



Article

Marginal Bone Maintenance and Different Prosthetic Emergence Angles: A 3-Year Retrospective Study

Diego Lops ¹, Eugenio Romeo ¹, Michele Stocchero ² , Antonino Palazzolo ¹, Barbara Manfredi ¹ and Luca Sbricoli ^{2,*}

¹ Department of Prosthodontics, Dental Clinic, School of Dentistry, University of Milan, 20142 Milan, Italy; diego.lops@unimi.it (D.L.); eugenio.romeo@unimi.it (E.R.); antonino.palazzolo@unimi.it (A.P.); barbara.manfredi@unimi.it (B.M.)

² Department of Neurosciences, School of Dentistry, University of Padova, 35128 Padova, Italy; stocchero.michele@gmail.com

* Correspondence: luca.sbricoli@unipd.it

Abstract: The aim of the present retrospective study was to assess marginal bone changes around implants restored with different prosthetic emergence profile angles. Patients were treated with implants supporting fixed dentures and were followed for 3 years. Marginal bone levels (MBL) measured at the prosthesis installation (t0) and at the 3-year follow-up visit (t1) were considered. The MBL change from t0 to t1 was investigated. Two groups were considered: Group 1 for restorations with an angle between implant axis and prosthetic emergence profile $>30^\circ$, and Group 2 for those with an angle $\leq 30^\circ$, respectively. Moreover, peri-implant soft tissue parameters, such as the modified bleeding index (MBI) and plaque index (PI) were assessed. Seventy-four patients were included in the analysis and a total of 312 implants were examined. The mean EA in groups 1 and 2 was 45 ± 4 and 22 ± 7 degrees, respectively. The mean marginal bone level change (MBL change) of 0.06 ± 0.09 mm and 0.06 ± 0.10 mm were, respectively, in groups 1 and 2. The difference in the MBL change between the two groups was not statistically significant ($p = 0.969$). The MBL change does not seem to be influenced by the emergence angle for implants with a stable internal conical connection and platform-switching of the abutment diameter.

Keywords: dental implant; bone level; prospective study; sub-crestal placement; emergence profile



Citation: Lops, D.; Romeo, E.; Stocchero, M.; Palazzolo, A.; Manfredi, B.; Sbricoli, L. Marginal Bone Maintenance and Different Prosthetic Emergence Angles: A 3-Year Retrospective Study. *J. Clin. Med.* **2022**, *11*, 2014. <https://doi.org/10.3390/jcm11072014>

Academic Editors: Bruno Chrcanovic and Mark A. Reynolds

Received: 10 February 2022

Accepted: 1 April 2022

Published: 4 April 2022

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Dental implants osseointegration is actually a well-established issue, due to improved surface characteristics. One of the modern implant therapy goals is to optimize esthetics, with a natural implant-supported restoration integration, especially regarding the peri-implant soft tissues. The correct interproximal papilla shape, the scalloping of the gingival margin and the thickness of the vestibular soft tissue are recognized as fundamental for esthetics. Even more important is the achievement of adequate cleansing procedures, in order to prevent any peri-implant soft tissues inflammation that may lead to a marginal bone level change. In fact, in the seventh *European Workshop on Periodontology*, different clinical parameters were recommended as items to evaluate the health status of the peri-implant tissue [1]: plaque accumulation, presence of bleeding on probing, probing depth and bone resorption, respectively.

The discrepancy between the implant diameter and the shape of the final prosthetic restoration requires compensation. According to *The Glossary of the Prosthodontic Terms*, 9th edition [2], the emergence angle (EA) is the angle between the average tangent of the transitional contour relative to the long axis of a tooth, dental implant or dental implant abutment.

Many studies have shown that over-contoured restorations may have an influence on gingival inflammation and plaque retention [3]. Excessive crown contour acts as a