Case Report

The Management of Maxillary Sinusitis Due to Failure of Maxillary Sinus Elevation or Dental Implant

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Abstract
Maxillary sinus elevation has become a predictable approach to increase bone height to allow implant placement to restore chewing function in the posterior maxilla. However, Schneiderian membrane perforation may occur during maxillary sinus elevation or implant placement. Improper management of the Schneiderian membrane perforation may cause maxillary sinusitis. The objective of this paper was to present maxillary sinus elevation approach to treat maxillary sinusitis due to previous failed maxillary sinus elevation or inappropriate implant placement.

ABBREVIATIONS
CBCT: Cone Beam Computed Tomography

INTRODUCTION
Osseointegrated dental implants have become one of the most predictable treatment modalities with long-term success to replace missing teeth [1]. Even in the posterior maxillary region, an environment that receives stronger forces and poorer bone quality, a success rate of approximately 95% at 5 years can be achieved with careful planning and execution [2]. However, bone loss due to periodontal disease, endodontic infection, trauma or maxillary sinus pneumatization can create a challenge for implant placement due to inadequate bone height in the posterior maxilla [3]. In such situations, maxillary sinus elevation has become a predictable and routine approach to increase bone height in the posterior maxilla for patients seeking implant-based therapy [4,5]. However, the prevalence of Schneiderian membrane perforation during maxillary sinus elevation has ranged from 3.6% to 56% [6]. Improper management of the Schneiderian membrane perforation during maxillary sinus elevation or implant placement may cause maxillary sinusitis [6]. The objective of this paper was to utilize maxillary sinus elevation approach to treat maxillary sinusitis due to failure of maxillary sinus elevation or improper dental implant placement.

CASE PRESENTATION
A 56-year-old healthy male was referred to treat left maxillary sinusitis due to previous failed maxillary sinus elevation. Patient had symptoms of pressure, congestion and slight pain in the area under the left eye. The CBCT scan after failed left maxillary sinus elevation presented lateral bony wall defect, thickening of the Schneiderian membrane and inadequate bone height for implant placement on March 10, 2011 (Figure 1). Patient denied history of left maxillary sinusitis prior to maxillary sinus elevation and the initial CBCT scan showed clear left maxillary sinus cavity on October 21, 2010 (Figure 2).

Maxillary sinus elevation via lateral window technique was decided to treat left maxillary sinusitis. After local anesthesia, a buccal partial-thickness flap was created. Lateral wall bony defect could be utilized as access to carefully elevate the Schneiderian membrane from the bony surfaces (Figure 3). Anorganic bovine bone Endobon, Biomet 3i, Palm Beach Gardens, FL was then placed into the left maxillary sinus cavity and the resorbable collagen membrane Osseoguard, Biomet 3i, Palm Beach Gardens, FL was placed to cover the lateral bony wall defect.

Patient’s symptoms of maxillary sinusitis were resolved after the second maxillary sinus elevation. Postoperative CBCT scan showed newly created lateral bony wall and adequate bony height for implant placement on April 7, 2011 (Figure 4).

A healthy female aged 62 came to clinic because of continuous mild pain in the area under left eye after receiving dental implant treatment at the left maxillary quadrant at another clinic. The CBCT scan presented thickening of the Schneiderian membrane possible due to membrane perforation from implants on June 13, 2011 (Figure 5). Patient denied history of left maxillary sinusitis prior to implant therapy.

Dental implants at left maxillary quadrants were removed and left maxillary sinus elevation via lateral window approach was performed to treat maxillary sinusitis. The full-thickness flaps
FL was placed to seal the Schneiderian membrane perforation (Figure 7). Anorganic bovine bone Endobon, Biomet 3i, Palm Beach Gardens, FL was then placed into the left maxillary sinus cavity and another resorbable collagen membrane Osseoguard, Biomet 3i, Palm Beach Gardens, FL was placed to cover the lateral window.

Patient’s symptoms of maxillary sinusitis were resolved after left maxillary sinus elevation. Postoperative 6-month CBCT scan showed adequate bony height for successful implant placement on March 22, 2012 XiVE, Dentsply Friadent, Mannheim, Germany (Figure 8).

**DISCUSSION**

Maxillary sinus elevation has become a predictable and routine approach to increase bone height in the posterior maxilla to allow implant placement simultaneously or post-operatively.

were elevated to perform antrostomy to gain access to elevate the Schneiderian membrane from the bony surfaces. Schneiderian membrane perforation was noted (Figure 6) and resorbable collagen membrane Osseoguard, Biomet 3i, Palm Beach Gardens,
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Figure 6 Perforation of the Schneiderian membrane was noted.

Figure 7 Resorbable collagen membrane was placed to seal the Schneiderian membrane perforation.

Figure 8 Post-operative 6-month CBCT showed adequate bone height to allow implant placement successfully on March 22, 2012.

However, improper management of Schneiderian membrane perforation during maxillary sinus elevation or implant placement may cause maxillary sinusitis [6]. The goal of the paper was to discuss the maxillary sinus elevation approach to resolve the maxillary sinusitis due to previous failed maxillary sinus elevation or improper implant placement. The first case presented the lateral wall bony defect. In this situation, Schneiderian membrane will incorporate into the buccal flap tissue. The buccal split-thickness flap was created to allow the elevation of buccal flap. The buccal bony defect was then utilized as access to elevate the Schneiderian membrane. The intact Schneiderian membrane including part of connective tissue from the buccal flap could prevent the bone graft from collapsing into the Schneiderian membrane.

The second case showed the intact lateral bony wall, so the full-thickness flap could be raised. The antrostomy should be performed to gain access to carefully elevate the Schneiderian membrane from the bony surfaces. Since the perforation of Schneiderian membrane was present, the rigid resorbable collagen membrane could be placed to seal the perforation to prevent the collapse of added bone graft.

Although treatment approaches between two cases varied slightly, the fundamental principle was the same to carefully elevate the Schneiderian membrane from the sinus bony wall. Then, the added bone graft could stay in place instead of collapsing into the Schneiderian membrane which may cause maxillary sinusitis. In conclusion, the management of maxillary sinusitis via appropriate maxillary sinus floor elevation could gain predictable outcome.

REFERENCES