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study

Surgical treatment of peri-implantitis: three-year results from a randomised controlled clinical trial

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RELEVANT BACKGROUND

Peri-implantitis is characterised by an extensive inflammatory lesion residing in peri-implant soft tissues and by loss of peri-implant bone. To date, the majority of peri-implantitis treatment studies lack sufficient sample sizes, do not include a control group, and are characterised by short follow-up periods. Carcuac et al. in 2016 reported that the use of chlorhexidine for decontamination of the implant surface during surgical therapy did not provide any benefit over saline.

It was also observed that an adjunctive 10-day regimen of systemic antibiotics led to improved outcomes at implants with modified surfaces. The investigators saw that the strongest predictor for treatment outcomes was the surface characteristics. Thus, the odds for treatment success at one year were significantly higher for implants with non-modified surfaces.

It is not understood whether the observed short-term benefits of antibiotics are sustained beyond the first year and whether implant-surface characteristics influence long-term outcomes and, possibly, the recurrence of disease.

AIMS

This study reports on the three-year follow-up of patients enrolled in a randomised controlled clinical trial on the surgical treatment of advanced peri-implantitis.

MATERIALS AND METHODS

The study was designed as a four-arm randomised controlled clinical study with three years of follow-up. A total of 100 patients diagnosed with advanced peri-implantitis – periodontal probing depth (PPD) ≥ 6 mm, bleeding / suppuration on probing (BoP/SoP) positive, and marginal bone loss >3 mm – were enrolled. Of the implants involved, 64.6% were maxillary and 35.2% mandibular. Surgical therapy aiming for pocket elimination was performed and patients were randomly assigned to one of four treatment groups:

- Group 1: systemic antibiotics (amoxicillin, 2 × 750mg daily)/mechanical implant-surface decontamination supplemented by an antiseptic agent (0.2% solution of chlorhexidine digluconate) (AB+/AS+);
- Group 2: systemic antibiotics/mechanical implant-surface decontamination with saline (AB+/AS-);
- Group 3: no systemic antibiotics/mechanical implant-surface decontamination supplemented by an antiseptic agent (AB-/AS+);
- Group 4: no systemic antibiotics/mechanical implant-surface decontamination with saline (AB-/AS-).

Patients were enrolled in supportive periodontal therapy every three months during the first year and, thereafter, according to individual needs. A clinical examination evaluating the PPD values and the presence or absence of BoP/SoP was performed at 12 and 36 months. The radiographic bone levels were calculated in x-rays two weeks after the surgery and at 12 and 36 months.

The primary outcome of the study was absence of additional bone loss after therapy (>0.5 mm from radiographic baseline). All the results were analysed by linear or logistic regression, using the implant as the unit of analysis.

The characteristics of the implant surface and the use of systemic antibiotics as potential predictors were also evaluated. Predictive values and sensitivity/specificity of BoP/SoP at one and three years with regard to additional bone loss between radiographic baseline and three years, and between one and three years, were calculated.

results

- The clinical findings showed a reduction in the probing depth of 2.7mm at three years. The reduction in the probing depth was higher in non-modified surface implants and with the use of systemic antibiotics.
- At three years, an increased probing depth (>5mm) was observed in 35% of the implants. The probability of increased probing depth was lower at non-modified-surface implants (9-22%) when compared to modified-surface implants (34-58%). The systemic use of antibiotics decreased the probability for PPD >5mm at implants with a modified surface from 58% to 34%. A reduction in bleeding on probing of 40% was also observed. This reduction was higher in non-modified-surface implants. The radiographic findings showed a bone loss of 1.3mm at implants with a modified surface when therapy was not supplemented by systemic antibiotics while a bone gain of 0.3mm in those where an antibiotic was administered.
- The negative predictive value of BoP/SoP for bone loss >0.5mm during the follow-up period ranged from 78% to 90%. The positive predictive value of BoP/SoP, however, was lower (38-53%). Similarly, the sensitivity of BoP/SoP at three years ranged from 78% to 85%, while a specificity of 48-49% was noted. Thus, the absence of BoP/SoP at the one- and three-year examinations yielded a high probability of identifying an implant that did not demonstrate additional bone loss after therapy.
- The results of the multilevel analysis confirm: 1) the influence of the implant surface; 2) the benefits of the antibiotics only in modified surfaces; 3) the significant interaction between both factors.
- The absence of bleeding on probing at the first and third year was not associated with any additional bone loss.



LIMITATIONS

- The present study it does not evaluate the condition of the prosthetic rehabilitations or if these were modified. The presence or absence of keratinised tissue around implants is not mentioned either, and this is a factor that has been seen to influence the inflammation of peri-implant tissues and thus affect the BOP result.
- Regarding the implants, only 24% had a non-modified surface, much lower than the 76% with a modified surface.
- BoP/SoP was scored as negative only if all aspects of the implant (mesial, buccal, distal, and lingual) were negative. This might become a problem when comparing results with other articles as they might show higher values for BOP.



CONCLUSIONS

- Surgical treatment of peri-implantitis is partially effective, and outcomes of therapy are affected by implant-surface characteristics.
- Potential benefits of systemic antibiotics are not sustained over a three-year follow-up period.



IMPACT

- The surgical treatment of peri-implantitis is partially effective in arresting the progression of the disease.
- Clinicians should consider the implant-surface characteristics for the surgical treatment planning of peri-implantitis.
- Clinicians should also consider that the potential benefit of systemic antibiotics is short-term and limited to implants with modified surfaces.
- The absence of bleeding/suppuration on probing during the follow-up after treatment has a high predictive value in decreasing the progression of bone loss.



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