Therapy of peri-implantitis: a systematic review
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CRD summary
The authors concluded that mechanical debridement with antiseptic or antibiotic therapy, Er:YAG laser and resective or regenerative surgical techniques could not be ruled out as being useful treatments for peri-implantitis, but it was not possible to determine relative efficacy. The authors acknowledged limitations in the quality of the studies and their cautious conclusions were appropriate. The reliability of the conclusions was unclear, as relevant studies may have been missed.

Authors' objectives
To assess the efficacy of all treatments for peri-implantitis.

Searching
PubMed and The Cochrane Library were searched up until July 2007. Search terms were reported. Studies needed to be in English and published in peer-reviewed journals. A large number of relevant journals were handsearched up until July 2007. Retrieved articles and reviews were cross checked for relevant studies.

Study selection
Studies were eligible if they were randomised controlled trials (RCTs) or comparative (parallel or split mouth design) studies of any treatment for peri-implantitis as defined according to consensus of experts in periodontology. Studies had to include at least five participants in each group and have a follow up period of at least six months. Studies were excluded if participants had previous treatment for peri-implantitis within 12 months of study, received antibiotics within three months of study, had a history of radiotherapy in the head and neck region, had absent or uncompleted periodontal treatment before placement of implant or had presence of active inflammation at the implant site at the time of placement. Criteria for outcomes were not specified.

Most participants in the included studies had moderate to advanced peri-implantitis lesions (probing pocket depth >4 mm and radiographic bone loss), but a group of participants had more minor lesions. Most participants were either non smokers or had no systemic diseases that could influence treatment outcome. A wide range of different implants were used. Non-surgical treatments assessed included mechanical debridement by ultrasonic device, Er:YAG laser and mechanical debridement with antibiotics. These treatments were compared with mechanical debridement with carbon fibre curettes and mechanical debridement with antiseptic (chlorhexidine). One trial compared access flap surgery with either nanocrystalline hydroxyapatite or xenograft and collagen membrane.

Two reviewers independently assessed the articles for inclusion in the review. Disagreements were resolved by consensus or reported in the text.

Assessment of study quality
The authors assessed the internal validity of the included studies according to criteria of Esposito et al (2001) and Roccuzzo et al (2002). The assessed domains included: sample size calculation; randomisation and allocation concealment method; clear definition of inclusion and/or exclusion criteria; completeness of follow up; groups comparable at baseline for prognostic factors; presence of masking; and appropriate statistical analysis. Assessments included whether these domains were adequate, unclear or not present. Each study was then given an overall assessment of risk of bias: low, moderate or high according to definitions proposed by Esposito et al (2005).

Two reviewers independently assessed the internal validity of the included studies, with disagreements resolved by consensus or reported in text.

Data extraction
Study authors were contacted for missing, unclear or unpublished data (when necessary). The authors stated neither how
the data were extracted for the review nor how many reviewers extracted data.

**Methods of synthesis**

Studies were combined in a narrative synthesis, because the authors considered the studies were too clinically heterogeneous to carry out a meta-analysis.

**Results of the review**

Five studies (n=103) were included: three were randomised comparative parallel group studies; one was a randomised controlled split-mouth study; and one was a randomised controlled parallel group study. The risk of bias was estimated as high for all included studies. Sample sizes were relatively small. Follow up ranged from six to 12 months.

At six months follow up, there was no evidence of a difference in bleeding on probing, probing pocket depth or bone loss between submucosal debridement alone, ultrasonic devices and carbon fibre curettes. Also at six months follow up, there was no evidence of a difference in probing pocket depth or clinical attachment level between Er:YAG laser and mechanical debridement with antiseptic. Er:YAG laser was associated with a greater reduction of bleeding on probing at six months, but this was not confirmed at 12 months follow up (figures not given). Mechanical debridement with minocycline antibiotics was associated with a greater reduction in bleeding on probing (figures not given) and mean probing pocket depth (from 3.9 mm to 3.6 mm versus 0 mm change) when compared with mechanical debridement with chlorhexidine in participants with shallow lesions at 12 months follow up. When surgery was undertaken either with nanocrystalline hydroxyapatite or xenograft and collagen membrane, probing pocket depth and clinical attachment level improved in both groups at six months follow up.

**Authors’ conclusions**

Within the limitations of the selected studies, mechanical debridement with antiseptic/antibiotic therapy, Er:YAG laser and regenerative techniques may be useful for the treatment of peri-implantitis, but the indications for each technique were not clear.

**CRD commentary**

The review had clearly stated inclusion criteria for study design, participants and interventions. Outcomes were not specified, although some outcomes were listed in table form. The authors searched two relevant databases and handsearched a number of journals for published studies in the English language. They attempted to find further information by reviewing reference lists, but publication bias was not assessed. With these limitations, relevant studies may have been missed (only five studies were identified). Methods were used to minimise bias and reviewer error in the selection of studies and quality assessment, but methods for data extraction were not reported, so bias and error during this process could not be ruled out. The included studies had small sample sizes, short follow-up periods and were all graded as having a high risk of bias. These studies were synthesized in a long narrative format. The authors’ conclusions reflected the limited evidence appropriately, although the conclusions should be interpreted with a degree of caution as it was possible that some relevant studies may not have been included in the review.

**Implications of the review for practice and research**

Practice: The authors stated that all the treatments that were assessed may be useful for treatment of peri-implantitis, but specific indications were not clear.

Research: The authors stated that RCTs were required to assess the efficacy of systemic antibiotics (an intervention that was not included in the review). Further RCTs with a larger number of participants and longer periods of follow up were also needed to more definitively assess the interventions included in the review.

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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.