

RAPORTEURS

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study

Implant mucosal tunnel may be critical modifier for peri-implant health

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Summarised from original article 'The depth of the implant mucosal tunnel modifies the development and resolution of experimental peri-implant mucositis: A case-control study' with kind permission from Wiley Online Library.

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BACKGROUND

Peri-implant mucositis is an inflammatory disease that affects the soft tissues surrounding osseointegrated dental implants, without causing loss of marginal bone. Peri-implant mucositis is considered to be the precursor of peri-implantitis, an inflammatory disease of the soft tissues surrounding osseointegrated dental implants that does include loss of marginal bone. It is believed that controlling peri-implant mucositis prevents peri-implantitis. Many studies demonstrate the relationship between plaque accumulation around implants and the onset of peri-implant mucositis. Adequate biofilm control and accessibility around the implant supra-structure for proper cleaning are key factors for the prevention and treatment of peri-implant diseases.

It has been shown that implants with supra-mucosal restoration margins have more positive results in treating peri-implant mucositis than implants with sub-mucosal restoration margins. However, implants are frequently placed more deeply into the soft tissues – with sub-mucosal restoration margins – to achieve better aesthetic results. It has been suggested that the distance from the implant-prosthesis interface to the soft-tissue margin – i.e. the depth of the so-called "mucosal tunnel" – is a possible modifier for prevention and treatment strategies for peri-implant diseases.

AIMS

The aim of this experimental case-control study was to investigate the effect of mucosal tunnel depth on the induction, development, and resolution of peri-implant mucositis.

MATERIALS AND METHODS

This was a prospective clinical study that included 19 subjects with at least one transmucosal healthy implant (Straumann, tissue-level) with a screw-retained restoration, who underwent an experimental peri-implant-mucositis protocol over an 84-day period. Implants having a mucosal tunnel depth of ≥ 3 mm (deep mucosal tunnel, DMT) were determined as the test group, while a mucosal tunnel depth of ≤ 1 mm (shallow mucosal tunnel, SMT) constituted the control group.

The two groups were assigned according to the depth of the mucosal tunnel based on clinical and radiographical evaluations. Intraoral radiographs were screened to identify reconstructions with the endosteal portion of the implant located apically to the marginal crest of bone in the neighbouring teeth. Clinically, the depth of the mucosal tunnel – the distance between the implant shoulder and the mucosal margin – was measured and confirmed after crown removal.

All subjects underwent a pre-experimental hygiene-optimisation period, followed by the preparation of individual acrylic stents placed onto the selected implants. Subjects were then instructed to maintain regular oral hygiene for 21 days with the stents in place to prevent access to the implant sites, thereby interrupting normal oral hygiene only at the experimental site. After this plaque-accumulation period, stents were removed and self-performed hygiene procedures were resumed for the next 21 days (first resolution phase), followed by professional cleaning and the removal of the crown. Instructions were then given to continue regular oral hygiene for an additional 14 days (second resolution phase, post-professional cleaning).

Measurements were made initially (-28 days), at baseline (day 0), and at the beginning of each week for the following 56 days. The results of modified plaque index (mPI), modified gingival index (mGI), and the IL-1 β level of peri-implant sulcus fluid were then evaluated.

results

- No differences in mPI between the groups during induction, first resolution, and the post-professional-cleaning phase were observed.
- No differences in mGI between the groups during induction were observed; however, there were significant differences during the first-resolution phase (self-performed oral hygiene), with a greater and faster resolution of inflammation in the SMT group. Resolution of inflammation in the DMT group was achieved only after crown removal and professional sub-mucosal tunnel cleaning.
- Although no differences between the groups were detected for mPI and mGI during the induction phase, there were higher IL-1 β concentrations in the DMT group at the end of the induction phase, indicating a more intense inflammatory reaction in the DMT group.
- A significant correlation was found between IL-1 β concentrations and mGI values.



LIMITATIONS

- The number of patients per group is not clearly reported.
- The distribution of periodontitis cases in the test and control groups is not reported.
- The thickness/volume of the peri-implant mucosa is not taken into account.
- The distance of the implant collar to the bone is not taken into account or reported.
- Implants included in the study were of one specific brand with a "tissue-level connection" and results may not be applicable for implants of other brands and/or implants with a "bone-level connection".



CONCLUSIONS

- The present data suggest that the depth of the mucosal tunnel is an important modifier of the treatment outcome of experimental peri-implant mucositis.
- The depth of the mucosal tunnel modifies the effects of preventive measures for peri-implantitis that require the complete control of peri-implant mucositis.
- Deep placement of implants, leading to deep mucosal tunnels, limits the effectiveness of self-performed oral hygiene and cleaning because accessibility deep below the soft-tissue margin is not possible.



IMPACT

- Self-performed oral hygiene can result in resolution of inflammation in peri-implant mucositis. However, deep placement of implants limits the effectiveness of self-performed oral hygiene.
- In cases with a deep mucosal tunnel, treatment of peri-implant mucositis requires removal of the prosthesis for effective submucosal cleaning.



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