What is Bone Grafting?

Bone grafting can be performed in many different areas of the body, but in dentistry, the most common use of bone grafting is in preparation for the placement of a dental implant. Not everyone who receives a dental implant requires a bone graft for successful treatment. However, the benefits that bone grafting can offer in overall healing time and improved integration of the titanium implant into the jawbone make it difficult to recommend an implant placement without some type of graft to accompany it. But what are bone grafts made of and how do they work?

The Evolution of Bone Grafting

Traditionally, bone grafting is literally a type of bone transplant. Healthy bone and/or bone marrow is removed from an area of the patient’s body where disability is unlikely to occur and then transplanted to the site where bone repair is required. This kind of graft is obviously the most biocompatible, but it is also the most difficult on the patient. Two surgeries are required – one to harvest the graft, and another to place it.

Donor bone, bone marrow, and even sterilized cow or pig bone can also be used for bone grafting. This is easier on the patient, and a better solution for those patients who may not have a viable area of bone from which to harvest a graft. However, biocompatibility of these grafts is more complicated, and the potential transfer of disease or infection through donor grafts, although less common, is still of concern to dentists and patients alike.
The Evolution of Bone Grafting (cont’d)

Synthetic grafts have long been the ideal in terms of ease on the patient, sterilization, and biocompatibility. But while synthetic materials may be able to mimic the structure and strength of bone, they have mostly relied upon the living cells in the actual patient bone surrounding the graft to do the work of integration and repair. Depending on how much healthy bone the patient has in the area where the graft is required, these types of grafts alone have varied levels of success.

The most successful synthetic grafts now combine a bioactive protein with what is called an osteoconductive matrix. This matrix is simply a structure that mimics bone structure and integrates well with both living bone and the titanium of the implant. The addition of the bioactive protein stimulates the cells in the patient’s living bone surrounding the implant to begin the work of integrating the synthetic matrix and the titanium implant faster and more effectively than simply placing the matrix alone.

Dental Bone Grafting

Although the concept of grafting sounds scary, it shouldn’t be. Many bone grafts are placed when an extraction is done to fill the hole occupied by the root of the tooth. This preserves both the height and width of the ridge. It can also minimize post-extraction complications.

Most dental bone grafts are done with or just prior to the placement of an implant. However, even for patients who do not intend to replace an extracted tooth with an implant, a bone graft in the extraction site can help preserve the structure and integrity of the jawbone for the surrounding teeth. This can allow for a more successful placement of a bridge, an implant or
Dental Bone Grafting (cont’d)

even a partial or denture later on, if the patient changes his or her mind about replacing the tooth.

There are several other applications of dental bone grafting as well:

• Implant preparation and integration (including sinus lifts)
• Fill and strengthen the jawbone in an extraction site
• Repair and stimulate bone growth in areas of bone loss due to periodontal infection and/or furcations (between the roots of molars)
• Add vertical height to the jaw bone in preparation for holding a denture
• Repair of congenital defects or reconstruction after cancer surgery
• Trauma repair

What kind of bone graft should I get?

Only you and your dentist, oral surgeon, or periodontist can determine together what type of bone graft is the most appropriate treatment for the conditions of your mouth and body. Synthetic grafts are the most commonly used materials for many types of dental grafts. However, they may not be suitable for all situations. Other common materials may sometimes include bovine (cow) bone or cadaver bone.

Current patients of Dr. Rich who have questions or concerns about the bone grafting materials used in our office are always welcome to call our office or to ask for more information at your next regularly scheduled appointment.
References:

Clinical Oral Implants Research: *Effect of PDGF-BB and beta-tricalcium phosphate (β-TCP) on bone formation around dental implants*

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Journal of Periodontology: *Platelet-derived growth factor enhancement of two alloplastic bone matrices*