Eight-year follow-up of successful intentional replantation

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Intentional replantation has been practised for many years as a treatment modality for pulp-less teeth. Although the success ratio for intentional replantation is far below that for routine or surgical endodontics, this procedure should be considered an alternative to tooth extraction. A case of mandibular second molars treated with intentional replantation and retrograde fillings is reported in this article. At the eight-year recall visit, radiographs showed no evidence of pathological changes.

Case report

A 48-year-old woman was referred for evaluation and treatment of a painful mandibular left second molar. The patient described recent severe throbbing pain associated with the left second molar area, extending to the left ear, of three days' duration. The patient stated that she had had a cavity in tooth 57 (Fig. 1) and her dentist had performed root-canal therapy a few months before her presentation. Upon examination, tenderness to percussion and palpation were noted and sulcus depths around tooth 57 did not exceed 5mm. Radiographic examination revealed an endodontic failure associated with a peri-radicular radiolucency (Fig. 2).

The patient was anaesthetised, and tooth 57 was extracted and received in a sterile gauze sponge saturated with saline, Hanks' balanced salt solution, Viaspan or a doxycycline solution for the entire time the tooth is outside the socket.

We have documented three clinical cases to exemplify the potential of IR as a viable treatment option in select endodontic cases. The purpose of this article is to report a case of successful IR as an alternative to extraction.13–15,17

Contra-indications may include:

- Long, curved roots
- Advanced periodontal diseases that have resulted in poor periodontal support
- Multi-rooted teeth with diverging roots that make extraction and replantation impossible
- Teeth with non-restorable caries

In order to provide the best long-term prognosis for a tooth that is to be replanted intentionally, the tooth must be kept out of the socket for the shortest period possible, and the extraction of the tooth should be atraumatic to minimise damage to the cementum and the PDL.1,7,9 The PDL, attached to the root surface, is kept moist in saline. Hanks' balanced salt solution, Viaspan or a doxycycline solution for the entire time the tooth is outside the socket.

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saline solution. The wound was packed with sterile gauze and the patient asked to close her teeth together to immobilise the pack. Resection of both the mesial and distal roots was performed by bevelling the root tip with a #702 bur in a straight handpiece. Retro-preparation of the mesial root was accomplished using a #1/2 round bur in a contra-angle handpiece with copious irrigation. An MTA retrograde filling was placed in the root canals (Fig. 5). Once the extra-oral procedure had been completed the socket was irrigated gently with a normal saline solution to remove the clot and the tooth was replanted. No splint was needed.

Six weeks later, the patient was asymptomatic and the replanted tooth was firm in its socket. At the time, the patient was advised to proceed with the final restoration on the replanted molar (Figs. 6-8).

After one year (Fig. 9), three years (Fig. 10), four years (Fig. 11) and eight years (Fig. 12), the patient attended for evaluation and radiographs were taken of the tooth. The radiographs showed no evidence of resorption and the patient was asymptomatic.

Discussion
Intentional replantation is an accepted endodontic procedure in cases in which intra-canal and surgical endodontic treatments are not recommended. Although not frequently used, IR is a treatment option that dentists should consider under these conditions. If the standard protocols during IR are not followed, root resorption and ankylosis may be observed within one month and one to two years, respectively.13 Most resorptive processes are diagnosed within the first two to three years. However, although rare, new resorptive processes could occur even after five or ten years.17

As various investigators report varying success rates, it is difficult to predict the outcome for IR.

Bender and Rossman15 evaluated 51 cases with an overall success rate of 80.6 per cent (six recorded failures). Replanted teeth survived from one day to 22 years. A second mandibular molar that failed after three weeks was replanted successfully a second time with no signs of failure after 46 months of follow-up.

Majorana et al.26 followed 45 cases of dental trauma for five years, recording complications and responses to treatment. Root resorption was observed in 45 cases (17.24 per cent). Of these, nine were associated with luxation injury (20 per cent) and 36 (80 per cent) with avulsion. The authors identified 50 cases of inflammatory root resorption (18 transient and 12 progressive) and 15 cases of ankylosis and osseous replacement. Nuzzolese et al.29 state that the success rate of IR at five years reported in the literature ranges from 70 to 91 per cent.

Al-Hezaimi et al.23 treated a radicular groove that predisposed a 15-year-old girl to a severe periodontal defect with a combination of endodontic, IR and Emdogain (Straumann) therapy. At the one-year follow-up, the patient was comfortable and active healing was evident.

Demiralp et al.21 evaluated the clinical and radiographic results of IR of periodontally involved teeth after conditioning root surfaces with tetracycline.
Shintani et al.27 performed an IR of an immature mandibular incisor that had a refractory periapical lesion. The incisor was extracted and the periapical lesion was removed by curettage. The root canal of the tooth was then rapidly irrigated, and filled with a calcium hydroxide and iodoform paste, after which the tooth was secured with an archwire splint. Five years later, no clinical or radiographic abnormalities were found, and the root apex was obturated by an apical bridge formation.

Kaufman28 reported successful results of a maxillary molar tooth treated with IR after a four-year follow-up period. A mandibular first molar, which was replanted, by Cronskikov and Wallace29 showed no signs of resorption and ankylosis after six months.30 Different investigators reported success rates varying from 52 to 95 per cent with follow-ups of between one to 22 years in posterior teeth.3,15-17

Bender and Rossman18 reported a success rate of 77.8 per cent in molars. Among 14 mandibular molars, the success rate in first molars was 85.7 per cent, and 71.4 per cent in second molars. Of the four maxillary molars, three first molars and one second molar, one maxillary first molar failed, resulting in a 66.7 per cent success rate in first molars.2

Baghoobar and Vissink31 replanted 29 teeth, consisting of two mandibular first molars, 17 mandibular second molars, one mandibular third molar and nine maxillary second molars, and followed them for an average of 62 months. The success rate was 72 per cent and 25 of them were still in function.19

Conclusion
For extraction and replantation cases, the practitioner must have the right patient and the right rapport with that patient. The practitioner must also be able to assess the tooth and be confident that it can be extracted without breakage. Additionally, the practitioner must be able to recognise tooth morphologies that may lead to extraction problems. This is a skill that is perfected through experience. Replantation is a predictable and acceptable method of treatment in my office when patients present with root canals that require retreatment due to failure or those that cannot be completed owing to sclerosing of the canals.

In order to be successful with extraction and replantation cases, the practitioner must have the right patient and the right rapport with that patient.

References
A complete list of references is available from the publisher.

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