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# In Vivo Estimation of Clinical Efficiencies of Two Commercially Available Grafts during Sinus Lift Procedure for Insufficient Implant Bone Heights: An Original Research Study

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KEVWODDS	ABSTRACT:
KE I WORDS	Background and Aim: Insufficient bone availability is one of the greatest challenges in
Dental Implant,	restoring missing teeth by implants. Many clinical approaches have been discussed by several
Sinus Lift, Bone,	clinical to resolve this issue however, none of the method is seems to be ideal. Therefore this
Grafts, Maxillary	in vivo study was conducted to estimate clinical efficiencies of two commercially available
Sinus, Osteotomy	grafts during sinus lift procedure for insufficient implant bone heights.
	Materials and Methods: Total 20 patients were selected and studied in detail including males
	and females in the age range of 26-50 years. Group 1 patients included 10 patients wherein
	Geistlich Bio-Oss Small Granule Bone Grafts was used during sinus lift procedure for
	insufficient implant bone heights. Group 2 patients included 10 patients wherein Septodent
	RTR (Resorbable Tissue Replacement) Bone Grafts was used during sinus lift procedure for
	insufficient implant bone heights. Sinus lift procedure was performed and bone grafts were
	placed and clinical performances were sought in post operative phases Statistical analysis
	was conducted to draw the inferences and results. P value less than 0.05 was taken as
	significant.
	Statistical Analysis and Results: Results showed that out of 20 studied patients, 13 were
	males and 7 were females. In group 1, total 8 patients showed satisfactory outcomes with
	highly significant p value (0.01). In group 2, total 6 patients showed satisfactory outcomes
	with significant p value (0.02). One-way ANOVA showed that the level of significance
	calculated for between the groups was highly significant (0.001).
	Conclusion: Within the limitations of the study, authors concluded that Geistlich Bio-Oss

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Small Granule Bone Grafts was more clinically useful than Septodent RTR (Resorbable Tissue Replacement) Bone Grafts when evaluated in 6 months post operative phases during sinus lift procedure for insufficient implant bone heights.

### Introduction

Implant surgery has always been a challenging task for clinicians since there are several factors involved in it. Maxillary arch implant placement is clearly different from mandibular arch.<sup>1-3</sup> In Lower arch, we must consider about the proximity of anatomical structures while in maxillary sinus is the point of concern in the upper arch. Most common cause of tooth loss is chronic periodontitis and associated activities.<sup>4-8</sup> These diseases primarily caused tooth mobility by resorption of bone which ultimately leads to partial or complete edentulism. This is particularly true for Indian scenario. In India, chronic periodontitis is prime reason for tooth loss in elderly. In the literature, several methods have been experimented to manage these conditions. Application of bone grafts are most commonly used for severely resorbed bony conditions.9-13 There are several bone grafts available now a days with their own advantaged and disadvantages. A particular single bone graft material cannot be utilized in all clinical circumstances unanimously. Therefore, clinician must be completely aware of the indication and disadvantages of grafts before their clinical usages.<sup>14-16</sup> In view of all these remarkable facts and information, this in vivo study was conducted to estimate clinical efficiencies of two commercially available grafts during sinus lift procedure for insufficient implant bone heights.

### **Materials and Methods**

This study was planned and conducted to find out the possible solution of the said problems. The study design was in vivo wherein the materials were tested and evaluated on selected patients. To make sure the consistency, authors deployed single alike clinical team for all implant related osteotomy procedure. Total 20 patients were selected and studied in detail in the study. All patients were selected by stratified systematic sampling procedure. Both male and female subjects were included in the study. Inclusion criteria included; patients with missing posterior teeth which needs artificial replacement (single maxillary molar of either

side right/left), patients with insufficient bone availability for placing implant, patients in the age range of 26-50 years. Exclusion criteria included patients without with all teeth present in upper arch, patients with any type of post operative follow up problem, patients receiving intense medication for other diseases which could possibly impede with data transparency. All 20 patients were grouped under two categories. Group 1 patients included 10 patients wherein Geistlich Bio-Oss Small Granule Bone Grafts was used during sinus lift procedure for insufficient implant bone heights. Group 2 patients included 10 patients wherein Septodent RTR (Resorbable Tissue Replacement) Bone Grafts was used during sinus lift procedure for insufficient implant bone heights. Septodent RTR Bone Grafts is made by beta tricalcium phosphate granules and it releases calcium and phosphate ions to enhance bone formation. Septodent RTR Bone Grafts is also osteo-conductive which helps in bone renewal within 4-5 months. Maxillary sinus lift procedure was performed in indicated situations and bone grafts were placed for managing insufficient implant bony heights. Clinical performances and behaviors were noted in post operative phases for both the groups and results formulated accordingly. The responses were studied as satisfactory and nonsatisfactory in 6 months post operative timings. Signed and informed consents were obtained from all participating patients. Statistical analysis was conducted to draw the inferences and results. P value less than 0.05 was taken as significant.

### Statistical Analysis and Results

All the identified responses were mapped as raw data and it was checked for any potentially integrated error. Subsequently data was subjected to basic statistical analysis with SPSS statistical package for the Social Sciences version 22 for Windows. Nonparametric test, namely, chi-square test, was used for further data analysis; p-value. Out of 20 studied patients, 13 were males and 7 were females [Table 1, Graph 1]. P-value was highly significant for age group 26-30 years. It

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was 0.02. Maximum 8 patients were found in age group of 31-35 years. Table 2 illustrates about the basic statistical description with level of significance evaluation using "Pearson Chi-Square" test. It was for Group 1 for Geistlich Bio-Oss Small Granule Bone Grafts during sinus lift procedure for insufficient implant bone heights. Responses were noted as satisfactory and non-satisfactory in 6 months post operative timings. Total 8 patients showed satisfactory outcomes with highly significant p value (0.01). Table 3 illustrates about the basic statistical description with level of significance evaluation using "Pearson Chi-Square" test. It was for Group 2 for Septodent RTR [Resorbable Tissue Replacement] Bone Grafts during sinus lift procedure for insufficient implant bone heights. Responses were noted as satisfactory and nonsatisfactory in 6 months post operative timings. Total 6 patients showed satisfactory outcomes with significant p value (0.02). Table 4 illustrates about the estimation amongst all studied questions using one-way ANOVA. The level of significance calculated for between the groups was highly significant (0.001).

Table 1	: Age	& gender	based statistical	description of	of contributing	patients
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Age Group (Yrs)	Male	Female	Total	P value
26-30	3	1	4	0.02*
31-35	6	2	8	0.10
36-40	2	1	3	0.60
41-45	1	2	3	0.70
46-50	1	1	2	0.90
Total	13	7	20	*Significant
			*]	o<0.05 Significant



Graph 1: Patients demographic distribution and associated details

**Table 2:** Basic statistical description with level of significance evaluation using "Pearson Chi-Square" test (Group 1 for Geistlich Bio-Oss Small Granule Bone Grafts during sinus lift procedure for insufficient implant bone heights, n=10), Noted as satisfactory and non-satisfactory in 6 months post operative timings

Status	n	Stat. Mean	Std. Dev.	Std. Error	95% CI	Pearson Chi- Square Value	df	p value
Satisfactory	8	1.13	0.019	0.055	1.96	1.281	1.0	0.01*
Non-Satisfactory	2	1.02	0.541	0.128	1.12	1.942	2.0	0.08
						*	p<0.05 s	significant

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**Table 3:** Basic statistical description with level of significance evaluation using "Pearson Chi-Square" test (Group 2 for Septodent RTR [Resorbable Tissue Replacement] Bone Grafts during sinus lift procedure for insufficient implant bone heights, n=10). Responses were noted as satisfactory and non-satisfactory in 6 months post operative timings

Status	n	Stat. Mean	Std. Dev.	Std. Error	95% CI	Pearson Chi- Square Value	df	p value
Satisfactory	6	1.03	0.094	0.055	1.23	1.049	1.0	0.02*
Non-Satisfactory	4	1.01	0.364	0.128	1.94	1.237	2.0	0.92
	*p<0.05 significant							

**Table 4:** Estimation amongst all studied questions using one-way ANOVA [Group 1= Geistlich Bio-Oss Small GranuleBone Grafts, Group 2= Septodent RTR (Resorbable Tissue Replacement) Bone Grafts]

Variables	Degree of Freedom	Sum of Squares $\sum$	Mean Sum of Squares m∑	F	F Sig. (p)	
Between Groups	2	1.530	1.937	1.1	0.001*	
Within Groups	15	2.504	0.237	-		
Cumulative	101.13	07.234	:	*p<0.0	5 significant	

### Discussion

Bone grafts have been extensively studied since decades by several researchers. Literature has well evidenced that bone graft materials are the first choice of clinicians for clinical management of most of the bony defects.<sup>17-20</sup> All the bony deficiencies or defects of upper and lower jaws are also indicated for bony reconstructions using bone graft materials. Mostly, auto-grafts are used for major bone reconstructive surgeries. For minor oral surgical procedures like implants and bone augmentations, dental practitioners recommends to use commercially available powdered form of bone graft materials.<sup>21-25</sup> These grafts are extremely useful in case of enucleation of major jaw cysts. Many researchers have also confirmed that bone graft materials are also employed for jaw resection surgeries as in case of treatment of ameloblastoma and their variant.<sup>26-28</sup> Sometime, surgeons prefer to fill powdered bone grafts in cases of enblock respective surgeries. In maxillary arch surgery or implant osteotomy, there is a potential risk of exposing or invading maxillary sinus. It happened mostly when there is clinical deficiency of alveolar bone. Therefore in an attempt to achieve primary stability in implant, dentist has to put sufficient quantity of bone graft material. Studies have been conducted on the success rates and outcomes of grafts.<sup>29-30</sup> Mostly, they confirmed the success rate of more than 50% when placed precisely under strict sterilization.

### Conclusion

Within the limitations of the study, authors concluded extremely significant inferences and results. Geistlich Bio-Oss Small Granule Bone Grafts was found more clinically useful than Septodent RTR (Resorbable Tissue Replacement) Bone Grafts when evaluated in 6 months post operative phases. Therefore authors recommended clinical usage of Geistlich Bio-Oss Small Granule Bone Grafts for managing insufficient implant bone heights during sinus lift procedure. However for both of the experimented grafts, infections can also be seen if the surgical procedure is not attempted in a strict sterile environment. Authors also anticipate some other long term future studies so as to set up other significant norms in these prospects.

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