

"From Fracture To Function: Horizontal Posts In Tooth Reattachment"

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Abstract

Tooth fractures present both functional and aesthetic challenges, especially when involving molars. This case describes the management of a fractured segment in the mandibular left molar, treated by approximating the fragment using a band, performing root canal therapy, and reinforcing with a horizontal post. The technique preserved tooth structure, restored occlusion, and achieved satisfactory long-term prognosis.

Keywords - Tooth fragment reattachment, Band stabilization, Horizontal post reinforcement, Occlusal force management

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I. Introduction

Fractures of teeth may result from trauma, caries, or iatrogenic causes. While anterior teeth are more commonly discussed in the literature for fragment reattachment, molars present special challenges due to occlusal load, access, and fragment displacement. Reattachment of tooth fragments is a conservative procedure that, if feasible, can restore morphology, occlusion, and function while delaying or avoiding prosthetic crowns or extraction.

Root canal therapy (RCT) becomes necessary when pulp exposure or irreversible pulpitis occurs. Use of posts (especially horizontal or intraradicular posts) can improve retention and distribute forces, particularly when large fragments are involved. The use of a band to approximate and stabilize the fragment temporarily is a method to ensure proper alignment during adhesive procedures.

This report delineates the treatment of a mandibular left molar fracture employing band approximation, RCT, and horizontal post reinforcement.

II. Case Report

A 26-year-old male patient came to the Department of Conservative Dentistry & Endodontics, Jaipur Dental College, Jaipur complaining of a fracture in the lower left back tooth region that had occurred during biting on a hard object. On clinical examination, the mandibular left first molar exhibited a VERTICAL fracture of its coronal portion; the fractured fragment was still in situ but slightly mobile, with a visible crack line extending across the MESIAL, OCCLUSAL AND DISTAL surfaces, not involving the furcation. The fragment fitted reasonably well against the remaining tooth structure. The patient reported sharp pain on chewing, temperature sensitivity, and occasional spontaneous pain, suggesting pulpal involvement. Radiographic assessment confirmed that the fracture cross the cemento-enamel junction, and signs of irreversible pulpitis were present. The patient had no significant medical history, and consent was obtained for a conservative but definitive treatment.

Under local anesthesia, the fragment was first stabilized by placing a circumferential stainless-steel band around the tooth, approximating the fractured portion to the remaining coronal tooth structure. This band acted to hold the fragment in correct alignment and reduce micro-movement during subsequent procedures. Once stabilized, an access cavity was prepared through the occlusal surface; the pulp tissue was extirpated, root canal instrumentation was carried out using standard hand and rotary files, with irrigation (sodium hypochlorite followed by EDTA) to cleanse the canals, and the canals were obturated with gutta-percha and sealer in a single cone obturation technique. Following obturation and after ensuring the canal filling was sound, a horizontal post was planned to reinforce the reattached fragment. A horizontal channel was prepared transversely from the buccal across into the fragment region, taking care to preserve structure. A suitable post was sized, trial-fit, and

then cemented horizontally with resin cement. Excess cement was removed and post cementation verified radiographically.

Following treatment, a postoperative periapical radiograph confirmed acceptable root filling, correct horizontal post placement, and proper adaptation of fragment margins. The patient was instructed on care: avoid heavy chewing on that side for several weeks, maintain excellent oral hygiene, and return for follow-up. At one-month recall, the patient was asymptomatic, fragment stable, no signs of infection or mobility, occlusion comfortable. Crown preparation was done to deliver the PFM prosthesis. Six months after treatment, the tooth remained functional, with no pain, and radiographs showed no periapical pathology.

This case demonstrates that in mandibular molars where the fractured fragment is recoverable and approximate fit is achievable, combining fragment stabilization (via band), root canal therapy, and horizontal post reinforcement can preserve tooth structure, restore form and function, and yield a favorable long-term outcome. Vigilant assessment of fragment integrity, careful bonding technique, and management of occlusal forces are crucial to success.



Fig. 1 Pre Operative Photograph And Radiograph

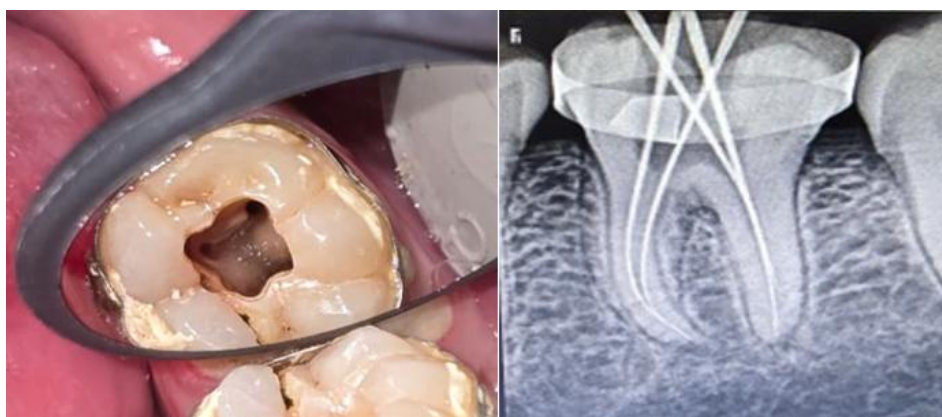


Fig. 2 Access Opening And Working Length Determination



Fig. 3 Obturation



Fig. 4 Rubber Dam Isolation Post Obturation

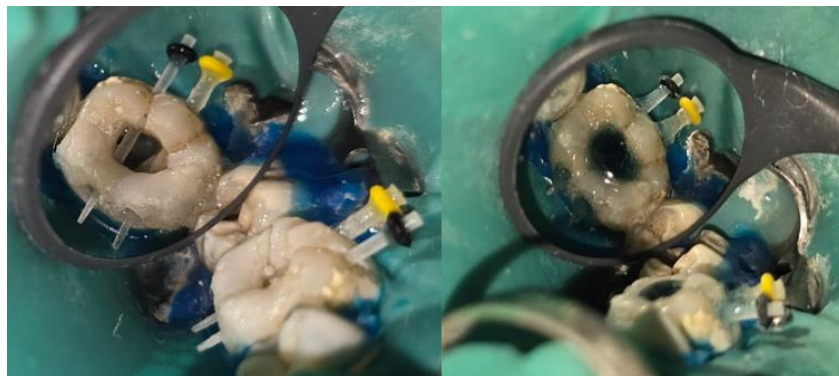


Fig. 5 Horizontal Post Placement



Fig. 6 Tooth Rehabilitation



Fig. 7 Post Operative



Fig. 8 Crown Preparation And Cementation

III. Discussion

In this case the reattachment of a fractured coronal fragment of a mandibular molar was successfully accomplished by fragment stabilization using a band, followed by root canal treatment and reinforcement with a horizontal post. The favorable outcome corroborates findings in the literature that under appropriate conditions, fragments can be reattached with good functional and structural integrity.

A number of studies have addressed fragment reattachment techniques, mostly in anterior teeth, and identified factors that influence success. A recent comprehensive review highlighted that fragment reattachment is a conservative and effective option when the fragment is intact, there is a close approximation to the tooth remnant, and pulpal health can be managed appropriately. In our case, the fragment was reasonably well fitting, and pulpal pathology necessitated endodontic treatment — a scenario that, while more complex, is manageable if proper protocol is followed.

Preparation design is reported to significantly affect fracture resistance. Techniques such as internal dentinal grooves, over-contours, bevels, and additional retentive features generally restore a larger proportion of original strength compared with simple reattachment. For example, the internal dentinal groove or over-contouring has been shown to recover nearly 90-97% of the fracture resistance of unfractured teeth in laboratory studies as opposed to simple reattachment which performs much worse. In the present case, the use of a horizontal post may function similarly to an internal reinforcement, helping to distribute masticatory forces and reduce stress concentration along the fracture line, especially in a molar subject to heavy occlusal load.

Another important factor is the adhesive system used, and the quality of bonding. Moisture control, proper etching, choice of bonding agent, and ensuring that both fragment and tooth surfaces are clean and compatible are essential. In anterior fragment reattachment reports, failures are often linked to contamination, poor preparation, or inadequate bonding.

Occlusal forces are particularly relevant in molars due to high masticatory load. Many case reports and in vitro studies focus on anterior teeth, which bear different patterns of stress. Molars present greater risk of failure if reinforcements (e.g. posts, internal retention, bands) are not used. In our case, the horizontal post reinforced the fragment and likely reduced flexure under load. Literature suggests that posts (especially fiber or metal) or external grooves help improve fracture strength and reduce catastrophic failure modes.

Some limitations inherent to fragment reattachment apply here as well. Also, the presence of subgingival margins or involvement of biological width can complicate achieving a hygienic junction. Although not explicitly encountered in this case, these are points to monitor over follow-up. The literature indicates that many failures or losses of fragments occur within the first two years, so early follow-up is critical.

In comparing this case with reported outcomes, the success here aligns with what has been observed in anterior teeth with well-controlled pulpal involvement, good fragment fit, and reinforcement. While direct comparisons are difficult because molar fragment reattachment with horizontal posts is less commonly reported, the principles translate: fragment integrity, stabilization, adhesive sealing, and reinforcement are central to long-term prognosis.

IV. Conclusion

The reattachment of a fractured segment in a mandibular molar, using a band to approximate the fragment followed by root canal treatment and horizontal post reinforcement, can be a viable treatment in selected cases. Success depends on fragment integrity, correct stabilization, precise adhesive bonding, and management of occlusal and periodontal factors. Long-term follow-up is essential to assess function, periodontal health, and to monitor for failures.

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