



ISSN Print: 2394-7489
ISSN Online: 2394-7497
IJADS 2025; 11(1): 247-252
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www.oraljournal.com
Received: 19-01-2025
Accepted: 23-02-2025

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Camouflage management of skeletal Class II malocclusion with severe Proclination: A case report

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DOI: <https://www.doi.org/10.22271/oral.2025.v11.i1d.2126>

Abstract

Skeletal Class II malocclusion with severe proclination poses both functional and esthetic challenges, requiring a well-planned orthodontic approach for effective management. While orthognathic surgery is often considered for severe skeletal discrepancies, camouflage treatment remains a viable alternative in non-growing patients with acceptable facial balance. Camouflage treatment aims to correct the dental manifestations of the skeletal discrepancy through strategic extractions, controlled tooth movement, and biomechanical techniques to optimize occlusion and facial esthetics. Extraction of premolars is commonly employed to address severe maxillary incisor proclination by providing space for retraction and improving the incisor inclination. The use of fixed orthodontic appliances, such as pre-adjusted edgewise systems, allows for precise tooth movement, correction of overjet, and establishment of a harmonious occlusal relationship. This approach enables the orthodontist to achieve functional and esthetic improvements without the need for surgical intervention. This case report discusses the principles and mechanics of camouflage treatment in a skeletal Class II patient with severe proclination, emphasizing the importance of individualized treatment planning to achieve stable and satisfactory results.

Keywords: Severe Proclination, case report, Camouflage management, overjet

Introduction

Malocclusion is a prevalent dental anomaly that not only affects oral function but also has significant implications for an individual's psychological well-being and social interactions. Well-aligned teeth contribute to the harmony of the stomatognathic system and are essential for optimal occlusal function, periodontal health, and facial aesthetics. Among the various forms of malocclusion, Class II Division 1 is one of the most commonly encountered in orthodontic practice, particularly in the Indian population ^[1]. This condition is typically characterized by an underlying Class II skeletal base, an Angle's Class II molar relationship, proclined maxillary incisors, increased overjet, incompetent lip seal, and a convex facial profile ^[2]. The resultant imbalance in facial aesthetics and function often leads to both functional and psychological concerns in affected individuals ^[3].

The management of Class II malocclusion, particularly in non-growing patients, remains a subject of considerable debate. Growth modification is a viable treatment option in younger patients through the use of myofunctional appliances, which help redirect mandibular growth to correct the skeletal discrepancy ^[4]. However, in patients who have completed their growth phase, treatment options are limited to either orthodontic camouflage or orthognathic surgery. While orthognathic surgery provides a definitive correction of the skeletal discrepancy, it is often associated with significant risks, high costs, and patient reluctance ^[5]. In such cases, orthodontic camouflage serves as an effective alternative, aiming to mask the skeletal discrepancy through controlled dental movements ^[6].

Orthodontic camouflage in Class II malocclusion often necessitates strategic extractions to facilitate the retraction of proclined maxillary incisors and correction of excessive overjet. The extraction of two maxillary premolars is commonly performed in cases where there is minimal mandibular crowding or cephalometric discrepancy ^[7, 8].

However, when significant mandibular crowding or a severe skeletal discrepancy is present, the extraction of four premolars two maxillary and two mandibular is preferred to maintain an optimal occlusal balance [9, 10]. Recent studies indicate that patient satisfaction with orthodontic camouflage is comparable to that achieved through surgical correction [11], with two-premolar extractions yielding better occlusal outcomes than four-premolar extractions [12].

This case report highlights the orthodontic camouflage treatment of a non-growing patient with a skeletal Class II Division 1 malocclusion, severe incisor proclination, increased overjet, and deep overbite. The case was managed with the extraction of all four first premolars and treatment mechanics designed to achieve an optimal occlusal relationship while simultaneously improving facial aesthetics. The treatment strategy, biomechanics employed, and final treatment outcomes are discussed in detail, demonstrating the effectiveness of orthodontic camouflage in achieving both functional and esthetic goals.

Case Report

The patient, JT, a 14-year-4-month-old female, presented with the chief complaint of forwardly placed front teeth and an inability to close her lips. On clinical examination the patient exhibited a Class II skeletal pattern with a convex facial profile and posterior divergence. The maxillo-mandibular plane angle and face height ratio were within normal limits. However, the patient had incompetent lips, a hyperactive

mentalis muscle, and an acute nasolabial angle, contributing to the overall facial imbalance. Intraoral examination revealed healthy soft tissues and good oral hygiene. The patient presented with a complete dentition, except for the third molars, maxillary arch was V-shaped and narrow, with severely proclined incisors, mild crowding, and a scissor bite between the upper left second premolar (25) and the lower left second premolar (35). Similarly, the mandibular arch was narrow and U-shaped, with proclined incisors and mild anterior crowding. Tooth 35 was displaced lingually, and a deep Curve of Spee measuring 5 mm was observed. Occlusal analysis indicated a Class II incisor relationship with a significant overjet of 9.5 mm and an overbite of 4 mm. The dental midlines were coinciding, while the buccal segment relationships were classified as half-unit Class II (end-on) bilaterally. Cephalometric analysis indicated a Class II skeletal pattern, with 80° SNA angle and 76° SNB angle suggestive of a retrognathic mandible. The Eastman-corrected ANB and Wits appraisal (AO ahead of BO by 6.5 mm) further confirmed the Class II discrepancy. Vertical parameters, including the maxillo-mandibular plane angle and face height ratio, were within normal limits. Dental analysis showed significant incisor proclination, with an interincisal angle of 98° , confirming severe proclination. Lower incisor positioning relative to the A-Pog line suggested forward displacement. Soft tissue evaluation highlighted a protrusive lower lip relative to Ricketts' E-plane and an acute nasolabial angle due to upper lip protrusion.



Fig 1: Pre-treatment intraoral and extraoral photograph

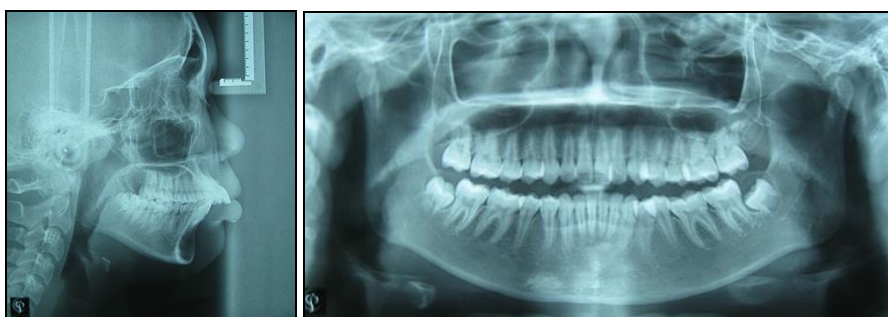


Fig 2: Pre-treatment Radiograph

Table 1: Pretreatment Cephalometric analyses

Variable	Pre-treatment	Normal
SNA	80°	82°±3
SNB	76°	79°±3
Wits appraisal	4°	3°±1
SN to maxillary plane	5°	8°±3
Wits appraisal	-6.5 mm	0 mm
Upper incisors to maxillary plane angle	128°	108°±5
lower incisors to maxillary plane angle	105°	92°±5
Interincisal angle	98°	133°±10
Maxillary mandibular plane angle	28°	27°±5
Upper anterior face height	47 mm	
Lower anterior face height	59mm	
Face height ratio	55%	55%
Lower incisors to A-pog line	6 mm	0-2 mm
Lower lip to Ricketts E Plane	+5 mm	-2 mm

Diagnostic summary, treatment objectives

J.T., a 14-year, 4-month-old Malay female, presents with a Class II incisor relationship on a Class II skeletal base, characterized by a convex profile, posterior divergence, hyperactive mentalis muscle activity, and incompetent lips. Her malocclusion includes a large overjet, deep overbite, severe proclination of upper and lower anteriors, and mild crowding in both arches. The IOTN assessment indicates a dental health component of 5a and an aesthetic component of 9.

Problem List

1. Severe upper and lower incisor proclination
2. Increased overjet and overbite
3. Mild crowding in both arches
4. Scissor bite of 25 with 35
5. Pronounced curve of Spee in the lower arch
6. Severely convex facial profile

Aims and Objectives of Treatment

1. Correction of upper and lower incisor proclination
2. Alignment and leveling of arches to achieve normal overjet and overbite
3. Resolution of crowding in both arches
4. Correction of scissor bite in the left buccal segment
5. Establishment of Class I canine and molar relationships
6. Achieving a well-interdigitated and stable occlusion
7. Improvement of facial profile
8. Implementation of an effective retention protocol to maintain results

Treatment Plan

The treatment plan for J.T., a 14-year, 4-month-old Malay female with a Class II incisor relationship on a Class II skeletal base, involves a comprehensive orthodontic approach to address her severe incisor proclination, increased overjet and overbite, mild crowding, and scissor bite. Given the severity of the malocclusion, extraction of all first bicuspid is planned to create space for proper alignment and retraction of the incisors.

Orthodontic treatment will be carried out using a 0.022 slot MBT prescription pre-adjusted edgewise appliance (PEA). Anchorage control will be achieved through the use of lace backs and cinch backs to prevent anchor loss and facilitate controlled tooth movement. No minor or major adjunctive surgical procedures are required.

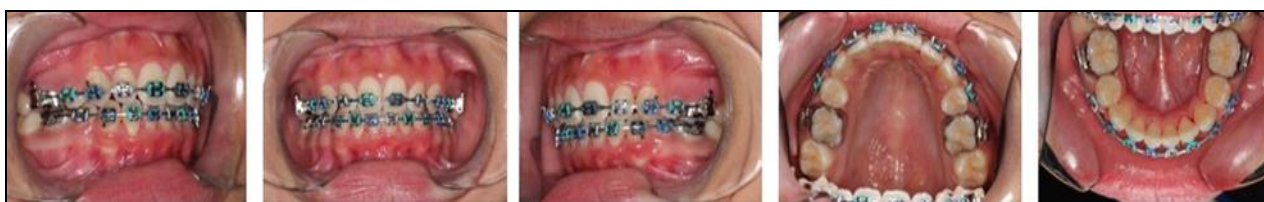
Throughout the treatment, professional oral hygiene maintenance and periodontal therapy will be provided as necessary to ensure optimal gingival health. Upon completion of active treatment, a retention protocol will be implemented to maintain the achieved results. Fixed retainers will be placed in the upper and lower anterior regions, supplemented by removable retainers, which will be worn full-time for one year, followed by night-time wear for an additional six months.

The prognosis for stability is favorable, provided a well-interdigitated occlusion is achieved alongside a normal overjet and overbite. Proper retention and patient compliance will be essential to maintaining long-term results.

Treatment Progress

Table 2: Treatment Progress

19/04/2011	Upper arch bonded with 0.022" slot MBT brackets and 0.014" nitinol wires fixed.
23/05/2011	Lower teeth bonded and 0.014" nitinol wire fixed
25/08/2011	0.016" x 0.022" nitinol wires fixed in upper and lower arches
27/09/2011	0.017" x 0.025" S.S wires fixed and Class II intermaxillary elastics advised
28/03/2012	0.018" x 0.025" S.S wires fixed in upper and lower arches.
20/10/2012	Upper 0.019 x 0.025" S.S wire with tear drop loops fixed for retraction of upper teeth. Lower arch 0.019" X 0.025 S.S arch wires fixed with reverse curve of spee.
17/06/2013	Upper & lower teeth fixed with 0.021" x 0.25" nitinol wires. Class II elastics to be worn full time.
28/08/2013	DPT and lateral cephalograms taken just prior to debonding to check the root paralleling.
23/09/2013	Upper and lower debonding done and fixed retainers were bonded. Impressions were taken for the vacuum formed removable retainers to be delivered next day.

**Fig 3:** Mid treatment intraoral photographs

Treatment Results

The post-treatment assessment reveals a Class 1 incisor relationship with an overjet of 2.5 mm and an overbite of 3 mm. The centrelines are coinciding, and both left and right buccal segment relationships are Class 1. There are no crossbites or displacements. Functional occlusion is characterized by canine-guided occlusion on lateral excursion. No additional occlusal features are noted. However, complications during treatment included the patient's irregular attendance, leading to missed sessions and contributing to prolonged treatment duration. Cephalometric analysis revealed minor changes in SNA and SNB values, with a 1.5°

increase in ANB. Wits appraisal showed a favorable 5 mm improvement, indicating a shift toward a Class I skeletal pattern. The upper incisor to maxillary plane angle reduced significantly from 128° to 94°, correcting severe proclination. Lower incisor to mandibular plane angle decreased from 105° to 101°. The inter-incisal angle improved from 98° to 135°, suggesting a normalized incisor relationship. Maxillo-mandibular plane angle showed minimal change, and face height ratio remained stable. Soft tissue analysis indicated improved lower incisor inclination relative to the A-Pog line and Ricketts' E-plane.

Table 3: Occlusal Index

Index of Treatment Need (IOTN)	Pre-treatment	Post treatment
Dental Health component	5a	1
Aesthetic Component	9	1



Fig 4: Post treatment intraoral and extraoral photograph



Fig 5: Post-treatment Radiograph

Table 4: Pretreatment & Post treatment comparison of cephalometric analysis

Variable	Pre-treatment	Post treatment	Changes
SNA	80 ⁰	79.5 ⁰	0.5 ⁰
SNB	76 ⁰	74 ⁰	2 ⁰
Wits appraisal	4 ⁰	5.5 ⁰	1.5 ⁰
SN to maxillary plane	5 ⁰	7 ⁰	2 ⁰
Wits appraisal	-6.5 mm	-1.5 mm	5 mm
Upper incisors to maxillary plane angle	128 ⁰	94 ⁰	34 ⁰
lower incisors to maxillary plane angle	105 ⁰	101 ⁰	4 ⁰
Interincisal angle	98 ⁰	135 ⁰	37 ⁰
Maxillary mandibular plane angle	28 ⁰	30 ⁰	2 ⁰
Upper anterior face height	47 mm	47 mm	0 mm
Lower anterior face height	59 mm	61 mm	2 mm
Face height ratio	55%	56%	1%
Lower incisors to A-pog line	6 mm	3.5 mm	2.5 mm
Lower lip to Ricketts E Plane	+5 mm	+1 mm	4 mm
Lower incisors to maxillary plane angle	105 ⁰	101 ⁰	4 ⁰
Interincisal angle	98 ⁰	135 ⁰	37 ⁰
Maxillary mandibular plane angle	28 ⁰	30 ⁰	2 ⁰
Upper anterior face height	47 mm	47 mm	0 mm
Lower anterior face height	59 mm	61 mm	2 mm
Face height ratio	55%	56%	1%
Lower incisors to A-pog line	6 mm	3.5 mm	2.5 mm
Lower lip to Ricketts E Plane	+5 mm	+1 mm	4 mm

Rationale for Treatment

The patient presented with an IOTN score of 5a and an aesthetic component of 9, indicating a definite need for orthodontic treatment. With high motivation and excellent oral hygiene, an extraction-based approach was chosen due to the severity of the malocclusion. All first bicuspid were extracted, and 0.022 MBT brackets were bonded. Treatment was carried out using light force application. Given the high anchorage requirements, lacebacks and cinchbacks were incorporated throughout, along with light Class II elastics to aid in bite opening.

Critical Appraisal

The initial Class II incisor relationship contributed to an increased convexity of the profile and severe lip incompetence. First bicuspid extractions were necessary to manage space for leveling the 5 mm Curve of Spee and retracting the protruded upper and lower incisors. At the end of treatment, significant incisor retraction was achieved, establishing a Class I incisor and molar relationship. The deep overbite was corrected to within normal limits.

Treatment Outcome

The patient was highly satisfied with the final results after approximately 30 months of treatment. The prognosis remains favorable due to well-established buccal occlusion and improved lip competency, which should help maintain the overjet correction.

Iatrogenic Effects

A post-treatment DPT revealed slight blunting of the incisor roots, indicating minor iatrogenic effects but with no significant impact on long-term prognosis

Conflict of Interest

Not available

Financial Support

Not available

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How to Cite This Article

Kedilaya VB, Kumar KHC, Vishnupriya TR, Bharatkrishnan CK, Kareem T, Kumar SV. Camouflage management of skeletal Class II malocclusion with severe Proclination: A case report. International Journal of Applied Dental Sciences. 2025;11(1):247-252.

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