Single or multiple visits for endodontic treatment?

When people need root canal treatment of permanent teeth, are single-visit treatments as effective as multiple-visit treatments?

Figini L, Lodi G, Gorni F, Gagliani M.
Single versus multiple visits for endodontic treatment of permanent teeth. Cochrane Database Syst Rev 2007; issue 4

Data sources Searches for relevant studies were made using the Cochrane Oral Health Group's Trials Register, CENTRAL, Medline and Embase. The major oral medicine journals were also searched by hand and reference lists of included studies and reviews were checked. Endodontics experts were contacted by e-mail. No language limitations were imposed.

Study selection Randomised controlled trials (RCT) and quasi-RCT of root canal treatment were included. Surgical endodontic treatment was excluded. The outcomes considered were the number of teeth extracted for endodontic problems; radiological success (absence of any periapical radiolucency) after at least 1 year; postoperative pain; painkiller use; swelling; or sinus track formation.

Data extraction and synthesis Data were collected using a specific extraction form. The validity of the studies included was assessed on the basis of allocation concealment, blindness of the study, and loss of participants. Data were analysed by calculating risk ratios. When valid and relevant data were collected, a meta-analysis of the data was undertaken.

Results Twelve RCT were included in the review. Four studies had a low risk of bias, four a moderate risk, and another four had a high risk of bias. The frequency of radiological success and immediate postoperative pain were not significantly different between single- and multiple-visit root canal treatments. People who had single-visit treatment reported a higher frequency of painkiller use and swelling, but the results for swelling were not significantly different between the two groups. We found no study that included tooth loss and sinus track formation among its primary outcomes.

Conclusions No difference exists in the effectiveness of root canal treatment, in terms of radiological success, between single- and multiple-visit treatments. Most short- and long-term complications are also similar in terms of frequency, although patients undergoing a single visit may experience a slightly higher frequency of swelling and are significantly more likely to take painkillers.

Commentary

Recently, it has been recognised that root canal treatment can be successfully carried out within a single visit, especially for the primary treatment of vital pulp or asymptomatic necrotic pulp. A single-visit treatment — a root canal treatment completed with final filling in the same treatment session as the instrumentation procedure — reduces total time for the treatment and travel time for the patient, has good patient acceptance and is good for practice management. Another reason for the single-visit treatment is that the pulpal tissue is usually only infected superficially, rarely involving the apical portion of the pulp tissue even though the coronal portion may have been severely damaged.[1] The unreliability of temporary cements in maintaining a good coronal seal during the period between visits[2] also needs to be considered. The recent invention of rotary nickel–titanium instruments has also made single session of treatment easier than before.

Endodontic treatment of teeth that have established apical periodontitis is another issue, because those root canals are already infected to the apex: studies on root canal treatment for pulpectomy or those on teeth with apical lesions should be analysed separately. Only three small RCT were identified for this review that compared single-visit with multiple-visit endodontic treatment of teeth with apical periodontitis. Multiple visits are required because bacterial eradication can not be predictably maximised without calcium hydroxide dressing between appointments, and thus the potential for healing may be compromised.

Interestingly, even after the subgroup analysis was limited to the treatment of teeth with apical periodontitis, a single visit was more favourable than multiple visits, although the difference in radiographic healing rate between the two treatment regimens was not statistically significant. Possible explanations for this result are, first, the high success rate of both regimens meant that the sample size pooled from three studies was insufficient to demonstrate a difference between the two treatment regimens, resulting in a wide confidence interval for the mean difference. Secondly, strict elimination of bacteria may not be necessary and effective root canal filling may be sufficient in terms of healing, rather than complete eradication. It is also claimed that calcium hydroxide has limited effectiveness in eliminating bacteria from root canals.[3]

This Cochrane Review provides very important but limited evidence: although single-visit treatment may be as effective as multiple visits, or even better, there is little information from previous studies regarding the size of apical lesions and clinical symptoms to help identify the single-visit root canal filling. To establish the criteria for single-visit treatment of teeth with apical lesion or other clinical symptoms, large scale multicentre studies which adhere to standardised intervention protocols and diagnostic methods will be needed.

Toru Naito
Department of General Dentistry, Fukuoka Dental College, Fukuoka, Japan

1. Reeves R, Stanley HR. The relationship of bacterial penetration and pulpal pathosis in carious teeth. Oral Surg Oral Med Oral Pathol 1966; 22:59–65.
2. Balto H. An assessment of microbial coronal leakage of temporary filling materials in endodontically treated teeth. J Endod 2002; 28:762–764.
3. Sathorn C, Parashos P, Messer H. Antibacterial efficacy of calcium hydroxide intracanal dressing: a systematic review and meta-analysis. Int Endodont J 2007; 40:2–10.

Address for correspondence: Luisa M Fernandez Mauleffinch, Cochrane Oral Health Group, MANDEC, School of Dentistry, University of Manchester, Higher Cambridge Street, Manchester M15 6FH, UK. E-mail: luisa.fernandez@manchester.ac.uk

Evidence-Based Dentistry (2008) **9**, 24. doi:10.1038/sj.ebd.6400570