Guest Editorial

Bone Grafting and Dentistry

Dental bone grafting is the replacement or augmentation of the portion of the jaw bone that anchors the teeth. This surgical procedure is often done to reverse the loss or resorption of bone that may have occurred due to tooth loss, trauma, disease, or ill-fitting dentures, and to rebuild the bone structure beneath the gums in preparation for dental implants or other tooth replacements.

When bone graft is placed in the jaw, it can help promote new bone growth. When successful, bone grafting can restore both the height and width of a patient's jaw bone.

Several options are available for bone grafting, including autografts, allografts, xenografts, and alloplasts.

Autogenous bone grafts (autografts) are made from a patient's own bone, typically harvested from the chin, jaw, lower leg, hip, or skull. Considered the "gold standard," autografts are "live bone" complete with the cellular elements that enhance bone growth. These include osteogenesis (bone formation), osteoconduction (bone formation via migration upon a scaffold), and osteoinduction (bone formation by proteins such as bone morphogenetic proteins, which direct cells to form new bone).

A potential downside of allografts is that they involve a second procedure to harvest the bone, which may be painful and not in some patients' best interest.

Allogeneic bone (allograft) is derived from a genetically unrelated member of the same species. It is typically nonvital bone harvested from a cadaver and processed through freeze-drying to extract water. Allogeneic bone is neither osteogenic nor osteoinductive. It is osteoconductive and serves as a framework that surrounding bone can grow over.

Xenogenic bone is nonvital bone derived from another species, usually a cow. Because the potential for immune rejection and contamination by viral proteins is higher, xenograft material is processed at very high temperatures. Like allografts, xenografts serve as an osteoconductive framework.

Allografts and xenografts are preferred by many patients and dental professionals because they eliminate the potentially painful second harvesting procedure. However, because they lack bone forming properties, bone regeneration may take longer and outcomes may be less predictable.

Alloplasts are commercially produced synthetic products that have many of the same bone forming properties as human bone, and are a safe and proven alternative to autograft and allograft. Alloplasts include hydroxyapatite, calcium sulfate. or any formulation thereof. Alloplasts can provide a framework for bone growth; however, they do not contain natural proteins that influence bone growth.

Today, we have the ability to grow bone where needed. This not only gives us the opportunity to place implants of proper length and width, but also gives us a chance to restore functionality and esthetic appearance for patients.

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