An evidence-based assessment of the clinical guidelines for replanted avulsed teeth. Part I: Timing of pulp extirpation

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CRD summary
This review concluded that the likelihood of successful periodontal healing was improved by periodontal extirpation within 14 days of tooth replantation because of a decreased risk of developing inflammatory resorption. Limitations in the review methods, small sample sizes and study designs of the evidence a note of caution is warranted when interpreting this review.

Authors' objectives
To assess if early pulp extirpation (within 10 or 14 days of tooth replantation) increases the chance of a successful periodontal healing outcome.

Searching
MEDLINE, PubMed, The Cochrane Library and Web of Science were searched in April 2004. Reference lists of included studies were searched. Search terms were not reported apart from the additional terms added for PubMed update searches in May 2006. Only articles written in English were included.

Study selection
Prospective and retrospective clinical studies and case series that compared early and late pulp extirpation in adult permanent anterior teeth and that reported periodontal healing outcomes were eligible for inclusion. Outcomes were: acceptable and functional periodontal healing, replacement resorption and inflammatory resorption for pulp extirpation within 10 and within 14 days. Animal and laboratory studies or investigations of primary or permanent posterior teeth were excluded.

Included studies were retrospective clinical audits or prospective cohort studies conducted in populations aged between six and 48 years. Periodontal healing outcomes were assessed clinically and using radiographs, high percussion notes, reduced mobility, infraocclusion and periodontal ligament space loss. Follow-up ranged from up to one year to seven years.

One reviewer performed the study selection.

Assessment of study quality
The authors stated that papers were critically appraised using forms adapted from checklists (references provided).

Data extraction
Details of numbers of patients and teeth, timing of pulp extirpation, length of follow-up and method of diagnosis of healing outcomes were extracted. Numbers of teeth with each outcome were extracted and used to calculate odds ratios (OR) with 95% confidence intervals (CI). Teeth with less than one year follow-up were excluded.

One reviewer performed the data extraction.

Methods of synthesis
Studies were pooled in a meta-analysis using a random-effects model. Heterogeneity was assessed using $\chi^2$ test and $I^2$ statistic. Sensitivity analyses explored the effect of removing outlying studies.

Results of the review
Six studies were included (272 teeth in 227 patients; 236 teeth were included in the meta-analysis).
Pulp extirpation within 10 days (two studies) or within 14 days (four studies) had no statistically significant effect on functional healing compared to later treatment. Early pulp extirpation had no statistically significant effect on acceptable healing (three studies for 10 days and six for 14 days) or replacement root resorption (three studies for 14 days). Pulp extirpation within 14 days reduced the likelihood of inflammatory resorption compared to later treatment (OR 0.37, 95% CI 0.14 to 0.98; four studies), but treatment within 10 days had no effect (three studies). Between-study heterogeneity was low for all analyses ($I^2<$11%).

Authors' conclusions
The likelihood of successful periodontal healing was improved by periodontal extirpation within 14 days of tooth replantation because of a decreased risk of developing inflammatory resorption.

CRD commentary
This review had a clearly stated question. Inclusion criteria covered the setting, intervention and outcomes, but not study design. Restricting the literature search to articles written in English meant that some relevant research may have been missed. The authors stated that the evidence was critically appraised, but did not provide any details of the methods or results. A limitation of this review (acknowledge by the authors) was that most of the methods were performed by one person, which increased the risk of mistakes during the process. Some studies were pooled in a meta-analysis, but as the available evidence was from observational study designs the pooled results may have been less reliable than evidence from randomised controlled trials. The authors acknowledges there were limitations in the review methods, small sample sizes and study designs of the evidence. Therefore, a note of caution is warranted when interpreting this review.

Implications of the review for practice and research
Practice: The authors stated that their meta-analysis supported the clinical guideline for pulp extirpation, although the critical period may be 14 rather than 10 days.

Research: The authors did not make any recommendations for research.

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