



EVALUATION OF THE AESTHETIC OUTCOME OF IMPLANT SINGLE-UNIT RESTORATIONS WITH TITANIUM AND ZIRCONIA ABUTMENTS USING AESTHETIC INDEXES – A PILOT STUDY

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INTRODUCTION

Implant single-unit restorations are considered a valid treatment option, due to its highly predictable results in terms of osseointegration (1-9). However, its aesthetic integration frequently constitutes a challenge. For many years in scientific research, the aesthetic outcome was poorly documented and not included in the success criteria of implant restorations (11). In order to evaluate the aesthetic result, well-defined objective parameters are required, concerning the peri-implant mucosa and the crown, that will operate as a quality regulator of the surgical and prosthetic procedures that led to the current aesthetic outcome, as well as a method to identify long-term changes (1,12,13). Titanium is usually used as abutment material, due to its excellent stability and biological integration (5). Nonetheless, it is associated to a greyish shimmering of the peri-implant mucosa, which jeopardizes the aesthetic outcome, especially in cases with thin biotype (5,10). The use of zirconia abutments has become more popular in recent years, particularly in regions of high aesthetic demand, as they combine high strength, biocompatibility and, due to its white colour, aesthetics (10). The aim of this pilot study was to compare the aesthetic outcome of patients receiving one single-unit implant restoration in the aesthetic zone with titanium and zirconia abutments, by means of three aesthetic indexes (PES/WES, ICAI and CIS), in order to understand if the information obtained with which of them is equivalent, as well as which of the abutment materials has the best aesthetic outcome

MATERIAL AND METHODS

The list of patients who received dental implants in the Dental Clinic of the Faculty of Medicine of the University of Coimbra (FMUC), between 2005 and 2012, was reviewed and those who fulfilled the following eligible criteria were asked to participate: one single-unit implant restoration in the aesthetic zone (14-24) *in situ*, with titanium and zirconia abutments and natural adjacent and contralateral teeth. All patients (n=16) were submitted to a control visit, in order to take photographs, collect a radiograph, fulfil a clinical analysis and lastly, impressions. The clinical analysis, performed by one of the investigators, consisted of filling in two documents, one for the evaluation of clinical criteria, such as lip line (no exposure of papillae, exposure of papillae, full exposure of mucosa margin), gingival biotype (thick, medium-thick, thin), probing depth and bleeding on probing, and the other for the assessment of the aesthetic outcome with the indexes mentioned and presented in Tables 1,2,and 3, accordingly with the parameters and criteria proposed by their authors.

The statistical analysis was performed with a statistical software package (SPSS 21; IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp;). The correlation between indexes was calculated by the use of the Cohen's k and the internal consistency of the indexes was analysed by the Cronbach's α . SPSS Amos (Arbuckle, J. L. (2006).

Table 1 - Pink and White Esthetic Score (PES/WES) grid with categories: Mesial Papilla, Distal Papilla, Curvature of the Facial Mucosa, Level of the Facial Mucosa, Root Convexity/ Soft Tissue Colour and Texture, Crown Form, Crown Volume, Crown Colour, Surface Characterization, Translucency.

Table 2 - Implant Crown Aesthetic Index (ICAI) grid with categories: Mesiodistal dimension of the crown, Position of the incisal edge, Labial convexity of the crown, Vestibular contour of the mucosa, Colour and translucency of the crown, Texture of the crown, Position of the vestibular margin of the mucosa, Position of the mucosa in the proximal spaces, Colour and texture of the mucosa.

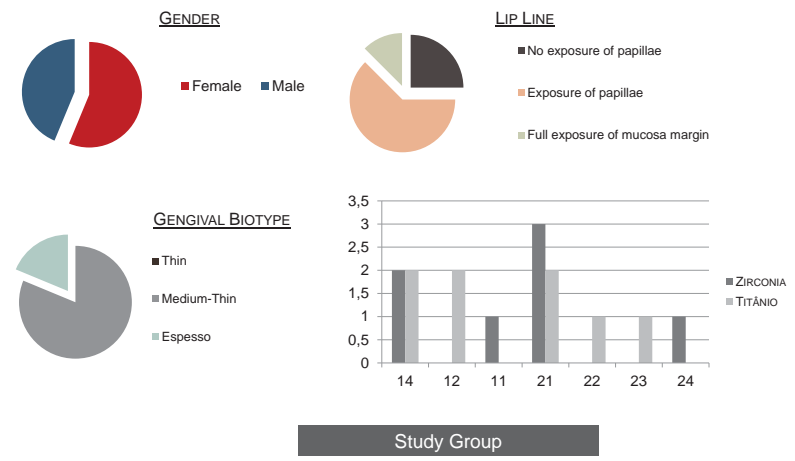
Table 3 - Copenhagen Index Score (CIS) grid with categories: Crown morphology, Crown colour match, Symmetry/Harmony, Mucosal discoloration, Mesial papilla, Distal papilla.

Table 1 - Pink and White Esthetic Score (PES/WES)

Table 2 - Implant Crown Aesthetic Index (ICAI)

Table 3 - Copenhagen Index Score (CIS)

RESULTS



Visual comparison of aesthetic outcomes with PES/WES, ICAI, and CIS scores. Includes VAS (Visual Analogue Scale) for gingiva and crown, and treatment recommendation questions.

Mean result for each index, according to the evaluation of external observers. Subjective evaluation of the patient, regarding his/her satisfaction towards the aspect of the gingiva and crown, by means of a VAS scale.

Correlation between PES/WES e ICAI, upon the evaluation aesthetic vs. unaesthetic. Agreement: 178, Disagreement: 171 (in 170 of them, the ICAI evaluates as unaesthetic). K=0.13

Internal consistency of each index (alpha de Cronbach). PES/WES: 0.85, ICAI: 0.81, CIS: 0.7

Aesthetic outcome: Zirconia abutment vs. Titanium abutment. Comparison table for PES/WES, ICAI, and CIS across aesthetic and unaesthetic outcomes for both abutment types.

DISCUSSION AND CONCLUSION

Dental implant treatments have become a routine procedure, mostly due to its high rates of survival and success. However, despite their significance, they are not the only aspects to consider in a successful rehabilitation. (9,16). The aesthetic success, as well as the functional, must be taken as primary goals in the rehabilitations, especially when we take into consideration implants positioned in the maxillary aesthetic zone. Within the context of this study, the PES/WES has the higher value of internal consistency, which means that it is the most reproducible. This characteristic is supported by the literature (17). However, it lacks aspects related to overall aesthetics, such as the evaluation of lip line and considerations regarding smile and facial harmony. The answer to the question "Can we compare the outcomes obtained with different indexes?" appears to be negative, as the correlation between them is not strong. Therefore, we can state that it is a mistake to compare restorations, as well as the protocols and procedures associated, when different indexes are involved. As so, it is of paramount importance to establish an agreement for the evaluation of the aesthetic parameters. Only then, this comparison can exist. According to the information collected for this pilot study, the cases with zirconia abutments were considered to have a better aesthetic outcome, when compared to those with titanium abutments.

CLINICAL IMPLICATIONS

Within the limitations of this pilot study, zirconia abutments have a better aesthetic outcome, so they may be used with advantage in regions with high aesthetic demand. However, more studies are necessary.

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