

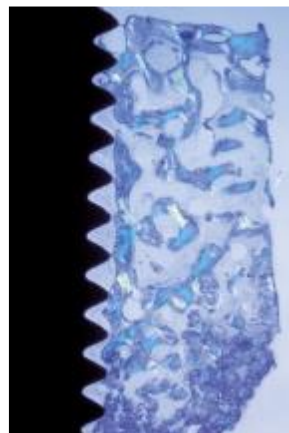
Minimally Invasive Sinus Augmentation Rational and Guidelines

Before we begin to discuss the indications of when to use the sinus bump or the microsurgical lateral approach when placing the implant and the graft material at the same time, it is critical to understand the importance of how implants integrate or don't integrate to the bone graft inside the sinus.

In the study "Histologic Analysis of Clinically Retrieved Titanium Microimplants Placed in Conjunction with Maxillary Sinus Floor Augmentation" It was proven that neither autografts or allografts when grafted into the sinus at the same time as implant placement do not produce integration to the implant as shown in these two photomicrographs from the study after either 6 months or 12 months. When implants are placed immediately into grafted sinuses grafted with these materials only the preexisting bone is supporting the implant. Likewise these materials have been shown to not produce integration when placed around immediate implants in extraction sockets.



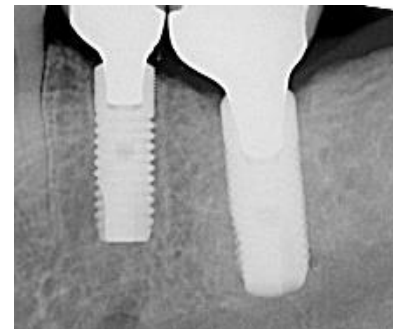
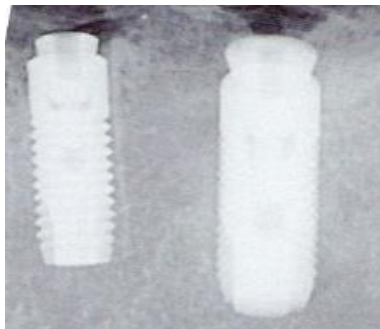
Allograft with no integration



Autograft with no integration

Sinus Graft, Socket Graft Putty & Ridge Graft are the only graft materials in today's market to produce integration through the graft material in both immediate extraction sockets and sinuses. These 2 cases below were implants floated in Socket Graft Putty and Sinus Graft.

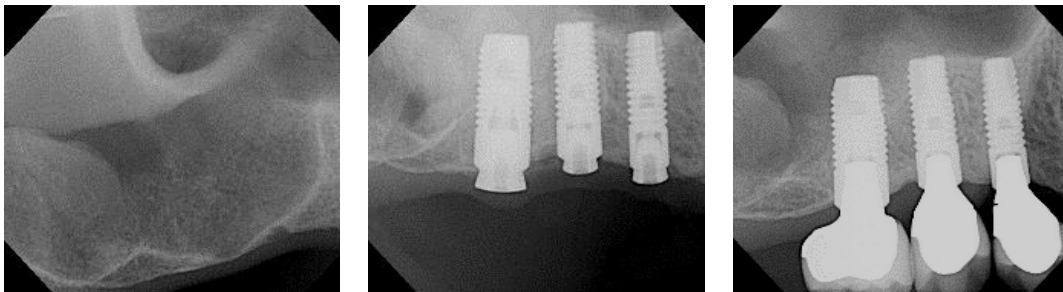
#19 failed core vent implant. Implant floated in our graft material with no bone contact. Loaded 3 months later. Final radiograph taken approximately two years after being in function.



Floated in Socket Graft Putty™ final radiograph at healing abutment appoint with the implant integrated.



Implants placed in approx. 1 mm of bone, grafted the same day with Sinus Graft™. Healing abutments placed 3 months after implants and Sinus Graft. Final radiograph approximately 2 years after loading.



The ability of a graft material to produce integration through the graft material makes delayed implant placement in the sinus obsolete.

A discussion of the differences between crestal and lateral wall osteotomies first requires a rationale for the grafting protocol and timing of implant placement.

The traditional sinus augmentation utilizing a large maxillary lateral wall osteotomy with delayed implant placement is invasive with significant morbidity and complications. It is not possible to perform this surgical procedure under sterile conditions. In a well done study of lateral wall osteotomies using autografts, 50% of the sinus augmentation surgeries became infected resulting in a decrease in bone production and 5% of the sinus grafts required removal.

In a meta-analysis of sinus augmentation, the sinuses that received autografts had a higher failure rate than all other graft materials. Due to the morbidity and complications from harvesting autografts, there is no scientific justification for using autografts for sinus augmentations.

Microsurgical sinus augmentations can be done using sterile technique which significantly reduces the incidences of sinus infections. The traditional crestal approach required fracturing the floor of the sinus. Using this technique, studies concluded that on both patients and cadavers, 25 % of the membranes tore which required aborting the procedure or the graft material entered the sinus. Over the last 15 years there have been robust development on both

the methods of accessing the sinus and sinus graft materials. Today, we have a number of instruments available that allow us to expose the sinus membrane without damage, either through the crest or the through the lateral wall.

A study done by an oral surgery department compared various graft materials with immediate and delayed implant placement using Astra implants. Smokers, drinkers and anyone with a significant illnesses were excluded from the study. The results are as follows:

“Of the 99 implants, the survival rate was 90.9%; 8 implants failed within 1 year after implant placement, and 1 implant failed 1 year after implant loading. All failed implants were placed with sinus lift simultaneously. The average height of alveolar bone before implant placement was 6.9 mm, while the height of alveolar bone of failed implants was 2.1 mm, on average.”

This study showed an unacceptable failure rate of 10% after the first year and the findings confirmed that the reason for failure was due to failure of the graft materials to produce integration to the implant when the graft and implant were placed at the same time in minimal bone. The implants only integrated in the patients preexisting bone and not the graft material resulting in failure when placed in minimal bone.

Using the microsurgical lateral wall technique by injecting Sinus Graft, 30 implants were placed with the average time since placement at 16 months, with a range of 6 to 33 months. The range of pre-graft alveolar bone was between 2.5 mm and 8 mm, with an average alveolar bone thickness of 4.6 mm. No patient was excluded for any medical reason, smoking or alcohol consumption. All implants integrated and one implant was lost in a bruxism patient yielding a success rate of 97%. This study was published in the Journal of Oral Implantology. In addition, we have posted on our web site an ongoing study that involves 50 consecutive sinus augmentations using Sinus Graft with all implants integrated and still functioning after approximately a mean of 2 years. The reason for our success rate using Sinus Graft, is because our graft materials are the only graft materials that produce integration to the surface of immediately placed implants irrespective of if they are in a socket or a sinus.

With the advent of microsurgical methods to safely expose the sinus membrane, and having regenerative technology (Sinus Graft) that produces integration to implant surfaces the time has come for minimally invasive sinus augmentations with immediately placed implants to be the primary method of placing implants in atrophic maxillas.

Our guidelines in regard to weather to do a through the implant osteotomy or lateral wall is based on the ability to visualize the sinus membrane.

Steiner Sinus Bump-In a situation where there is 2.5 mm or less bone on the crest, we advise a crestal osteotomy to expose the membrane. In this case the membrane is never contacted with instruments. The tip of the Sinus Graft syringe is made to seal against the bone around the opening into the sinus. The tip in this case does not enter the sinus. The graft raises the membrane to a level depending on the amount of material grafted.

Lateral approach- If there is between 3 and 8 mm of bone on the crest, we advise the microsurgical lateral wall Steiner Sinus Lift. In this area of the maxilla, the bone is thin and usually approximately 2 mm thick. It is very easy to expose and visualize the sinus membrane and dissect it according to the instruction on our web site. If a patient presents with 8 mm of alveolar crest or more, the lateral wall of the sinus thickens in the area of the osteotomy as the maxilla transitions into the zygoma making the lateral wall access more difficult. In these instances where only a few millimeters of augmentation is needed, we advise a through the implant osteotomy sinus bump as previously described.

Today there is no justification to subject our patients to the harvesting of bone for sinus augmentations. Likewise, there is no justification to put a patients through a second surgery for delayed implant placement. There is no justification to take 8 months to a year to restore an atrophic maxilla when it can be done with a higher success rate with loading in 3 to 4 months.

