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Avulsion and replacement of the tooth element fractured at the level of the middle 1/3: a case report

CASE REPORT

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Abstract – Dental trauma continues to cause loss of teeth, particularly in the anterior region of the maxilla. Reimplanting the tooth with the fragment repositioned by turning it through 180° presents a conservative treatment option that makes it possible to keep a tooth, at first indicated for extraction, functioning and with a satisfactory esthetic appearance.

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Coronal-root fracture caused by accidental trauma is very common, and when it involves the vestibular area of anterior teeth, it may cause esthetic damage that is difficult to resolve. Clinical and experimental studies have shown that autogenous tooth transplantation is a useful and safe type of treatment in cases of early tooth loss, aplasia or coronal-root fracture (1–4). Jonsson and Sigurdsson (5) found a mean success rate of 97.5% for autotransplanted teeth in a mean follow-up time of 10 years and 4 months. Ioannidou and Makris (6) indicated that transplanting could be the treatment of choice in edentulous areas of the oral cavity, taking into consideration criteria such as age (young patient with half or three-fourths of the roots developed), the tooth being out of the alveolus for less than 30 min, minimum splinting, absence of injury to the periodontal ligament and Hertwig's epithelial sheath and endodontic treatment in teeth with completely developed roots. Long-term annual follow-up after surgery is also of fundamental importance for successful treatment and involves the following: mobility tests, percussion tests to diagnose ankylosis, periapical radiographs for observing peri-radicular pathologies and marginal bone loss, and probing to check periodontal health (6–10).

Other coronal-root fracture treatment possibilities described in the literature would be fragment removal associated with clinical crown augmentation and subsequent rehabilitation with a core and crown, fragment removal and orthodontic extrusion with a conventional fixed or removable appliance, and extraction with future fixed denture or osseointegrated implant rehabilitation (4, 11, 12). Among the possible treatment options for the clinical case to be presented, extraction would lead to a complete bone loss in the region and would not favor the esthetic appearance of a fixed denture; the adjacent teeth would lose dental structure during preparation for a fixed three-element denture. Tooth implantation after extraction could minimize bone loss, but it would be a more expensive procedure, and have a much longer clinical resolution time than the technique presented.

Case report

The patient JGO, an 18-year-old student presenting with 'crooked, broken and very sensitive teeth', was attended at the Integrated Clinical Discipline of the Master's Course in Dentistry of the Federal University of Ceará, on 18 April 2005.

In anamnesis, the patient met with a serious automobile accident 5 months before, resulting in a fracture at the base of the mandible on the left-hand side. To treat the fracture, surgery was performed to place two miniplates that could be seen in the panoramic radiograph (Fig. 1). In spite of the surgical procedure, the patient's activities had not been completely restored, as an accentuated reverse articulation (cross bite) in the patient's left arch could be observed.

Intraoral examination (Fig. 2) revealed fractures of several teeth, as a direct result of the accident.

Fig. 1. Panoramic radiograph.

Fig. 2. Intraoral examination (April 2005).

Fig. 3. Fracture in the middle third of tooth 12 (April 2005).

Fig. 4. Drawing back the flap (October 2005).

Fig. 5. The root fragment repositioned with a turn through 180°.

Fig. 6. Splinting the tooth to the neighboring teeth with photopolymerizable resin.

By periapical radiographic examination, a comminuted type of fracture was detected at the beginning of the middle third of tooth 12 (Fig. 3). Initially, because of the doubtful prognosis that this tooth is capable of remaining in the patient's oral cavity, its extraction and a tooth implantation in this region were suggested. When the

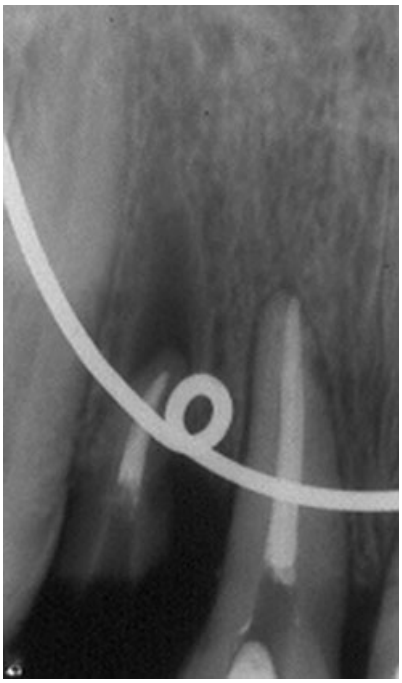

Fig. 7. The root canal was filled with calcium hydroxide-based sealer and gutta–percha.

Fig. 8. Temporary acrylic crown.

Fig. 9. Follow-up of 12 months (13 October 2006).

Fig. 10. Radiographic follow-up of 12 months. The patient was having orthodontic treatment to correct the reverse articulation.

patient was informed of his treatment options, he opted to have the element reimplanted with a turn through 180°. This alternative was shown to be feasible as the tooth remainder would still be approximately 13 mm long, and enable a cast metal core and metal ceramic crown to be placed. In addition, the treatment was within the patient's financial reach. The surgical procedure was performed on 10 October 2006.

After drawing back the flap, the tooth was luxated with the tip of a straight lever, to avoid loss of supporting bone structure as far as possible. After the tooth was removed from the alveolar cavity, the root fragment was repositioned with a turn through 180° and was splinted to the neighboring teeth with light polymerizable resin. For the postoperative period, antibiotic and analgesic medication was prescribed, and the patient was advised to keep to a liquid and/or pasty diet for a week, until the suture was removed. (Fig. 4,5,6). After 15 days had elapsed, the contention was removed and the endodontic treatment began with the application of a temporary calcium hydroxide and physiological solution-based dressing that would remain in the canal for 15 days. As the patient presented no sensitivity in the location, on 21 November 2006 the root canal was filled with calcium hydroxide-based sealer and gutta–percha cones (Fig. 7). On 25 November 2006, the temporary acrylic crown was fabricated to maintain gingival health and return the tooth in question to functionality (Fig. 8). After a follow-up of 12 months,

the tooth presents stability, no mobility, functionality and no pathologic alterations in the periodontium (Fig. 9 and 10). Furthermore, the patient is having orthodontic treatment to correct reverse articulation.

Discussion

Intentional tooth reimplantation with a turn through 180° is an easy procedure to perform. It allows alveolar bone and gingival tissue health to be maintained at satisfactory levels, without tooth structure absorption by inflammation or replacement. It has been shown to be an excellent treatment alternative in well-selected cases of coronal-root fractures, mainly in the anterior region of the maxilla (12, 13).

Successful treatment is based on controlling the damage that may be caused to the periodontal ligament, either by the extraction procedure itself, or by the time the remainder stays in the extra-alveolar media. Microbiological control was performed for 7 days after the procedure, and calcium hydroxide-based intracanal medication was used, both being essential for achieving a successful treatment outcome. (12, 14).

Conclusion

Reimplantation and prosthetic rehabilitation of element 22 were successfully integrated with the treatment, and appropriate functionality and esthetic appearance were restored.

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