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study

Peri-implant marginal tissues in chronic-periodontitis patients

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RELEVANT BACKGROUND

Several animal and clinical studies have shown that some peri-implant marginal bone loss occurs after implant installation. The aetiology is multifactorial, involving a combination of clinical, mechanical, and biological factors. Therefore, different techniques have been suggested as ways to limit this process.

Platform switching – the use of prosthetic components with a smaller diameter than the implant platform – has been shown to better preserve the peri-implant marginal bone compared with the external hexagon connection. Similarly, the use of tissue-level implants – with the platform placed supracrestally and presenting a polished transmucosal neck – has also resulted in reduced marginal bone resorption in several prospective studies.

Although several studies have investigated the effect of these implant designs on marginal bone loss, the results are inconclusive because of the heterogeneity of the studies, the shortcomings of randomised controlled trials, and the lack of long-term follow-up.

In this context, patients with a history of periodontitis experience more marginal bone loss than patients who have not suffered from periodontitis. Based on the above, it can be considered that platform switching and/or the use of tissue-level implants is more appropriate for periodontitis patients. However, it is unknown which of the two approaches may result in the least marginal bone resorption in patients with a history of periodontitis.

AIMS

The aim of this study was to assess the clinical and radiographic parameters of patients with a history of chronic periodontitis treated with bone-level implants with a platform switch and with tissue-level implants, both of which are considered to be protective against peri-implant marginal bone loss.

MATERIALS AND METHODS

A prospective randomised, split-mouth, controlled clinical trial which included 20 partially edentulous patients older than 35 years, previously treated for chronic periodontitis, in supportive periodontal therapy for at least one year, presenting good oral hygiene, and requiring two dental implants. Exclusion criteria were smokers or former smokers, untreated periodontitis, antibiotic therapy in the last six months, absence of keratinized tissue at the implant site, or requiring any bone or soft-tissue graft.

Each patient received one Straumann bone-level implant with a platform switching abutment (BL) and one Straumann Standard Plus tissue-level implant (TL). Cone beam computed tomography (CBCT), models, diagnostic wax-up, and a combined surgical and probing guide were used for implant planning, surgery, and evaluation. A one-stage surgical protocol was applied.

Implants were loaded after three months with a single screw-retained crown and patients were followed up every month for nine months and then every three months up to 24 months. Plaque index, bleeding of probing (BOP), probing pocket depth (PPD), gingival/mucosal-margin position, distance from gingival/mucosal margin to the stent margin, and relative clinical attachment level (rCAL) on both teeth and implants were assessed on the day of prosthesis installation and one, three, six, 12, and 24 months after implant loading.

Standardised radiographs taken at the time of implant surgery, at implant loading, and at six and 24 months thereafter were measured by a calibrated examiner to determine the distance from the implant platform/shoulder to the most coronal, visible bone-to-implant contact (MBL) on the mesial and distal sites of each implant.

results

Twenty bone-level implants and 20 tissue-level implants were placed.

Statistically significant differences ($p < 0.05$) were found for the following clinical parameters:

- Full-mouth bleeding on probing: baseline, 16.4 ± 7.1 ; 24 months, 28.5 ± 8.7 .

No statistically significant differences ($p > 0.05$) were found for the following parameters:

- Full-mouth plaque index: baseline, $17.6 \pm 11.3\%$; 24 months, $27.1 \pm 12.1\%$.
- Probing pocket depth baseline, TL group $2.60\text{mm} \pm 0.42\text{mm}$ and BL group $2.70\text{mm} \pm 0.33\text{mm}$; 24 months, $3.39\text{mm} \pm 0.63\text{mm}$ and $2.52\text{mm} \pm 0.58\text{mm}$, respectively.

- Relative peri-implant clinical attachment level (rPCAL) baseline, TL group $7.27\text{mm} \pm 2.06\text{mm}$ and BL group $7.78\text{mm} \pm 1.43\text{mm}$; 24 months, $8.06\text{mm} \pm 1.87\text{mm}$ and $8.36\text{mm} \pm 1.88\text{mm}$, respectively.
- Relative peri-implant mucosal margin position: baseline, TL group $4.50\text{mm} \pm 1.22\text{mm}$ and BL group $5.11\text{mm} \pm 1.30\text{mm}$; 24 months, $4.17\text{mm} \pm 1.86\text{mm}$ and $4.43\text{mm} \pm 1.78\text{mm}$, respectively.

The radiographic analysis showed that the marginal bone loss at 24 months after loading was $0.75\text{mm} \pm 1.12\text{mm}$ for the TL group and $0.70\text{mm} \pm 0.72\text{mm}$ for the BL group. No statistically significant differences could be observed between the groups at any time point.



LIMITATIONS

- Confounding factor: different positions of the implant platform in relation to the bone crest.
- Timing of implant placement after extraction was not specified.
- Two years of follow-up may be too short for possible relevant differences to be disclosed.



CONCLUSIONS

- In patients with a history of chronic periodontitis under strict supportive therapy, tissue-level and bone-level implants performed equally well, both clinically and radiographically.



IMPACT

- It is not clinically relevant whether patients with a history of chronic periodontitis are rehabilitated with bone-level implants with a platform switch or with tissue-level implants in terms of clinical and radiographic peri-implant parameters, at least over a period of 24 months.



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