Case Report

Implants in maxillary sinus

Yazad R. Gandhi, Mayank Singh\(^1\), Nimisha Singh\(^2\), Hariram\(^2\)

ABSTRACT

Augmentation of the floor of the maxillary sinus is an extremely important technique for posterior site development in the maxilla prior to implant placement. A number of techniques have been suggested and used in the past to deal with membrane perforations such as suturing the membrane, application of fibrin sealants oxidized regenerated cellulose and collagen membranes. The most important aspect of sinus grafting is the integrity of the sinus membrane solely to confine the graft. If membrane tears are not taken care of, graft material can extravasate into the antrum and block the ostium. The fast-resorbing membranes are not good enough to form bone as their integrity is lost before woven bone forms. The novel technique demonstrates the use of a slow-resorbing membrane not only for perforations, but even in circumstances where the sinus is devoid of a membrane, thus bypassing the waiting period for schnederian membrane regeneration prior to grafting.

Key words: Grafting, implants, maxillary sinus

INTRODUCTION

Augmentation of the floor of the maxillary sinus was described for the first time by Tatum, Boyne, and James. It is an extremely predictable technique for posterior site development in the maxilla prior to implant placement. As reported in the literature, contraindications of sinus grafting include blockage of the osteomeatal complex, inferior turbinate pneumatization, acute sinus infections, chronic fungal sinusitis, neoplasm of sinus, and hypoplasia of sinus.\(^{[1]}\)

Timmenga, \textit{et al.} reported that clearance of the maxillary sinus is rarely compromised after sinus floor augmentation and that development of chronic maxillary sinusitis, with all its therapeutic consequences, still has to be considered as a rare condition. Until recent times, tearing of the schnederian membrane meant that the sinus graft had to be aborted until later when membrane regenerates, unless the tear was small in dimension.

The maxillary sinus is pyramidal in shape. We are concerned with the lateral wall and base of pyramid. The average volume of the adult human maxillary sinus is 14.71 cc.\(^{[2]}\) There is a direct correlation of the adult sinus size and inter-zygomatic buttress width. The study of Stammberger gives an average volume of 3.5 cc graft requirement to raise the sinus membrane 15 mm and that of 5.66 cc to raise it 20 mm. The osteomeatal complex has to be in optimal health for the sinus graft to be successful.

The sinus lining is similar to the respiratory mucosa, being composed of three layers (a) the epithelial layer (b) the lamina propria and (c) the periosteum. The periosteum and lamina propria are tightly bound, and it facilitates easy detachment from the cortical walls while elevation. Thickness of this membrane varies from 0.3 to 0.8 mm. Any reason for compromise of ciliary function, mucous production or ostial patency would contribute to a compromise in the success of the graft.

The thickness of the membrane varies in smokers, ranging from extremely thin and fragile to thick and fibrous. Ciliary activity in smokers is reduced, predisposing the patient to increased risk of sinusitis due to diminished clearance of the sinus.

The sinus consensus conference in 1996 concluded that 48% are membrane perforations. A number of
Gandhi, et al.: Implants in maxillary sinus

Techniques have been suggested and used in the past to deal with membrane perforations such as suturing the membrane, application of fibrin sealants oxidized regenerated cellulose and collagen membranes. The technique for the repair of large perforations was first described by Pikos in 1999.\[3\]

Complications of sinus lift procedures can be classified according to etiologic factors:
1. Systemic disease-related
   1.1 Bisphosphonate medication
   1.2 Uncontrolled osteoporosis
   1.3 Heavy smokers (>10 cigarettes a day)
2 Anatomy and procedure related
   2.1 Membrane perforation
   2.2 Septate sinus
   2.3 Sinus hypoplasia
   2.4 Pneumosinus dilitans
3 Sinus pathology-related
   3.1 Pseudocysts
   3.2 Retention cysts
   3.3 Mucoceles
4 Sepsis-related
   4.1 Empyema
   4.2 Post-operative hematoma
   4.3 Hemosinus
   4.4 Aéroceles in the grafted sinus
   4.5 Chronic sinusitis
   4.6 Oroantral fistula
5 Prosthesis-related
   5.1 Tissue borne prosthesis immediate post-operative

CASE REPORT

A 58-year-old man reported to the dental and maxillofacial clinic with complaint of heaviness over the right side of face and nasal discharge for the last 1 month. The history revealed multiple surgical episodes for implant placement at a dentist’s clinic 4 months back, following which there was considerable discomfort and swelling over the right side of face which lasted 7-10 days. This was followed by loss of all implants over a period of 3 months.

The patient currently wore a complete tissue borne denture in maxillary arch. Intra-oral examination revealed considerable hard and soft tissue loss with lack of good bound-down keratinized tissue. Radiographic investigations by way of an orthopantomograph showed two implants in the right maxillary sinus with one of them close to the floor of the orbit [Figure 1]. A complete maxillary rehabilitation was planned for implant-supported prosthesis with bilateral sinus grafts and anterior maxillary onlay grafts under general anesthesia.

On raising a mucoperiosteal flap in the right maxillary sinus region a perforation was seen in lateral wall of the maxilla, the sinus membrane was tense and fluctuant [Figure 2]. The membrane was incised and spontaneous purulent discharge was observed, following which the membrane was curetted out [Figures 3 and 4]. Two implants were removed from the sinus encapsulated in granulation tissue.

Following a thorough lavage, a double-layered cross linked type 1 collagen membrane with a delayed resorption pattern (Biomed, Zimmer Dental) was used to create an artificial membrane to contain the graft [Figure 5]. The membrane was secured by Titanium tacs (Autotac, biohorizons Inc.) on the medial wall of the sinus inferior to the ostium and brought out laterally and fixed with tacs to the lateral wall of the maxilla.

A 50:50 mixture of autograft and xenograft (Bioss, Geistlich) was used mixed with Plasma Rich Protein to graft the sinus [Figure 6]. A second layer of collagen membrane covered the access opening to the sinus. The anterior maxilla was prepared and block autografts harvested from the symphysis were fixed using four lag screws and covered with a type 1 collagen membrane. Closure was achieved with suture 4,0 Mersilk suture and the patient discharged on antibiotics, analgesics, nasal decongestants, and oral rinses, 8 months later, the implants were inserted, following which patient underwent a waiting period of 4 months. Thereafter, the implants were uncovered and revealed good integration to the grafted bone [Figures 7 and 8].

DISCUSSION

The most important aspect of sinus grafting is the integrity of the sinus membrane solely to confine to the graft. If membrane tears are not taken care of, graft material can extravasate into the antrum and block the ostium. Fibrin glue and fast-resorbing membranes were compared for sinus perforations and it was found that fast-resorbing membranes are not good enough to form bone as their integrity is lost before woven bone forms.[4]

This novel technique demonstrates the use of a...
slow-resorbing membrane not only for perforations, but even in circumstances where the sinus is devoid of a membrane, thus bypassing the waiting period for Schneiderian membrane regeneration prior to grafting.

REFERENCES

1. Tatum H Jr. Maxillary and sinus implant reconstructions. Dent Clin North Am 1986;30:207-29.
2. Cervin A, Bende M, Lindberg S, Mercke U, Olsson P. Relations between blood flow and mucociliary activity in the rabbit maxillary sinus. Acta Otolaryngol 1988;105:350-6.
3. Pikos MA. Maxillary sinus membrane repair: report of a technique for large perforations. Implant dent 1999;8:29-34.
4. Misch CE. Maxillary sinus augmentation for endosteal implants: Organized alternative treatment plans. Int J Oral Implantol 1987;4:49-58.

How to cite this article: Gandhi YR, Singh M, Singh N, H. Implants in maxillary sinus. Natl J Maxillofac Surg 2012;3:214-7.

Source of Support: Nil. Conflict of Interest: None declared.