The root resection of an endodontic-periodontal lesion

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A 57-year-old female was referred by her general dental practitioner for intermittent pain, local swelling and suppuration in the region of the maxillary left first molar (tooth 26). About four years earlier tooth 26 developed non-specific symptoms, which were managed by local periodontal treatment. Following that, the patient continued to experience intermittent mild discomfort during which the affected site would be treated with subgingival scaling and root planing.

Then two years ago, the conditions deteriorated with pain, swelling and discharge of pus from the adjacent mucosa of tooth 26. In particular, the gingiva around the mesiobuccal root of tooth 26 was inflamed and showed a gingival recession of 5mm. Periodontal probing revealed pocket depths of 10mm in the buccal area of the mesio-buccal root. However, apart from areas around tooth 26, the general periodontal status was normal. Tooth 26 did not respond to pulp vitality tests and was tender to percussion.

A provisional diagnosis of an endo-perio lesion associated with tooth 26 was made. The treatment plan was first to root treat the tooth, followed by periodontal treatment. Root canal treatment of tooth 26 was duly completed. However, the pus discharge from the area continued unabated.

Clinical examination

The patient was healthy. Apart from hormone replacement therapy, she was not on any medication. The patient had regularly attended the dentist every six months.

The patient had good oral hygiene. Apart from tooth 26, the periodontal probing profile of the remaining teeth was within normal range. In the intercuspal position (ICP), the molar relationships were class I on both sides. The anterior teeth showed normal overjet and overbite. At the retruded contact position (RCP), the initial contacts were between tooth 17 and tooth 47 on the right side.

The incisors provided the anterior guidance. There was immediate posterior disclusion on protrusion of the mandible. Lateral excursions saw multiple contacts between teeth on the working sides (group function). No non-working side interference was present on either side.

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Figure 1: Examination of the problem site.

Figure 2: Moderately restored dentition with generally good alveolar bone support.

Tooth 26 was restored with a class I amalgam restoration. The tooth was mildly tender to percussion and biting. Its adjacent mucosa was swollen and exuded pus on palpation (Figure 1). Periodontal probing revealed a 10mm periodontal pocket in the buccal aspect of the mesiobuccal root.

Radiographic examination

A dental panoramic tomograph (DPT) (Figure 2) showed a moderately restored dentition with generally good alveolar bone support. Consistent with the DPT, a periapical radiograph of tooth 26 revealed extensive periradicular bone loss in the mesiobuccal root area. A comparison radiograph taken 12 months earlier had shown progression of the bone loss (Figures 3 and 4).

Figure 3: Preoperative radiograph.

Figure 4: Preoperative tooth 26 after initial RCT.

Figure 5: Master apical files.

Figure 6: Retreatment completed.

A periapical radiograph of tooth 26 showed three root-filled canals. The root canal fillings appeared not to be well condensed and those in the mesio- and distobuccal roots were short of their respective radiographic apices. Apical extrusion of gutta percha from the palatal root was evident (Figure 4).

Provisional diagnosis

The localized periodontal defect in a patient with otherwise healthy periodontium and the failure of previous periodontal therapy were suggestive of an endo-perio lesion.

Figure 7: Tooth 26 preoperative.

Figure 8: Pus discharge.

Treatment plan

Two treatment options for tooth 26 were discussed with the patient. One was to re-root treat followed by resection of the mesiobuccal root if signs and symptoms persisted. The other was to extract it.

In view of the previous less than optimal root canal treatment, it was proposed to the patient that an attempt be made to re-root treat tooth 26. If that failed, the mesiobuccal root would be resected. This was because periodontal regeneration in the mesiobuccal root area was considered unlikely, as the bone loss was too far advanced and previous periodontal therapy had already proved unsuccessful. The patient consented to the treatment plan after being comprehensively informed about the benefits and risks of the treatment.

Treatment

a. Root canal retreatment of tooth 26

Local anesthetic was administered by local infiltration using 2.2ml 2% lignocaine with 1:80,000 adrenalin. Rubber dam was placed to isolate tooth 26. The existing class I amalgam restoration was removed and endodontic treatment was commenced. The gutta percha in the canals was softened with chloroform and removed with Hedstroem files. The second mesiobuccal canal was also located. All the canals were irrigated copiously with 3% sodium hypochlorite and Betadine. Coronal flaring with Profile orifice shapers was carried out and patency was gained for all canals. The tooth was dressed with calcium hydroxide and access was sealed with cotton wool and IRM.

At the following visit, the working lengths were determined with the use of a Root ZX apex locator and periapical radiographs. Using Flexofile and Flexofile Golden Mediums, the canals were apically enlarged to size 35 for the palatal canal and size 30 for the other canals (Figure 5). The step-back increment was 0.5mm for all canals. The root canal system was obturated with gutta percha and Roth sealer using a formed cone technique and cold lateral condensation. Energized spreading completed the final obturation. The access cavity was restored with an amalgam Nayyar core (Figure 6).

At the six-month review, the patient reported that the exudation from the periodontal pocket of tooth 26 had persisted. The adjacent mucosa of the mesiobuccal root still exuded pus on palpation.

Figure 9: Reflection of mucoperiosteal flap.

Figure 10: Separation of mesiobuccal root.

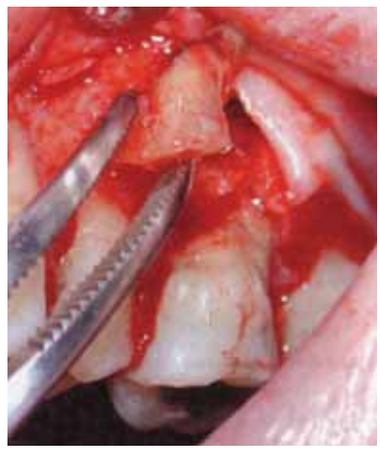

Figure 11: Extraction of mesiobuccal root.

Figure 12: Odontoplasty and retrograde amalgam.

Figure 13: Post-surgical results at one week.

Figure 14: Post-surgical results at two months.

Figure 15: Satisfactory access for plaque control.

Periodontal probing revealed a deep periodontal pocket associated with the buccal aspect of the mesiobuccal root. It was decided to proceed with root resection of the affected mesiobuccal root. Root resection was confined to just the mesiobuccal root because of the normal probing depths around the rest of the tooth and normal radiographic appearance of the interradicular bony region.

b. Mesiobuccal root resection of the tooth 26

(Figures 7 to 15)

On the day of the surgery, the surgical site was anesthetized by buccal and palatal infiltrations of 2% lignocaine with 1:80,000 adrenalin local anesthetic solution. Buccal mucoperiosteal flaps were raised by intra-sucular incisions from the mesial aspect of tooth 24 to the mesial aspect of tooth 27.

The mesiobuccal root was immediately visible when the flap was elevated (Figure 9). The root was resected apical to where it joined the crown (Figure 10 and Figure 11). The root stump was smoothed down with a white stone. The tooth trunk was reshaped by odontoplasty, creating an area that would be easy to clean (Figure 12). All remaining granulation tissues were curetted.

The flap was replaced and firm pressure applied using a moist gauze pack to minimize blood clot formation beneath the flap and allow better approximation of the flap to the bone. Four sutures (Ethilon 5/0) were placed to secure the flap. Firm pressure was reapplied and postoperative instructions given. Healing was uneventful. One week after the surgery, the patient returned asymptomatic for suture removal (Figure 13).

Figure 16a: Initial review radiograph.

Figure 16b: Review radiograph at one week.

Figure 16c: Review radiograph after two years.

c. Review

At the two-month review there were no symptoms and the patient was free of complaints. Tooth 26 showed a Grade 0–I tooth mobility. Its adjacent soft tissue had healed satisfactorily (Figure 14). Periodontal probing depths around the tooth were within normal range. Accessibility of the resected root area for plaque control was good (Figure 15). At the 24-month review, the tooth remained symptom-free. Radiographic examination showed a clean surgical site (Figure 16a-c).

Discussion

In the reported case, the origin of the endo-perio lesion associated with tooth 26 was unknown. Establishing the original cause of an endo-perio lesion is not usually straightforward. Serial radiographs and the state of the pulp on first entering the root canal system can provide useful clues. For example, the presence of a vital (bleeding) pulp in a tooth associated with serial radiographs, which showed progressive periodontal disease, would suggest a periodontal origin to the endo-perio lesion. Unfortunately, in this case this information was lacking. Serial radiographs of tooth 26 were not available and the general dental practitioner who carried out the primary root canal treatment had not recorded the state of the pulp on entering the pulp chamber.

The discharge of pus from the periodontal pocket of tooth 26 had persisted despite the root canal retreatment. This may have been a result of persistent periodontal disease, intracanal microorganisms that were inaccessible to instrumentation (Sundqvist et al 1998) or coronal leakage (Ray & Trope, 1995). The severe bone loss affecting the mesiobuccal root and the previously unsuccessful periodontal and endodontic therapies led to root resection of the affected root as the next treatment option.

A study of the literature indicated a divergence of opinion on the effectiveness of root resection therapy. The differing success rates from one study to another are a result of a lack of consensus in the criteria used to evaluate treatment outcome. While a few authors had used strict periodontal criteria such as bleeding index, pocket depth or attachment loss, most used tooth survival as the only evaluation criterion to measure long-term results. The reasons for root resection, how the teeth were subsequently restored and the operator's skills were also different in each case. An accurate comparison and summary of data is therefore difficult to achieve.

Despite these limitations, some trends can be identified. The failure rates of root resection procedures after five years, as reported by most studies, are low. In a limited meta-analysis using common denominators of time of observation and criteria of failure as defined by Langer et al (1975), Buhler (1988) reported that the failure rate for teeth treated by root resection, over a seven-year observation period, was 11%. With guarded optimism, the prospect of tooth 26 healing after root resection was assessed to be good.

References

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