Effect of platelet-rich plasma on bone regeneration in dentistry: a systematic review
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CRD summary
This review concluded that for the treatment of periodontal defects there was evidence for the beneficial effects of platelet-rich plasma, weak evidence for sinus elevation and no conclusive evidence for other applications. In light of the poor evidence base to support these conclusions, the findings should be regarded with some caution.

Authors' objectives
To assess the effects on bone regeneration of platelet-rich plasma in dentistry.

Searching
MEDLINE and Cochrane Central Register of Controlled Trials were searched to June 2006. Search terms were reported. The reference lists of previously published reviews and included papers were manually searched to identify additional articles. The search was restricted to English language studies.

Study selection
Controlled clinical trials of platelet-rich plasma that recruited at least five patients with maxillofacial bone defects and reported clinical, radiographic or histological bone healing outcomes were eligible for inclusion. Both 1-step and 2-step platelet-rich plasma preparation were evaluated. Included studies comprised the following treatment modalities: periodontal defects; sinus augmentation; oral-maxillofacial reconstructions; and bone formation in extraction sites. Follow-up ranged from 10 weeks to 12 months.

Two reviewers independently selected studies for inclusion in the review. Any disagreements were resolved by consensus.

Assessment of study quality
Two reviewers independently assessed study quality using items derived from guidelines for systematic reviews based on sample size calculations, randomisation methods, allocation concealment, examiner blinding, validity of statistical methods, validity of outcomes and estimation. Agreement between the reviewers was quantified using Cohen's kappa.

Data extraction
Outcomes from each study were used to calculate means and standard deviations or standard errors from which 95% confidence intervals (CI) were calculated.

The authors stated neither how the data were extracted for the review nor how many reviewers performed the data extraction.

Methods of synthesis
A comparison of studies reporting similar outcome measures was undertaken using calculated CI where the mean of controls were set to zero and a significant effect was observed if there was no overlap of the confidence intervals of the treatment and control groups. The studies were not pooled, but narrative synthesis, graphical displays and tabulated study details and results were presented.

Results of the review
Nine studies were included in the review (280 patients, study size ranged from five to 88). The majority did not meet recommendations on study quality. The authors stated that there was substantial heterogeneity present, but this was not formally assessed.

Two of the three studies evaluating periodontal defects reported a significant improvement with platelet-rich plasma. Both studies evaluating sinus elevations showed a significant difference between platelet-rich plasma and controls. Two of the three studies evaluating oral-maxillofacial reconstructions reported positive effects of platelet-rich plasma. Only one study evaluated bone formation in extraction sites and reported a positive result.
Authors' conclusions
For the treatment of periodontal defects there was evidence for the beneficial effects of platelet-rich plasma, weak evidence for sinus elevation and no conclusive evidence for other applications.

CRD commentary
The review addressed a clear question and undertook an adequate search for studies with clear inclusion criteria. The literature search was restricted to publications in English and there was no specific search for unpublished studies. Hence, both publication and language bias could have been present, but they were not formally assessed. Appropriate methods were used to minimise reviewer error and bias during the review process (conducted in duplicate). An assessment of study quality found most included studies to be of poor quality. There was heterogeneity in study characteristics, although this was not formally assessed and the included studies comprised small study numbers. In light of this a narrative synthesis was appropriate. The methodology employed to compare the treatment and control groups was poorly reported, so it was unclear whether the method was appropriate. Given the poor study quality, wide confidence intervals for the outcomes compared and clinical heterogeneity, there was some doubt over the reliability of the authors’ conclusions; these should be regarded with some caution.

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

Research: Better reporting of clinical trials on platelet-rich plasma was required to assess study quality.

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