<Original Article>

Evaluation of Survival Rate and Crestal Bone Loss of the Osstem GS Ⅱ Implant System

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• Abstract

The survival rate of the OSSTEM GS II Implant 1 year after serving the prosthetic function in 2 domestic and foreign medical institutes was 97.57%; the success rate was 95.7%, and the average alveolar bone resorption was 0.24mm(n=389). In particular, the alveolar bone resorption occurred differently according to the placement location as well as whether or not the patient underwent bone grafting operation, but the implant s length and diameter did not have significant impact on alveolar bone resorption.

• Keywords : GS Ⅱ implant, survival rate
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Introduction

OSSTEM GS Implant is a submerge type with internal hex connection structure; it is characterized by the micro/macro dual thread designed to minimize bone resorption. The surface is treated with RBM (resorbable blast media), with the body design enabling the simple adjustment of placement depth and assuring superb initial stability.

This study examined the survival rate of OSSTEM

GSII Implant and the bone resorption rate 1 year after prosthesis placement based on cases of surgeries performed in 1 domestic and 1 foreign medical institutes.

Materials and Methods

Patients who underwent the Osstem GS Implant (Osstem, Korea) placement surgery at the Department of Dentistry of Bundang Seoul National University Hospital from June 2005 to October 2008 and patients who had placement surgery with the same implant at a dental clinic in Singapore from March 20, 2007 to April 28, 2008 were surveyed. There were a total of 278 patients (146 males and 132 females) and 698 implants placed. Alveolar bone resorption 1 year after the completion of prosthetic placement could be measured among 134 patients (72 males and 62 females) where 389 implants were placed. The success rate and survival rate considered all patients. The implant was considered to have survived when osseointegration was maintained at the current point and was not removed due to symptoms such as mobility and pain. For the success rate of the implant, only those with less than 1.5mm of bone loss for 1 year after placement were included in the calculation. Alveolar bone resorption was measured in patients who had periapical radiograph taken 1 year after the completion of prosthesis.

The region where the implants were placed was divided into 4 groups: upper anterior, upper posterior, lower anterior, and lower posterior. The anterior included teeth from central incisor to canine, and the posterior, premolar and molar. The average bone resorption in each group was measured.

Patients were divided into the case of performing maxillary sinus elevation or horizontal/vertical bone grafting and the case of not performing the above to examine the alveolar bone resorption 1 year after the completion of prosthetic placement in each group.

The implant's diameter was categorized into 4 types from a minimum of 3.5mm to a maximum of 5mm; the average alveolar bone resorption in each group was then measured.

The implant's length was divided into 6 groups from a minimum of 7mm to a maximum of 15mm; the average alveolar bone resorption in each group was then measured.

To examine bone resorption, the distance between the first screw thread to the very top of the resorbed alveolar crest as represented in the parallel periapical radiograph was measured; alveolar bone resorption on the mesial and distal sides were measured with the distance measurement program of IMPAX (Agfa, Belgium), with the average recorded.

SPSS 12.0 (LEAD Technology, USA) was used for the statistical calculation. ANOVA was used to examine the difference in alveolar bone resorption due to placement area and implant's diameter, and independent T-test, to examine the difference in alveolar bone resorption due to bone placement surgery method. The Kruskal-Wallis method was used to verify the significance at $p<0.05$. For the post-hoc test of ANOVA, Tukey's Studentized Range and Duncan's Multiple Range Test were performed; for the post-hoc test of Kruskal-Wallis, the Bonferroni procedure was applied.

Results

Among the 698 GS implants placed, 681 survived until 1 year after placement. The survival rate was 97.57%. Excluding 13 implants that showed 1.5mm or more bone resorption, the success rate was 95.70% (668/698).

The alveolar bone resorption rate measured 1 year after 1 year bm ofsTrinisured.

Less bone resorption was observed in case bone grafting such as maxillary sinus elevation and horizontal/vertical bone grafting was performed compared to the case when the above was not performed, and the difference was statistically significant (p=.022). Average alveolar bone resorption of 0.30mm (sd=.50, n =173) was observed in case bone grafting was not performed, and average of 0.19mm (sd=.45, n=212) (Table 2), in case it was performed.

Alveolar bone resorption did not show significant difference in relation to the implant's diameter (p=0.691), recording 0.19mm (sd=0.37, n=78) when the diameter was 3.5mm, 0.25mm (sd=0.50, n=129) when the diameter was 4.0mm, and 0.23mm (sd=0.47, n=81) when the diameter was 4.5mm. Alveolar bone resorption was 0.27mm (sd=0.50, n=99) when the diameter was 5.0mm (Table 3).

Alveolar bone resorption showed significant difference in relation to the implant's length (p=0.016), recording 0.23mm (sd=0.33 n=28) when the length was 7mm, 0.12mm (sd=0.30, n=57) when the length was 8.5mm, 0.30mm (sd=0.57, n=115) when the length was 10mm, 0.27mm (sd=0.54, n=97) when the length was 11.5mm, 0.25mm (sd=0.38, n=60) when the length was 13mm, and 0.58mm (sd=0.23, n=3) when the length was 15mm (Table 4).

concentrated in the cancellous bone which has less density[7]. In this study, the highest resorption was found in the lower posterior, upper posterior, lower anterior, and upper anterior