A systematic review of the effect of surgical debridement vs. non-surgical debridement for the treatment of chronic periodontitis

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Authors' objectives
To compare surgical with nonsurgical debridement in the treatment of chronic periodontal disease.

Searching
MEDLINE and the Cochrane Oral Health Group's Specialised Trials Register were searched from 1965 to April 2001 for reports in the English language; the search terms were stated. In addition, the reference lists in reviews and books were checked.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible for inclusion. Split-mouth randomisation was used in all of the included RCTs.

Specific interventions included in the review
Studies that compared surgical with nonsurgical treatments were eligible for inclusion. The included studies compared open flap debridement (modified Widman flap), modified Kirkland flap, reverse bevel flap, osseous surgery and coronal scaling with nonsurgical scaling and planing treatment. The included studies used different treatment regimens such as no initial pre-surgical scaling, initial scaling and root planing with no further treatment in the nonsurgical group, or initial scaling and root planing followed by repeat scaling and root planing in both treatment groups. All of the included studies were conducted in University settings.

Participants included in the review
Studies of patients aged 20 years or over, with clinically diagnosed chronic periodontal disease, were eligible for inclusion. Studies that included only patients with aggressive periodontitis were excluded. One study that was initially selected was excluded after discussion at a workshop, as it included patients with recurrent disease. The participants in the included studies were aged from 22 to 68 years.

Outcomes assessed in the review
Studies that assessed outcomes at least 12 months post-treatment were eligible for inclusion. The studies were only included if the analysis was on an individual patient basis rather than site level. The primary outcomes in the review were change in clinical attachment level (CAL), change in probing pocket depth (PPD) and bleeding on probing. The review also assessed longer term outcomes and adverse effects. The duration of follow-up ranged from 1 to 7 years.

How were decisions on the relevance of primary studies made?
Two reviewers independently screened titles and abstracts for inclusion. The authors were contacted for additional information where possible. Any disagreements were resolved by discussion. Inter-reviewer agreement was assessed using the kappa statistic.

Assessment of study quality
Validity was assessed on the basis of the method of randomisation, allocation concealment and the completeness of follow-up. Two reviewers independently assessed validity. Inter-reviewer agreement was assessed using the kappa statistic.

Data extraction
Two reviewers independently extracted the data. Where studies did not report the standard deviations, various methods were used to input appropriate values for variance.

Methods of synthesis
How were the studies combined?
The studies were combined using a meta-analysis. The weighted mean difference (WMD) and 95% confidence intervals (CIs) between surgical and nonsurgical treatments were calculated for CAL and PPD. Random-effects models were used when significant heterogeneity was detected; fixed-effect models were used where considered appropriate. The outcomes were assessed for three categories of initial probing depth: 1 to 3 mm, 4 to 6 mm, and greater than 6 mm.

How were differences between studies investigated?
Statistical heterogeneity was assessed but the method was not reported. A subgroup analysis was used to explore the effect of treatments on non-molar and molar teeth.

Results of the review
Six RCTs (235 patients) were included.

Agreement between the reviewers was high for both study selection (kappa 0.93) and validity assessment (100%). Two RCTs described the method of randomisation, but none of the studies reported on allocation concealment.

Pockets greater than 6 mm depth: the studies showed that surgical treatment significantly increased both PPD reduction and CAL gain compared with nonsurgical treatment. The WMD was 0.58 mm (95% CI: 0.38, 0.79) for PPD (3 RCTs) and 0.19 mm (95% CI: 0.04, 0.35, P=0.017) for CAL gain (5 RCTs). No significant heterogeneity was detected (P=0.897 for CAL and P=0.687 for PPD).

Pockets 4 to 6 mm deep: the studies showed that scaling and root planing significantly increased CAL gain compared with surgical treatment, whereas surgery significantly increased PPD reduction. For surgical versus nonsurgical treatment, the WMD was 0.37 mm (95% CI: -0.49, -0.26, P<0.001) for CAL gain (4 RCTs) and 0.35 mm (95% CI: 0.23, 0.47) for PPD (2 RCTs). No significant heterogeneity was detected (P=0.331 for CAL and P=0.108 for PPD).

Pockets 1 to 3 mm deep: the studies showed that nonsurgical treatment significantly reduced CAL loss compared with surgical treatment; the WMD (4 RCTs) was -0.51 mm (95% CI: -0.74, -0.29, P<0.001). No significant difference between nonsurgical and surgical treatment was observed for PPD; the WMD (2 RCTs) was 0.101 mm (95% CI: -0.036, 0.239, P=0.147). Since significant heterogeneity was found for both meta-analyses (P=0.005 for CAL and P=0.008 for PPD), random-effects models were used.

Two RCTs found that surgery decreased PPD for deep pockets (greater than 6 mm) in non-molar teeth, but found no difference between treatments for CAL according to tooth type.

One RCT found no difference at 5 years between treatments for PPD and CAL among non-molar teeth. One RCT found no difference at 2 years between treatments for molar furcations.

The studies suggested similar reductions in bleeding on probing with surgical and nonsurgical treatments.

Longer term studies suggested both treatments were similarly effective, but the results were based on decreasing numbers of patients.

Authors' conclusions
The treatment of periodontal disease with scaling plus root planing, with or without open flap debridement, is effective in increasing attachment and reducing gingival inflammation. Open flap debridement increases PPD reduction and CAL gain compared with nonsurgical treatment for deep pockets.
CRD commentary
The review question was clear in terms of the study design, intervention, participants and outcomes. Two relevant databases were searched but, by restricting the reports to English language publications, other relevant studies may have been omitted. Two reviewers independently selected the studies, assessed validity and extracted the data, which reduces the potential for bias and errors. Validity was assessed using defined criteria and some relevant information on the included studies was tabulated.

Some studies were appropriately combined in meta-analyses, but the finding of significant heterogeneity for the meta-analysis of shallow pockets (1 to 3 mm) suggests that the meta-analysis may not have been appropriate for this analysis. Having found significant heterogeneity for shallow pockets, the authors did not explore potential reasons for this, although they did discuss some of the differences between the studies in the review. Some of the included studies had high drop-out rates (20 to 38% across 4 studies reporting this information) and, as the authors correctly stated, this may have influenced the results.

The evidence in this review was from a relatively small number of patients who were participating in a small number of University-based studies that, generally, had a high drop-out rate. Evidence from the review is, therefore, limited and the results may not be generalisable to other settings.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that future research should assess patient preferences and patient-based outcomes. They also stated that future researchers should follow the CONSORT guidelines (http://www.consort-statement.org; accessed 19/08/04).

Bibliographic details

PubMedID
12787211

Indexing Status
Subject indexing assigned by NLM

MeSH
Chronic Disease; Dental Scaling; Humans; Outcome Assessment (Health Care); Periodontal Attachment Loss /diagnosis; Periodontal Index; Periodontitis /surgery /therapy; Randomized Controlled Trials as Topic; Subgingival Curettage; Surgical Flaps

AccessionNumber
12003000822

Date bibliographic record published
31/08/2004

Date abstract record published
31/08/2004

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on
the reliability of the review and the conclusions drawn.