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The Challenge of Dental Implant Replacement in The Aesthetic Area: Case Report

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1. Summary

The search for optimization of surgical techniques, the advancement of computed tomography and the consolidation of prototyping techniques culminated in the development of a new philosophy of rehabilitation with implants: guided surgery. This work proposed to show a case report, describing the sequence in the replacement of a dental implant, assisted by guided surgery and how it offers more safety and predictability in borderline cases. The articles for this research were selected through the virtual databases, Pubmed, Scielo and BVS with publications between 2006 and 2024. These studies prove that the guided surgical technique offers several advantages described throughout the work.

2. Introduction

The term guided surgery is defined by the use of a surgical guide, which enables the installation of an implant. whose position was virtually planned using software that combines data from a CT scan and an intraoral scan. Based on this planning, the guide itself, after being digitally designed, is printed in resin, using a 3D printer [1].Guided surgery has been used more frequently to minimize complications during implant installation, especially in borderline cases where there is little bone availability [2-4]. Good positioning of the implant in relation to the hard and soft tissues favors Long-term peri-implant health [5].Even using guided surgery, in many cases, there is a need to perform bone augmentation. The use of regenerative techniques and biomaterials has been widely studied in recent years 15. For the regeneration of the vestibular bone plate, the use of biomaterial associated with a properly stabilized collagen membrane is proposed 20. In this way, by excluding soft tissue and epithelial cells, bone formation occurs through the osteoconduction process 21. When implants present good primary stability at the time of their installation, there is the possibility of installing an immediate provisional implant. This procedure, when well indicated and executed, adds more aesthetic predictability to the case, since the peri-implant tissues remain stable over time 19.Given the above, the objective of this work is to report a case of replacement of a dental implant with a new implant through guided surgery technique , associated with bone reconstruction and prosthetic rehabilitation .

3. Clinical Case

Female patient, 27 years old, sought dental treatment to change the crown on implant, as it was fractured Figure 1. During the clinical evaluation and removal of this crown, it was noted that the implant platform was damaged Figure 2, justifying its replacementKeywords : Dental Implants , Guided Surgery, Bone Regeneration , Soft Tissue Manipulation.

Figure 3. On radiographic examination, slight bone loss was noted in the interproximal region. Figure 3. Due to the limited bone availability Figure 4, the removal of this implant and installation of another using the guided surgery technique were planned, for greater predictability of its positioning.Initially, it was proposed to remove the implant without opening a flap. Figure5, so that there would be less remodeling of the peri-implant tissues. However , during the attempt to remove the implant, it fractured in its cervical third Figure 6, which generated the need to open a flap, with the aim of improving the visibility of the operative field and removing the remainder of the implant. Relaxing incisions were made to preserve the papillae Figure 7, so that there would be minimal aesthetic damage to the healing process .After removing the remainder of the implant, the surgical guide was adapted Figure 7, and then, the 2.9x14 mm implant (Neodent - Narrow GM Acqua) was installed with 20 N.cm lockingFigure 8. Given the bone defect resulting from the removal of the implant , guided bone regeneration was performed. using biomatrial of xenogeneic origin (Straumann Erabone 0.5 cc) and collagen membrane (Straumann Jason 20x30mm) Figure 9. The ROG was stabilized using absorbable sutures. To support and condition the soft tissues, a provisional crown was screwed onto the installed implant Figure10.After 4 months the patient returned for molding and installation of the final prosthesis Figure 11, which was carried out on a tibase component Figure 12, with zirconia infrastructure and a lithium disilicate crown over it Figure 13.

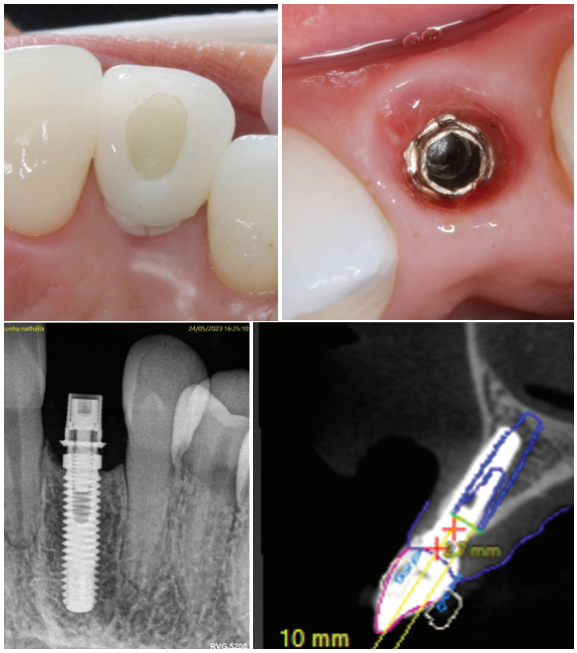

Figure 1,2,3,4: During the clinical evaluation and removal of thiscrown, it was noted that the implant platform was damagedjustifying its replacement.

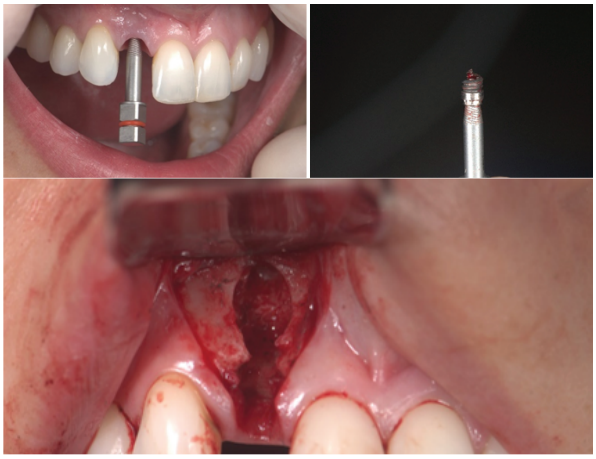

Figure 5&6: which generated the need to open a flap, with the aim of improving the visibility of the operative field and removing the remainder of the implant.

Figure 7,8,9,10: Given the bone defect resulting from the removal of the implant, guided bone regeneration was performed. using biomatrial of xenogeneic origin (Straumann Erabone 0.5 cc) and collagen membrane (Straumann Jason 20x30mm).

Figure 11,12,13: After 4 monthsthe patient returned for molding and installation of the final prosthesis, which wascarried out on a ti-base componentwith zirconia infrastructure and a lithiumdisilicate crown over it.

4. Discussion

In the described report, the guided surgery technique was used due to the small bone availability , enabling the optimization of the implant position in a three-dimensional way in the bone tissue , also guided by the future position of the prosthesis [1-4]. Regarding implant survival rates , guided surgery does not present differences when compared with conventional protocols. However, biological and technical complications during the intraoperative implant installation are greater in conventional protocols compared with guided surgery [5-7].Furthermore, the technique that uses guided surgery can help to reduce postoperative discomfort, when it does not require the opening of a flap. 4 In the case presented, due to the incident during removal (implant fracture), it was necessary to open a modified total flap, with the aim of preserving the papillae, since flaps that preserve the papilla have a much lower degree of contraction compared to those that include it in the incision design [10,11].The indication for implant replacement was due to the fact that there was deformation in the implant platform, caused by direct contact between the zirconia and the implant platform, due to the fact that the degree of hardness of the zirconia is greater than that of the titanium of the implant. This difference can lead to plastic deformation of the hexagon of the connection [22]. Prosthetic phase, the choice of zirconia infrastructure is justified because this material has demonstrated several favorable biological properties in comparison to titanium abutments [16]. Zirconia abutments show a decrease in bleeding on probing over time and less plaque accumulation than titanium abutments. This can be attributed to their surface properties, resulting in less bacterial colonization and reduced inflammation and better soft tissue integration [17]. This is possible due to the adhesion and proliferation of fibroblasts resulting in better sealing of the peri - implant mucosa, promoting greater soft tissue stability over time [18].

5. Conclusion

Guided surgery provides greater safety and predictability in the three-dimensional positioning of implants, especially in borderline cases. In addition, tissue reconstruction allows maintenance of the vestibular contour and, combined with provisional restoration, pink esthetics was successfully achieved in this case report.

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