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Case Report

Traumatic Sinus Lift with Immediate Implants using Lumina Bone Porous Large Associated with PRF

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Abstract

The maxillary sinus lift is a surgical procedure that has become widely utilized, marking modern dentistry. It is responsible for enabling oral rehabilitation treatments through dental implants. In this sense, this study aims to present a clinical case report in which a traumatic sinus lift was performed with immediate implants, using Lumina Bone Porous Large technology associated with PRF. As for its methodology, it is based on clinical reporting. Thus, there has been an observed increase in the demand for fixed and stable prosthetic rehabilitations, a factor that intensifies the search for effective techniques to enhance the posterior maxillary bone volume, making the maxillary sinus lift an increasingly common and necessary intervention in clinical practice. From the mentioned clinical case, it was concluded that the use of heterogeneous bone grafts allows for the maintenance of the structure adjacent to the extracted dental element, even in more complex situations for the stability of the peri-implant complex, and in cases of severe atrophy such as in the posterior maxilla.

Keywords: Traumatic Sinus; Immediate Implant; Xenogeneic Graft Bone

Introduction

Oral rehabilitation consists of a set of dental techniques and methodologies carried out to return or restore the aesthetics, function and, above all, the oral health of patients who have undergone some tooth loss, with dental implants being one of the most commonly performed procedures to re-establish these lost functions [1,2].

With tooth loss, the patient tends to develop moderate or severe bone resorption over time, consequently preventing the direct installation of the implant which, over time, becomes an increasingly challenging task [3]. In implantology, there is an alternative for bone reconstruction using autogenous materials, biomaterials, or a combination of both, which have specific properties making them viable for addressing bone deficiencies and achieving satisfactory results [4].

Bone resorption prevents the installation of conventional dental implants, so in cases of sinus pneumatization and insufficient bone thickness it is necessary to perform a maxillary sinus lift, providing bone gains and rehabilitation possibilities [5]. By elevating the sinus membrane and increasing the bone volume in the posterior maxilla, it becomes possible to install dental implants safely and predictably [6]. In turn, this surgical procedure consists of creating a superior hinged door in the lateral wall of the maxillary sinus, which, once prepared, is internally rotated to a horizontal position so that the new elevated sinus floor, together with the internal maxillary mucosa, creates a space that can be filled with biomaterials for grafting [7].

Surgical bone reconstructions in the maxillary sinus region have evolved a lot in recent years, however, nowadays, the use of

autogenous grafts is practically unnecessary and almost never performed, so much so that, according to Goulart [8]., *et al*. 2015, only the use of biomaterials in performing maxillary sinus augmentation has had much effect in scientific literature. The combination of biomaterials and platelet-rich fibrin increases the predictability of outcomes in surgeries with or without the immediate presence of implants [9].

The maxillary sinus lift is an essential surgical procedure in modern dentistry, playing a fundamental role in enabling oral rehabilitation treatments through dental implants [2]. In recent years, the growing demand for fixed and stable prosthetic rehabilitations has driven the search for effective techniques to enhance posterior maxillary bone volume, making the maxillary sinus lift an increasingly common and necessary intervention in clinical practice [10].

To accelerate the bone formation process, the L-PRF technique has been used, considering that many materials have an osteogenic effect on the sinus membrane and a favorable healing process relative to the periosteum [9,11]. L-PRF is a concentrate of platelets and leukocytes, not thrombolyzed, which are centrifuged immediately after blood collection, aiming for good healing, where its function is to have a continuous release of leukocyte cytokines and bone growth factors, encouraging tissue repair in the region of the surgery [5,11,12].

Therefore, this article aims to analyze, according to the scientific literature, the technique of traumatic sinus lift with immediate implants using Lumina Bone Porous Large associated with PRF and its impact on the stabilization of oral function and patient well-being [5,12,13].

Case Report

The proposed Case aims to report the technique that utilizes the biomaterial Lumina-Porous® in the maxillary sinus, combined with platelet-rich fibrin, with the immediate placement of implants, to demonstrate the material's properties in light of the results achieved.

MAS, a 62-year-old female patient, presented at the postgraduate clinic of FACSET university, at the Braga Institute of Dentistry and Research center, for dental implant placement. The patient's history revealed the absence of teeth in the posterior maxilla on the left side for several years and the use of a removable partial prosthesis in the region.

Clinical and radiographic examinations indicated the need to rehabilitate teeth 26 and 27. Additionally, the bone height to the floor of the maxillary sinus ranged from 2 mm to a maximum of 2 mm, with good bone thickness in the region and the need for the extraction of the residual root of 26.

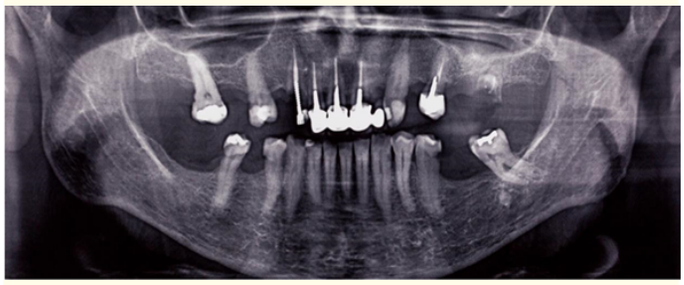

Figure 1: Initial Panoramic Rx View.

Figure 2,3: Initial View, Initial incision.

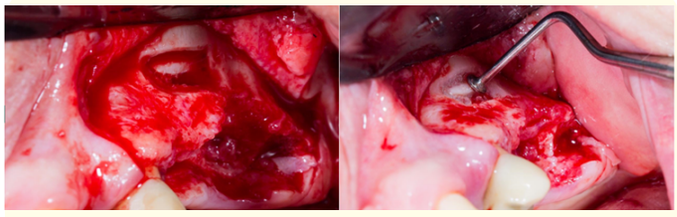

Figure 4,5: Initial osteotomy, Sinus Acess.

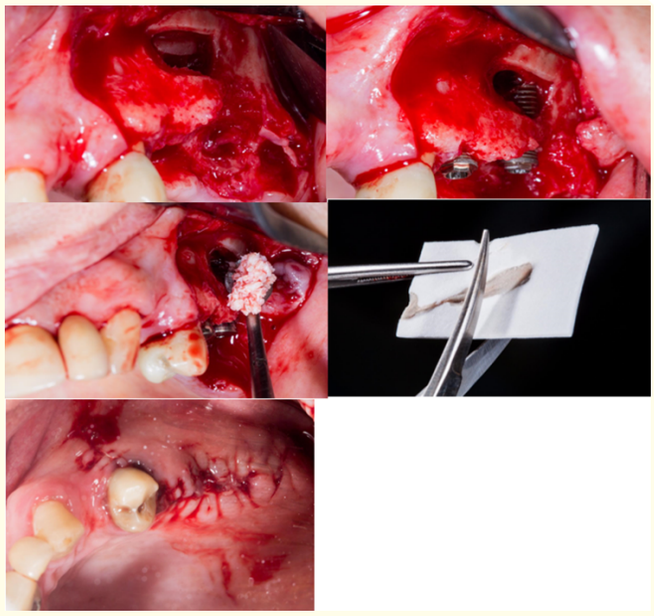

Figure 6-10: Sinus Lifting, Implante Instelled, Xenogeneic Graft bone + PRF, Collagen Membran, Suture.

The patient underwent surgery for sinus lift using a traumatic technique, with the insertion of implants measuring 3.75 x 11 mm to replace each absence. Through the decortication of the vestibular bone wall in the region using an FG1 spherical carbide bur, due to the bone atrophy in the area, we reconstructed the bone profile by filling and covering it with heterogeneous bone graft material, Lumina Bone Porous Large granules soaked in serum extracted from the supernatant of PRF membranes (Castro., *et al*., 2017), followed by coverage with non-crosslinked type 1 and 3 collagen membranes, Lumina Coat Double Time, and subsequently adapting platelet-rich fibrin (PRF) membranes. After 6 months, we carried out the re-opening to make implant-supported restorations.

Discussion

This clinical case addressed the technique of traumatic maxillary sinus lift using Lumina Bone Porous® in combination with platelet-rich fibrin (L-PRF) and immediate dental implant placement. The effectiveness of the method can be credited to the osteoconductive characteristics of the biomaterial associated with L-PRF, which created a conducive environment for bone formation and implant integration, confirming results obtained by Castro [9]., *et al.* (2017).

In his article, Pucetti [15]., *et al*. (2021) reports that bone loss becomes gradual after the loss of the dental element, both in the width and height of the alveolar bone crest, whether due to trauma or pathological conditions, causing bone atrophy, which hinders implant installation. However, Rocha [16]., *et al*. (2023) mentions that the need for a maxillary sinus lift arises when the patient has less than 8 millimeters in height and 4 millimeters in width. On the other hand, the initial residual bone height obtained in this clinical case was 2 mm, which posed a major clinical challenge because, according to Resnik [1]., *et al*. (2020), conditions of intense bone resorption restrict the likelihood of successful dental implants. In this context, the maxillary sinus lift proved to be an essential technique for increasing bone volume, allowing for the safe and effective installation of implants.

The maxillary sinus region is considered an area of significant bone loss due to a lack of stimuli [16]. However, Garpar [13]., *et al*. (2024) considers the bone in the posterior maxilla to be type IV bone, which can compromise the primary stability of the implant. The lateral window technique for maxillary sinus lift is a viable technique aimed at increasing bone volume below Schneider's membrane, both in height and density. It is indicated in cases of extreme maxillary sinus pneumatization, where bone augmentation is required, facilitating bone gain for implant placement [17-19]. Which, in turn, Brito [12]., *et al*. (2023) mentions as the technique that allows greater and better control of the surgical site, and is indicated when there is little bone height.

The exclusive use of biomaterials such as Lumina Bone Porous®, replacing autogenous grafts, illustrates the advancement of bone reconstruction techniques, as noted by Goulart [20]., *et al*. (2015). This substitution reduces morbidity associated with the procedure, providing patients with a less invasive postoperative experience. Additionally, the collagen membrane used as a coating played a crucial role in stabilizing the biomaterial, as mentioned by Moura [21]., *et al*. (2021), aiding in more effective tissue recovery.

The inclusion of PRF in the surgical protocol brought notable advantages. According to Marques [14]., *et al*. (2023), the continuous release of growth factors by PRF promotes bone and tissue regeneration, increasing the predictability of outcomes. The presence of leukocytes and platelets in PRF creates a favorable environment for bone formation and reduces postoperative inflammatory complications. On the other hand, according to Martins [17]., *et al*. (2022) and Navarro [22]., *et al*. (2022), in their articles, they mention that PRF favors the healing process and the release of growth factors, in an interval of 7 to 14 days, providing greater stability to the implant. Among the benefits of platelet-rich fibrin (PRF), we can highlight its low cost, short time required for bone formation, autologous nature, and simplified technique, in addition to reducing saucerization, thus increasing the longevity of implants [23]. In addition, Pessoa [10]., *et al*. (2019) and Pucetti [15]., *et al*. (2021) mention that PRF accelerates bone graft maturation.

However, studies show that PRF associated with biomaterials in maxillary sinus lifts ensures greater predictability for subsequent rehabilitation [24]. Six months after the procedure described in this clinical case report, the implants achieved clinical and radiographic stability, aligning with the success rates described in previous studies [2,9,25]. The recovery of mastication and oral aesthetics in the patient highlights the importance of combining maxillary sinus lift techniques with contemporary biomaterials in oral rehabilitation. However, it is crucial to emphasize that the success of the method depends on meticulous planning, correct material selection, and precise technical execution. Although the results are favorable, it is essential to conduct long-term follow-up studies to assess the durability and stability of implant-supported rehabilitations executed using this approach. Therefore, this study contributes to the literature by demonstrating the feasibility and effectiveness of using Lumina Bone Porous® biomaterial and PRF in maxillary sinus lifts with immediate implant installation. The implementation of the technique proved to be a safe and innovative option for situations

of intense bone resorption, providing benefits for both the surgeon and the patient.

Conclusion

Based on the literature and the clinical case presented, we can conclude that the use of heterogeneous bone grafts enables the maintenance of the structure adjacent to the extracted dental element, even in more complex situations for peri-implant complex stability, including severe atrophy in the posterior maxilla.

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