Clinical outcomes of GBR procedures to correct peri-implant dehiscences and fenestrations: a systematic review

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CRD summary
The authors concluded that there was a lack of evidence on the most reliable grafting material and membrane barrier for correcting dehiscence/fenestration defects and to demonstrate whether augmentation procedures were required to ensure the long-term survival of implants. Due to potential biases in the review process and absence of detailed quality assessment, the reliability of these conclusions is unclear.

Authors' objectives
To evaluate the clinical outcomes of guided bone regeneration procedures used to correct dehiscence/fenestration defects associated with placement of screw-shaped titanium implants.

Searching
MEDLINE was searched from 1986 up to December 2008. Several journals (from 1986 up to December 2008) and reference lists of articles found were handsearched for additional studies. Articles published in English were eligible. Search terms were reported.

Study selection
Randomised controlled trials (RCTs), controlled clinical trials, cohort studies, case control studies and prospective or retrospective case series studies that reported on dehiscence or fenestration defects associated with placement of endosseous dental implants were included. Included studies were required to have only screw-type titanium implants, which included different types of surface modifications. Studies had a minimum follow up period of 12 months after the start of prosthetic loading and reported on a minimum of 10 consecutively treated patients. Studies in medically compromised patients or that reported on bone regeneration around implants placed in post-extraction sockets following peri-implantitis and guided bone regeneration procedures performed before implant placement were excluded.

On average, prosthetic rehabilitation was started five months after implant placement (range three to six months). Follow-up period ranged from 12 to 114 months after loading of implants. Initial defect/implant exposure (where reported) ranged between 1mm and 12mm. Materials used in regeneration procedure varied between studies (grafting membranes included expanded polytetrafluoroethylene, xenogenic collagen, polylactic-polyglycolic acid and grafting materials included autogenous bone, bovine bone material and demineralised freeze-dried bone). Primary outcomes of interest were complication rate, and survival/success rate.

Two reviewers independently selected the studies. Any disagreements were resolved through discussion.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
Implant survival, success and complication rates (expressed as percentages) associated with augmentation procedures and changes in probing depth at re-entry were extracted.

The authors did not state how many reviewers performed data extraction.

Methods of synthesis
The results were combined in a narrative synthesis.

Results of the review
Seven studies (374 implants in 238 patients) were included: one controlled clinical study, four prospective studies and two retrospective studies. Methodological quality was described as poor on average. The number of patients included in each study ranged from 13 to 75.

Overall implant survival rate was 95.7% (range 84.7% to 100%; seven studies). Implant success rate was reported in only two studies (96.1% and 90%). Coverage gained by regeneration procedure ranged from 63% to 100%. Uneventful healing was reported in 57% to 100% of cases. There were no notable modifications of probing depth and/or variation of clinical attachment level around implants immediately after completion of prosthetic rehabilitation and at the end of observation period (four studies). Implant survival rates by grafting material were reported.

Authors' conclusions
It was difficult to draw a significant conclusion on the most reliable grafting material and membrane barrier for correction of dehiscence/fenestration defects. It was impossible to demonstrate that such augmentation procedures were needed to ensure long-term survival of implants.

CRD commentary
This review had a clear research question and inclusion criteria were specified for study design, patient population and intervention. Several sources were searched for eligible studies, although possibilities of language and publication biases could not be ruled out. Study selection was performed by two reviewers independently, which minimised risk of selection bias. Errors and bias in the data extraction process could not be ruled out. The authors described overall study quality as poor, but no details of the quality assessment were reported and so it is difficult to assess to what extent this may have influenced the review findings. Some study details, such as participant characteristics, were poorly reported and so generalisability of the review findings could not be assessed. Given the high level of clinical heterogeneity observed between studies, it was appropriate to combine results in a narrative synthesis. Due to the absence of detailed quality assessment and some potential for bias in the review process, the reliability of the authors' conclusions is unclear.

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 was required to provide more accurate assessments of which membrane or grafting materials were more effective. Research was needed on whether augmentation procedures were necessary to correct dehiscence/fenestration defects and assess the impact on long-term survival/success rates and the influence of regeneration procedures in the stability of peri-implant soft tissues around implants initially affected by fenestration/dehiscence defects.

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