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Research

# Correction of severe deep bite and gummy smile using mini-screw anchorage: A case report

Pawankumar Dnyandeo Tekale [a,*], Ketan K. Vakil [b], Murlidhar R. Sastri [c], Jeegar K. Vakil [d], Chetan O. Agrawal [e], Ketan Ashokrao Gore [f], Bhuwan Saklecha [g]

[a] Senior Lecturer, Department of Orthodontics, Dr Rajesh Ramdasji Kambe Dental College and Hospital, Akola, Maharashtra, India
[b] Professor and Head, Department of Orthodontics, S.M.B.T. Dental College and Hospital, Sangamner, Maharashtra, India
[c] Professor, Department of Orthodontics, S.M.B.T. Dental College and Hospital, Sangamner, Maharashtra, India
[d] Senior Lecturer, Department of Orthodontics, S.M.B.T. Dental College and Hospital, Sangamner, Maharashtra, India
[e] Orthodontist and Private Practice, Pune, Maharashtra, India
[f] Senior Resident, Department of Orthodontics, S.M.B.T. Dental College and Hospital, Sangamner, Maharashtra, India
[g] Senior Lecturer, Department of Orthodontics, Index Institute of Dental Science, Indore, Madhya Pradesh, India

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ABSTRACT

The patient was a 23-year-old girl who had an Angle Class II Division 1 malocclusion, severe overjet, and deep bite with a gummy smile. She had both impacted mandibular canine teeth. The objectives were to correct deep bite, gummy smile, accentuated overjet, alignment of impacted canine and to achieve adequate overbite and overjet. The treatment involved extraction of maxillary first premolars proceeding with retraction and intrusion of the upper anterior teeth with mini-screw implants as the orthodontic anchorage. After treatment, adequate overbite and overjet and a satisfactory maxillary gingival exposure in the smile were obtained. The mini-screw implant anchorage method is useful for correction of severe overjet and a deep bite with a gummy smile.



## 1. Introduction

An excessive display of gingival tissue on smiling, usually referred to as a “gummy smile,” is often aesthetically displeasing [1]. Several etiologic factors have been proposed in the literature; these include skeletal, unigingival, and muscular factors that may occur alone or in combination. Gummy smile is an aesthetic problem for some patients and a frequent finding that can occur as a result of various intraoral or extraoral etiologies [1–3]. Thus, concise evaluation of etiology and diagnosis and implementation of treatment plan had important roles in the treatment outcome. If a gummy smile is characterized by overgrowth of anterior vertical maxillary excess, the outcome may not always be successful with conventional orthodontic therapy alone. In such cases, surgical therapy, such as that provided by a Le Fort impaction or maxillary gingivectomies, are often chosen to gain a good smile [3].

However, if the patients are unwilling to undergo surgical treatment, an alternative method must be considered to treat the gummy smile. Mini-plates and mini-screws are now frequently used for establishing absolute anchorage for orthodontic tooth movement [4–7]. Surgical invasion is minimal during mini-screw insertion, compared with that associated with placement of mini-plates, because mucosa should be cut and a flap is required. In contrast, the mini-screws provide sufficient anchorage for incisor retraction in Class II treatment without unwanted orthodontic side effects. With Class II treatment in premolar extraction cases, it had been shown that mini-screw anchorage could provide more effective incisor retraction than the traditional anchorage method in which a headgear and a transpalatal arch were used [7,8]. In this case report, we present the management of severe deep bite, gummy smile, and accentuated overjet for a skeletal Class II patient using mini-screw anchorage.

## 2. Etiology and diagnosis

The patient, a 22-year-old girl, had a convex profile, Angle Class II malocclusion, skeletal Class II base with retruded mandible. Her chief complaints were forwardly placed upper

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Authors have obtained and submitted the patient signed consent for images publication.

* Corresponding author: Dnyanita Orthodontic Care, Opp District Court, Near Dunakhe Hospital, Adalat Road, Aurangabad, Maharashtra, India, 431001.
*E-mail address:* pawan0804@gmail.com (P.D. Tekale).

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front teeth and excessive display of gums while smiling. We had previously recommended orthodontic treatment with orthognathic surgery. However, the patient was not willing to undergo the surgery. The clinical examination revels that the skeletal Class II base with prognathic maxilla and retrognatic mandible relationship, proclined and forwardly placed maxillary anteriors, increased overjet, deep bite, accentuated deep curve of Spee, impacted right and left mandibular canines, protrusion of upper and lower lips, and incompetent lips. The functional examination reveals incisal and canine guidance without prematurity and shift. The patient had no temporomandibular joint symptoms. No deviation and pain during the border movement of the mandible were discovered. No short or hyperactive upper lip or vertical maxillary excess was found.

Pretreatment extraoral, intraoral photographs (Fig. 1) and cephalogram and a panoramic radiograph (Fig. 2) were taken before treatment. The cephalometric analysis (Table 1) demonstrated a Class II skeletal relationship (Point A-Nasion-Point B Angle 5°) as a result of the prognathic maxilla. The A point was Sella-Nasion-Point A Angle 84°, and B point was Sella-Nasion-Point B Angle 79°. The angle between the maxillary incisors and the Sella-Nasion line plane was 118°, and the Incisor mandibular plane angle was 101°, which indicated that the protrusive profile was mainly caused by the proclined maxillary anterior teeth.

## 3. Treatment objectives

The treatment objectives were to create a satisfactory occlusion with correction of deep bite, accentuated overjet, and gummy smile and alignment of impacted mandibular canine teeth. Correction of axial inclination of maxillary and mandibular anteriors with retraction and intrusion of the maxillary anterior teeth was indicated to reduce deep bite and the convex profile, protruded upper and lower lip, and incompetent lips.

## 4. Treatment alternatives

The treatment options were discussed with the patient. The first option was traditional orthodontic treatment with Le Fort I surgery to reduce the gingival exposure and to correct maxillary protrusion. The second option involved orthodontic intrusion of the maxillary anterior region using mini-screw anchorage. Because the surgical treatment plan was declined by the patient, the treatment objectives essentially consisted of vertical control and distalization of the anterior teeth.

The treatment alternatives were presented to the patient.

1. Extract the maxillary first premolars and use Kalra Simultaneous Intrusion and Retraction arch-wire for simultaneous intrusion

**Fig. 1.** Showing pretreatment intraoral and extraoral photographs.