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SHORT IMPLANTS AS A ALTERNATIVE TO LATERAL SINUS LIFT

Fahim Atamni
Clinic of Oral-Surgery and Implantology Tel-Aviv
Department of Oral and Maxillofacial Surgery, Orthopedic Stomatology and Oral Implantology
USMF "N.Testemitianu"

Abstract

The present studies evaluated short implants placement in the posterior maxilla with less than 10mm residual bone height to avoid invasive surgery such as maxillary sinus augmentation through a lateral approach. Two different surgical techniques; flapless surgical technique and flap opening technique were performed. Patients had been treated between the years 2000 to 2009 with different screw implants.

624 short implants, 8 mm in length and different diameters were placed in the partially or completely edentulous maxilla of 156 patients in the posterior maxilla and all patients were restored with fixed prosthesis. The patients mean age was 57 years (range 30 to 84 years) (92 females, 64 males). During stage II surgery and before loading, 25 short implants (4%) were not osseointegrated and were removed. After a mean loading period of 5 years 2 additional short implants were lost. Altogether 27 implants of 624 implants were removed; survival rates were also recorded. The secondary stability (SS) of implants was also evaluated immediately after implant exposures and then each year after first examination. This study showed a cumulative survival rate of 95% for short implants placed in the posterior maxilla.

Key words: short implants, survival rate, fixed prosthesis, sinus lift.

Introduction

The anatomy of the posterior maxilla presents many limitations to implant placement. These anatomic factors include poor bone quality and decreased bone quantity (1), location of the atrium. Because of these anatomic factors and some biomechanical factors (2), one would expect the success rate for implants placed in the posterior maxilla to be lower than that for other locations. In 1991, Reiger (3) recommended using a larger number of implants in the posterior maxilla to compensate for the decreased predictability for oseointegration in that area. Langer et

al (4) recommended for use of wider diameter implants to obtain a greater surface area for bone contact.

Invasive bone graft procedures, such as sinus lifts and only grafts had been advocated to permit implants placement, but these procedures require a longer healing period and may present other complications (5-8).

Force factors could effect the long-term stability of implants, specially in the posterior region (9).

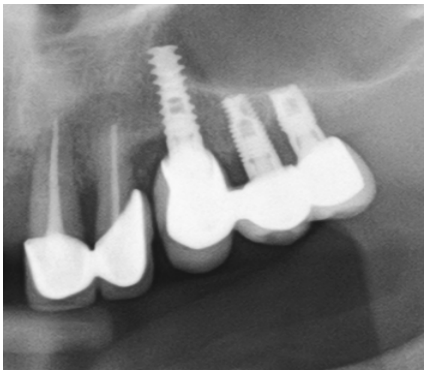
Masticatory factors of 288N and 565N in the premolar and molar regions have been reported respectively (10). Posterior cantilevers on implant prosthesis produce complications, such as screw fracture, abutment or prosthesis fracture bone loss. If short implants are used in the compact bone of the posterior maxilla and successfully osseointegrated, they can provide support and retention for implants restorations. Short implants placements in the posterior maxilla provides posterior bone support without sinus augmentation or supplemental grafts.

However there are no greater risks combined with implant placement in this area. Shorter implants may offer several advantages compared with longer implants (11). The surgical procedure is reduced in complexity with decreased risk of overheating the bone and subsequent each of site preparation and implant insertion. In 2006 Misch et al, reported on a retrospective 6-year case series study in this study the short implant dimension was dealt with by reducing biomechanical factors incisal guidance eliminated lateral forces in excursions. Multiple implants were always splited together additional implants or wider implants were used when possible according to Misch. Success rates of 99.7% by short implants were noted in 5 years follow up study (12). Other reports in the literature also support the use of short implants, provided proper for orientation and load distribution are favorable (13-18). The aim of this study was to evaluate short implants supported restorations as a alternative treatment for rehabilitation of the atrophic posterior maxilla and to avoid grafting procedures of the posterior maxilla.

Material and Method

This study included all patients whose treatment was planned and carried out in our private clinic (Clinic for Oral Surgery and Implantology - Tel-Aviv) for a fixed implant restoration involving implants in the atrophied posterior maxilla. The criteria for surgically placing implants in this area depended on a sufficient bone of at least 8 mm residual bone height in the area. Patient selection followed the same protocol as for standard implants. A total of 624 short implants were placed in the posterior maxilla of 156 patients (92 females, 64 males) with an average age of 54 years (range 30-84) between October 2000 and February 2009. Both partially and completely edentulous patients were included. Clinical and radiographic examinations of all 624 implants were performed 6 months after implants placement and each year after the first examination. Secondary stability (SS) of the implants were measured with the periotest (Medizintechnik Gulden, Germany) after screwing the healing caps. According to the residual bone height between the alveolar crest and sinus floor determined by radiographical examination of the vertical dimention multiple implants were placed which were always splinted together.

Figure 1



Implant selection was based on the anatomic factors of each individual site, including bone quantity and quality with the aim to maximize the surface area and primary stability of each implant. Different implant types were used; the most common implant is 8 mm long and 4.2 mm in diameter SLA implant. Table 1 illustrates the distribution of implant types.

Table 1

Distribution of Implant in the Posterior Maxilla				
Implant dimensions	1 PM	2 PM	1M	2M
3.75 mm diameter 8mm	8	21	11	8
4.2 mm diameter 8 mm	17	38	138	132
5 mm diameter 8 mm	19	25	108	99
Total	44	84	257	239

The most frequently used implants were implants with 4.2 mm in diameter, while wider-diameter implants (5.0 mm) were placed lesser. The logical method to increase functional surface area in this region is to increase the implant diameter, because the residual bone heights limit the implants length. The wider diameter reduces the risk of overload. According to the classification of Lekholm and Zarb (19) the quality of the posterior maxilla bone was subjectively divided in 4 groups corresponding of compact bone and the density of trabecular bone. Intraoperatively the bone quality of all patients were noted from the same operator.

Results

Of the 624 short implants placed in the posterior maxilla, 597 implants were fully osteointegrated. The cumulative survival rate of implants were 95%. This takes into account 2 failed implants at the 5 years follow-up examination. This study included different types of implants. According to the classification of Lekholm and Zarb (19) bone quality was subjectively recorded for each implant placed in the posterior maxilla. Figure 1 shows the various bone qualities encountered while implant placement. Type IV was most frequently encountered, 305 of the 624 implants were placed in Type IV bone (48.9%), 19 of them were failed in second stage surgery; survival rate was 93.8%. 220 of the 624 implants were placed in Type III bone (35.3%), 8 of them failed in the second stage surgery, survival rate was 96.4%. 74 of the 624 implants were placed in Type II bone (12%) and all were fully osteointegrated, 25 of the 624 implants were placed in Type I bone (3.8%) and no implant failure was recorded.

The average age of the patients was 57 years. 5 different types of implants failed in posterior maxilla. The largest number of failed implants (19) were DF, alpha Bio implants 3.75 mm n diameter all other implant types had 4 or fewer failures. No patient reported discomfort from pain, swelling, bleeding after the operation. The patients who experienced implant failure in the posterior maxilla were not taken any medications regularly.

The survival of each implant was evaluated at the time of restoration 4 months after implant placement through the SS measurements, Periotest Value (PV) of each patient were analysed and documented like in Table 2.

Table 2

PV of inserted implants in the Posterior Maxilla									
D	L	Periotest Value							
5.0	8	-3							-4
4.2	8		-4	-4	-5	-6	-4	-3	
3.75	8								
Teeth Nr.		7	6	5	4	4	5	6	7
Total implants									

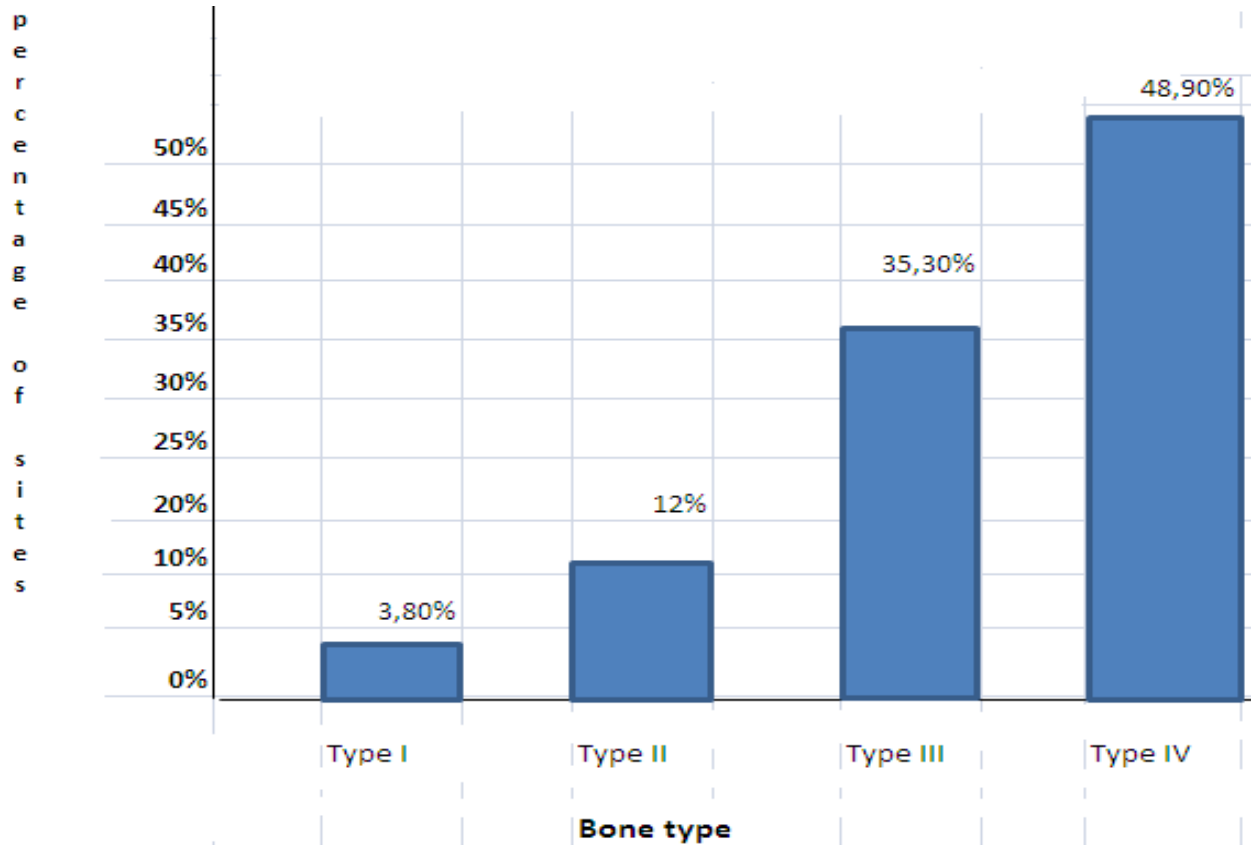


Fig 1:Distribution of implants according to bone density.

Discussion

In the last decade several authors have focused their studies on short implants to evaluate their reliability, and high survival and success rates have been reported (14-18). The bone surrounding implants that are placed in the posterior maxilla may be inferior in quality, especially in the premolar or molar region (16) .The advantage of placing short implants in the posterior maxilla is the ability to provide bone retention without sinus augmentation or any grafting procedure involving full integrated and splinted implants can enhance initial stability and long term success. Several variables can influence the final result, but in general they are grouped as surgical factors, implant and occlusion-related factors. The survey factors such as a surgical trauma bone damage, sharpness and design (20). Bone quality and quantity are the most important factors (21) ,while design surface coating (22), diameter and length are the important implant related factors, force design is the important occlusion related factor. All these variables are a matter of scientific investigations because they may influence the clinical outcome. The survival of each implant was evaluated through SS measurement, PV values were recorded after disclosure, following placement of prostheses, marginal bone maintenance as seen in the panoramic radiographs and the absence of pain, swelling or infection. The success rate for short implants placed in the posterior maxilla was 95% which compares favorably with the results of previous studies of short implants placed the posterior maxilla (23).

Das Neves et al (24) rewied the results of 33 studies of studies of 16,344 Branemark-type implants and assessed failure rates over time seven hundred eighty six failures were reported, representing a failure rate of 4,8%. There was no correlation between implant length and implant success or failure. Buser et al (25) reported upon 2,359 titanium plasma-sprayed internal-attachment implants. No difference in implant survival rates between longer and shorter implants were reported in an 8-year life table analysis. Examinations of success and failure rates following implant placement in the posterior maxilla underscored the predictability of shorter implant use.
Fugazzotto et al (26) reported on 987 implants that were 6, 7, 8 or 9 mm in length placed in maxillary molar position and restored with single crowns. A cumulative success rate of 95,1%

was reported. The success rates of previous studies compares favorably with the results of this study. Implant insertion must be accomplished as atraumatically as possible, with minimal amount of lateral pressure against the walls of the osteotony to help prevent inadvertently widening the osteotony site.

Conclusions

Short implant in the posterior maxilla are beneficial in the restoring the maxillary arch. Implants placed in the posterior maxilla assist in the stabilizing bone-anchored prosthesis. Based upon this retrospective report of 8 mm implants in length in the posterior maxilla, the following observations were made: from October 2000 to February 2009 624 8 mm implants were placed in the posterior maxilla and restored, implant survival rate is 96%.

The survival rates are similar to those reported in the literature, regardless of implant length. Short implants may provide an alternative approach to the rehabilitation of atrophied maxilla reducing patient morbidity compared to conventional advanced augmentation procedures of the sinus. Short implant insertion is relatively easy to perform in any private clinic by surgeon, who is not trained for advanced techniques.

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REALIZĂRILE MEDICINEI STOMATOLOGICE URBANE CU DIFERITE FORME DE GESTIONARE ŞI PERSPECTIVELE DE DEZVOLTARE

Anatolie Pancenco
Catedra Chirurgie OMF, Stomatologie ortopedică şi implantologie orală FPM
USMF „Nicolae Testemiţanu”

Summary

Stomatolog medicine realization with differit chainds of perspective graduate

This compartment stud according to the results of the both included Public Medical – Sanitary Institutions dentistry profil and Private Medical –Sanitary Institutions from Chisinau during 1999 – 2008 years has been.

Essential indices of the Dentistry Institutions activity and the dynamic development during mentioned years have a variable character with the tendency of development and continuous improvement according to modern requirements.

Rezumat

Studiul la compartimentul dat a fost efectuat în baza rezultatelor activităţii Instituţiilor Medico - Sanitare Publice de profil stomatologic, cît şi structurilor medicale private din municipiul Chişinău pe parcursul anilor 1999 – 2008. Indicii de bază ai activităţii instituţiilor de profil stomatologic, cît şi dezvoltarea în dinamică pe perioada anilor menţionaţi poartă un caracter variabil, cu o tendinţă de dezvoltare şi de perfecţionare continuă în raport cu cerinţele contemporane.