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RAPPORTEURS

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AFFILIATION

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study

Surgical treatment of peri-implantitis using enamel matrix derivative, an RCT: three- and five-year follow-up

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RELEVANT BACKGROUND

Peri-implantitis is a relatively common complication of dental implant therapy and may result in loss of implant-supporting bone and implant loss. A variety of clinical approaches are utilised in the current treatment of peri-implantitis, based on defect severity and configuration. Although many studies report encouraging short-term outcomes, randomised controlled trials (RCTs) with long-term follow-up on the effects of peri-implantitis are scarce and disease resolution is difficult to predict.

Enamel matrix derivative (EMD) has demonstrated accelerated wound healing and regeneration in periodontal defects and may provide osteopromotive and antibacterial effects. However, no RCT has examined whether the use of adjunctive EMD could promote healing in combination with peri-implant surgery.

This research group previously published findings from an RCT on regenerative surgical treatment of peri-implantitis (Isehed et al., 2016). The adjunctive use of EMD resulted in a limited but statistically significant additional radiographic bone gain at affected implants one year following therapy.

AIMS

The aim of this prospective randomised controlled intervention study was to evaluate the long-term clinical and radiographic outcomes (three and five years) of the regenerative surgical treatment of peri-implantitis with and without adjunctive EMD.

MATERIALS AND METHODS

This study was a prospective double-blinded RCT on the adjunctive effect of enamel matrix derivative (Emdogain®) used in addition to surgical treatment of peri-implantitis.

Peri-implantitis was identified by presence of a pocket ≥5mm with bleeding on probing (BOP) and/or suppuration and with angular peri-implant bone loss of ≥3mm, measured radiographically. Each patient contributed one implant to the study analysis. Patients were excluded if they had uncontrolled diabetes or a history including recent use of systemic antibiotics or medication associated with gingival hyperplasia. All implant systems were accepted.

All patients received initial non-surgical therapy and oral-hygiene instruction. The surgical approach involved access flap with mechanical instrumentation (ultrasonic and hand) and implant decontamination with sodium chloride; patients did not receive systemic antimicrobials. Patients were randomised to receive EMD (test) or not (control) prior to flap closure. Supportive periodontal therapy was provided at three- to six-month intervals throughout the follow-up period.

Clinical and radiographic measurements were conducted at baseline, and one, three, and five years following surgery. Clinical measurements at three years and five years included BOP, suppuration, and plaque; probing depths were not recorded as implant superstructures remained in situ. Periapical radiographs were taken using paralleling technique and were evaluated by a radiologist using ImageJ software and fixed landmarks for calibration. The primary outcome was radiographic bone-level change.

Implants with progressive disease that required retreatment were excluded from further analysis. Differences in bone level, bone-level changes, and implant-survival distribution between groups were statistically analysed.

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results

- After randomisation, 15 patients were assigned to the EMD group and 14 to the non-EMD group. Test and control groups had a similar profile at baseline. 25 patients (13 test, 12 control) were available for analysis at the three-year and five-year time points.
- Overall, no statistically significant difference was found between the groups at any point in terms of BOP, suppuration, or plaque. BOP levels decreased as the follow-up period progressed in both groups and suppuration was not present at any site after five years.
- Over the five-year period, 44% of the treated implants were lost or required retreatment because of recurrent infection; this included 31% of the implants in the EMD group compared to 58% in the non-EMD group.
- At both three and five years, statistically significant positive median bone-level change (in excess of 1mm) was seen in both groups versus baseline. Although median bone-level changes between groups were not statistically significant at either three or five years, partial least square (PLS) modelling of implant survival showed that adjunctive use of EMD was positively associated with implant survival rates.

LIMITATIONS

- Because of the small sample size and subsequent high rate of implant loss/reinfection, only 14 implants were available for analysis after five years, which reduced the ability to draw definitive conclusions based on these results.
- Multiple implant types were included in the study population. Inferences cannot be made regarding the effect of implant surfaces/designs because of the limited size of this study.
- The outcomes of regenerative peri-implantitis treatment may depend on the defect morphology. This study provided limited information on the morphology of treated defects.
- To reduce loss of patients to follow up, multiple operators conducted radiographs and clinical measurements, and radiographs were not standardised.

CONCLUSIONS

- Successful treatment of peri-implantitis is difficult to accomplish – 11 of 25 implants were lost to follow-up as a result of implant loss or recurrent infection in the five years following surgery.
- The beneficial effects of EMD on radiographic bone level at one year following surgery demonstrated in a previous paper by this research group were not evident at three and five years of follow-up. The use of adjunctive EMD as part of the surgical treatment of peri-implantitis failed to demonstrate statistically significant clinical or radiographic benefits at five-year follow-up.
- However, statistical analysis applying a PLS model indicated that EMD use was positively associated with implant survival time. Future studies with larger patient cohorts are necessary to verify these findings.

IMPACT

- This study confirms the common finding that successful treatment of peri-implantitis is difficult to accomplish.
- Adjunctive use of EMD during peri-implantitis surgery may not offer longer-term clinical or radiographic benefits compared to access-flap surgery. However, EMD may be positively associated with implant survival, indicating it may postpone implant failure in cases of advanced peri-implantitis that undergo surgery.
- Additional studies, possibly including a cost-benefit analysis, may be indicated to evaluate the merits of EMD use in peri-implantitis treatment.

LINK TO ORIGINAL JCP ARTICLE:

https://www.onlinelibrary.wiley.com/doi/abs/10.1111/jcpe.12894

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