Localized Sinus Floor Elevation with the Use of an Implant: A Case Report

Implant Yardımı ile Gerçekleştirilen Lokalize Sinus Tabanı Yükseltildiği: Olgu Raporu

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ABSTRACT

Implant placement in the posterior maxilla is often complicated by deficiencies in the volume and the quality of available bone. Crestal approach have been used successfully for for sinus elevation to facilitate placement of implants in these region. Instruments called osteotomes are used to widen and condense the lateral walls of an osteotomy, followed by the upward fracturing of the sinus floor with the instruments. Variations of this technique have been developed. In this case report a different approach for the localized sinus floor elevation and the lateral wall condensation by the use of an implant and the 18 months results of this technique has been presented.

ÖZET


KEYWORDS

Dental implants, Sinus augmentation, Osteotome, Sinus membrane

ANAHTAR KELİMELER

İmplant, Sinus augmentationu, Osteotom, Sinus membranı
INTRODUCTION

The success rate obtained with dental implants depends to a greater extent on the volume and the quality of the surrounding bone. Misch et al., indicated that the minimum dimensions of an alveolar bone has to be 5 mm in width and 7-10 mm in height in order to place an implant with predictable results. Initial stability of the implant is one of the fundamental criteria for obtaining osseointegration.

Implant placement in the posterior maxilla is often complicated by deficiencies in the volume and the quality of available bone. Bone in the posterior maxilla is often in poor quality due to an unfavorable postextraction resorptive patterns and the pneumatization of the maxillary sinus.

The sinus lifting and grafting procedure, described by Tatum, is a well-known method to obtain sufficient bone levels for implant placement. The sinus lift procedure uses an access window through the lateral wall of the maxillary sinus for bone grafting between the Schneiderian membrane and the floor of the sinus. Other techniques for sinus elevation via crestal approach have been used successfully for more than 2 decades to facilitate placement of implants. The technique generally involves the use of instruments called osteotomes, to widen and condense the lateral walls of an osteotomy, followed by the upward fracturing of the sinus floor with the instruments. Variations of this technique have been developed. In this case report a different approach for the localized sinus floor elevation and the lateral wall condensation by the use of an implant and the 18 months results of this technique has been presented.

CASE PRESENTATION

A 38 years-old white male with non-contributory medical history referred to Hacettepe University, Faculty of Dentistry, Department of Periodontology for implant treatment for his missing maxillary left molar tooth. Radiographic examination revealed that the alveolar bone height was 8 mm and not sufficient for an implant placement. In order to place an ideal implant localized sinus floor elevation and the lateral wall condensation has been planned. After local anesthesia, sulcular incisions were made, a full thickness flap was raised. The width of the alveolar crest was 8mm and was favourable for the insertion of an 4.8mm WN ITI SLA (Straumann®, Freiburg, Germany) screw-type implant. In order to insert an implant 10 mm in length the osteotomy was prepared to a depth of 1 mm below the Schneiderian membrane, as determined tactiley and radiographically with a reduced speed of the handpiece (Figure 1). The implant osteotomy was prepared to the appropriate final diameter which was 4.2 mm. Then the implant was manually screwed into the receptor site using slight pressure creating a greenstick-type fracture in the antral floor which elevated the bone and also the sinus membrane (Figure 2). The apical portion of the implant engages the cortical floor, with bone over the apex, and an intact sinus membrane. The flap was sutured using 4.0 vicryl suture. The panoramic radiograph which was taken immediately after the surgery revealed a greenstick-type fracture appearance creating a 2mm increase in the height of the bone (Figure 3).

Patient was prescribed a prophylactic antibiotic therapy (500 mg Amoxicillin 2x1, 500 mg Ornidazol 2x1) starting on the day of surgery and continuing for 7 days postoperatively. Also the patient was told to use an antihistaminic (10mg sterizin HCl) once a day for 10 days and an analgesic to control pain or discomfort for a week. Patient was instructed to try not to blow his nose for at least 3 days after the surgery, and to cough or sneeze with an open mouth. Sutures were removed 1 week postoperatively. Healing was uneventful. After 6 months of healing the implant was restored with a well-designed guidance on the posterior teeth. Patient was seen every 6 months. Eighteen months after loading, panoramic radiograph still demonstrates a 2mm increase in height from the original antral floor (Figure 4).
DISCUSSION

Sufficient density and appropriate volume of bone are crucial factors for successful implant treatment. Bone resorption in the posterior maxilla can limit the possibility of placing implants that are long enough for the stability of the loaded implants.

Perforation of the Schneiderian membrane is the main intraoperative complication and occurs in % 7 to % 35 of the procedures which were done by Tatum technique. Since the crestal osteotome approach is a blind technique for sinus floor elevation, membrane perforation may occur. A % 4.7 detectable sinus membrane perforation has been reported in a study using osteotomy technique which was less than the open sinus lifting procedure. The sinus floor which can be elevated safely without a perforation using osteotomy technique depends on the localized anatomy, membrane quality and the experience of the surgeon. Experience of the surgeon and the radiographic evaluation is very important for using this technique since it is a blind technique and osteotomy is prepared only to a depth of 1 mm below the Schneiderian membrane.

Instruments for osteotome-mediated sinus floor elevation have been used by different clinicians. With the use of these instruments, the pressure which was created by the clinician will fracture the floor of the sinus and will help to lift the sinus membrane. It has been suggested that it is possible to observe a gain of approximately 3 to 4 mm of bone from the sinus floor to the implant apex with osteotome technique. The amount of initial alveolar bone height, presence of sinus membrane perforation, and the amount of exposed implant surface appear to play an important role for the bone gain after sinus floor elevation. With the use of the technique described in this case report will cause a well controlled and limited pressure which is safer, easier and less invasive. Sinus floor elevation by using Tatum technique is more complicated. This direct approach will increase the risk of membrane perforation. Clinician must be very well experienced. It will also take more time. Since no graft material is used in this technique it is cheaper than the direct technique. Also since
no additional graft is used in this technique success rate of implant survival might be higher than the other techniques. It has been shown that the maximum loss of the grafted material occurs in the first 12 months and loss of grafted material continuous to 36 months. It remains stable after 36 months and almost no loss of grafted material occurs after this time. The loss of implants occurs usually 3 years after the augmentation procedure. Technique described in this paper can be used only when a 2-3 mm of bone is needed for an optimal implant placement which can be evaluated as a limitation of this technique.

The success of the intact sinus membrane lift cannot be confirmed before or at the time of the implant placement. If sinus membrane perforation occurred during the initial implant placement procedure, increased bone height is not likely. This is the primary reason why only 0 to 2mm of additional bone height is attempted with this technique. It has been reported that the implant protruding 2 to 3 mm into the antrums of monkeys had complete spontaneous regeneration of bone over the entire surface. When the implants protruded up to 5 mm into the antrum only partial growth of the bone occurred at the implant apex. If a perforation has occurred an implant no more than 2 to 3 mm longer than the original sinus bone height must be placed.

Technique which was described in this case report may be used for only when 2 to 3 mm extra bone height is needed. If more than 3 mm of bone height increase is needed sinus elevation and augmentation technique described by Tatum should be used for a predictable implant treatment.

This technique can be very suitable and effective especially for the patients who have 7 to 8mm of bone height below the Schneiderian membrane and does not want or not suitable for an open sinus surgery.

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REFERENCES


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