


Traumatogenic Occlusion in a Pediatric Dental Patient: A Case Report

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ABSTRACT

Aim and objective: This case report aims to describe the management of mandibular anterior teeth subjected to occlusal trauma.

Background: Occlusal trauma occurs as a result of reduced ability of the tissues to resist the occlusal forces most likely as a result of masticatory system dysfunction abnormal contact of the teeth, and prosthetic or orthodontic treatments that create occlusal interferences.

Case description: This paper describes a case of traumatogenic occlusion seen in the dentition of a 13-year-old female patient and its management by stabilization, endodontic, and orthodontic therapy.

Conclusion: The removal of the anomalous occlusal forces and stabilization of the affected teeth is the most relevant therapy for teeth affected by trauma from occlusion (TFO).

Clinical significance: Periodic monitoring of developing occlusion contributes to preventive care and encourages the maintenance of a healthy periodontium.

Keywords: Anterior occlusal problems, Deep bite, Dental trauma, Splinting.

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BACKGROUND

The American Academy of Periodontology defines trauma from occlusion as “an injury to the attachment apparatus as a result of excessive occlusal force.” Some of the other terms used to describe this condition are occlusal trauma, traumatic occlusion, traumatogenic occlusion, occlusal disharmony, and occlusal overload.¹

Occlusal trauma describes an injury resulting in tissue changes within the attachment apparatus, including periodontal ligament, supporting alveolar bone, and cementum, as a result of occlusal force(s).² It occurs most likely as a result of masticatory system dysfunction abnormal contact of the teeth, or orthodontic and prosthodontic treatments which create occlusal interferences in the dentition.³

Trauma from occlusion (TFO) can be classified into acute and chronic types. Primary TFO occurs due to alterations in occlusal forces, whereas secondary TFO occurs because of reduced ability of the tissues to resist the occlusal forces. Proper history and clinical examination are crucial for the diagnosis of TFO.⁴

This case report presents the management of a pediatric patient affected by occlusal trauma.

CASE DESCRIPTION

A 13-year-old female patient presented to the Department of Pediatric and Preventive Dentistry with a chief complaint of “pain and mobility in the lower incisors” (Fig. 1). The pain was first noticed on biting or chewing food and was relieved by itself. This aggravated two days before the patient reported.

Extraoral examination showed no signs of any pathological condition or trauma. However, a deep mentolabial sulcus angle was observed (96°). The mentolabial angle is formed by the line joining the labrale inferius and the depth of the sulcus to the pogonion point. Individuals with a class II skeletal base exhibit a deep mentolabial sulcus (Fig. 2).⁵

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Intraoral examination showed plaque deposits on tooth numbers 31, 32, 41, and 42. Erythematous gingiva and gingival recession were also observed. Wear facts were present on tooth numbers 31 and 41. All four lower incisors were tender on percussion followed by grade I mobility. The probing depths were normal indicating a healthy periodontal tissue. However, the labial mucosa was tender on palpation. The patient also had a class I molar relation with increased overbite with retroclined maxillary and mandibular incisors.

Radiographic investigation revealed a large periapical lesion involving the four mandibular incisors (Figs 3 and 4). Vitality testing was done using electric pulp test (EPT) which showed all four incisors to be nonvital. Fremitus test was positive with vibratory movements palpated on occlusion. The patient also exhibited an increase in overbite along with retroclined incisors. The overbite was measured at 6 mm on the diagnostic cast. Based on clinical findings and investigations, the condition was diagnosed as primary trauma from occlusion.

Primary occlusal trauma is an injury that occurs due to excessive occlusal forces to teeth with healthy periodontal support resulting

in tissue changes. It occurs in cases with normal clinical attachment and bone levels.⁶

Phase I Treatment

Following parental consent of the parents, full mouth oral prophylaxis was done and endodontic treatment was initiated for tooth numbers 31, 32, 41, and 42. The patient was also started on a 5-day antibiotic course along with daily chlorhexidine mouth rinses. The occlusal prematurities were identified using articulating paper and selectively removed by coronoplasty.

The endodontic treatment was completed in multiple visits. Following the cleaning and shaping, metaphex dressing was given for a period of 3 months. A semirigid wire and composite splint were given from canine to canine, lingually, to restore masticatory function and stabilize the teeth (Fig. 4). A splint is an apparatus that supports, protects, and immobilizes teeth with compromised periodontal support due to trauma fracture or certain endodontic surgical procedures. Splinting has been advocated to optimize healing outcomes for the periodontal ligament.⁷

The patient was kept on follow-up visits every 3 weeks (Fig. 5). The patient was assessed based on clinical and radiographic signs and symptoms. Radiographic signs of healing were seen within 3 months following which permanent obturation was done using gutta-percha and mineral trioxide aggregate (MTA) root canal sealer. The access cavities were sealed with composite resin cement.

Phase II Treatment

For correction of the traumatic bite, a removable Hawley’s appliance with anterior bite plane was prescribed to guide the premolars into occlusion and thus increase the overbite (Figs 6A to C). Full-time wear of the appliance was prescribed for a period of 6 weeks with follow-up visits every 2 weeks (Fig. 7). Following 3 months of wear of the appliance, the deep overbite decreased from 6 mm to 3 mm (Fig. 8).

A radiograph taken at 1 year follow-up showed complete resolution of the lesion apically (Fig. 9). The periodontal tissue was healthy and the treated teeth showed satisfying esthetics and function. The patient was then advised to undergo fixed appliance orthodontic treatment for final correction of malocclusion related to deep bite and incisor inclinations.

DISCUSSION

The adaptive capacity of the periodontium varies from person to person as well as the same person at different times. The periodontium adapts in response to increased functional demand.^{8,9} Forces that go beyond the adaptive capacity cause injury.¹⁰

The tissue injury occurs in three stages — injury, repair, and adaptive remodeling of the periodontium. The injury occurs due to excessive occlusal forces resulting in repair, which is initiated naturally, to restore the periodontium. However, in chronic forces, the periodontium remodels to cushion the impact. The PDL widens, as a result of bone resorption forming angular



Fig. 1: Preoperative intraoral frontal view



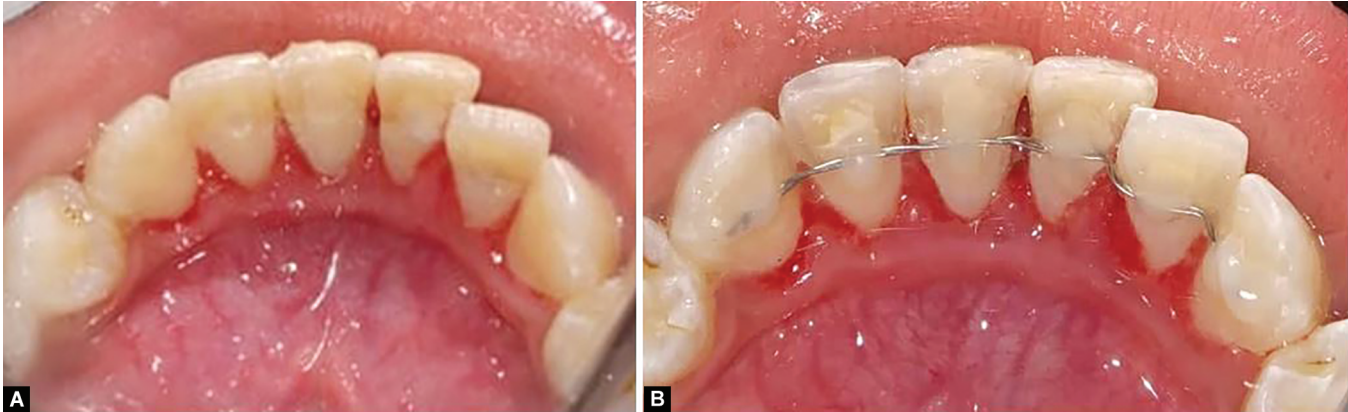
Fig. 3: CBCT radiographic image



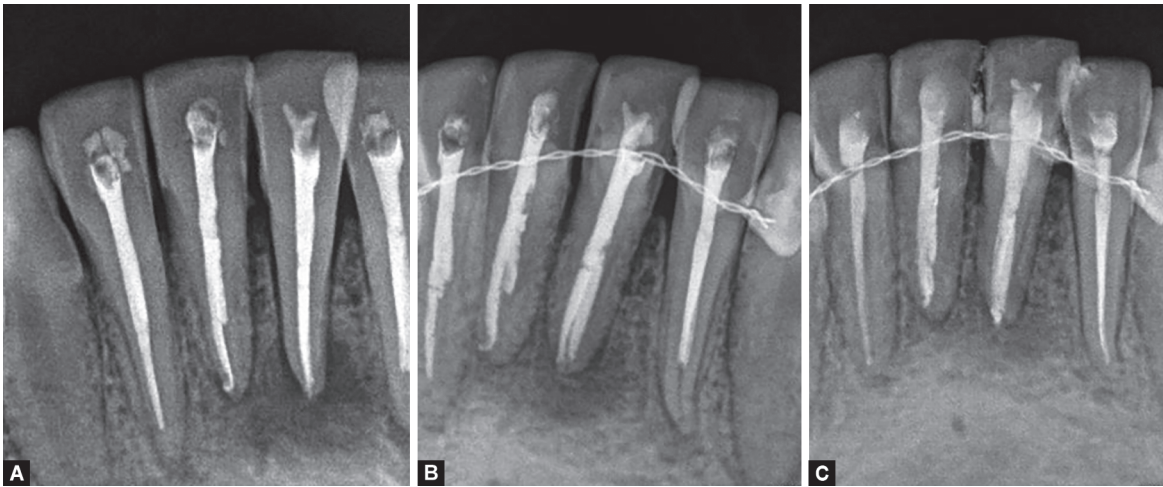
Figs 2A and B: (A) Preoperative extraoral frontal view; (B) Preoperative profile view



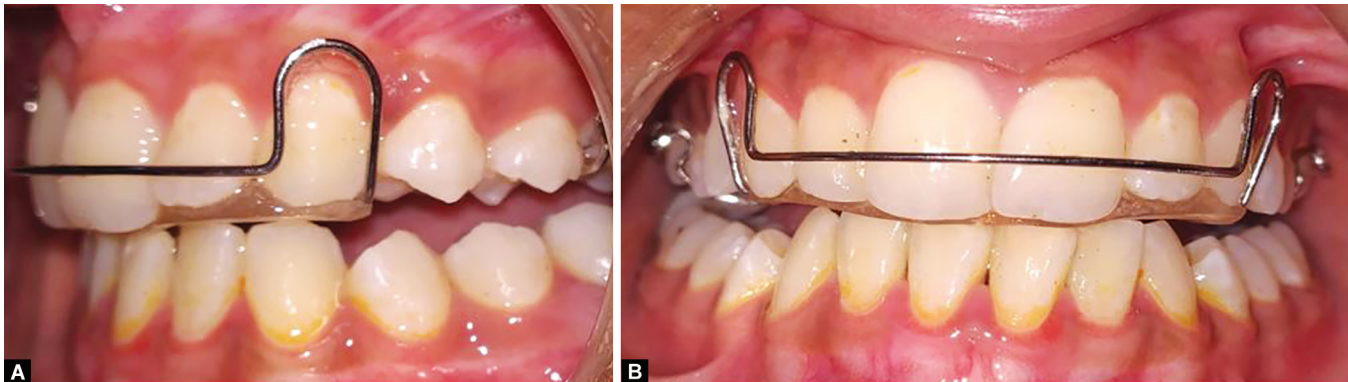
Fig. 4: IOPA 31, 32, 41, 42



Figs 5A and B: Splinting of 33, 32, 31, 41, 42, 43



Figs 6A to C: (A) Radiograph at 6 weeks of metapex dressing; (B) Radiograph at 3 months of metapex dressing; (C) Final obturation

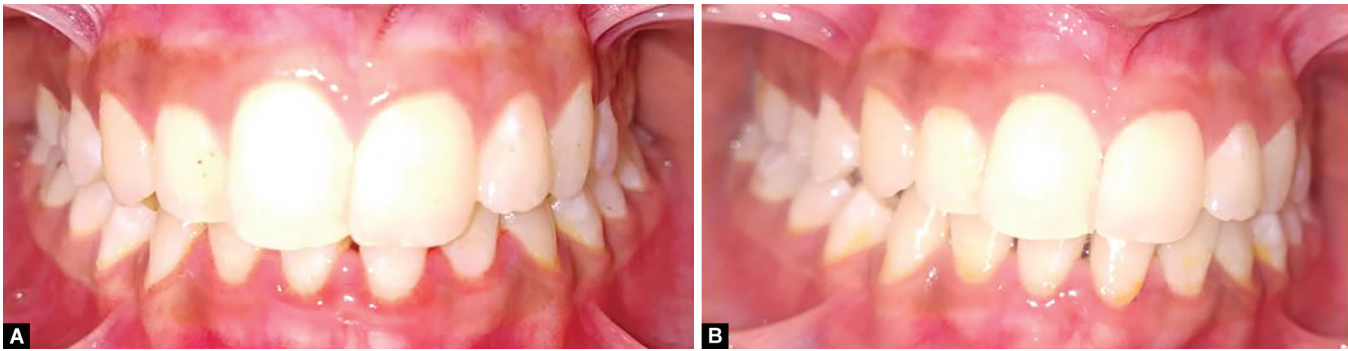


Figs 7A and B: Removable Hawley's appliance with anterior bite plane

bone defects without periodontal pockets. Eventually, the tooth becomes loose.¹⁰

According to Glickman, increased tooth mobility is the cardinal manifestation of TFO. Plaque-induced gingivitis along with occlusal trauma act as codestructive forces altering the normal inflammatory pathway. The treatment considerations include occlusal adjustments, stabilization of teeth, and orthodontic corrections.^{11,12} In the current scenario, the patient presented with an otherwise healthy periodontium, and hence the condition was diagnosed as primary trauma from occlusion.

Since the involved teeth in this case report were nonvital on presentation, endodontic therapy was initiated. A clinical review by Çalıřkan reported successful treatment of large periapical lesions with nonsurgical treatment using calcium hydroxide as an antibacterial dressing.¹³ In this case, metapex (calcium hydroxide and iodoform) was used for the antibacterial dressing and it was successful in promoting healing of the periapical lesion. Similar results were also obtained by Ghorbanzadeh et al., using calcium hydroxide as an intracanal medicament in root canal treatments, as a conservative nonsurgical approach



Figs 8A and B: Preoperative and postoperative frontal view

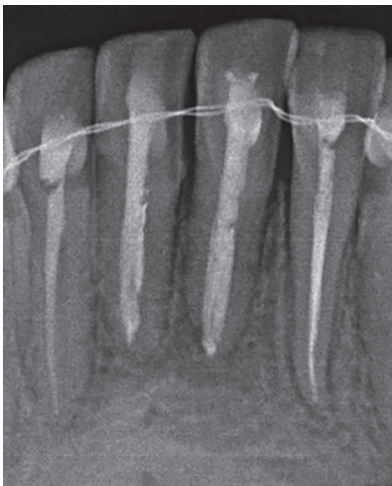


Fig. 9: One year follow-up radiograph

lead to complete healing of large cyst-like lesion without invasive treatments.¹⁴

According to the American Academy of Periodontology, the goals and treatment considerations for traumatic occlusion include occlusal adjustment of teeth which helps setting up of appropriate functional relationships appropriate for the periodontium. This can be done by coronoplasty, restorations, or removal of tooth. In this case report, coronoplasty was done for occlusal adjustment. Further treatment goals include temporary, provisional, or long-term stabilization of mobile teeth using a splint. Splinting also provides normal functioning and reduces patient discomfort.¹⁵⁻¹⁷ In this case, splinting was done by the means of a wire and composite splint.

An association between deep overbite and large periodontal lesions has been noted in the literature. These lesions frequently appear on radiographs as circumscribed radiolucencies, close to the apex.¹⁸ Deep bite is a common malocclusion seen in most children as well as adults and is most difficult to treat successfully.¹¹ An excessive overbite of incisors may be traumatic to lower incisors, palatal aspect of upper incisors, or both. This can result in severe inflammation of the gingiva as well as food impaction. The outcome is marked gingival recession, hypersensitivity, loss of attachment, and tooth mobility.¹⁹

Glickman appraised that occlusal equilibration of teeth may result in a normal and functional interdental relationship. Elimination of harmful occlusal forces should be carried out by reshaping or movement of teeth. In such patients with a traumatic deep bite orthodontic tooth alignment can be beneficial. In a growing child where overbite is increased due to over-eruption of

the incisors, supra eruption of posterior teeth can be encouraged to reduce the overbite.²⁰ For this an anterior bite plane can be given to reduce overbite.²¹ An inclined plane may also be given depending upon the horizontal relation of teeth. This is followed by fixed orthodontic treatment for final finishing. In the current scenario, an anterior bite plane was successful in decreasing the overbite and eliminating the traumatic masticatory forces. Final correction by fixed orthodontic therapy and its retention will prevent the recurrence of such an event.

CONCLUSION

Early intervention is the key in the diagnosis and management of traumatogenic occlusion. The selection of treatment options should always be customized to individual cases while considering a multidisciplinary approach to rehabilitate them. The elimination of the traumatic forces and stabilization of affected teeth are the most applicable therapy for TFO. Orthodontic treatment can also be beneficial for patients with periodontal problems and traumatic bite.

CLINICAL SIGNIFICANCE

Periodic monitoring of developing occlusion contributes to preventive care and encourages the maintenance of a healthy periodontium. Regular restorative care and careful orthodontic planning can also play a role in the prevention of developing occlusal abnormalities. Thus, prevention will maintain the vitality of the tooth allowing the clinician to select noninvasive approaches toward the management of TFO.

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