Surgical Success of Dental Implants Placed in Sinus Lift and Non-Sinus Lift Areas in Warfare Victims Presenting to Ghazi Tabatabai Clinic from 2001 to 2008

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Abstract

Objective: Local bone augmentation in the posterior maxilla (sinus lift) before the placement of dental implants has become an acceptable treatment technique in implant dentistry. However, limited documented data are available on the results of this technique and relevant issues in Iran. The present study aimed at evaluating the surgical outcome of sinus lift and implant placement in warfare victims presenting to Ghazi Tabatabai Clinic during 2001-2008.

Methods: In this retrospective study, 50 patients that had undergone sinus lift surgery were evaluated. All warfare victims presenting to the clinic who had a medical record and undergone sinus lift treatment were enrolled. Those with incomplete medical files were excluded from the study. The required data were extracted from patients’ medical records and entered into a questionnaire. The mean duration of follow up was 53.32±23.05 months. The surgical success criterion was presence of osseointegrated implants in the oral cavity during the follow up period. Statistical analysis was performed using t-test and Fisher’s exact test.

Results: failed out of which 5 were in the sinus-lift area. Thus, the total success rate, the success rate of implants placed in the sinus lift area and the success rate of those out of the sinus lift area were 96.6%, 93.9% and 98%, respectively.

Conclusion: The study results demonstrated high success rates for implants placed in sinus lift and non-sinus lift areas in warfare victims.

Key words: Sinus floor augmentation, Maxillary sinus, Dental implants, Treatment failure, Osseointegration, Warfare victims

Please cite this article as follows:

Introduction:

Patients with severe maxillary atrophy are susceptible to change in the function of speech, deglutition and mastication. These changes usually result in development of severe psychological problems in these patients (1). Such patients are the best candidates to benefit from the advantages of implant placement in the atrophic areas (2-5). However, decreased bone volume due to resorption (especially when the teeth have been missing for a long time), poor quality of bone and anatomical barriers like the pneumatization of maxillary sinus in the posterior maxilla can compromise implantation or its long term success (6). Bone resorption in an edentulous area necessitates augmentation
before implant placement. In the posterior maxilla, sinus lift is a standard procedure for this purpose which has gained lots of attention (7). The maxillary sinus lift technique was first described in the late 1970s to facilitate implant placement in the atrophic posterior maxilla (8). Boyne and James were the pioneers to describe this technique in 1980 (9). Since then, several methods have been suggested for maxillary sinus floor augmentation (10) and different graft materials have been used for this purpose. However, it is not clear which one is the most appropriate for bone regeneration (11-13). Knowledge about the effective factors in the course of sinus lift and implant treatments and their success or failure can play a significant role in treatment planning and proper selection and use of available techniques and may significantly enhance implant survival. However, limited information is available on the sinus lift treatment results and relevant issues in Iran.

Ghazi Tabatabai clinic is affiliated to Shahid Beheshti University of Medical Sciences and following an agreement with the Islamic Revolution Mostazafan Foundation has been providing dental care services such as dental implant therapy for warfare victims suffering from dentofacial traumas since 2000. The present study aimed at evaluating the surgical outcome of sinus lift and implantation in warfare victims presenting to Ghazi Tabatabai Clinic during 2001-2008. The results can help in recognition of the factors influencing the success rate and their consideration in future studies.

Methods:

In this descriptive cross sectional study, 50 patients who had undergone sinus lift surgery were evaluated. These patients were warfare victims suffering from maxillofacial, mental and psychological, spinal or chemical traumas. Of the 50 under study patients, 49 were males and one was female. The mean age of patients was 46 years. The mean degree of disability was 38.6%. The highest degree of disability was 25%. All warfare victims who had a medical record in Ghazi Tabatabai Clinic and had undergone SL surgery and implant placement during 2001-2008 were entered the study. Subjects with incomplete medical records were excluded. The mean duration of follow up was 53.32±23.05 months.

The required data were extracted from the patients’ medical records and entered into a questionnaire containing several questions regarding demographic characteristics of subjects (patient’s first and last names, date of birth, file number, and degree of disability) and a few questions about the type of treatments received. For this study, first a pilot study was carried out. Some of the records were evaluated and the required data were entered into a questionnaire. The relevant assessments were performed and unpredictable findings and variables were added to the questionnaire. Then, all medical records were evaluated and data were entered into the new questionnaire. After completion of data entry, all records were re-evaluated to ensure completion of questionnaires and accuracy of the entered data.

Selection of the brand of implant was based on the agreement between the Mostazafan Foundation and Ghazi Tabatabai Clinic. Mostazafan Foundation was in charge of purchasing the implants. Thus, choosing the implant brand was not an option. Implants that stayed in place during the follow up period and met the success criteria of Smith and Zarb (14) were considered to be successful.

Data were analyzed using SPSS version 15 software. The frequency of different variables was calculated and reported as number and percentage. The mean value of quantitative variables was also calculated and reported. T-test and Fisher’s exact test were used for analysis and comparison of results.

Results:

Of 50 understudy patients, one was excluded due to having an incomplete medical record and several previous surgeries in the maxillofacial area. For the remaining 49 subjects, a total of 235 implants were placed out of which 82 were in the sinus lift and 153 were out of the sinus lift area. Of a total of 49 sinus lift surgeries, 30 were performed with open and 19 with closed techniques. The smallest and the largest implant
diameters were 3 mm and 6.5 mm, respectively. The most commonly used implant had 4 mm diameter. The shortest and tallest implants were 8.5 mm and 15 mm, respectively. The most common implant used had 13 mm height. The highest number of implants received by a patient was 9 implants and the lowest was one. Brands of implants used in this study are demonstrated in Table 1.

<table>
<thead>
<tr>
<th>Brand</th>
<th>Frequency</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>F2</td>
<td>27</td>
<td>11.4</td>
</tr>
<tr>
<td>Biohorizon</td>
<td>23</td>
<td>9.8</td>
</tr>
<tr>
<td>3i</td>
<td>112</td>
<td>47.7</td>
</tr>
<tr>
<td>Xive</td>
<td>61</td>
<td>26</td>
</tr>
<tr>
<td>Branemark</td>
<td>3</td>
<td>1.3</td>
</tr>
<tr>
<td>Noble Biocare</td>
<td>9</td>
<td>3.8</td>
</tr>
<tr>
<td>Total</td>
<td>235</td>
<td>100</td>
</tr>
</tbody>
</table>

The most commonly used implant brand was 3i. Of 235 implants, 8 implants failed. Thus, the total success rate of implants was 96.6%. Of 8 failed implants, 5 were in the sinus lift area. Therefore, the success rate of implants placed in the sinus lift area was 93.9% while the success rate of implants out of the SL area was 98%. Of 5 failed implants in the sinus lift area, two were at the location of tooth number 16, two at the location of tooth number 26 and one at the location of tooth number 27. Of a total of 8 extracted implants one failed after 5 months, 2 after 6 months, 4 after 8 months and one after 36 months. The mean time to failure for these implants was 476 days (range 7 days to 6 and a half years).

Fisher’s exact test failed to find a significant association between the length or diameter of implants, technique of surgery or brand of implant and treatment outcome. The reason may be the small number of failed cases.

Discussion:

The present study evaluated the surgical outcome of sinus lift and implant placement in warfare victims presenting to Ghazi Tabatabai Clinic during 2001-2008. The study results demonstrated that the total success rate of implants placed in SL area was 93.9%.

In a study conducted by Bornstein in 2008 (15), a total of 59 SL procedures were performed on 56 patients and 111 implants were placed. In general, 13 implants failed due to various reasons. Thus, the total success rate of implants was 98%. In their study, smokers and patients with severe systemic conditions were excluded from the study. Whereas, in our study census method was used for data collection and our only exclusion criterion was incomplete medical record. Additionally, the present study was conducted on warfare victims with various degrees of dentofacial traumas. Furthermore, this was a retrospective study and all the evaluations were performed on the data extracted from patients’ medical records. Thus, type of variables or their method of assessment could not be changed. Due to the mentioned issues and also the fact that no similar study has been conducted to date, acceptable comparison of results was not possible.

In a study by Schleier in 2008 (16), 62 implants were placed for 30 patients. They used Resonance Frequency Analysis for assessment of implant stability immediately after insertion and also before loading. Of 62 implants, 59 were successfully integrated. Thus, the overall success rate of implants was reported to be 94%. Their exclusion criteria were bone height <4 mm and width<5 mm, chemotherapy patients, those with bone defects, renal or liver conditions, psychological problems and poor oral hygiene. In our study, of 82 implants placed in the SL area, 5 failed yielding an overall success rate of 93.9%. None of the above mentioned exclusion criteria were considered in our study and our patients had suffered from various degrees of dentofacial, psychological, chemical and orthopedic traumas. For instance, patients who had a problem in their hands had a poor oral hygiene because they were unable to properly brush their teeth. Some others had previous history of diseases for which they were still under medication. However, due to the retrospective method of study and insufficient data on patients’ records, information in this respect was scarce.

Emmerich in his systematic review in 2005 (17)
concluded that Short-term clinical success (up to 3 years) of implants placed with osteotome sinus floor elevation technique was similar to that of implants conventionally placed in the posterior maxilla.

In the present study, of 57 implants placed with open SL technique, 52 were successful and 5 failed. Whereas, all the 25 implants placed with the closed technique were successful. Considering the high success rate of implants placed in the SL area, comparison between the open and closed techniques was not possible. This finding can further confirm the results of the aforementioned systematic review.

In a study by Hatano et al, in 2004 (13), the clinical success rate of implants was reported as 94.2% and all implant failures occurred within 3 years following augmentation.

In the current study, the latest treatment failure occurred 3 years after insertion. Thus, we may state that our study results confirm those of previous studies.

**Conclusion:**

This retrospective descriptive study demonstrated that implant placement with or without open or closed maxillary sinus lift surgery in warfare victims with various degrees of dentofacial, neural, psychological, spinal, chemical or orthopedic traumas was associated with a high success rate with minor differences that were not statistically significant.

**Limitations and Suggestions**

As mentioned earlier, this study had several limitations. These limitations did not confound our results but limited their generalization. This study could not evaluate the effect of different factors on the outcome. These limitations are as follows:

1. This retrospective study was limited to the information present in patients’ medical records.
2. Details of the performed therapeutic procedures and the factors affecting the outcome were not present in patients’ records.
3. Variation in the time of follow up was another problem. Many of the patients were residing in other cities and due to their physical problems were not able to show up for their follow up session at the scheduled time.

**References:**


