

Summarised from *Journal of Clinical Periodontology* Volume 47, issue 3 (March 2020), 392-403

Editors: Phoebus Madianos & Andreas Stavropoulos, EFP scientific affairs committee

Rapporteurs:

Amina Basic, Cecilia Hansson, Anna Trullenque Eriksson, and Anna Ydenius Alian, with Ingemar Abrahamsson

Affiliation:

Postgraduate programme in periodontology, Sahlgrenska Academy at the University of Gothenburg, Sweden

study

Influence of prosthetic features on peri-implantitis

Authors:

Yuseung Yi, Ki Tae Koo, Frank Schwarz, Heithem Ben Amara, Seong Joo Heo

Background

Peri-implantitis is a plaque-associated pathological condition affecting the tissues around dental implants. It is characterised by inflammation in the peri-implant mucosa and progressive loss of supporting bone. Reported risk factors include poor oral hygiene, a history of periodontitis, and irregular supportive therapy.

It has been suggested that there may be an association between certain prosthetic features and peri-implantitis. It has been argued that a straight emergence profile or concave interproximal areas can facilitate oral-hygiene measures at fixed dental prostheses, while over-contoured restorations may interfere with the periodontal health of natural teeth. The same may be true for implant-supported prostheses.

In fact, suboptimal access for proper plaque control is a common finding in peri-implantitis cases. A prosthetic design with a small emergence angle and a straight or concave emergence profile may facilitate self-performed plaque control and thereby minimise the risk of marginal bone loss and peri-implantitis. It is therefore worth investigating the influence of various prosthetic features on the risk of marginal bone loss and peri-implantitis.

Aims

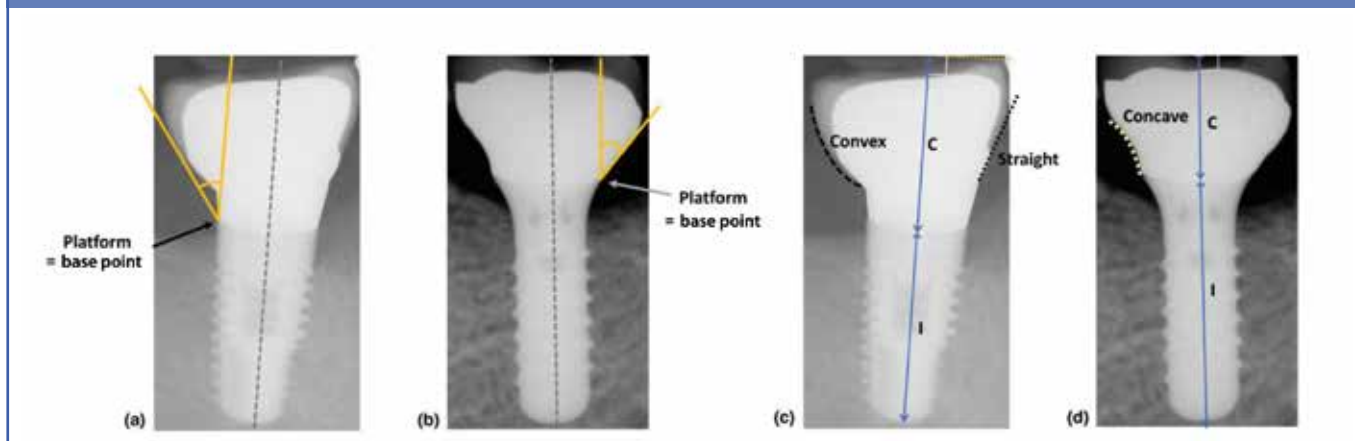
The objective of this study was to analyse the impact of various prosthetic features and other known risk factors on the prevalence of peri-implantitis by building a prediction model.

Materials & methods

- This is a cross-sectional study on patients who had received dental-implant restorations between March 2002 and February 2012 in a university clinic in Seoul, South Korea.
- Exclusion criteria included patients who had systemic diseases and conditions, who had irregular maintenance care or poor oral hygiene, who were smokers, or who had been treated previously for peri-implantitis.
- Implants from different manufacturers with various implant-connection types were included (bone-level external, bone-level internal, and tissue-level).
- Data was categorised according to the implant-connection type (bone-level external, bone-level internal, or tissue-level), emergence angle (above and below 30 degrees), emergence profile (concave, straight, or convex), implant location, implant diameter and length, history of periodontitis, bone augmentation, immediate or deferred implant placement, one- or two-stage protocol, screw- or cement-retained, implant position within the restoration (single, splinted mesial, splinted middle, splinted distal), and crown/implant ratio (see figure).
- The case definition for peri-implantitis was presence of bleeding on probing (BoP) and/or suppuration, increased probing depth, and bone loss > 0.5mm as measured on the radiographs one and five years after the insertion of the prosthesis.
- Marginal bone loss and the prosthetic features were measured on intra-oral radiographs obtained using the paralleling technique. Marginal bone loss, the emergence angle, and the emergence profile were assessed on the mesial and distal aspects.

Figure:

Example of the assessment of emergence angle, emergence profile, and crown/implant (C/I) ratio. (a) An example of the assessment of emergence angle in bone-level implant; (b) in tissue-level implant; (c) crown/implant (C/I) ratio in bone-level implant; (d) in tissue-level implant. C: the length of the crown includes the entire restoration above the implant platform; I: the length of the implant; dotted line: long axis of the implant.



Results

- The study included 169 patients with 349 dental implants.
- 173 of 349 implants were diagnosed with peri-implantitis.
- At tissue-level implants (6.3% of all implants), the effect of the analysed factors on marginal bone loss and the prevalence of peri-implantitis was not statistically significant.
- At bone-level implants, there was more marginal bone loss and peri-implantitis was found more frequently compared to tissue-level implants. Marginal bone loss and prevalence of peri-implantitis were higher with external types of connection, an emergence angle ≥ 30 degrees, and a convex emergence profile.
- The risk of marginal bone loss and peri-implantitis was higher for implants in a middle position in a bridge compared to other positions.
- The risk of peri-implantitis was highest when a combination of an emergence angle of ≥ 30 degrees, a convex emergence profile, and a splinted-middle position was present (OR 287).
- Other factors –such as a history of periodontitis, crown/implant ratio, and screw- or cement-retention of the prosthesis– all had an effect on marginal bone loss, but the effect was not statistically significant for the current presence of peri-implantitis.
- For the final prediction model, only emergence angle, emergence profile, and splinted position within the restoration had enough sensitivity and specificity to be included.

Limitations

- While 173 of 349 implants were affected by peri-implantitis, this is reported as a proportion of 24.8%. It is unclear what the unit of analysis is for this. It seems to be on site level (mesial or distal) rather than on implant or patient level.
- All data on peri-implantitis is provided at site level. It is unclear whether the statistical model compensates for this – e.g. factors that have an effect at site, implant, or patient levels.
- For some variables, the subgroups are rather small. For instance, only 22 implants are tissue-level, and only 26 implants are in a splinted middle position.
- Because of the study's cross-sectional design, changes in factors such as compliance and plaque control are unknown.

Conclusions & impact

- Over-contoured implant prostheses were proven to be associated with peri-implantitis.
- An emergence angle of ≥ 30 degrees, a convex emergence profile, and a middle position in a bridge were the identified factors associated with a higher risk of marginal bone loss and peri-implantitis.
- This study highlights the importance of prosthetic design for proper access for oral-hygiene measures to help in the prevention of peri-implantitis.



JCP Digest 75, published in July 2020, is a summary of the article 'Association of prosthetic features and peri-implantitis: A cross-sectional study'. J Clin Periodontol. 2020; 47 (3): 392-403. DOI: 10.1111/jcpe.13251



<https://www.onlinelibrary.wiley.com/doi/epdf/10.1111/jcpe.13251>



Access through EFP members' page log-in: <http://efp.org/members/jcp.php>