International Journal of Dentistry and Oral Science (IJDOS)
ISSN: 2377-8075

Surgical Alternative in Sinus Lift Reoperation

Case Report

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Abstract

The increasing use of osseointegrated implants requires special attention to overcome limitations in bone tissue. In maxillary posterior region, sinus pneumatization reduces bone availability for implants insertion. Membrane perforation is commonly observed during *sinus lift* procedure, when trying to achieve bone volume. Through a case where the implant was removed from inside the maxillary sinus patient, causing extreme membrane and bone damage. An alternative treatment using the periosteum as membrane is described.

Keywords: Dental Implants; Maxillary Sinus; Complications; Membrane Perforation.

Introduction

The increasing use of osseintegrated implants [1] also requires special attention to overcome limitations in bone tissue. In maxillary posterior region, sinus pneumatization is the most common complication that reduces bone availability for implants insertion [2, 3].

The technique of sinus lift described by Tatum [4] and Boyne and James [5] is the most successful approach for bone regeneration in atrophic maxilla. According to this technique, an opening at lateral sinus wall is created to displace the Schneiderian membrane in order to fill the space in sinus floor with a graft material [6]. Thus, the integrity of Schneiderian membrane is essential for sinus lift success.

However, membrane perforation is commonly observed during this procedure [7], ranging from 20 to 60% [8]. As a consequence, some professionals avoid reconstructive techniques using short and thin implants [9]. Nevertheless, the poor bone density in maxillary posterior region may affect osseointegration or cause implant displacement into maxillary sinus [10].

Although the Caldwell-Luc technique [11] has been indicated to remove foreign bodies presented into the maxillary sinus, this procedure causes extensive damage in the Schneiderian membrane and compromises future bone regeneration [12].

Thus, the aim of this study was to report a sinus lift technique after extensive damage in Schneiderian membrane resulting from removal of implant in maxillary sinus using the Caldwell-Luc technique.

Case Report

The patient reported pain and swelling in the region from teeth 12 to 14 two weeks after a surgical procedure for implants insertion.

Clinical exam revealed reddish gingiva and pain to palpation without pus. The periapical radiograph showed the presence of three implants and the implant inserted in the region of 13 moved to the maxillary sinus. The remaining implants exhibited poor bone support that could affect osseointegration (Figure 1). Thus, the removal of all implants was indicated.

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Received: November 07, 2017
Accepted: November 27, 2017
Published: November 28, 2017

Citation: Costa BE, Grolli Klein GB, Siqueira L, de Lima Romeiro R, Ribeiro-Junior PD. Surgical Alternative in Sinus Lift Reoperation. *Int J Dentistry Oral Sci.* 2017;4(11):552-556. **doi:** http://dx.doi.org/10.19070/2377-8075-17000109

The procedure was conducted in ambulatory environment under local anesthesia with 2% mepivacaine hydrochloride with 1:100,000 adrenaline. The Caldwell-Luc technique was used to access the maxillary sinus. The osteotomy in the sinus lateral wall was conducted with a spherical bur (#8) in low-speed handpiece and electric surgical motor. The implant was removed under abundant irrigation with saline and aspiration. The remaining implants were removed using reverse torque.

The procedure caused extensive damage in the sinus lateral wall and Schneiderian membrane, preventing any immediate regeneration or rehabilitation.

After 8 months, another clinical exam was conducted to plan the procedures of bone regeneration for implants insertion.

Two planning treatments were established based on tomography and prototyping (Figure 2). One alternative was the fixation of bone blocks into the maxillary sinus while the other approach suggested the use of particulate bone using the periosteum as a membrane based on a technique with divided flap in the defect area. The treatment planning was selected at the moment of the surgery since bonding between periosteum and Schneiderian membrane could not be detected through the complementary exams. Iliac crest was used as donor area.

The second surgical step was conducted in the hospital under general anesthesia associated with local anesthesia with 2% mepivacaine hydrochloride with 1:100,000 adrenaline. The treatment alternative using particulate bone after displacement of the Schneiderian membrane was selected (Figure 3 a/b).

Additional radiographic exams taken six months after grafting revealed enough bone volume for implants insertion (Figure 4). Another surgery was indicated for fixation of 3 implants. The procedure was conducted in ambulatory environment under local anesthesia with 2% mepivacaine hydrochloride with 1:100,000 adrenaline. External hexagon cylindrical implants (Titanium Fix) were inserted in the region of teeth 12 (3.75 mm x 13 mm), 13 (3.75 mm x 10 mm) and 14 (3.75 mm x 10 mm). All implants exhibited appropriate initial stability ranging from 30 to 50 N (Figure 5 a/b).

After all surgical procedures, it was administered amoxicillin 875 mg twice a day for 7 days, nimesulide 100 mg twice a day for 3 days, paracetamol 750 mg four times a day for 5 days, and mouth washing with 0.12% chlorhexidine gluconate three times a day for 10 days.

After 6 months for osseointegration, the implants were reopened to place regular healing abutments with height ranging from 3 to 4 mm. After gingival repair, open-tray impression was taken and 3 porcelain-fused-to-metal crowns were attached (Figure 6).

Discussion

The displacement of implants into maxillary sinus is a frequent complication reported as a consequence of increasing insertion of implants in maxillary posterior region [13].

In addition to iatrogenic procedures, Galindo P. et al., suggested 3 other reasons for implant migration into sinus: 1-alteration of intra-sinus pressure, 2-autoimmune reactions against implants caus-

Figure 1. Initial X-Ray to Look Previous Implants. Implants in 12 and 14 Teeth Region with Little Bone Insertion and in 13 Tooth Region the Implant was Inside the Maxillary Sinus.

Figure 2. Cone Bean CT after Implants Removal Showing all Damage Caused to Lateral Bone Wall and Schnederian Membrane, During the Implants Removal.

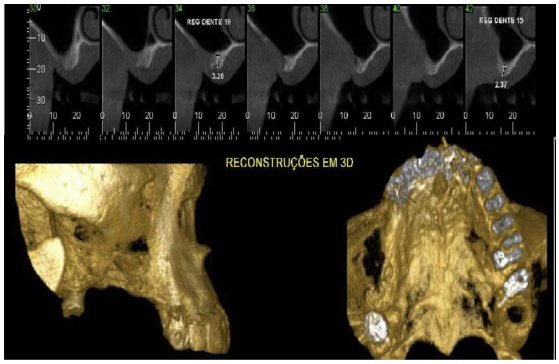

Figure 3a/b. Sinus Approach - # Schneiderian Membrane * Periosteum. After Flap Elevation and Divided, is Possible to See the Difference Between Both Structures. The Sinus Lift Technic was Used, and the Sinus was Filled with Particulate Autogenous Bone Graft.

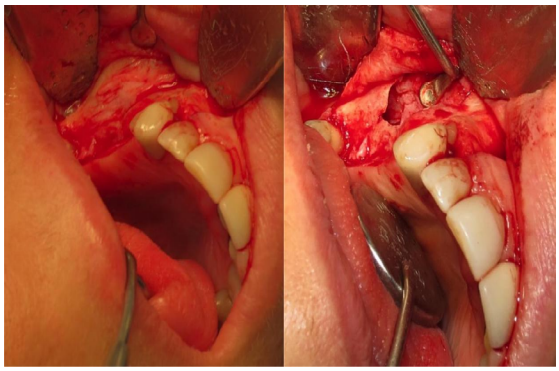

Figure 4. Cone Bean CT after Sinus Graft Showing the Great Bone High Obtained, Making Possible the use of Traditional Dental Implants.

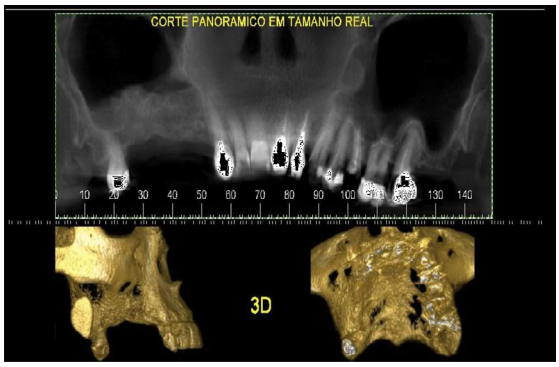

Figure 5 a/b. Implants Placement in the 12, 13, 14 Teeth Region by Tradicinonal Technic using External Hexagon Cylindrical Implants, with Good Primary Stability.

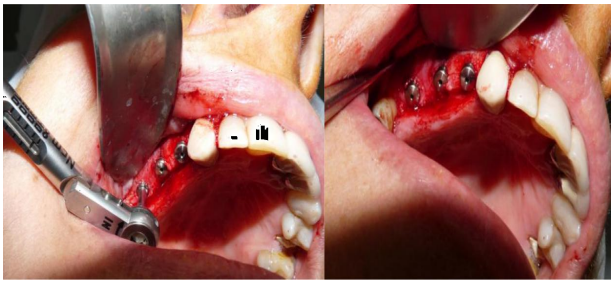

Figure 6. After Osseointegration Time, 6 months, the Implants was Restored using Metallic - Ceramic Crowns.

ing bone destruction and loss of osseointegration, and 3-bone resorption as a result of occlusal trauma [14].

Foreign bodies into sinus cavity cause sinus inflammation due to interruption of mucous-ciliary mobility and/or tissue reaction [15] that can cause aspergillosis [16]. Scorticati MC et al., reported cases of intense headache caused by foreign bodies presented into the maxillary sinus [17]. Thus, any object inside the sinus must be removed even under asymptomatic condition [18].

Several techniques have been suggested for removal of implants into the sinus, such as Caldwell-Luc intra-oral access, trans-nasal endoscopy [19] or an association of both methods [20]. The selection of each approach depends on proper indication consider-

ing the possible damage and further insertion of dental implants.

Treatments using endoscopes preserve the sinus epithelium and unstop the ostium obliterated by chronic inflammation [21]. However, this alternative is not commonly indicated because it requires specific equipment and training and also extensive opening for sinus manipulation and object removal [22].

The intra-oral approach provides direct visualization, easy access and appropriate opening for removal of foreign bodies. On the other hand, it may cause damage to infra-orbital nerve, retraction of cheek soft tissue, buccal-sinus fistula, and extensive damage in the sinus lateral wall and Schneiderian membrane [23, 24].

The treatment of sinus membrane perforation is challenging. For Testori et al., [25] three alternatives can be taken: 1-use of collagenous membrane for obliteration, 2-natural membrane healing, and 3-use of block without membrane repair.

Considering that the use of membranes is not appropriate after extensive damage in the Schneiderian membrane, the other alternatives can be indicated [26, 27].

For natural membrane healing, 3 to 4 weeks are required for repair without interposition of any material between the Schneiderian membrane and alveolar mucosa for proper bonding [28].

According to the repair protocol suggested by Fugazzotto and Valssis for defects class V (i.e. sinus lift in areas with Schneiderian membrane perforation [29]), the treatment should divide the buccal flap in order to provide sealing with the periosteum, conventional membrane lift and insertion of particulate material.

In a different scenario, bone regeneration can be achieved through complete curettage of the Schneiderian membrane and further fixation of bone blocks in the sinus medial wall [30].

The iliac crest was selected as the donor area because it is an autogenous material, a gold standard for bone regeneration, and it also provides a 3D structure for adaptation and fixation of bone blocks. In addition, the iliac crest bone can be inserted as a particulate material in case of membrane displacement.

Conclusion

This study demonstrated that implant-supported rehabilitation can be conducted through bone regeneration in maxillary sinus even after extensive Schneiderian membrane perforation.

The technique can be indicated as a safe and predictable alternative to provide appropriate clinical results of bone repair.

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