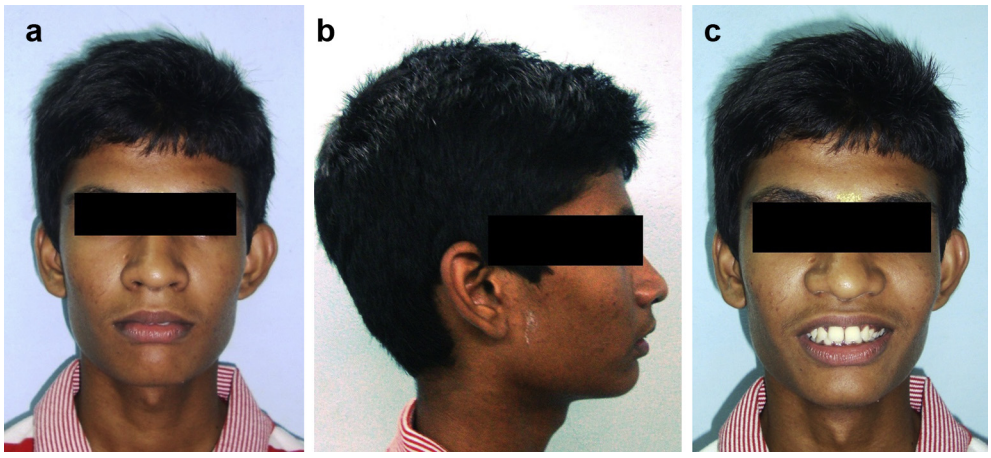


Fig. 1 – Pre-treatment extraoral (a) frontal view (b) profile view (c) smile view.

sulcus. Clinical Frankfort mandibular plane angle was average (Fig. 1). Intraoral examination revealed ¼ class II molar and full cusp class II canine relation on both sides. Over retained deciduous tooth 63 was present. He had an overjet of 14 mm and an overbite of 6 mm. Distopalatal rotation of 13 and 23 was also present. Incisal edge fracture was noted in 31 & 41 and restoration was found in lingual aspect of 41 (Fig. 2).

Standard panoramic and lateral cephalometric radiographic were obtained. The panoramic radiograph confirmed the presence of all the permanent teeth, including the unerupted third molars and endodontic treatment of 41. 13 and 23 roots were found to be distally tipped in the radiograph. Over retained deciduous tooth 63 with root resorption was also observed (Fig. 3). The lateral cephalometric analysis revealed mild prognathic maxilla (SNA 85°), orthognathic mandible (SNB 80°), low mandibular plane angle (SN-MP 22°) and protrusive incisors (Interincisal angle 103°, U1-NA 45°, 15 mm, L1-NB 29°, 8 mm) (Table 1). The case was diagnosed as a class II skeletal malocclusion due to maxillary prognathism with severe maxillary dental protrusion and deepbite (Fig. 4).

3. Treatment objectives

1. Extraction of over retained deciduous tooth 63
2. Closure of existing and extracted spaces
3. Correction of class II molar and canine relation
4. Derotate 13 and 23
5. Establishment of correct overjet and overbite
6. Level the curve of spee
7. Reduce lip strain and profile convexity

4. Treatment plan

Comprehensive fixed appliances in both arches and headgear for restriction of maxillary growth and maxillary first molar distalization were planned.

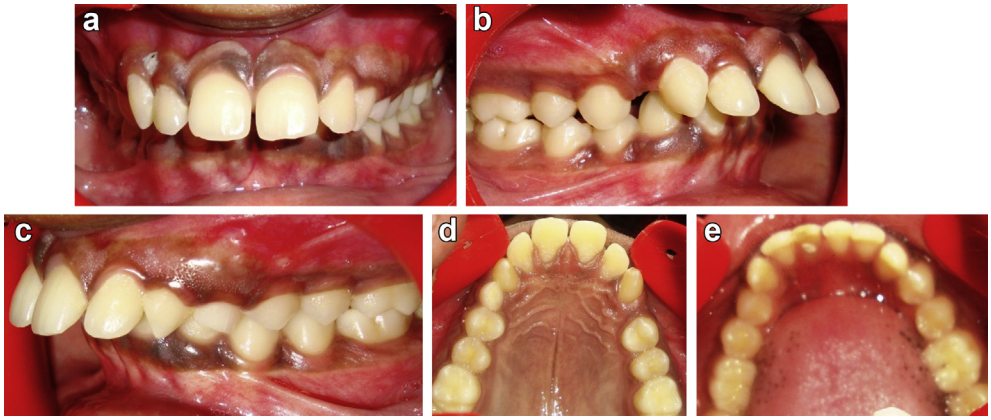


Fig. 2 – Pre-treatment intraoral (a) front view (b) right view (c) left view (d) maxillary occlusal view (e) mandibular occlusal view.

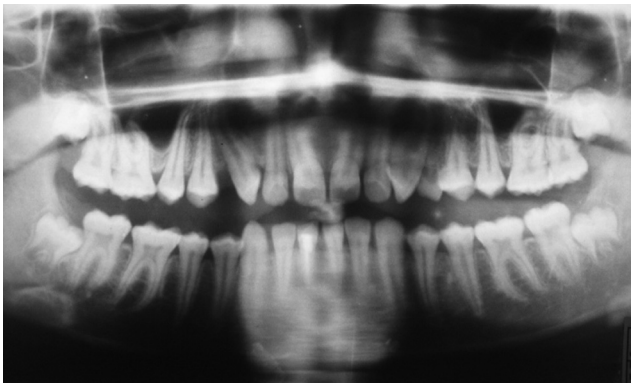


Fig. 3 – Pre-treatment panoramic radiograph.

5. Treatment progress

Initially treatment begun with fixed anterior plane for anterior deepbite correction. After 6 months, bite opening was achieved. 0.022 slot MBT brackets were bonded in upper and lower arch. The preformed molar bands were cemented in lower first molar. Initially alignment and leveling were begun with 0.014 nickel titanium archwire, progressively dimension of wires were changed, such as 0.016, 0.017 × 0.025,0.019 × 0.025 nickel titanium. Closure of existing and extracted primary canine spaces were initiated in 0.019 × 0.025 stainless steel wire along with elastomeric chain.

After space closure, it was observed that molar and canine were in class II relation, it was decided to give headgear for molar distalization and to restrict maxillary growth in anteroposterior direction. But patient compliance towards headgear usage was poor, so we decided to correct dentoalveolar problems alone such as class II molar and canine relation with class II elastics.

Table 1 – Cephalometric measurements.

Variables	Pre-treatment	Post-treatment
SNA	85°	84°
SNB	80°	80°
ANB	5°	3°
N to A	+2 mm	+1 mm
N to POG	−6 mm	−3 mm
WITS	AO > BO by 3 mm	AO > BO by 4 mm
SN-GOGN	22°	24°
FMA	20°	20°
SN-OP	11°	12°
OP-PP	6°	6°
OP-MP	12°	11°
Interincisal angle	103°	126°
IMPA	103°	105°
U1-NA (Angulation)	45°	20°
L1 – NB (Angulation)	29°	30°
U1-NA (Linear)	+15 mm	+4.5 mm
L1-NB (Linear)	+8 mm	+8 mm
U1-SN	129°	103°
y-axis	59°	59°
S-line to upper lip	+3 mm	−1 mm
S-line to lower lip	+4 mm	+2 mm
E-line to upper lip	0 mm	−4.5 mm
E-line to lower lip	+2.5 mm	0 mm

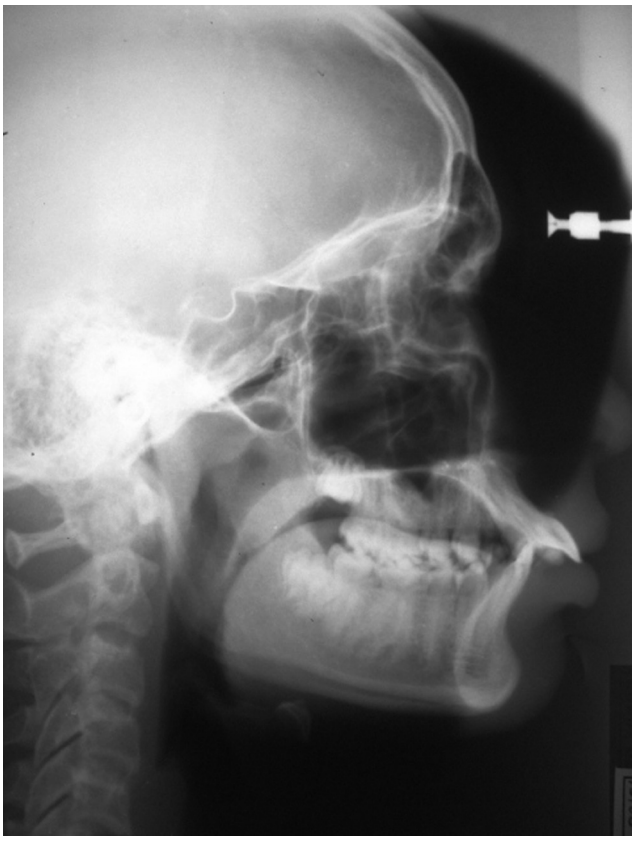


Fig. 4 – Pre-treatment lateral cephalogram.

After 8 months period, it was noted that improvement in class II molar and canine relation into class I occlusion (Fig. 5). At the end of treatment, interocclusal gap was present from canine to second premolar on both sides. The final settling was achieved with 0.016 nickel titanium wires and settling elastics. The case was debonded after 18 months of active treatment. Upper Begg's retainer and lower lingual bonded retainer from canine to canine were given (Fig. 6).

6. Treatment results

At the end of active treatment, the patient had improvement in facial profile and esthetics (Fig. 7). Ideal overjet and overbite were achieved. The class II molar and canine relation was corrected into class I on both sides. The deep curve of spee was very well leveled (Fig. 8). The post-treatment panoramic radiograph confirms root parallelism (Fig. 9). The cephalometric analysis revealed, maxillary incisors were retracted from 129° to 103° and the mandibular incisors were slightly proclined from 103° to 105° (Table 1). The mandibular plane angle remains unchanged (Fig. 10).

The Cephalometric superimpositions revealed mild restraint in the growth of maxilla and downward and forward advancement of mandible. The maxillary first molars were slightly extruded and anteroposteriorly remains in the same



Fig. 5 – Treatment progressive photos (a) frontal view (b) right lateral view (c) left lateral view.



Fig. 6 – Upper Begg's retainer.

place. The maxillary incisors were tipped palatally and intruded. The mandibular molars were extruded and mesially moved. The mandibular incisors were slightly tipped labially and intruded (Fig. 11).

The Cephalometric superimpositions and analysis confirmed that deepbite correction was done by relative intrusion. The relative intrusion means preventing further eruption of lower incisors and extrusion of lower molars without rotation of mandibular jaw. This is very well achieved in growing patient. In this case growth of the ramus provides space for extrusion of lower molar and compensates the downward rotation of jaw bases.[4–6]

7. Discussion

Class II malocclusion is a problem in sagittal plane. It may be skeletal or dental in nature. Most of the time it may be associated with problem in vertical and/or transverse plane.[2] In this case, class II malocclusion is due to maxillary prognathism and dental protrusion. Moreover, it is associated with vertical problem such as skeletal deepbite.

Growth modulation, orthodontic camouflage and orthognathic surgery are the three important treatment method used for correction of class II problem. During growing stage, maxillary excess is treated with headgear and mandibular deficient is treated with functional appliance, whereas in non growing stage, either camouflage or orthognathic surgery will be done.[4,7]

In this case, we were not able to modulate growth due to non compliance of patient, but orthodontic camouflage non extraction treatment was successfully done with fixed appliance and class II elastics. Angle demonstrated that class II elastics not only move teeth, but also cause significant skeletal changes that are stimulating the growth of mandible and restraining the growth of maxilla. But cephalometric evaluations did not support the significant skeletal changes occurred in response to intraoral forces.[8,9] Class II elastics has

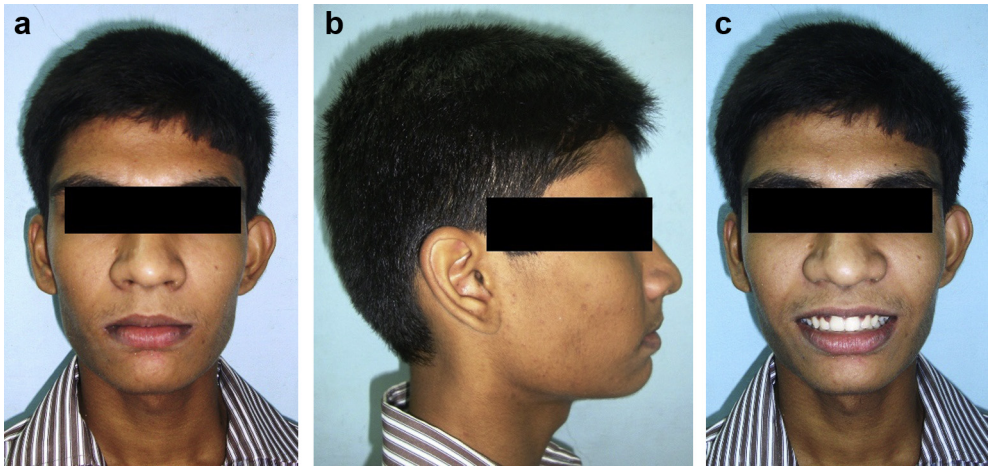


Fig. 7 – Post-treatment extraoral (a) frontal view (b) profile view (c) smile view.

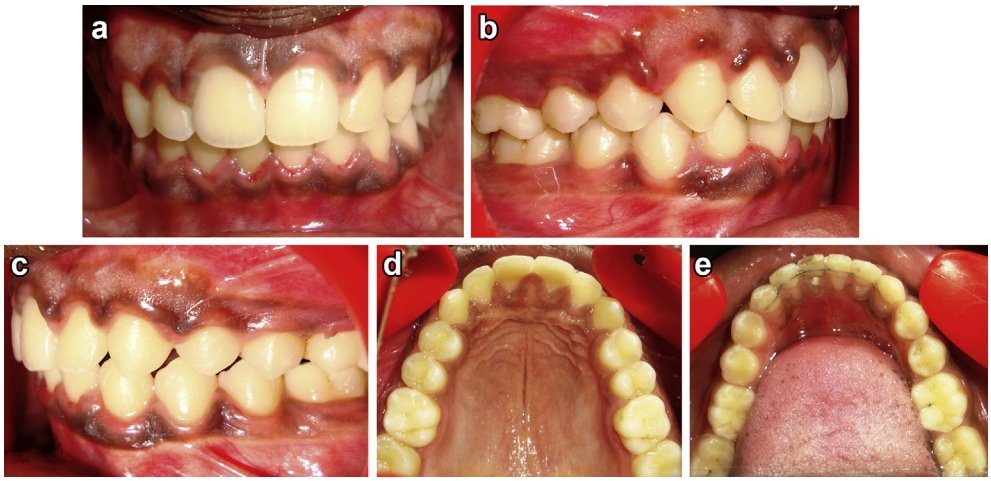


Fig. 8 – Post-treatment intraoral (a) front view (b) right view (c) left view (d) maxillary occlusal view (e) mandibular occlusal view.

horizontal and vertical components of force. Horizontal force retract maxillary anterior teeth and protract mandibular posterior teeth, whereas vertical force extrude maxillary anterior teeth and mandibular posterior teeth.[7] In this case maxillary anterior extrusion was controlled by giving accentuated curve in the archwire during retraction, but mandibular molar extrusion was allowed to correct the curve the spee.

Treatment effects of class II elastics remain unclear for the longer period time, but current literature revealed the outcome with comparative studies and systematic review. Combrink et al and Nelson et al reported that treatment effects of class II elastics were mainly dentoalveolar in the correction of class II discrepancies.[10,11] Nelson et al reported that class II elastics increases mandibular plane angle and lower anterior facial height, whereas Meistrell et al observed that no significant change in the mandibular plane angle.[11,12]

Serbesis-Tsarudis & Pancherz and Nelson et al concluded that on a long term basis, class II elastics and Herbst appliance have the same effect on the mandible.[13,14] Jones et al reported that no statistically significant differences were found in the treatment changes between class II elastics and Forsus groups.[15] Gianelly et al found that no differences in the treatment changes brought by class II elastics compared with Frankel function regulator and headgear.[16]

Guilherme Janson et al also state that class II elastics were effective in correcting class II malocclusions and their effects were primarily dentoalveolar. Their systematic review concluded that treatment effects of class II elastics are similar to fixed functional appliances in the long term.[17] In this case,

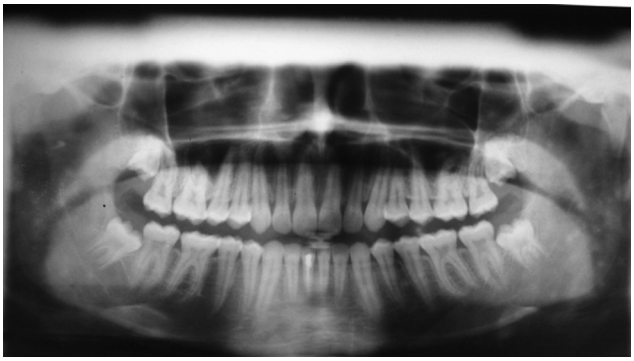


Fig. 9 – Post-treatment panoramic radiograph.

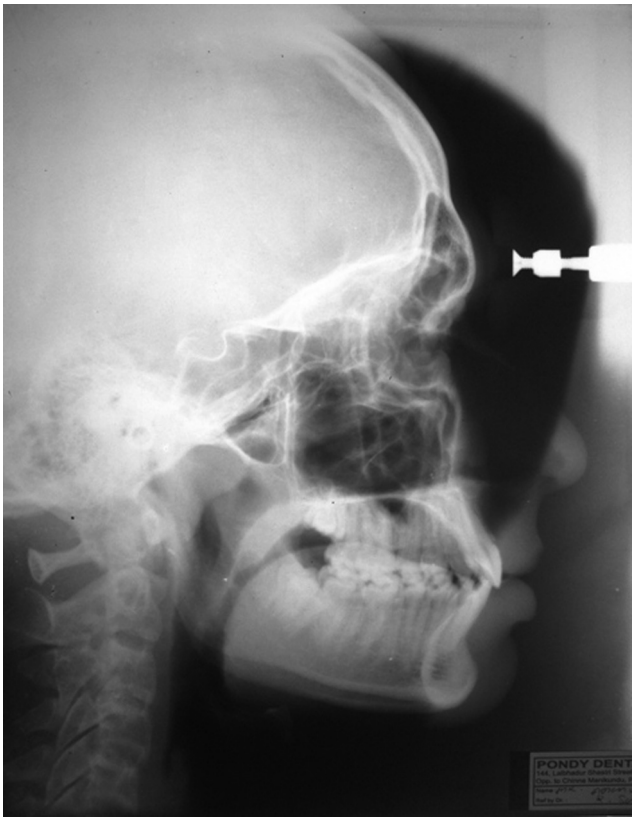


Fig. 10 – Post-treatment lateral cephalogram.

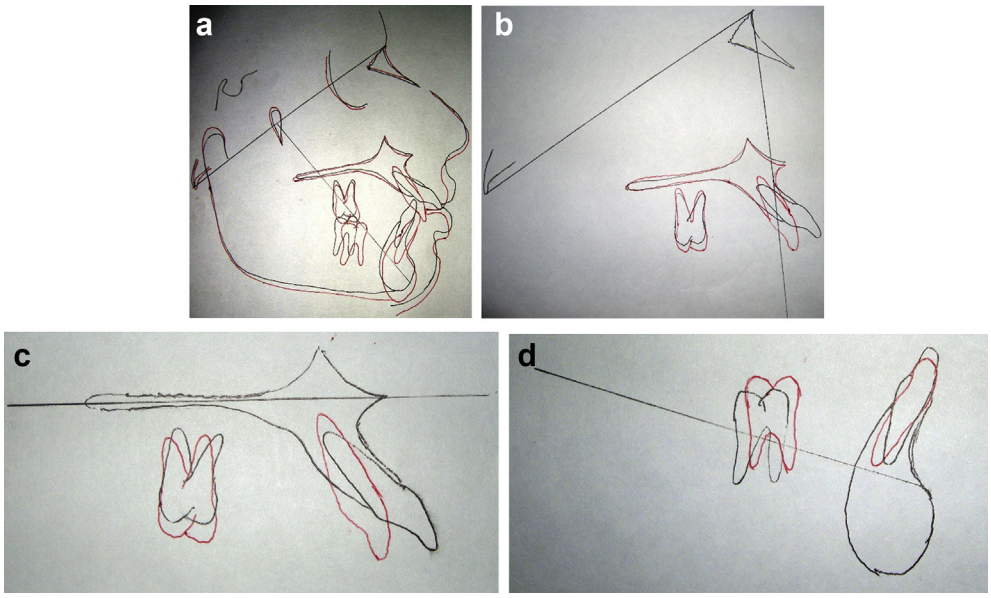


Fig. 11 – Cephalometric superimposition of (a) cranial base (b) maxilla (c) maxillary dentition (d) mandibular dentition.

treatment changes with class II elastics were in accordance with findings of Combrink, Nelson and Meistrell et al.

8. Conclusion

Though growth modulation was unsuccessful, esthetic and functional occlusion were very well improved with orthodontic camouflage treatment.

Conflicts of interest

All authors have none to declare.

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