Clinical study on implant survival and graft resorption rate after maxillary sinus bone grafting

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Background: The edentulous posterior maxilla generally provides a sharp ridge and pneumatization of maxillary sinus. Maxillary sinus bone grafting is one of the surgical techniques for reconstruction of the severely resorbed posterior maxilla. The survival rate of implant implanted after maxillary sinus grafting may be affected by the use of appropriate bone graft materials, the diameter and length of implants, the amount of residual ridge, and the selected surgical procedure.

Aim/Hypothesis: The purpose of this study is to show the total survival rate of implants after maxillary sinus grafting and the effects that reach the survival rate by types of graft materials, implant type, operation method, residual bone height and evaluate graft material resorption rate after sinus grafting.

Material and Methods: This study was performed on 24 patients who underwent maxillary sinus osteotomy through lateral approach in Oral Maxillofacial Surgery, Sanbon Dental Hospital, Wonkwang University. The mean age of the patients was 53 years. The ratio of male to female was 13 in male and 11 in female. (i) 61 dental implants placed with sinus bone grafting in 24 patients at Wonkwang University Sanbon Dental Hospital were installed simultaneously or after regular healing. (ii) Various bone grafts (autograft, xenograft, allograft, alloplast) and fourth implant type (GSII, Xive, Implantium, Novel biocare) were used. (iii) All implants were investigated clinically and radiographically, being with average 20 months follow-up period after installation. A - Graft ~ Apex of implant B - Grafted bone height in the area with implant C - Residual ridge

Results: A total of 61 implants placed in 28 maxillary sinuses of 24 patients were examined for survival rate of implants for a mean of 20 months after implantation. The height change of the bone graft material after the maxillary sinus graft was measured and observed using a panoramic photograph. The following results were obtained. (i) 3 fixtures were lost, resulting in 95.1% cumulative survival rate of 61 osseo-integrated dental implant. (ii) Survival rate according to bone material type, Implant type, operation method, residual bone height, have no statistically significant differences. (iii) The mean preoperative residual alveolar bone height was 4.75 mm, average postoperative height of graft materials 10.8 mm, vertical bone resorption rate was 10% after 2 years. (iv) Resorption rate according to operation method was 7%(simultaneous) and 5%(delayed) after 1 year.

Conclusions and Clinical Implications: Within the limit of the result of this study it can be suggested that maxillary sinus grafting may show predictable clinical result. Operation method, remaining bone height, type of implant and type of bone augmentation material had no effect on implant success. Resorption rate of sinus bone graft according to type of bone augmentation material and operation method may not be clinically significant difference.