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Total Tooth Reconstruction Using Dental Implants

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Abstract

Treatment with dental implants in patients with edentulous jaws faces many problems. First and foremost is the patient's overall health and ability to undergo a relatively extensive surgical procedure. Another issue is the local sufficiency of the alveolar bone to place a sufficient number of implants. This involves planning the number and placement of implants. This consideration is directly related to the type of prosthetic reconstruction and the suitability of its use, not only with respect to the patient profile but also the properties of the materials used for prosthetic reconstruction. This case report demonstrates a possible treatment of edentulous jaws with regard to the aforementioned issues.

Keywords: Dental Implant, Full -Arch Rehabilitation, Implants Supported Prosthetics

Introduction

Total rehabilitation of edentulous jaws is not new in implantology. It is a proven reliable treatment [1]. Although such examples can be encountered in practice, it is not advisable to replace every tooth with an implant but to use appropriately placed implants to support prosthetic work. For maxillary reconstruction, a minimum of four implants and a maximum of eight implants is recommended. A minimum of four implants in the maxilla is valid even when using a implant- supported overdentur with bar, telescopes or locators. [2]. If we use a implant-supported overdenture for reconstruction in the mandible, then a minimum of two implants localized usually at the canine site are recomended. We usually use four to six implants for a fixed restoration in the lower jaw [3]. However, there are cases in the literature recommending the use of three implants [4]. The systematic analysis then considers this type of treatment to be reliable and reducing the cost and time of treatment[5]. In addition to the number of implants, another issue is the type of prosthetic restoration, i.e. whether to use fixed prosthetics or a implant-supported overdenture. To a large extent, there is a dependency on the patient profile and the need to support the soft tissues of the lips and face. When the alveolus is low and soft tissue needs to be supported, we rather choose a implant-supported overdenture. Finally, there is the issue of using different types of materials to fabricate prosthetic work [6]. From this list it is already evident that the overall reconstruction of the teeth is the sum of a selection of individual alternatives.

Case report

A 58-year-old woman was referred to our clinic for a consultation on the possibility of using dental implants to reconstruct her teeth. At the time of the examination she was generally healthy, without regular medication, no allergies. She only reported smoking up to 5 cigarettes a day. The maxilla was edentulous, with preserved alveolus and rehabilitated with a resin overdenture for about 4 years. There was non-functional fixed prosthetic work anchored to teeth in the mandible reg. 45,43,33,35 and separated molar reg. 46 (Fig. 1). Due to the wobbliness and non-functionality of the prosthetic work in the mandible, it was her wish to address this area first. In the upper jaw, she considered a removable restoration satisfactory. The treatment plan was as follows: extract all remaining teeth in the mandible and make an immediate overdenture. After healing period of the alveolus, place four implants and make a subsequent prosthetic reconstruction with a implant-supported overdenture with telescopes.

Figure 1: A Panoramic Radiograph of A Toothless Maxillary Arch And Mandibular Arch with Failing Natural Dentition.

Three months after the tooth extractions, we proceeded to place implants in the lower jaw. We used tissue level implants - Bioniq plus (Lasak co, Czech Republic), with a diameter of 4 mm and lengths of 10 and 12 mm (Fig. 2.). Due to the amount of bone, implants were placed in reg 45,43,32 and 34. The overdenture was used as a surgical template to specify implant localization. After eight weeks of healing, we proceeded to prosthetic reconstruction. As a suitable alternative, a resin overdenture supported

by implants on telescopic crowns was fabricated (Fig. 3,4,5,6). The patient was satisfied with the result and after being instructed about hygiene around the implants, she was scheduled for a follow-up in a year.

Figure 2: Bioniq Plus Implant (tissue level)

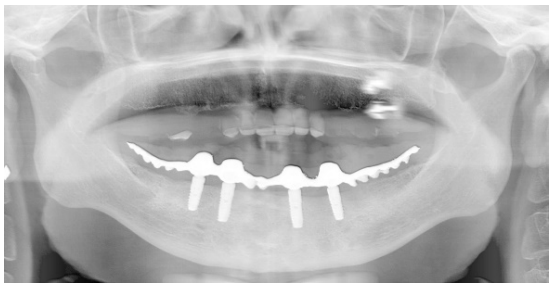

Figure 3: A Panoramic Radiograph with Healed Implants in Lover Jaw Loaded By Implant-Supported Overdenture

Figure 4: The Resin Overdenture with Metalic Frame and Telescopes

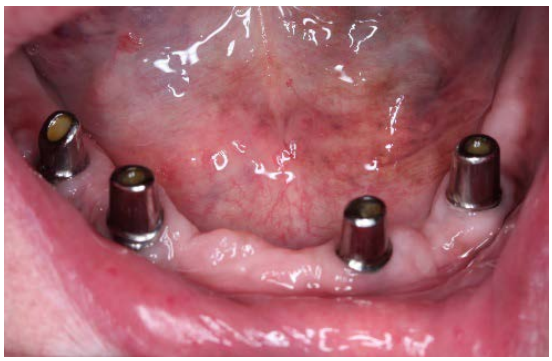

Figure 5: The Telescopic Crowns on Implants in Lower Jaw

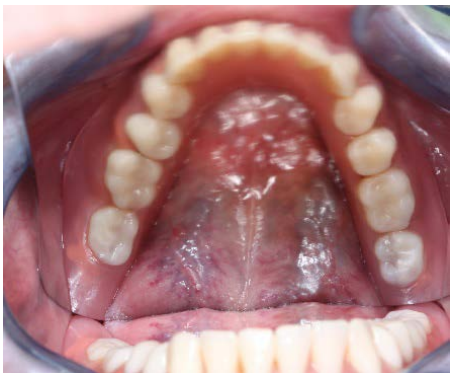

Figure 6: The Implant-Supported Overdenture in the Mouth (Miror Picture)

At the follow-up after one year, everything was fine and the patient wanted a fixed restoration in the upper jaw as well. Due to the sufficiency of the alveolus, we chose a fixed replacement on six implants as a suitable solution. We used bone level implants - Bioniq (Lasak co, Czech Republic), with a diameter of 4 mm and lengths of 12 and 14 mm in frontal area and diameter 5 mm and lenghts 10 mm in molar regions (Fig. 7). Due to the amount of bone, implants were placed in reg 16, 14,12,23,24 and 26. The upper overdenture was again used as a partial navigation during implant placement. After twelve weeks of healing, we proceeded to prosthetic reconstruction. In this case, we chose a fixed bridge made of zirconium as a suitable alternative (A2 colour). The bridge was fixed with screws up to 20 Ncm and the slots were sealed with Teflon and flow composite (Fig 8). After checking and adjusting her articulation, the patient was again instructed about the need for hygiene in the maxillary implant area and scheduled for a follow-up appointment in six months (Fig 9). At this follow-up, the patient reported no discomfort, was able to maintain proper oral hygiene, and was satisfied with the functionality and aesthetics of the rehabilitation (Fig 10). The X-ray examination also showed stability of the alveolar bone around the implants (Fig 11). The patient is now three years post-treatment with a stable outcome.

Figure 7: Bioniq Implant (Bone Level)

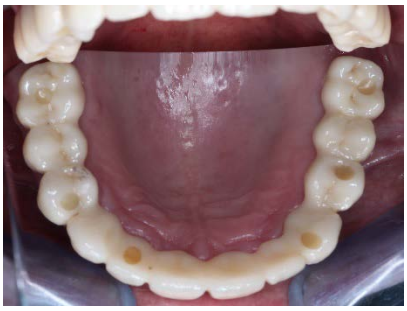

Figure 8: The Detail of The Screw Retained Zirconia Bridge Fixed Restoration in Upper Jaw (Miror Picture).

Figure 9: The Frontal View of Regular Oclusal Plane

Figure 10: The Patients Smile After Total Tooth Reconstruction

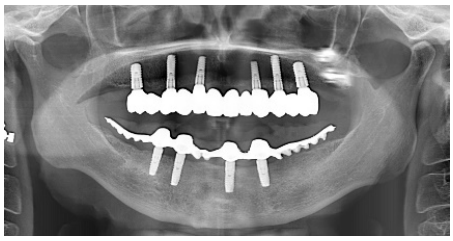

Figure 11: A Panoramic Radiograph of the Final „Full – Mouth" Reconstruction

Discussion

Given the complexity of the treatment, there are a number of things to discuss. First, let's discuss the treatment in the mandible. The teeth in the lower jaw were undoubtedly intended to be extracted but the fundamental question is why it has come to this. According to the initial examination and targeted history it was due to advanced untreated periodontitis. The patient lost teeth in her upper jaw from a similar cause. Therefore, we could have assumed poor hygiene habits and a greater tendency to peri-implantitis due to periodontitis [7,8]. For these reasons, a hybrid restoration that can be removed to allow good access to dental hygiene tools was chosen for the restoration in the mandible. Also for these reasons, tissue level implants, which are more resistant to peri-implantitis, were chosen. [9]. Telescopic crowns were chosen as the retention element to allow perfect retention of the overdenture, which is perceived as a fixed prosthesis [10]. The long-term success of this type of treatment in the mandible is proven and recommended [11].

In the maxilla, the alveolus was well preserved throughout the entire arch and implant placement could be considered without the use of bone augmentation. The lip and soft tissues of the face were also well supported. The patient also wanted a fixed restoration and had already adjusted her oral hygiene care at the time of planning. For these reasons, a fixed restoration on six bone level implants was chosen. The question was the choice of material for the fixed bridge [12]. Because of the good aesthetics, mechanical durability, bioinert properties and affordability, we chose milled zirconia bridge [13,14]. This material is considered promising and suitable for further clinical research [11]. We have always used the classical impression technique for prosthetic treatment of the upper and lower jaw due to the extent of prosthetic work [15]. The combination of different types of materials should not lead to overloading of the implants and/or damage to the integrity of the prosthetic work.

Conclusion

This case report demonstrates the overall rehabilitation of the dentition with regard to factors affecting the long-term stability of the outcome.

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