

# Root-canal retreatment: To treat or not to treat?

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Fig. 1 \_Pre-op radiograph.

**Root-canal retreatment** is a predictable treatment modality. When patients were informed about this treatment option in the past, the dentist often over-emphasised the possibility of failure. This still occurs today, however more and more practitioners are realising that root-canal retreatment can be a hugely successful treatment modality and can save the patients natural teeth while still maintaining prosthetic replacement options for the future should it become necessary. In our private practice, approximately 50 per cent of referred cases are endodontic retreatments and, using modern state-of-the-art techniques, success rates from 70 to 95 per cent are possible, which is in line with recently published outcome studies.<sup>1</sup>

Prior to initiating any complex treatment, the overall dentition is examined. The position of the tooth in the mouth, its functional and aesthetic requirements, the periodontal condition and the amount of remaining tooth structure are critical parameters to assess.

A discussion of the treatment options has become more complex over the years, as patients demand more detailed information about prospective treatments. Additionally, the number of treatment options has increased. A tooth with previous root-canal treat-

ment that has failed may be monitored, extracted, re-root-canal treated, either surgically or non-surgically or occasionally an intentional re-implantation may be preformed. In an ideal world, a cost-benefit analysis of each possible treatment should be discussed with the patient. This is a challenging discussion as the number of variables both known and unknown are significant.

When assessing a tooth for the possibility of root-canal retreatment, I try to establish the source of infection. Failure is almost exclusively due to the presence of bacteria. In the majority of cases, the bacteria will be located within the root-canal system. On rare occasions, there will be an extra-radicular infection. Bacteria such as *Actinomyces* species have been shown to be able to survive in resorbed regions of the external root surface. A practitioner is unable to distinguish, however, whether the bacteria are extra- or intra-radicular.

Non-microbial causes of failure include presence of cysts, foreign body reactions and possibly the presence of scar tissue rather than healing with bone and connective tissue. In the past, 50 per cent of periapical radiolucencies were believed to be cysts.<sup>2</sup> Our current understanding, however, suggests that the incidence of true cysts is around six per cent.<sup>3</sup> Another possible cause of failure is a foreign-body reaction to materials such as talc powder from gutta-percha points, but this is unlikely to be a common cause of failure. Finally, large lesions that extend and perforate the bony cortex buccally and lingually can sometimes heal with scar tissue and be misdiagnosed as not healed radiographically.

The critical question one must ask before initiating treatment is: Can I reach the area of infection and eliminate sufficient bacteria to create conditions conducive to health/healing? The most likely common cause of failure is missed canals that have a bacterial biofilm extending to the apical foramen. Remember, the mesio-buccal root of maxillary molars has two canals around 95 per cent of the time. Magnification, adequate light and knowledge of where to

look are necessary for locating this canal. Lower incisors also have a second canal more than 40 per cent of the time, with the second canal often placed more lingually.

We regularly treat teeth that have no peri-apical infections but have technically inadequate root-canal treatments. The conventional wisdom is that if planning to place crowns or bridges on teeth with technically inadequate treatments, one takes responsibility for such treatment, as it will form the foundation for subsequent work. Success rates are expected to be 94 per cent in this situation, which is phenomenally high and offers predictability for subsequent work.

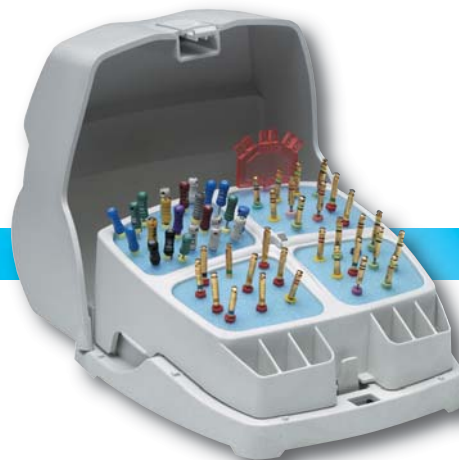
### \_Case report

The following case is an example of a retreatment case that was referred to our practice for an opinion and treatment, if required. The patient was asymptomatic on presentation for the initial consultation was no history of symptoms. Initial root-canal treatment had been initiated over ten years ago.

The #32 was unrestored while the #31 had an amalgam and a previous root-canal filling. Sensitivity tests revealed that the #32 responded positively, whereas the #31 gave a negative response. There were no probing defects greater than 3 mm. There was no buccal swelling or expansion of the bone, and the teeth were not tender to percussion or palpation. A large multilocular peri-apical lesion measuring 25 mm by 10 mm was noted to be associated with the #31 and #32 (Fig. 1).

A provisional diagnosis of chronic apical periodontitis was made. The likely cause of the lesion was intra-radicular bacteria. During a recent course, the majority of dentists suggested that the treatment of choice was to extract the tooth and possibly enucleate the lesion. It is important to remember that one cannot diagnose whether a lesion is odontogenic or non-odontogenic by radiography alone. There are two types of cysts: true cysts and bay cysts. Bay cysts are connected to the root-canal system and would be expected to heal following conventional endodontic therapy. Theoretically, true cysts are independent of the root-canal space and may not heal by root-canal treatment alone. (Much evidence suggests that the size of the lesion does not influence the outcome of healing, although it may be true that the greater the size of the lesion, the greater the likelihood of its being cystic.) The treatment recommended to the patient in this instance was root-canal retreatment with a review in six months to assess healing. There was an obvious possible source of infection in the untreated mesial canals, while the distal canals had a technically inadequate root-canal treatment (Fig. 1).

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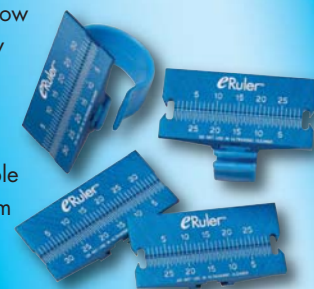




Fig. 2

**Fig. 2** Post-op radiograph with temporary restoration.

**Fig. 3** Post-op radiograph at six months.



Fig. 3

In the above case, the restoration was removed and the operating microscope was used to identify the mesial canals. Methylene blue was used to stain the tooth to check for and assess cracks. The silver points were removed by bypassing them with small files using solvent to dissolve the surrounding sealer and braiding three size 15 files around each point to remove each one intact. The remaining paste and obturation material apically was bypassed and patency was achieved as demonstrated by obtaining a consistent reading on the apex locator.

As the mesial canals had a double curvature, a serial step-back approach was initiated with NiTi rotary files in order to minimise the stress on the instruments. Patency was achieved and the canals were dressed with calcium hydroxide for a week.

At a subsequent visit, no symptoms were recorded and the canals were irrigated with sodium hypochlorite and EDTA to remove any remaining calcium hydroxide and any organic and inorganic debris. The canals were then obturated with a warm vertical condensation technique using System B and Obtura (both SybronEndo). There was some extrusion of sealer, which does not affect the outcome of treatment but may delay healing (Fig. 2).

## Conclusion

It is well established that it takes time for a lesion of endodontic origin to heal. We expect 25 per cent of lesions to heal completely after six months and 50 per cent to return to health after one year. Outcome studies suggest 74 to 86 per cent of lesions will completely heal after initial treatment or orthograde retreatment.<sup>4</sup> These high retreatment success rates may surprise many practitioners; however, an even more impressive 91 to 97 per cent will be asymptomatic and functional over time.

Modern advances, such as the operating microscope, NiTi instrumentation, ultrasonic irrigation and thermoplastic obturation techniques, are combined with the traditional use of rubber dam and chemical debridement using sodium hypochlorite and calcium hydroxide to obtain these outstanding success rates (Figs. 1 & 3).

Success in root-canal retreatment depends on preventing contamination of the canals during treatment and disrupting the bacterial biofilm to create conditions conducive to healing. The patient was advised to return to his general dental practitioner immediately following treatment for placement of a cuspal coverage restoration. The importance of this was again emphasised following the review appointment. There is evidence that posterior teeth not crowned following endodontic treatment are six times more likely to be lost. Thus, root-canal retreatment is a predictable treatment strategy that may enable patients to retain their natural teeth for an extended period of time.

*Editorial note: A list of references is available from the publisher.*

### about the author

roots



**Dr Daniel Flynn** qualified from the Dublin Dental School and Hospital, Trinity College (Ireland), in 2002. Dr Flynn recently joined the EndoCare team headed by Dr Michael Sultan. He has lectured in both the UK and Ireland and provides hands-

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