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Implant-Guided Surgery and its Role in the Correct Choice of Prosthetic Work

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Abstract

Background: Dental implants are now considered a predictable treatment option for tooth replacement. And before the surgical procedure, one should always think about the prosthetic part behind it. And to make this easier and more secure, surgical guides step in.

The aim of this study was to evaluate the accuracy of guided surgery planning and its role in helping us to choose the right prosthodontic system. In many cases, different factors contribute in making us choose the type of prosthetic component. In cases of cemented prosthetic selection, the loss of marginal bone is greater compared to screw-retained and that`s why we prefer to tend towards the screw-retained prosthetis.

Case report: The case presented in this report is about replacing a missing molar no. 36. After the radiographic evaluation with CBCT, the presence of the mesial roots of 36, infection and bone resorbtion is evident. After treatment of the 37, and post-extraction implant placement on 36 through a surgical guide, a personalized healing abutment is placed on it. After six months, we noticed not only zero bone deficit after implant placement but also an improvement of bone level, all this thanks to the surgical guide.

Conclusions: Thanks to the surgical guides, we can choose the right screw-retained type of prosthodontic restoration, which contributes even more in success and preserving the bone.

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INTRODUCTION

Dental implants are now considered a predictable treatment option for tooth replacement (1). Before the surgical procedure, one should always think about the prosthetic part behind it. Many times, there are biological limitations or other additional procedures that condition us in choosing the prosthetic part. But it does not necessarily have to be like this. Other factors that can condition our choice are: dental arch (maxillary or mandibular), implant position in the dental arch (frontal or distal region), inter-implant distance, implant depth or angle (2).

The aim of this study was to evaluate the accuracy of guided surgery planning and its role in helping us to choose the right prosthodontic system.

CASE REPORT

The patient, 37 years old female, presented to the clinic with the desire to fill the space of the missing tooth no. 36.

After the radiographic evaluation with CBCT, the presence of the mesial roots of 36 was ascertained as well as what was most worrying for the patient herself, a pronounced bone resorption resulting from the long-term presence of an odontogenic infection (Figure 1).

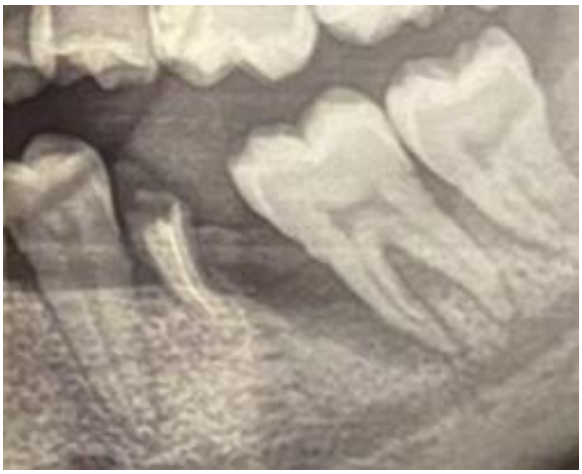

Figure 1. Presence of the root of 36 and infection accompanied by bone loss

After the patient`s consent, it was decided that the solution would be through a post-extraction implant, also due to the fact of dental mobility of element 37 due to this resorption. After the endodontic treatment on element 37 was performed, the extraction of the remaining roots of 36 and the placement of the implant with dimensions 4x8.5 were proceeded with. The surgical procedure was performed using a personalized surgical guide for several reasons.

Based on the CBCT evaluation, a very thin ridge was observed and taking into account the extraction that preceded it, placing the implant on the remaining bone structure would strongly condition us on its inclination. Consequently, this would also bring limitations in the selection of the prosthetic component.

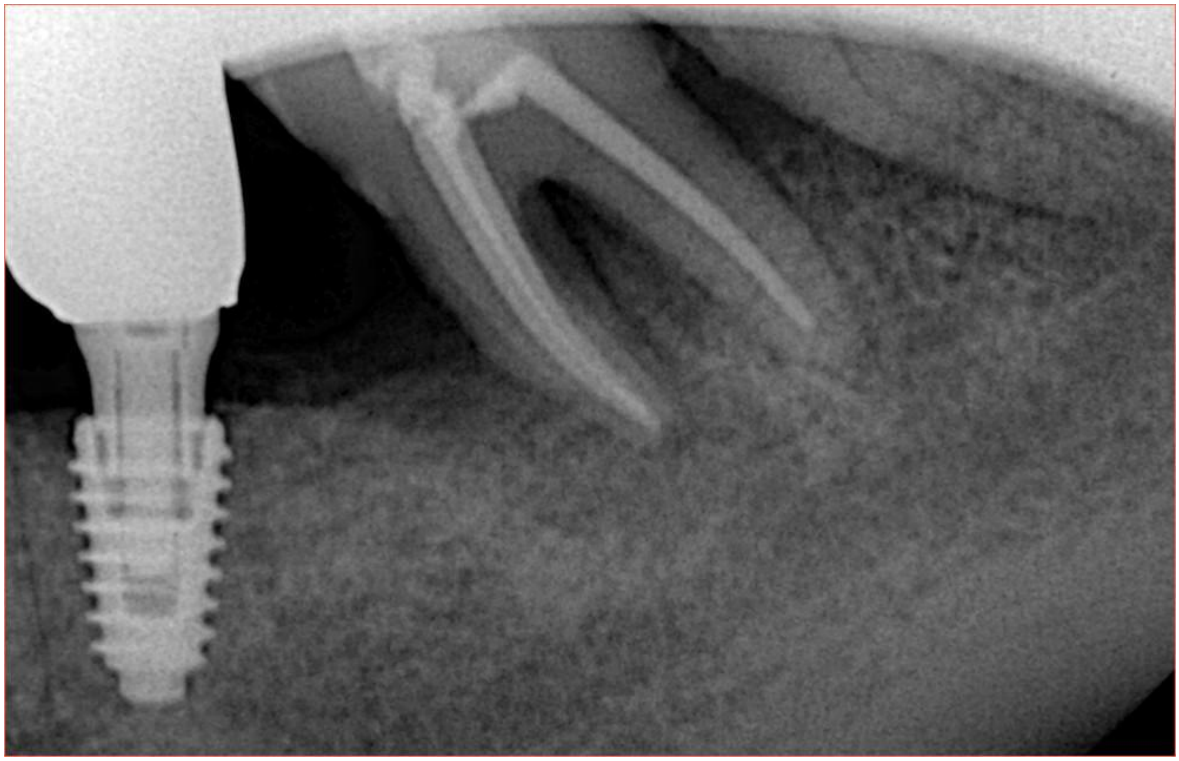

Figure 2. Improvement of the infection and gaining of bone

One of the problems related to bone defects in relation to implants is that since the bone contains irregularities, it is very natural for the inclination of the implant to deviate according to the latter. This would consequently also bring conditions for the prosthetic component. Since in this case a personalized surgical dam was used, we are sure that the positioning of the implant will be as we programmed it in the planning phase.

And not only that, but we will be more certain that we will not have further bone loss.

The above radiograph (Figure 2) was taken after 6 months, since the patient was living abroad. As can be seen, not only did we not have further bone loss but we also have a visible improvement with a slight elevation, in addition to the disappearance of the infection.

Another positive aspect of the personalized surgical guide is the avoidance of GBR, as in this case. If the surgical phase had not been guided, we would definitely need bone augmentation to compensate for the present deficit and what we could cause as a result of a non-ideal positioning of the implant (3).

DISCUSSION

In many cases, these are exactly what make us choose the type of prosthetic component.

This does not necessarily mean that it is a wrong choice, but let's imagine for a moment if we had the real opportunity to do so in choosing the prosthetic method on the implant. The prosthetic component with cementation on the implants offers a passive fit and high aesthetics, but is

always associated with the risk of cement residues in the biological contact areas, which also brings irritation to the biological tissues (4). Whereas those with screws or screw-retained are more recoverable in case of renovation, but have the problem of screw loosening or fracture.

What makes us develop the discussion in this aspect, is the fact that the choice of prosthetic component also affects the longevity of the implant itself. An important factor that ensures the success of dental implants is the proper distribution of stress around it under a certain chewing load (5).

In cases of cemented prosthetic selection, the loss of marginal bone is greater compared to screw-retained (6). Another factor that negatively affects the longevity of the implant is the frequent detachment of the prosthetic part from the implant. This is something that can happen, regardless of the type of connection. Whenever this happens, the possibility of damage to the marginal crest increases, consequently the probability of peri-implantitis increases (7).

What is used in the field of screw-retained prosthetics is the Cementless Screw-Retained Prosthesis or CL-SRP, a system that integrates digital technology with cementless prosthetics. Unlike conventional screw-retained restorations that are directly connected to the abutment, the CL-SRP incorporates a titanium base and a CAD/CAM-fabricated internal hex connection (Figure 3). This two-component system allows occlusal screw access to the final restoration, eliminating the dependence on cement and ensuring reparability (5).

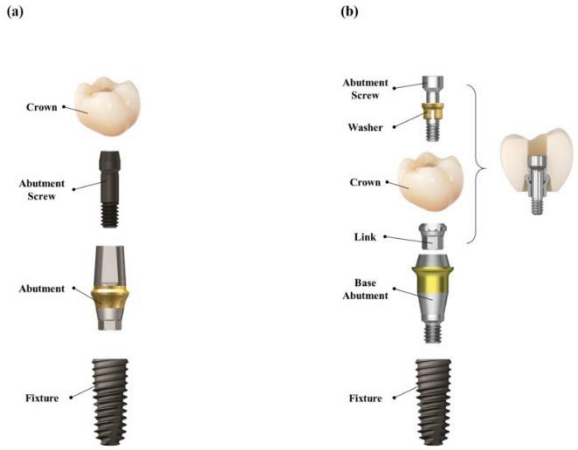

Figure 3. Two different prosthetic systems over implants

From what we said above, it is always preferable to go with screw-retained compared to cemented. But it is precisely those small inclinations that occur relatively often during the surgical phase that consequently lead to the angulation of the implant in such a way that they force us to go towards cemented prosthetics. Precisely to solve this handicap, guided implant surgery comes to our aid (8,9).

Guided implant surgery, especially tooth-supported, is perhaps the pinnacle of precision in implantology at the moment, certainly when talking to the static one (10).

CONCLUSIONS

1. Personalized surgical guides are the necessary tool for predictability and accuracy in common implant procedures.

2. The use of a personalized surgical guide increases the patient's confidence and creates an accurate idea of what the final restoration on the implant will look like.
3. Through surgical guides, it is easier to achieve better contouring of the gingival margin and overall aesthetics.

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Conflict of Interest Statement: The authors declare that they have no conflict of interest.

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