

Orthodontic Management of Post-Traumatic Loss of Maxillary Central Incisors with Compromised Anterior Occlusion to Facilitate Prosthetic Rehabilitation: An Interdisciplinary Case Report

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How to citation this article: Dr. Sayee Khotre, Dr. Harish Atram, Dr. Johar Rajvinder Singh, Dr. Varunjeet Chaudhary, Dr. Mrunal Aley, “Orthodontic Management of Post-Traumatic Loss of Maxillary Central Incisors with Compromised Anterior Occlusion to Facilitate Prosthetic Rehabilitation: An Interdisciplinary Case Report”, IJMACR – April – 2026, Volume – 9, Issue – 2, P. No. 141 – 144.

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Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Traumatic dental injuries involving maxillary central incisors are frequently encountered and often lead to significant esthetic and functional impairment. Prosthetic rehabilitation in such cases is further complicated when unfavorable occlusal relationships, such as absence of overjet and overbite, are present. A 18 year-old male patient presented with a history of trauma resulting in the loss of maxillary central incisors. Clinical examination revealed anterior space deficiency with an edge-to-edge incisal relationship, thereby reducing the overbite and overjet posing a challenge for prosthetic rehabilitation.

A simplified orthodontic approach using a fixed orthodontic MBT 0.018 appliance was employed to regain space and establish a favorable anterior relationship. Light continuous forces were used to achieve adequate overjet and overbite. Successful space creation and correction of anterior occlusion were achieved within 10 months, enabling prosthetic replacement with satisfactory esthetic and functional outcomes.

This case highlights the importance of orthodontic intervention in managing post-traumatic anterior edentulous spaces and demonstrates that simple mechanics can effectively facilitate prosthetic rehabilitation.

Keywords: Dental trauma, Orthodontics, Overjet, Overbite, Prosthetic rehabilitation, Space regaining

Introduction

Traumatic dental injuries (TDIs) are a significant public health concern, with maxillary central incisors being the most commonly affected teeth due to their anterior position and proclination¹. Loss of these teeth results in both functional and psychological consequences, necessitating timely and effective management.

The rehabilitation of anterior edentulous spaces following trauma is often complex and requires a multidisciplinary approach involving orthodontics and prosthodontics. One of the major challenges arises when there is a lack of adequate overjet and overbite, which are essential for proper prosthetic placement and long-term stability².

Orthodontic treatment plays a crucial role in such cases by facilitating space regaining, correcting occlusal discrepancies, and establishing favorable interarch relationships. Although advanced mechanics and skeletal anchorage are frequently advocated, simpler approaches can often achieve satisfactory outcomes when applied judiciously³.

This case report describes the orthodontic management of a post-traumatic anterior edentulous condition using simple mechanics to enable successful prosthetic rehabilitation.

Case Report

A patient age 18 year old male reported with a chief complaint of missing upper front teeth and difficulty in mastication and esthetics. The patient had a history of trauma due to road traffic accident prior, leading to the avulsion of maxillary central incisors and crown fracture of maxillary lateral incisors. No significant medical or family history was reported. There was no overjet &

overbite and the molar relation was Angle's Class I molar relationship.



Figure 1: Orthopantomogram(OPG)

The Orthopantomogram (OPG)(Fig. 1) confirmed absence of 11 and 21 and roots of lateral incisors were seen with adequate alveolar bone support. No pathological findings were seen.



Figure 2: Pretreatment extraoral & Intraoral photos

The treatment objectives were to regain adequate space for prosthetic replacement, (Fig 2) to establish positive overjet and overbite, to improve esthetics and functional occlusion, to facilitate long-term prosthetic stability.

Treatment Plan

The patient was started with orthodontic fixed mechanotherapy with 0.018 bracket slot prescription in mandibular arch. Mandibular central incisor to be extracted for intrusion and retraction to obtain optimum overjet and overbite. Levelling and alignment to be done along with subsequent incorporation of Reverse Curve of Spee (Fig. 3) for intrusion of anterior. Gradual correction of anterior occlusion resulted in the establishment of positive overjet and overbite. Final

detailing was done using rectangular archwires to stabilize the achieved results. (Fig 4) The total treatment duration was approximately [10 months].



Figure 3: Reverse curve of Spee



Figure 4: Post treatment photos

Discussion

Management of anterior tooth loss following trauma requires careful consideration of both esthetic and functional parameters. The absence of overjet and overbite poses a significant challenge for prosthetic rehabilitation, as it limits the space required for prosthesis placement and proper occlusal function⁴.

Orthodontic intervention plays a pivotal role in addressing these issues. Space regaining using open coil springs is a well-established technique that allows controlled and efficient tooth movement⁵. In the present case, the use of a 2×4 appliance provided sufficient control over anterior tooth positioning while maintaining simplicity in mechanics.

Previous studies have emphasized the importance of establishing proper anterior guidance prior to prosthetic rehabilitation to ensure long-term stability and prevent undue stress on prosthetic components⁶. Additionally, light continuous forces help in minimizing root resorption and preserving periodontal health⁷.

While advanced techniques such as skeletal anchorage systems have gained popularity, they may not always be necessary. This case demonstrates that simple orthodontic mechanics can achieve comparable results when applied with proper diagnosis and planning.

The interdisciplinary approach adopted in this case ensured optimal functional and esthetic outcomes, highlighting the importance of collaboration between orthodontists and prosthodontists.

Conclusion

Orthodontic correction of anterior occlusal discrepancies is essential in post-traumatic cases involving tooth loss. Simple and effective mechanics can successfully create favorable conditions for prosthetic rehabilitation, ensuring improved esthetics, function, and patient satisfaction.

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