

Influence of Peri-implant Mucosal Tissue Thickness on Peri-implant Bone Stability: a 3–5 Year Retrospective Radiographic Study

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Introduction. The use of dental implants as a support for dental prostheses to replace missing teeth is a common treatment for tooth loss. Dental implant long-term success is reported to be between 90–98%. However, gradual bone loss around the implants is still an ongoing concern. Loading, prostheses design and implant design is implicated in this event. More recently peri-implant mucosa (PIM) is considered as a contributing factor.

Aim, Materials and Methods. The aim of the study was to analyse radiographically the effect of mucosal thickness on peri-implant bone changes.

This retrospective radiographic study evaluated marginal bone changes around dental implants in the maxillary premolar area. Patients were selected from “Adenta Dental Clinic” database based on the quality of pre-operative and post-operative radiographs (annual and three to five years). Peri-implant mucosal tissue thickness was measured before implant placement (BIPM) three times. Peri-implant bone levels were measured mesially and distally two times: one year after implant placement mesial (1st AIPBM) and one year after implant placement distal (1st AIPBD), and three to five years after implant placement bone mesially (2nd AIPBM) and three to five years after implant placement bone distally (2nd AIPBD). The differences in bone thickness between both examinations: difference mesial (DM) and difference distally (DD), and relationship between mucosal tissue thickness and peri-implant bone stability were evaluated in both groups (Group 1 = BIPM < 2.5 mm and Group 2 = BIPM ≥ 2.5 mm).

Results. Measurements were taken by three independent reviewers using the same protocol. A total of 450 measurements of BIPM and 150 measurements of AIPBM and AIPBD were taken in 50 patients (22 males, 28 females) with the average age of 57 years (range 36–81). Radiographs were divided into two groups: group 1 (61 measurements of AIPBM and AIPBD, 183 measurements of BIPM), with thin mucosa (BIPM < 2.5 mm) and group 2 (89 measurements of AIPBD and AIPBM, 267 measurements of BIPM), with thick mucosa (BIPM ≥ 2.5 mm). Mucosal thickness of group 1 was 1.88 ± 0.05 mm, and for group 2 it was 3.12 ± 0.06 mm ($p < 0.001$). There were no differences between groups in 1st and 2nd follow-up mesially and distally (Group 1_{1stAIPBM} = 0.82 ± 0.13 vs. Group 2_{1stAIPBM} = 0.65 ± 0.13 , $p = 0.168$; Group 1_{1stAIPBD} = -0.56 ± 0.15 vs. Group 2_{1stAIPBD} = 0.00 ± 0.09 , $p = 0.125$; Group 1_{2ndAIPBM} = -1.43 ± 0.16 vs. Group 2_{2ndAIPBM} = -1.35 ± 0.16 , $p = 0.230$; Group 1_{2ndAIPBD} = -1.44 ± 0.14 vs. Group 2_{2ndAIPBD} = -1.38 ± 0.16 , $p = 0.325$). There were no correlations with mucosal thickness and peri-implant bone changes Group 1 (DM, $r = -0.08$, $p = 0.53$; DD, $r = -0.26$, $p = 0.04$) and Group 2 (DM, $r = -0.20$, $p = 0.06$; DD, $r = -0.40$, $p = 0.71$) between bone difference (DM, DD) and mucosa thickness (BIPM).

Conclusion. Peri-implant mucosal tissue thickness does not seem to influence changes in coronal peri-implant bone loss.