

# Orthodontic Camouflage For Class II Malocclusion: A Case Study Using Miniscrew Implants And Strategic Extractions

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## Abstract

*This case report describes the orthodontic treatment of a 21-year-old Caucasian female patient with a Class III incisor relationship on a Class II skeletal base and increased vertical proportions. The patient presented with severe crowding in both upper and lower arches, gingivitis, molar incisors hypomineralization, and extensive caries in the LL6 tooth. She also exhibited decreased overjet, a complete overbite, and a significant shift in upper and lower dental midlines. The primary objective of treatment was to correct the malocclusion through orthodontic camouflage, which involved the extraction of upper and lower first premolars on the right side and first molars on the left. Miniscrew implants were utilized to enhance anchorage. Fixed appliances with a pre-adjusted MBT prescription were employed for alignment and leveling of both arches. The treatment resulted in improved occlusion, correction of midlines, and resolution of the patient's aesthetic concerns. The case underscores the efficacy of orthodontic camouflage in managing complex malocclusion cases in adults while avoiding surgical intervention.*

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## I. Introduction

Malocclusion, particularly Class II skeletal discrepancies, represents a significant orthodontic challenge, especially in adult patients where growth modification is no longer possible. Class II malocclusions often result from mandibular retrognathia, which leads to a backward positioning of the lower jaw relative to the upper, affecting both aesthetics and function. In cases like this, orthodontic camouflage can be an effective treatment alternative to orthognathic surgery, which many patients may prefer to avoid due to its invasiveness and recovery time.

The patient in this case presented with a Class III incisor relationship on a Class II skeletal base and increased vertical proportions. The complexity of her malocclusion was compounded by severe crowding in both arches, gingivitis, molar incisors hypomineralization, and dental caries. While surgical correction may be recommended for severe Class II cases, research has shown that orthodontic camouflage is a viable alternative in selected adult patients. According to studies by Proffit et al. (2007), orthodontic camouflage can effectively address skeletal discrepancies by leveraging dental compensations, such as controlled tooth movements and extractions, to achieve functional and aesthetic improvements without surgery.

The extraction of first premolars in cases of severe crowding, as employed in this patient, is well-

supported in the literature. Studies by Kokich and Shapiro (2010) emphasize the importance of managing crowding through strategic extractions to improve alignment while preserving facial aesthetics. Additionally, anchorage reinforcement using miniscrew implants has become a standard in contemporary orthodontics, providing enhanced control over tooth movements, particularly in cases where maximum anchorage is required (Baumgaertel and Hans, 2009).

This report presents the diagnosis, treatment plan, and outcomes of a comprehensive orthodontic camouflage approach for a complex malocclusion, demonstrating how non-surgical intervention can produce optimal functional and aesthetic results in adult patients.

## **II. Case Presentation**

### **Patient Information**

The patient, Y.Z., is a 21 years and 7 months old Caucasian female, presenting with the chief complaint, “My front teeth are crooked.” The patient’s primary concern was aesthetic, related to the misalignment of her anterior teeth. Her medical history was unremarkable, and she was a regular dental attendee. No relevant medical conditions were noted.

### **Diagnosis**

Upon examination, the patient was diagnosed with a Class III incisor relationship on a Class II skeletal base with increased vertical proportions. The malocclusion was further complicated by:

- Severe crowding in both upper and lower arches (10mm in the maxilla, 9mm in the mandible).
- A 3mm shift in both the upper and lower midlines to the right.
- Decreased overjet (0mm) and decreased overbite (complete).
- Gingivitis localized to the lower central incisor, molar-incisor hypomineralization, and extensive caries affecting the lower left first molar (LL6).
- Crossbites involving UR 1, 2, 3, 4 and UL 2, with a tendency towards crossbite on UL 3 and UL 4.

### **Initial Clinical Findings**

- Extraoral Examination: The patient displayed acceptable facial symmetry with competent lips, though the nasolabial angle was increased. The lower lip was slightly protrusive to the E-plane, while the upper lip was slightly retrusive. There was no evidence of temporomandibular joint dysfunction (TMD).
- Intraoral Examination: Crowding and misalignment were apparent, with poor oral hygiene contributing to localized gingivitis and plaque deposits. Caries were noted in LL6, and hypomineralization affected the molar and incisor teeth. Overjet was reduced to 0mm, with a flat curve of Spee noted.



The occlusal views have been taken with a mirror. These mirror views have been correctly reversed

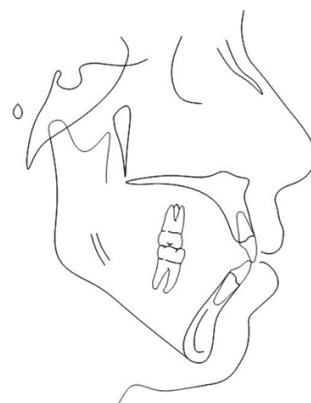
OPG



Lateral Cephalometric



Lateral cephalometric Tracing



Variable	Pre- Treatment	Normal
<u>Sna</u>	81°	82° ± 3
<u>Sub</u>	73°	79° ± 3
<u>Anb</u>	8°	3° ± 1
<b>Sn To Maxillary Plane</b>	15°	8° ± 3
<b>Wits Appraisal</b>	+1mm	0 Mm
<b>Upper Incisor To Maxillary Plane Angle</b>	110°	108° ± 6
<b>Lower Incisor To Mandibular Plane Angle</b>	93°	92° ± 6
<b>Interincisal Angle</b>	120°	133° ± 10
<b>Li-Upper Incisor Root Centroid</b>	+4mm	0-2 Mm
<b>Maxillary Mandibular Planes Angle</b>	38°	27° ± 5
<b>Upper Anterior Face Height</b>	52mm	55 Mm ± 3
<b>Lower Anterior Face Height</b>	70mm	70.5 Mm ± 4.5
<b>Face Height Ratio</b>	57.3 %	55% ± 4
<b>Lower Incisor To Apo Line</b>	4mm	0-2 Mm
<b>Lower Lip To Ricketts E Plane</b>	+3mm	-2 Mm

Sources of normal values:  
 Jacobson (1975) Am J Orthod, 67:125-133.  
 Houston WJB, Stephens CD and Tulley WJ (1992) A textbook of orthodontics. Wright, Oxford  
 Houston WJB (1989). Incisor edge-centroid relationships and overbite depth. Eur J Orthod, 11:139-143

Red denotes values outwith the normal range

Treatment Plan

The treatment plan involved orthodontic camouflage, leveraging the following strategies:

1. Extractions: First premolars were extracted on the right side and first molars on the left side (LL6 and UL6) to resolve crowding and allow alignment.
2. Anchorage Reinforcement: Miniscrew implants were placed in the upper and lower segments for enhanced

control during tooth movement.

3. Fixed Appliances: Pre-adjusted edgewise fixed appliances (0.022"x0.028" MBT prescription) were fitted to both arches to align and level the teeth.
4. Retention: Post-treatment retention involved upper and lower vacuum-formed retainers, with ongoing retention therapy.

#### Treatment Progress

The active treatment began in March 2015 and concluded in July 2017, spanning a total of 28 months.

Key treatment stages included:

- March 2015: Orthodontic assessment, extractions, and placement of fixed appliances.
- July 2015: Placement of miniscrew implants and initiation of space closure.
- March 2017: Completion of space closure and detailing of the occlusion with elastics and archwires.
- July 2017: Removal of fixed appliances and fitting of retainers.

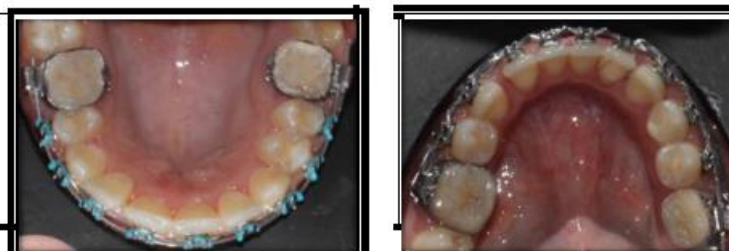
#### **Mid-Treatment Photographs (Intra-Oral Photos):**

Photographs A (INTRAORAL)



**Mid-Treatment Photographs (Intra-Oral Photos): Photographs B (Intraoral)**

Photographs B (INTRAORAL)



**Treatment Outcomes**

Post-treatment, the patient exhibited a Class I incisor and canine relationship with corrected overjet (2mm) and overbite. The midlines were coincident, and crowding was resolved. The final Peer Assessment Rating (PAR) score decreased from 44 to 2, reflecting a significant improvement in dental alignment and occlusion. The patient was satisfied with the aesthetic and functional outcomes.

**Post-Treatment Photographs: Intra-Oral Views**



*The occlusal views have been taken with a mirror. These mirror views have been correctly reversed.*

**III. Discussion**

This case demonstrates the successful use of orthodontic camouflage to treat a complex Class II malocclusion in an adult patient. The patient presented with significant skeletal and dental discrepancies, including mandibular retrognathia, increased vertical proportions, severe crowding, and crossbite. These issues were further complicated by gingival health problems, hypomineralization, and dental caries, making the case both functionally and aesthetically challenging.

**Orthodontic Camouflage Approach**

Orthodontic camouflage was chosen over orthognathic surgery in this case, as it provides a non-invasive alternative for managing Class II skeletal discrepancies in adult patients. Camouflage treatment aims to correct dental compensations, aligning teeth and improving function without directly addressing skeletal discrepancies. Studies have shown that orthodontic camouflage is effective for treating moderate to severe Class II malocclusions, particularly when patients are averse to surgical options (Proffit et al., 2007). In this case, the patient's skeletal relationship was addressed through selective extractions and strategic tooth movement to achieve optimal dental alignment and occlusion.

**Extraction Strategy and Space Management**

The extraction of first premolars in the right quadrant and first molars in the left quadrant was crucial for alleviating the crowding in both arches. Research supports the use of extractions in cases with severe crowding, where space creation is necessary for proper alignment of the teeth (Janson et al., 2010). The extraction of the LL6 was particularly significant, as it had extensive caries and was non-restorable. The corresponding UL6 was extracted to maintain symmetry and prevent tooth- size discrepancies, which could have impacted the occlusal relationship.

**Anchorage Reinforcement**

Anchorage control was a key consideration in this case, especially given the high-angle vertical growth pattern of the patient. Miniscrew implants were used for anchorage reinforcement to prevent unwanted

movement of molars and to assist with space closure. Research shows that miniscrews provide stable and predictable anchorage, particularly in cases where maximum anchorage is required (Baumgaertel and Hans, 2009). The successful use of miniscrews in this case helped maintain the correct vertical and anteroposterior relationships during space closure and alignment.

### **Treatment Duration and Stability**

The active treatment spanned 28 months, which is within the normal range for complex orthodontic cases involving extractions and anchorage devices. Treatment stability was achieved through retention using vacuum-formed retainers, which are commonly prescribed for long-term stability (Littlewood et al., 2006). Post-treatment radiographs and cephalometric analysis revealed that the patient's skeletal relationships remained unchanged, indicating that the patient's adult status had limited further growth. The dental alignment achieved was well-maintained with no significant relapse.

### **Gingival Health and Oral Hygiene**

Gingival health posed a challenge throughout treatment, as the patient initially presented with localized gingivitis and plaque deposits. As noted in the literature, orthodontic treatment can exacerbate pre-existing gingival conditions, particularly in cases where oral hygiene is inadequate (Bollen et al., 2008). Continuous reinforcement of oral hygiene practices during treatment helped to improve the patient's gingival condition, and by the end of treatment, the localized gingivitis had improved.

### **Aesthetic and Functional Outcomes**

From an aesthetic standpoint, the patient expressed satisfaction with the improved alignment and occlusion of her teeth. The corrected overjet, overbite, and midlines contributed to a balanced smile and facial appearance. Functionally, the patient achieved a Class I incisor and canine relationship, eliminating the crossbites and achieving mutually protected occlusion with canine guidance. These outcomes align with studies that suggest successful orthodontic camouflage can result in functional occlusion comparable to surgical outcomes in certain cases (Kokich and Shapiro, 2010).

## **IV. Conclusion**

This case highlights the efficacy of orthodontic camouflage in managing complex Class II malocclusions in adult patients. Through strategic extractions, the use of miniscrew implants for anchorage, and fixed appliance therapy, the patient achieved excellent functional and aesthetic results. While the skeletal relationship remained unchanged, the dental compensations provided a satisfactory outcome without the need for invasive surgery.

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