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study

Factors that influence outcomes of surgical peri-implantitis therapy

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Background

As demonstrated in the surgical treatment of angular bony defects in periodontitis, a careful assessment of variables related to patient, clinician, and site is necessary to facilitate a predictable treatment approach. There is, however, a lack of evidence on data from bony defects associated with peri-implantitis.

The clinical practice guidelines published by the European Federation of Periodontology emphasise probing pocket depth (PPD) and bleeding on probing (BoP) as primary clinical outcomes. Despite the effectiveness of the surgical management of peri-implantitis defects in reducing probing depths and clinical signs of inflammation, results have demonstrated no differences between different surgical approaches after the first year of treatment.

Nevertheless, a great variation in outcomes has been reported across different clinical trials that were unrelated to the treatment allocation. Efforts should instead be directed at establishing possible predictors of treatment outcomes to optimise the approach and patient selection.

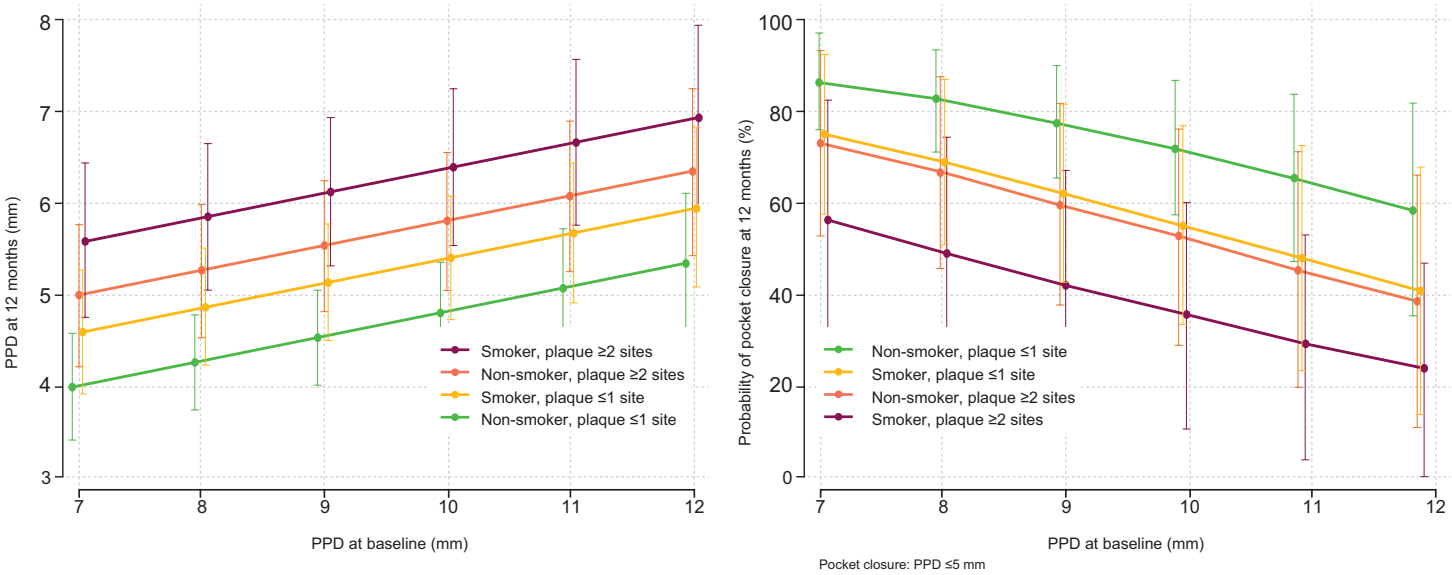
Aim

The objective of this research was to establish the predictors of treatment outcomes following the surgical treatment of peri-implantitis-associated defects, with or without a bone-replacement graft.

Materials & methods

- Data from a previously published multicentre, parallel group, randomised controlled trial across six centres were re-evaluated.
- A total of 138 patients diagnosed with advanced peri-implantitis, characterised as PPD ≥7mm with BoP or suppuration on probing (SoP) and radiographic bone loss exceeding 3mm at one or more implants after one year of function.
- Non-surgical treatment was carried out before surgical intervention and a 10-day regimen of systemic antibiotic treatment was initiated three days prior to the surgery.
- Implant surfaces were decontaminated with titanium curettes and rotating titanium brushes under saline irrigation.
- One group was allocated to access-flap treatment (control) while the second group received an access flap with a combined bone replacement graft (test: Bio-Oss collagen).
- The following measurements were recorded:
  - Plaque levels, PPD, and BoP/SoP at four sites per implant at baseline, six, and 12 months (plaque levels were also assessed at the sixth week).
  - Soft-tissue level and width of keratinised mucosa (KM) at baseline, six, and 12 months.
  - Radiographic marginal bone level (MBL) at baseline and 12 months.
  - Intra-surgical defect characteristics (depth, width, and configuration) at worst-affected site.
- A linear and multilevel regression model at two levels was carried out and adjusted to the treatment allocation (test or control) to estimate:
  - Final PPD.
  - Pocket closure (≤5mm).
  - BoP at ≥2 sites.
  - Recession.
  - MBL.

Figure: Predicted probing pocket depth (PPD) and predicted probability of pocket closure at 12 months by baseline PPD



Note: The models also included smoking and plaque at six weeks (only significant for PPD), as well as baseline keratinised mucosa and treatment group (none of them statistically significant).

Results

- No significant impact was found with the use or not of the bone-replacement graft.
- PPD: Baseline probing pocket depth, smoking, and plaque levels at six weeks were significant predictors of final probing pocket depth, while treatment approach and keratinised mucosa were not significant.
- Pocket closure: observed in 70.6% of the cases. Baseline PPD was the only significant factor associated with probability of pocket closure.
- BoP: Absence of keratinised mucosa at baseline, plaque levels at six weeks, and screw-retained prosthesis had a significant impact on BoP at 12 months, while treatment approach did not. BoP at 12 months was highly associated with probing pocket depths ≥6mm and plaque levels at ≥2 sites.
- Soft-tissue recession: treatment without bone substitute, baseline PPD, and maxillary location were considered as relevant predictors of the outcome at 12 months.
- MBL gain: baseline PPD and screw-retained prosthesis were significantly associated with MBL gain at 12 months. The treatment approach showed no relevant association.

Limitations

- Number of cigarettes and former smokers were not considered.
- The study was initially designed to answer a research question that was different from the one evaluated in this study.
- No specific surgical flap design was performed, which may explain the difference in outcomes between operators.
- Some variables were measured at a level of detail that would be difficult to assess clinically (0.5mm).

Conclusions & impact

- Initial PPD is an important predictor in the outcome of the surgical treatment irrespective of the surgical modality, as sites with initially deep PPD have a lower probability of pocket closure (≤5mm).
- Bone substitutes may reduce soft-tissue recession around implants, thus favouring their use in aesthetic areas.
- Level of self-performed plaque control is crucial in achieving the desired outcomes, as evidence of inadequate plaque control in the sixth week was associated with poorer outcomes in terms of residual PPD and BoP.
- Smoking cessation should also be encouraged for improved outcomes, as smokers presented greater residual PPD compared to non-smokers.

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