

Interdisciplinary rehabilitation of a laterally Luxated maxillary central incisor

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Abstract

Traumatic injuries to the maxillary anterior region may combine tooth displacement, pulpal damage and fracture of the supporting alveolar process. This case report describes the interdisciplinary rehabilitation of a 36-year-old woman following a road traffic accident. Computed tomography confirmed fracture of the alveolar process and lateral displacement of the root of tooth 11, with the apex trapped outside the alveolus. The crown was displaced palatally. Tooth 11 was unlocked, repositioned into its socket and stabilized with a 0.9 mm stainless steel orthodontic ligature wire semi-rigid splint for four weeks. Subsequent sensibility testing showed no response from tooth 11, whereas the adjacent maxillary anterior teeth remained responsive. With radiographic periodontal ligament widening and external resorption, the diagnosis was pulp necrosis with asymptomatic apical periodontitis in tooth 11. Root canal treatment was completed in tooth 11. Transillumination later revealed crack lines in the same tooth, and a full ceramic crown was planned. Tooth 21 remained vital and received a ceramic veneer with mesial proximal wrap and incisal overlap to address the midline diastema. Adhesive cementation produced a harmonious two-unit restoration while preserving tooth structure in the unaffected left central incisor.

Keywords: Dental trauma, lateral luxation, root canal treatment, ceramic crown, ceramic veneer

Introduction

Traumatic dental injuries frequently affect the maxillary incisors and may damage enamel, dentin, pulp, periodontal ligament and supporting bone in the same episode. A visible crown fracture can therefore underestimate the biological complexity of the injury. Accurate diagnosis requires a history of the event, careful clinical examination, pulp sensibility testing and radiographic assessment. Additional imaging is appropriate when associated facial or alveolar injury is suspected. The International Association of Dental Traumatology recommends early repositioning of displaced permanent teeth, passive flexible stabilization when indicated and structured follow-up because pulpal and periodontal complications may develop after the emergency visit ^[1].

Definitive rehabilitation should begin only after the injured supporting tissues are stable and the endodontic status has been established. When a traumatized tooth requires full coverage, an adjacent vital tooth should receive the least invasive restoration that satisfies the esthetic objective. Ceramic veneers can provide predictable esthetics with substantially less tooth reduction than a crown ^[2, 3]. This report describes staged surgical repositioning, endodontic

treatment of tooth 11 and asymmetric restorative rehabilitation with a full crown on tooth 11 and a veneer on vital tooth 21.

Case Report

A 36-year-old woman was referred after a road traffic accident involving the nose, chin and maxillary anterior region. Computed tomography confirmed fracture of the alveolar process and lateral root displacement of tooth 11, with the apex trapped outside the alveolus. Intraorally, the incisal edges of the central incisors were misaligned, the gingiva around tooth 11 was swollen and erythematous, and the crown of tooth 11 was displaced palatally (Fig 1). These findings established a diagnosis of lateral luxation of tooth 11 associated with injury to the supporting alveolar process. After local anaesthesia, the root apex of tooth 11 was directed incisally to unlock it from the alveolar bone. The tooth was then gently extruded with forceps, repositioned in its socket and the displaced bone was adapted. A semi-rigid splint using 0.9 mm stainless steel orthodontic ligature wire and composite was placed (Fig 2). The splint was removed after four weeks.



Fig 1: Initial clinical presentation. A, Palatal view showing palatal displacement of the crown of tooth 11. B, Frontal view showing misalignment of the maxillary central incisal edges and inflamed gingiva around tooth 11.

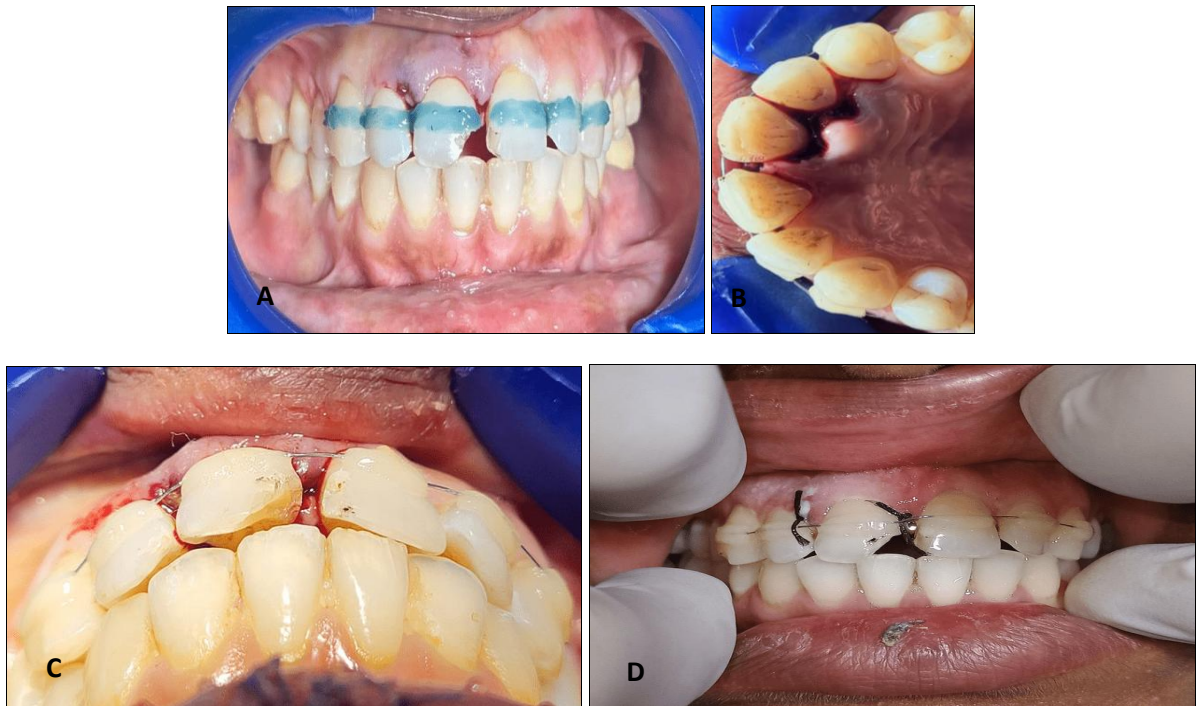


Fig 2: Repositioning and stabilization of tooth 11. A, labial view after repositioning and acid etching of the tooth surfaces for splinting. B and C, palatal view after splinting with orthodontic wire placement for stabilization. D, Completed semi-rigid wire-composite splint.

Clinical and radiographic reviews followed splint removal. Teeth 12, 13, 21, 22 and 23 responded positively to electric and cold pulp testing, whereas tooth 11 showed no response. Radiographic examination showed periodontal ligament widening and signs of external resorption. Tooth 11 was

diagnosed with pulp necrosis and asymptomatic apical periodontitis. Root canal treatment was performed only in tooth 11. Working length determination, master cone verification and obturation were documented radiographically (Fig 3).

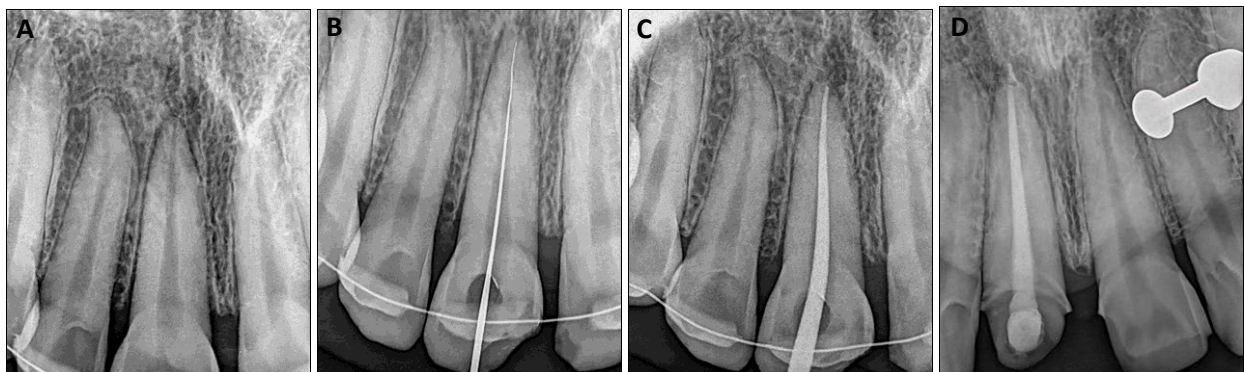


Fig 3: Endodontic management of tooth 11. A, Diagnostic radiograph after splinting. B, Working-length radiograph. C, Master-cone radiograph. D, Post-obturation radiograph. Tooth 21 remained vital and received no endodontic treatment.

Transillumination disclosed crack lines in tooth 11. A full crown was therefore planned for tooth 11. The patient also expressed concern about the midline diastema, but tooth 21 remained vital and structurally suitable for a conservative veneer. Facial photographs were transferred to smile-design software, and a two-unit restorative plan was developed. A resin mock-up was tried intraorally and modified before definitive preparation.

Tooth 11 received a full-crown preparation with approximately 2 mm incisal reduction, 1.5 mm axial reduction and a shoulder finish line. Tooth 21 received a veneer preparation with a mesial proximal wrap to close the diastema, a feather-edge distal finish and an incisal overlap design. Depth-orientation grooves guided approximately 0.5 mm facial reduction and 2 mm incisal reduction, with reduction adjusted by facial third (Fig 4).

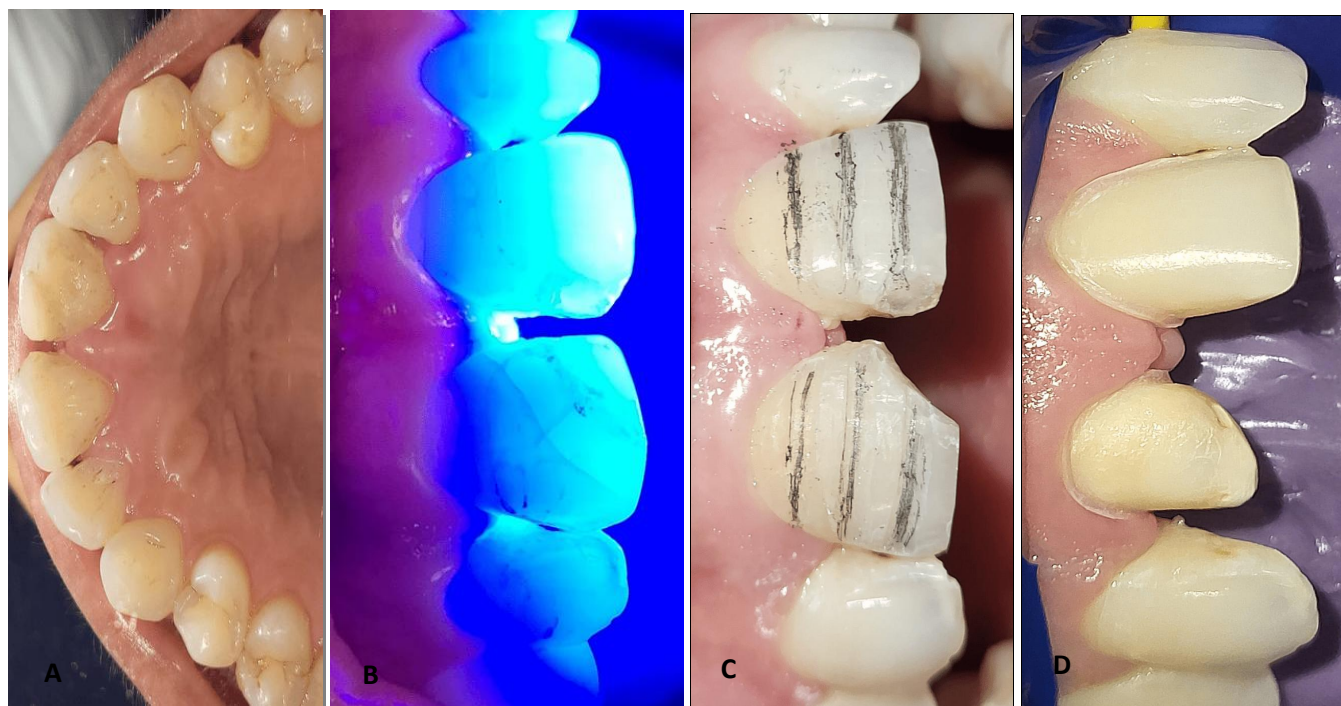


Fig 4: Restorative assessment and tooth preparation. A, Preoperative palatal view showing the midline diastema. B, Transillumination revealing crack lines in tooth 11. C, Facial and incisal depth-orientation grooves. D, Definitive preparations with a full-crown preparation on tooth 11 and a conservative veneer preparation on tooth 21.

At try-in, marginal adaptation, shade, proximal contact and the planned midline were verified. The ceramic intaglio surfaces were etched with 5% hydrofluoric acid for 20 seconds, rinsed and dried, followed by silane application for 60 seconds. The tooth surfaces were etched with 37% phosphoric acid for 15 seconds, rinsed and dried. Bonding agent was applied, air thinned and light cured. The

restorations were seated with light-cured veneer luting resin, tack cured for 2-3 seconds to permit excess removal, and then polymerized from the facial, incisal, palatal, mesial and distal aspects according to the manufacturer's instructions. The final crown on 11 and veneer on 21 restored incisal symmetry and closed the diastema (Figs 5-7).



Fig 5: Restorative planning and trial. A, Digital smile design. B, Digital design of the two-unit restoration. C, Intraoral resin mock-up. D, Extraoral view of the definitive ceramic crown for tooth 11 and ceramic veneer for tooth 21.

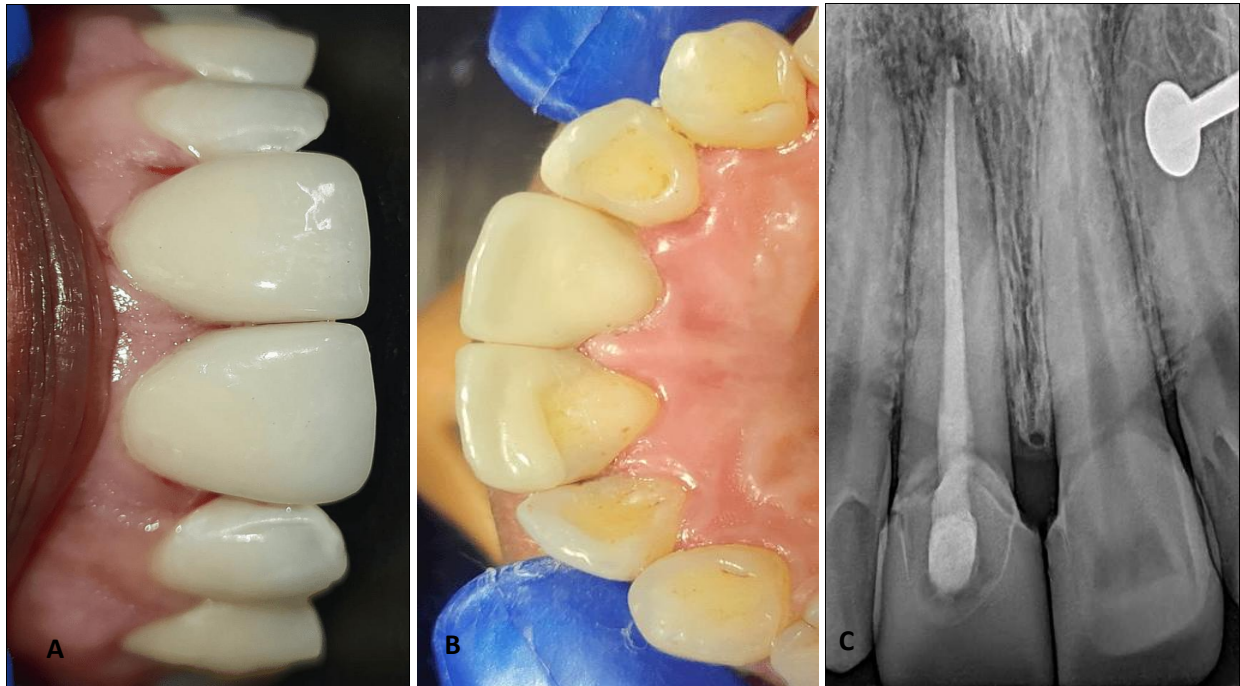


Fig 6: Definitive clinical and radiographic result. A, Lateral clinical view of the ceramic crown on tooth 11 and ceramic veneer on tooth 21. B, Palatal view of the definitive restorations. C, Post-treatment periapical radiograph of tooth 11.



Fig 7: Extraoral comparison. A, Pre-treatment smile. B, Post-treatment smile after esthetic rehabilitation.

Discussion

The first priority in this case was to identify the full extent of injury and stabilize tooth 11. The associated fracture of the alveolar process increased the importance of medical imaging and careful evaluation of the supporting tissues. Traumatic dental injuries should be treated as combined injuries when luxation and alveolar trauma coexist, because prognosis depends on pulpal and periodontal healing as well as restoration of the crown ^[1,4].

Semi-rigid splinting permits limited physiological mobility and supports periodontal repair.

Current trauma guidance recommends a passive splint for the shortest period compatible with the injury, with a longer stabilization period when an alveolar fracture is present ^[1]. The splint should include a limited number of healthy adjacent teeth and must not interfere with hygiene or occlusion. A scoping review found wire-composite splints to be the most frequently reported method and noted no additional benefit from unnecessarily extending the splint over more teeth ^[5]. These principles guided the four-week stabilization used in this case.

Pulp sensibility responses immediately after luxation can be transiently absent, so a single negative response does not establish necrosis ^[1]. Endodontic treatment should follow a diagnosis based on serial clinical and radiographic findings. Mature teeth with severe displacement injuries have a substantial risk of pulp necrosis and infection-related resorption ^[6]. In the present case, tooth 11 alone lost sensibility and developed radiographic findings consistent with pulpal necrosis and asymptomatic apical periodontitis, whereas teeth 12, 13, 21, 22 and 23 remained responsive. The restorative plan distinguished the needs of the two central incisors. Crack lines and previous endodontic treatment justified full coverage of tooth 11, while tooth 21 remained vital and received a veneer to conserve enamel ^[2]. ^{3]}. The mesial proximal wrap and incisal overlap permitted diastema closure and controlled the emergence profile. Adhesive treatment with hydrofluoric acid and silane was consistent with a silica-based ceramic protocol, while light-cured luting resin offered colour stability and extended working time for the veneer ^[9]. A limitation of this report is the absence of a documented long-term follow-up interval in the available clinical record. The immediate restorative result therefore should not be interpreted as evidence of long-term biological success. Continued review should include mobility, percussion, periodontal probing, marginal integrity and periapical radiographs. Longitudinal monitoring is particularly important after combined luxation and alveolar injuries because late root resorption, marginal bone changes or periapical disease may occur even after satisfactory early healing ^[1, 6].

Conclusion

The laterally luxated tooth 11 was managed by surgical repositioning, four weeks of semi-rigid splinting and root canal treatment after pulp necrosis developed. A full ceramic crown restored the cracked, endodontically treated tooth, while a conservative veneer on vital tooth 21 closed the diastema. Correctly differentiating the treatment required for each central incisor preserved tooth structure and produced a balanced esthetic result.

Declaration of Patient Consent

The authors certify that appropriate patient consent for treatment, clinical photography and publication was obtained. The patient was informed that identifying information would be concealed as far as possible, although complete anonymity cannot be guaranteed.

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Nil.

Conflicts of Interest

There are no conflicts of interest.

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Declaration on the Use of AI Assisted Technologies

OpenAI ChatGPT was used to improve the language, readability and structure of the manuscript. The author reviewed and verified the final content and accepts full responsibility for it.

References

1. Bourguignon C, Cohenca N, Lauridsen E, Flores MT, O'Connell AC, Day PF, *et al.* International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 1. Fractures and luxations. *Dent Traumatol*,2020;36(4):314–330. doi:10.1111/edt.12578.
2. Peumans M, Van Meerbeek B, Lambrechts P, Vanherle G. Porcelain veneers: a review of the literature. *J Dent*,2000;28(3):163–177. doi:10.1016/S0300-5712(99)00066-4.
3. Layton D, Walton T. An up to 16-year prospective study of 304 porcelain veneers. *Int J Prosthodont*,2007;20(4):389–396.
4. Levin L, Day PF, Hicks L, O'Connell A, Fouad AF, Bourguignon C, *et al.* International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: General introduction. *Dent Traumatol*,2020;36(4):309–313. doi:10.1111/edt.12574.
5. Spinas E, Pipi L, Mezzena S, Giannetti L. Use of orthodontic methods in the treatment of dental luxations: a scoping review. *Dent J (Basel)*,2021;9(2):18. doi:10.3390/dj9020018.
6. Andreassen FM, Kahler B. Pulpal response after acute dental injury in the permanent dentition: clinical implications-a review. *J Endod*,2015;41(3):299–308. doi:10.1016/j.joen.2014.11.015.
7. Mohammadi Z, Dummer PMH. Properties and applications of calcium hydroxide in endodontics and dental traumatology. *Int Endod J*,2011;44(8):697–730. doi:10.1111/j.1365-2591.2011.01886.x.
8. Schwartz RS, Robbins JW. Post placement and restoration of endodontically treated teeth: a literature review. *J Endod*,2004;30(5):289–301. doi:10.1097/00004770-200405000-00001.
9. Blatz MB, Sadan A, Kern M. Resin-ceramic bonding: a review of the literature. *J Prosthet Dent*,2003;89(3):268–274. doi:10.1067/mpr.2003.50.