Switching platform on esthetic area: Case report

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Abstract

The cervical bone remodeling around implants with conventional platform, known as saucerization, may compromise the maintenance of peri-implant hard and soft tissues, leading to esthetic impairments such as recessions and/or loss of papillae. The concept of platform switching with an inner placement of the implant-abutment junction, increasing the distance between bone and prosthetic platform, seems to minimize and/or block this bone resorption. The present paper has the purpose of presenting a clinical case report of previous esthetic rehabilitation using a platform switching implant associated to peri-implant plastic resources and peri-implants prosthesis that would maximize the final result. The clinical and radiographic results show preservation of proximal bone crest and papillae, maintenance of the soft tissue thickness and appropriate final esthetic result. Choosing implants with these characteristics of platform switching may be favorable in esthetic areas.

Keywords: Implants. Tooth structure. Prosthesis. Supporting tooth. Bone resorption.

How to cite this article: Clavijo VB, Pinto FR, Ramos GG, Ciotti DL, Buso L. Switching platform on esthetic area: case report. Dental Press Implantol. 2012 Oct-Dec;6(4):93-103.

» The authors report no commercial, proprietary or financial interest in the products or companies described in this article.

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Submitted: April 28, 2012
Revised and accepted: August 17, 2012

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Introduction

The implants with conventional platform, where the diameter of the implant is the same as of the prosthetic platform, were widely used in dentistry. Unfortunately it was found a cervical bone remodeling around these implants, between 1.5 and 2 mm vertically and 1.3 and 1.4 mm horizontally, on the first year of exposition to oral environment, placement of healer or abutment. This remodeling received the name of saucerization.[7,11,14,16,17] Many studies were done to find out how this saucerization occurs and if these factors could be present at the same time. Among them it is found the establishment of the peri-implant biological space,[6,14,15] stress forces generated by the abutment movimentation[6,11,15] establishment of the inflammatory infiltrate, bacterial colonization of the microgap existing on the implant-abutment junction[6,14] and the bacterial colonization of the peri-implant sulcus.[6]

A new concept or approach on the placement of prosthetic platform in relation to the implant trying to overcome these problems appeared and became known as Platform Switching. It uses the horizontal displacement of the bone abutment-implant junction through the use of abutments with smaller diameter than the implant diameter,[9,11,13,16,17] occurring the separation of the cervical bone in relation to the inflammatory infiltrate and microgap of contamination of the implant-abutment junction. There is great discussion about which are the necessary parameters to obtain good peri-implant esthetics, either in cases of unitary or adjacent implants. The correct placement and the presence of enough volumes of hard and soft tissues must allow the stability of soft tissues in harmony for a long time, so that there is presence of interproximal papilla and maintenance of the stable gingival magin,[17] ensuring the harmony of peri-implant tissues in relation to natural adjacent teeth, besides an adequate rehabilitation observing the anatomic aspects of adjacent teeth as for shape, texture, contour, position, color and also characteristics of the gingival architecture.[2]

The objective of this paper is to report a clinical case in which it was used an implant with platform switching approach and cone morse prosthetic connection in anterior superior esthetic region.

Clinical case report

Female patient sought the Specialization Course in Implantology of APCD/Piracicaba complaining about fracture and loss of tooth #11, extracted about 3 weeks before (Figs 1 and 2). During anamnesis it was not found any type of history of preexisting systemic disease, the patient was non-smoking and had an adequate plaque control.

Figure 1 - Initial photograph of the patient smiling.

Figure 2 - Frontal photograph of the patient in occlusion.

The clinical examination suggested that the ridge presented enough thickness for the installation of an implant of reduced diameter and that the periodontal biotype was intermediate with a slight depression on the buccal face of the ridge (Figs 3 and 4). Through panoramic and periapical radiographic exam it was found that even with slight bone remodeling in height and little loss of proximal bone crests, there was enough mesiodistal and cervico-occlusal space for installation of an implant in an early approach (Fig 5).

The surgery for implant installation was performed under local infiltrative anesthesia (lidocaine with epinephrine 1:100000). A supra-crystal incision slightly turned to palatine and intrasulcular extensions on the proximal and buccal faces of the adjacent teeth were performed, followed by total detachment of the buccal fold until all the bone wall could be seen. It was verified that the alveolus was partially healed. Then, it was installed an implant Ankylos® with 3.5 mm in diameter and 9.5 mm in height. It was placed 3 mm apical in relation to the cementoenamel junction of adjacent teeth (Figs 6, 7 and 8).

A graft of palatal conjunctive tissue was removed and stabilized under the buccal fold through simple sutures (Fig 9). Even with good stability, the cervical screws of the implant on buccal face were exposed after milling, needing guided bone regeneration using Bio-Oss and a collagen membrane over the biomaterial (Fig 10). The implant was immersed and the fold was replaced and sutured with simple sutures (Fig 11).

Figure 3 - Absence of the proximal papillae.

Figure 4 - Occlusal view, tissue depression in thickness.

Figure 5 - Initial radiograph.

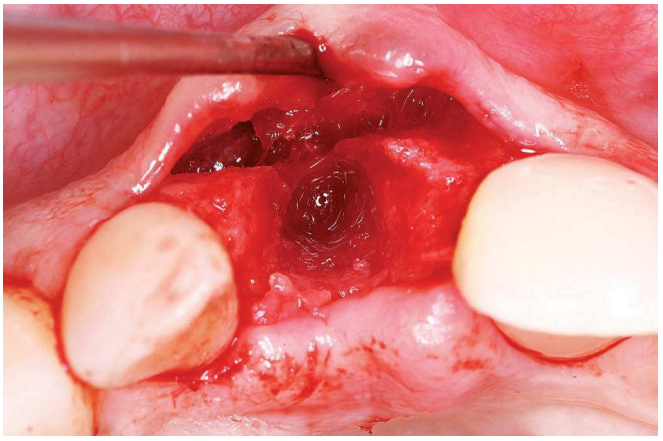

Figure 6 - Inspection of the ridge after lifting of the fold.

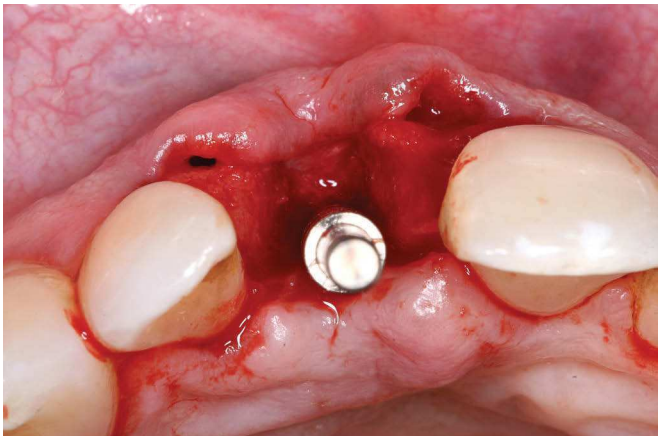

Figure 7 - Parallel pin in position.

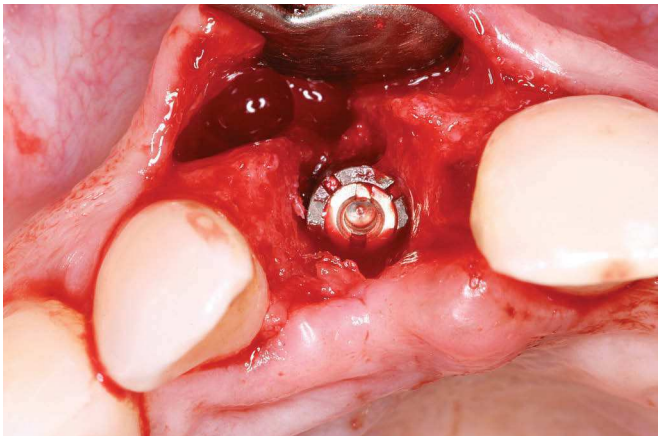

Figure 8 - Implant already installed and buccal bone dehiscence.

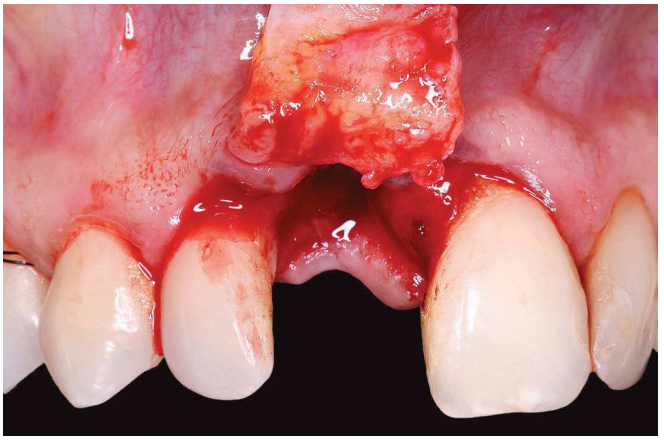

Figure 9 - Test of the placement of subepithelial graft.

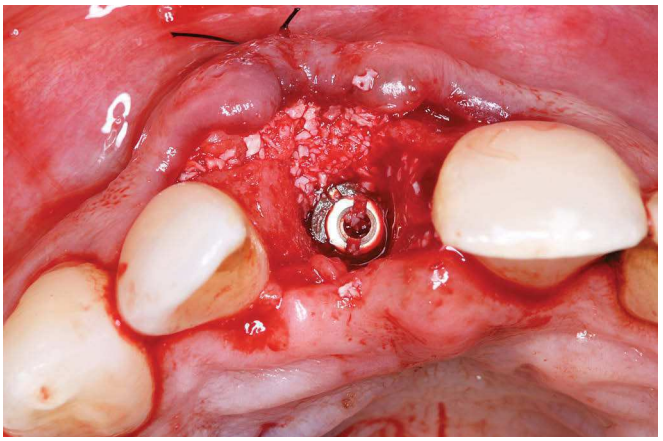

Figure 10 - Placement of Bio-Oss on the buccal bone dehiscence.

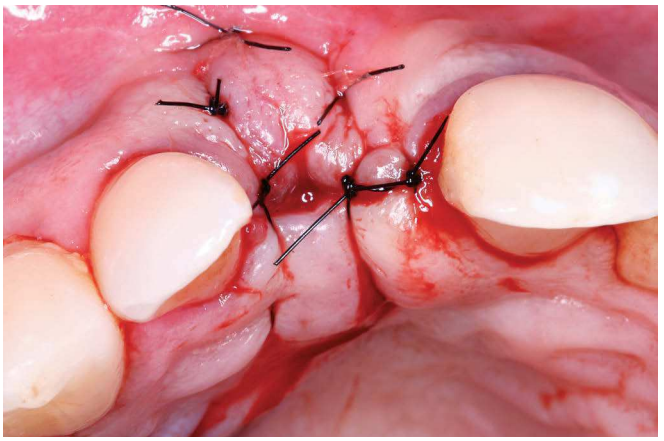

Figure 11 - Replacement of the fold and sutures.

Four months after implantation, it was done the reopening of the implant with a discrete semilunar excision, without touching the proximal faces of adjacent teeth. On the same session it was captured, right in the mouth, the temporary abutment of 3 mm in height, for beginning of tissue conditioning through temporary crown (Figs 12 to 15). Two months after the temporization it was done the personalized transfer of the emergency profile and of the tissue conditioning obtained with the temporary (Figs 16 to 21). Thus, a zirconia abutment Balance Ankylos® was prepared in laboratory and tested in mouth with the aid of a placement guide made in red acrylic resin that guaranteed the reproduction of its exact position (Figs 22 and 23).

Figure 12 - Tissue condition before the reopening.

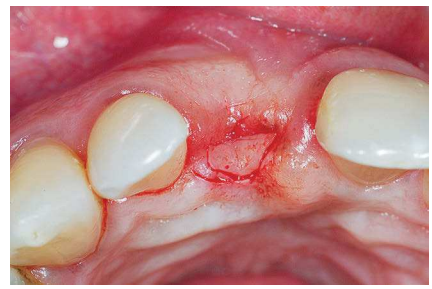

Figure 13 - Semilunar supra-crystal incision.

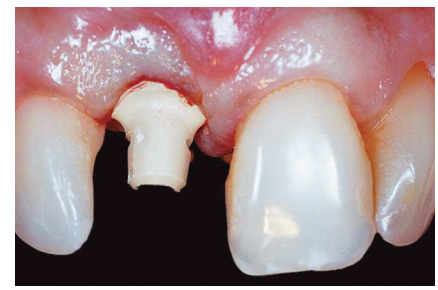

Figure 14 - Test and adjustment of temporary pillar.

Figure 15 - Temporary crown installed.

Figure 16 - Tissue conditioning obtained after 2 months.

Figure 17 - Emergency profile obtained with the temporary.

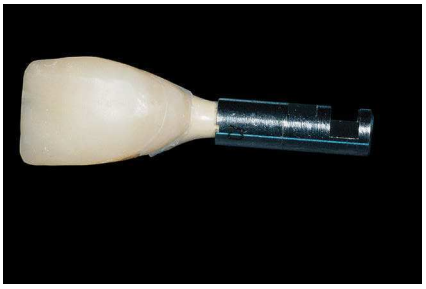

Figure 18 - Temporary crown joint to analogous.

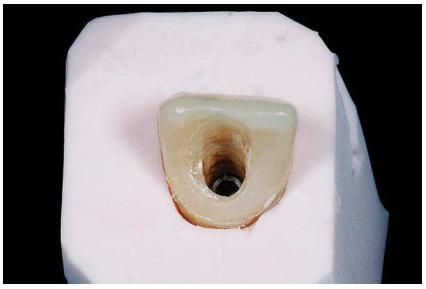

Figure 19 - Casting of emergency profile of temporary crown.

Figure 20 - Personalized transfer and temporary crown joint to temporary pillar.

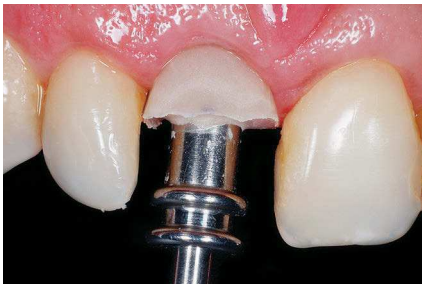

Figure 21 - Transfer personalized in mouth at the moment of transfer of implant.

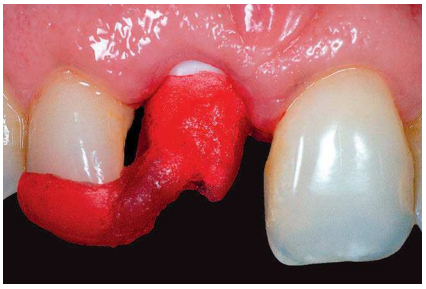

Figure 22 - Test of the zirconia pillar with assistance of a guide in acrylic resin.

Figure 23 - Zirconia pillar, ceramic coping and acrylic resin guide.

The test and adjustment of the crown were performed followed by its installation (Figs 24 and 25). Clinically it was possible to observe the presence of proximal papillae, good thickness of buccal peri-implant mucosa, absence of recession of mucosa and good integration of the prosthesis with the peri-implant tissues (Figs 26 to 29). The final periapical radiograph showed good adaptation of the crown and of the abutment and permanence of bone above the shoulder of the implant preserving the proximal bone crests (Fig 30). The maintenance of clinical and radiographic results can be observed one year after finalization of the case with acceptable maintenance of esthetic with good integration to peri-implant tissues and maintenance of interproximal bone levels (Figs 31 to 33).

Figure 24 - Test and adjustment of ceramic crown.

Figure 25 - Installation of ceramic crown.

Figure 26 - Good integration of the crown with adjacent teeth.

Figure 27 - Occlusal view of the installed ceramic crown.

Figure 28 - Right side view.

Figure 29 - Left side view.

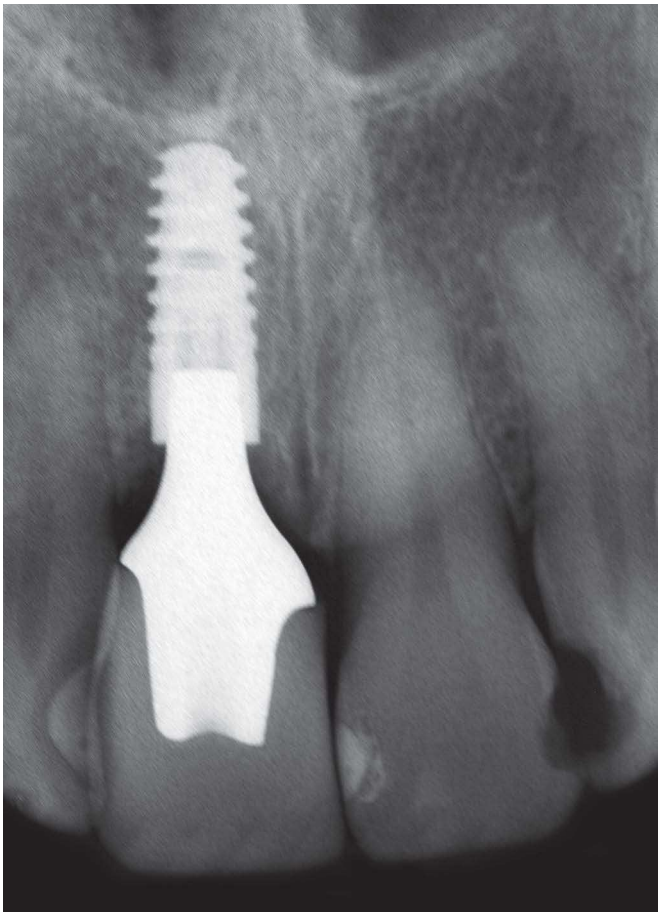

Figure 30 - Radiograph taken after installation of the ceramic crown.

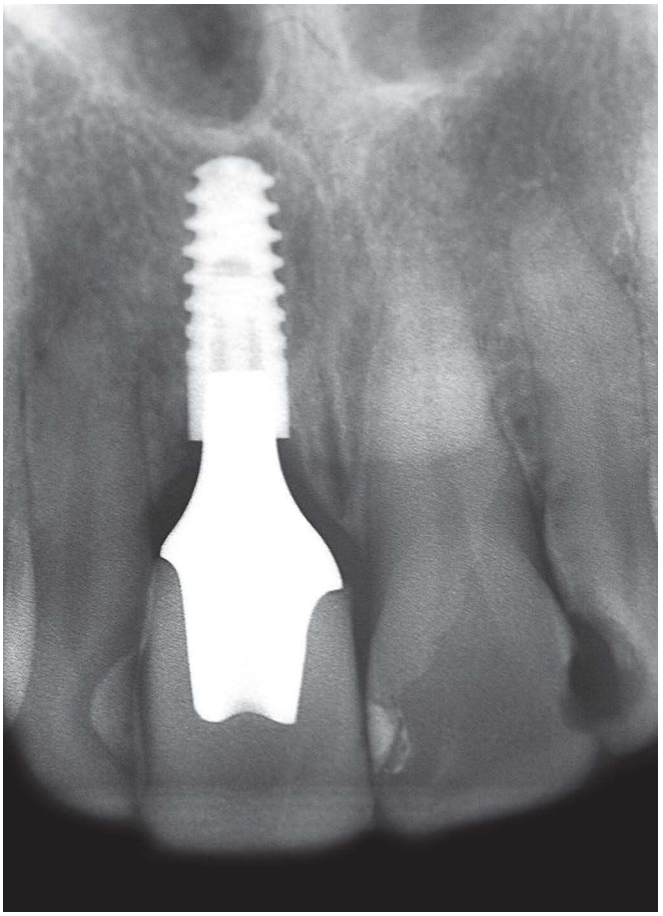

Figure 31 - Observation of 1 year after installation of ceramic crown.

Figure 32 - Observation radiograph of 1 year after prosthetic finalization.

Figure 33 - Final photo of the patient smiling.

Discussion

The clinical case presented in esthetic region had a ridge with alveolus in stage of early remodeling, with slight buccal depression, but that appeared to have enough thickness for installation of an implant with reduced diameter. The periodontal biotype was from intermediate to thin, and radiographically there was a slight remodeling of bone and proximal bone crest. The main objectives were adequate esthetic solution and satisfaction of the patient. For such, the necessity of using a graft of conjunctive tissue to increase the tissue thickness and, of guided bone regeneration to rebuild and keep the soft and hard tissues stable for a long time, besides the criteria for choice of platform pattern and prosthetic connection of the used implant.

The implants of conventional platform, where the diameter of implant is the same as of the prosthetic platform or abutment, were and still are widely used in Dentistry. Unfortunately it was found that it occurs a cervical bone remodeling around these implants, between 1,5 mm and 2 mm vertically and between 1,3 and 1,4 mm horizontally, on the first year where there is exposition to the oral environment- placement of healer or abutment. This remodeling received the name of saucerization.[7,11,14,16,17] Countless attempts to explain the causes and how the saucerization occurs were done: establishment of peri-implant biological space,[6,14,15] stress forces generated by the abutment movimentation,[6,11,15] establishment of the inflammatory infiltrate and of the peri-implant conjunctive tissue,[1,6,7,9] bacterial colonization of the microgap[6,14] and bacterial colonization of the peri-implant sulcus.[6]

On the attempt to solve this problem, a new approach on the placement of the implant platform in relation to the implant emerged, known as platform switching. In it there is the horizontal displacement of the implant-abutment connection in relation to the bone through the use of abutment of smaller diameter than the diameter of the implant.[9,11,13,16,17] It occurs the separation of the cervical bone in relation to the inflammatory infiltrate and microgap of contamination of the implant-abutment connection. Georg-Hubertus Nentwig[13] and Walter Moser developed the first system of implants that uses this approach, Ankylos by Dentsply, in 1985. In 1987 this system began to be clinically used. Richard J. Lazzara was one of the first to mention the existence of this concept and his study is widely mentioned in literature.[11] His clinical case report described radiographic observations done within 13 years, when it were used healers and abutments of smaller diameters than of the conventional platform of implants, in 2 hexagonal implants by Implant Innovations (3i), where the prosthetic components available on the market, in 1991, had smaller diameter than the diameter of implants. It was analyzed that in case of horizontal alteration on the placement of the implant margin and its platform, the installation of abutments seemed to reduce or eliminate the remodeling of the vertical bone crest common on the use of conventional platform.

The inner replacement of the implant-abutment junction of the implant shoulder and of the adjacent bone would reduce the bone resorption or remodeling for keeping the inflammatory infiltrate in an area of exposition smaller than 90°, different from the 180° observed in implants of conventional platform.[10,11] Another consequence observed was the increase on the area of surface for settlement of implant, with exposition of its surface, having more space for conjunctive insertion to insert and less necessity of bone crest resorption to occur this insertion.[11]

The clinical results (of bleeding absence or peri-implant inflammation and maintenance of soft tissues and papillae) and radiographic results (with the reduction or elimination of remodeling of the vertical bone crest) obtained in mentioned studies, gave support to choose an

implant with the pattern or approach of platform switching on the performance of this clinical case instead of the conventional platform. It were mentioned[4,9,12,16] the following recommendations for the use of the concept platform switching: Esthetic area, where it is necessary the preservation of hard tissues and consequently soft tissues, and region where there has been certain bone remodeling, after exodontia and when the ridge already is limited or atrophic. All these characteristics were present in this reported clinical case.

The implant selected for solution of the presented clinical case was the Ankylos® by Dentsply, which has surface treatment and platform switching approach with cone morse prosthetic connection. It was obtained a good prosthetic emergency profile on the clinical case because it was done the installation of the infraosseous implant and for the tissue conditioning done with the use of temporary prosthesis, since it was possible the permanence of a collar around the interface implant-cervical bone.[13] The best performance of cone morse implants when submitted to stress, in relation to other patterns of prosthetic connection, minimizing the risks of overloading the cervical, allows the installation of the infraosseous implant.[1]

At the moment of installation of the implant it was performed periapical radiograph, where it was verified a good adaptation of the crown and abutment and permanence of bone above the shoulder of the implant preserving the proximal bone crests. Clinically, there was formation of proximal papillae, good thickness of buccal peri-implant mucosa, absence of recession of mucosa and good integration of the prosthesis with the peri-implant tissues. The obtained results are similar to the presented in most studies in literature with implants of platform switching approach and/or cone morse connection.[1,2,4-7,9-17]

More studies are necessary to prove which are the physical and/or biological events resulting from change on the placement of the implant platform associated to cone morse connection. Also, lack studies that show the maintenance of stable soft and hard tissues over time in case of unitary and multiple adjacent implants in these approaches.

Conclusion

It is concluded that the use of implants with platform switching concept associated to cone morse prosthetic connection may help to prevent or minimize the peri-implant bone loss and consequently alterations on adjacent soft tissues, associated to the correct surgical and prosthetic planning ensuring an excellent functional and esthetic stability of the result.

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