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Research Article

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Bone Ring Technique

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Abstract

Tooth extraction is accompanied by vertical reduction of the alveolar ridge as a result of the bone atrophy.In cases where we are dealing with the upper jaw, changes in alveolar bone dimensions can alsobe accompanied by pneumatization of the maxillary sinus.These changes are even more often after the extraction of the maxillary first and second molars, and especially after the extraction of two or more teeth in a row in the distal maxillary region.Different techniques and materials are used to provide adequate bone support for dental implants in these cases.In the presented case, the autogenous bone ring(bone ring technique) transplantation technique,and immediate placement of the implant in the same surgical session was applied.

Keywords: Tooth Extraction, Bone Resorption, Implant, Autogenous Bone Rings

1. Introduction

AEarly extraction of the teeth of the distal region of the maxilla is often accompanied by a large bone loss, and as a result, it leads to the reduction of the vertical dimension of the alveolar ridge. In cases where we are dealing with the upper jaw, changes in the dimensions of the alveolar bone can also be associated with pneumatization of the maxillary sinus .These changes are more pronounced after extraction of the first or second maxillary molar, and especially in cases of extraction of two or more teeth in a row in the distal region. The replacement of an extracted natural tooth with an osseo-integrating implant represents one of the most important advances in contemporary dentistry.Various procedures and materials are in use to provide adequate bone support for dental implants .

In cases with advanced bone resorption and maxillary sinus pneumatization, the autogenous bone ring transplantation technique and immediate implant placement in the same session is an advanced method that significantly reduces time compared to other methods. For the application of this technique, the specific indication is the thickness of the remaining bone, which must be under 2mm. Through this technique, vertical regeneration is achieved through the autogenous bone.

The peculiarity of this technique is the immediate placement of the dental implant together with the bone ring. The bone ring in this case is the primary stabilizer of the implant, which simultaneously serves as a bone deposit to increase the level of the deficient bone.

2. Material And Method

Male patient, age 46. In the intraoral examination, the absence of tooth #16, which was extracted 10 years ago, was detected. In the 3D CBCT digital radiological examination, the low level of the alveolar ridge in that region with pronounced pneumatization of the maxillary sinus is found. From the anamnestic data, there is no evidence of any health condition as a contraindication for surgical intervention. He does not smoke; biochemical laboratory tests show normal values. Bone augmentation after raising the maxillary sinus is done through an autogenous bone ring taken from the patient, bone particles in the form of Xenograft artificial granules, as well as self-absorbing collagen membrane fixed through titanium screws with a length of 4-6mm. The surgical technique with autogenous bone ring enables the immediate placement of the dental implant by making the vertical augmentation of the alveolar ridge in the distal region of the upper jaw.

3. Surgical Intervention

In the lower jaw, in the retromandibular region, a bone ring is taken, which is pulled through special trephines to collect the bone, which remains in physiological digestion in order not to lose organic matter until the moment of augmentation. After the bone osteotomy in the region of tooth #16, the window for lateral access to the maxillary sinus was opened, the membrane (Schneiderian) was carefully raised and sufficient space was created for vertical augmentation with autogenous bone rings. The dental implant was immediately placed and fixed through the autogenous bone ring.

Augmentation was done with xenograft and autograft in a 50/50% ratio.To secure the augmenting material, a self-absorbing collagen

membrane was applied.Results 4 months after the surgical intervention, a digital radiological check-up was done in which it was found that the bone augmentation and osseo-integration of the dental implant is complete. The bone ring shows very low rates of resorption, as well as high rates of integration into the xenograft artificial bone. The physical parameters of the measurements prove that the length of the bone ring is 9.3mm and the total length is 17.4mm. The autogenous bone ring also did not undergo internal resorption during the time of osseo-integration of the implant, from 10 mm at the time of placement, it was rooted to 9.3 mm of bone height, which proves a satisfactory regenerative result.

4. Discussion

Alveolar bone augmentation is often necessary in cases where the placement of dental implants is planned. Invasive augmentation procedures often require staged implant placement and overall length of treatment.The innovative approach with ring-shaped autogenous bone grafts and dental implant placement in one session has been shown to be efficient and safe for alveolar ridge augmentation. Autogenous bone ring grafts are safely stabilized through dental implants. Their dimensions were determined by the diameter of the dental implant and the size of bone atrophy, to ensure adequate stability of the implant, have good biocompatibility with alveolar bone and implants. The application of this technique results in less bone resorption compared to other bone regeneration techniques.

5. Conclusions

Scientific sources prove the advantages of the autogenous bone ring augmentation technique for the regeneration of vertical bone defects in the distal region of the upper jaw in cases where the pneumatization of the maxillary sinus is quite pronounced. This technique greatly shortens the waiting time for the patient final prosthesis, does not require several surgical interventions, and uses autogenous bone to compensate for the resorbed vertical dimension over time [1-17].

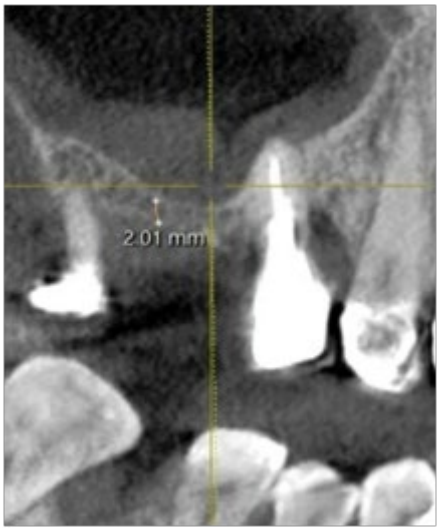

Figure 1: 3D CBVT digital radiography, analysis of the bone in the distal part of the maxilla, in the region of tooth #16, marked bone insufficiency is observed in the alveolar ridge (>2mm)

Figure 2: Bone ring

Figure 3: Immediate placement of the dental implant and its fixation through the autogenous bone ring

Figure 4: Augmentation with xenograft (Geistlich Bio-Oss) and autograft (Bone ring),also placement of the collagen membrane (self-absorbing), to provide the augmenting material.

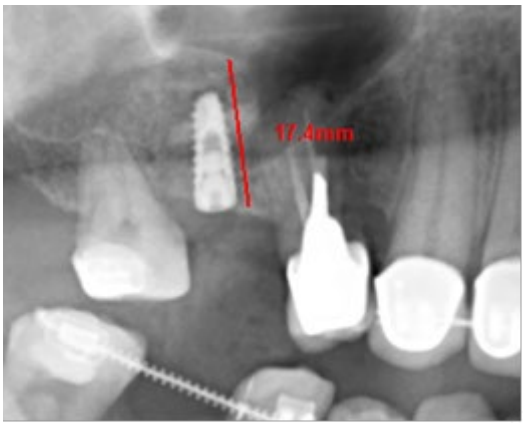

Figure 5: The vertical level of the alveolar ridge marks a significant increase from 2.1mm to 17.4mm bone height,

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