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Factors Affecting Implant Failure and Marginal Bone Loss of Implants Placed by Post-Graduate Students: A 1-Year Prospective Cohort Study

Gian Maria Ragucci [1], Maria Giralt-Hernando [1], IreneMéndez-Manjón[1], Oriol Cantó-Navés [2] and Federico Hernández-Alfaro [1,3]

Abstract

Introduction: Most of the clinical documentation of implant success and survival published in the literature have been issued by either experienced teams from university settings involving strict patient selection criteria or from seasoned private practitioners.

In contrast, studies focusing on implants placed and rehabilitated by inexperienced post-graduate students are scarce.

Objective: The purpose of this prospective study was to evaluate the success, survival, and marginal bone loss of implants (C1, MIS) placed and rehabilitated by inexperienced post-graduate students without applying strict selection criteria. In addition, other variables were investigated and correlated to patient health, local site, and both the surgical and prosthetic protocols.

Material and Methods: Study participants were scheduled for implant therapy at the International University of Catalonia. An experienced mentor determined the treatment plan in accordance with the need of each participant who signed an informed consent.

All surgeries and prosthetic rehabilitation were performed by the post-graduate students. Implant failure rate, contributors to implant failure, and MBL were investigated among 24 variables related to patient health, local site, and implant and prosthetic characteristics.

At each time point, the distance from the implant shoulder to the first bone-implant contact was measured on the mesial and distal sites. The difference between baseline and the milestone served to calculate the MBL on each side. Subsequently, the mean value of the two measurements was calculated for each implant (Figure 1).

The risk of implant failure was analyzed with a simple binary logistic regression model with

generalized equation equations (GEE) models, obtaining unadjusted odds ratios (OR).

The relationship between MBL and the other independent variables was studied by simple linear regression estimated with GEE models and the Wald chi2 test.

Results: One hundred and thirty C1 implants have been placed and rehabilitated by post-graduate students. Five implants failed before loading and none after restoration delivery; survival and success rates were 96.15% and 94.62%, respectively. None of the investigated variables significantly affected the implant survival rate. At the one-year follow-up, the mean (SD) MBL was 0.53 (0.39) mm. The following independent variables significantly affected the MBL: Diabetes, implant depth placement. The width of keratinized tissue (KT) and probing depth (PD) above 3 mm were found to be good indicators of MBL, with each additional mm of probing depth resulting in 0.11 mm more MBL.

Conclusion: Within the limitations of this short-term cohort study, the following conclusions may be drawn:

1. The failure rate of C1 implants placed and rehabilitated by inexperienced students at the 1-year follow-up was low (3.6%) and comparable to the data obtained by experienced practitioners.

2. No contributing factors specific to the inexperience of the students could be identified regarding implant failure and MBL.

3. Several factors have been shown to affect MBL: diabetes, implant depth, PD, and KT.

In contrast, thickness of the gingiva and prosthetic abutment height were not found to be contributing factors.

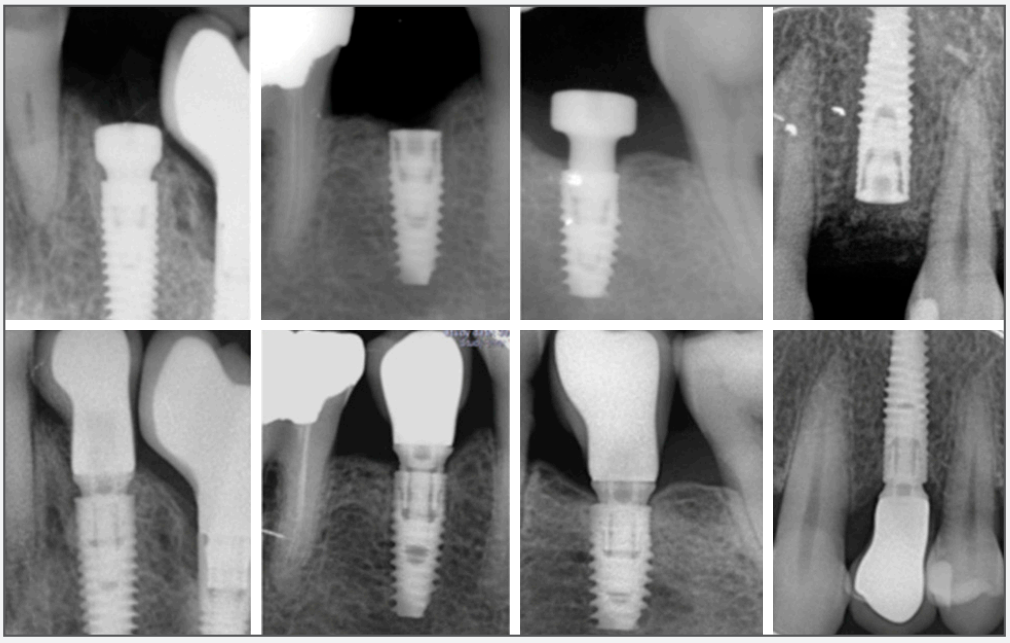

Fig1. Periapical radiographs with an intraoral dental film using a plastic index according to the parallel technique for marginal bone loss (MBL) analysis between baseline and 1 year follow-up.

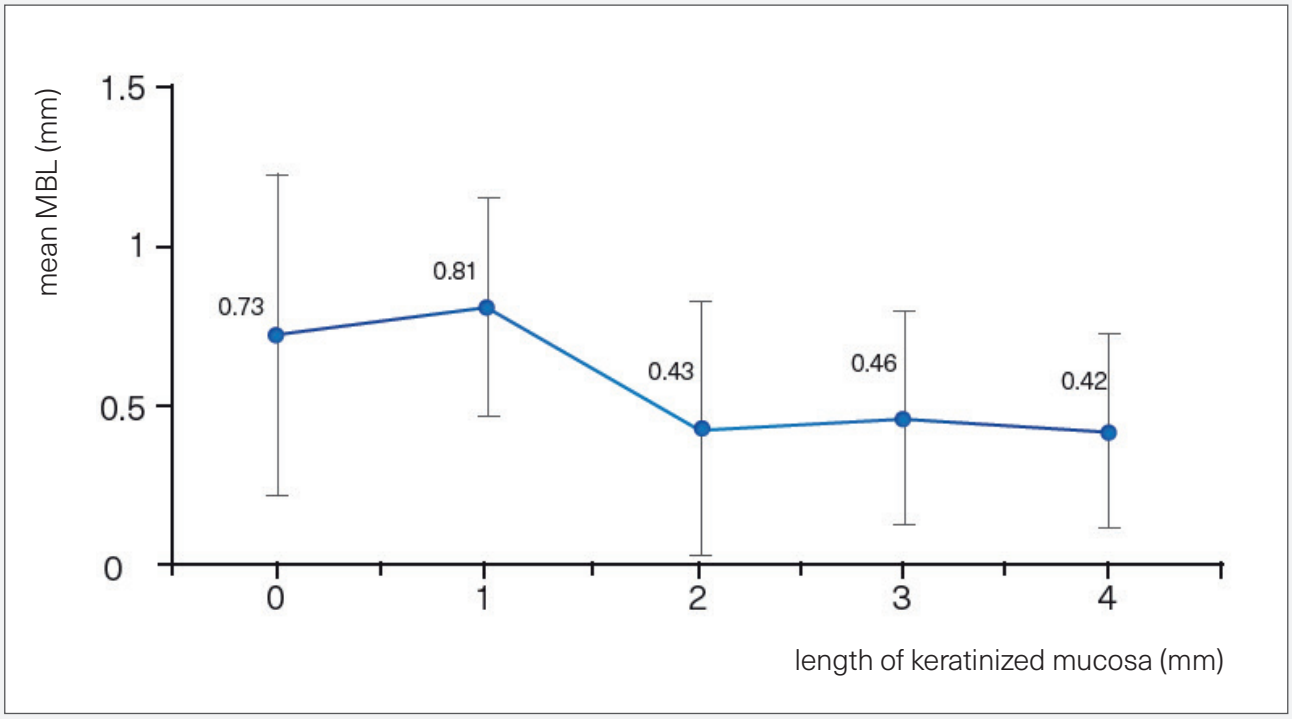

Fig2. MBL vs. measured keratinized tissue length.

Authors' affiliations

[1] Department of Oral and Maxillofacial Surgery, Universitat Internacional de Catalunya (UIC), 08017 Barcelona, Spain; mariagiralth@gmail.com (M.G.-H.); manjon. irene@gmail.com (I.M.-M.); h.alfaro@uic.es (F.H.-A.)

[2] Department of Restorative Dentistry, Universitat Internacional de Catalunya (UIC), 08017 Barcelona, Spain; oriolcanto@uic.es

[3] Institute of Maxillofacial Surgery, Teknon Medical Center, 08022 Barcelona, Spain.