Biological allograft products applied to dentistry

By Jason Yamada, DDS, MS

The advent of human bone grafting has led to applications within the specialties of dental and sinus reconstructive surgery for corrections to maladies such as ridge augmentations, sinus elevations and repair of other bony defects.

There are a myriad of specialized allograft products for various dental, oral and sinus reconstruction. This article describes products for use by general practitioners, endodontists, oral surgeons, maxillofacial surgeons, periodontists and other related specialties.

The preparation of targeted bone grafts for the mandible and maxilla include the preservation of minerals and collagen while removing inactive pathogens, antigens, fatty tissues and other decayed materials.

The minerals and collagen become the building blocks to complete and rapid bone regeneration as the expected outcome for your patients.

Mandible and maxilla bone grafts can be applied to dental surgery procedures for needed graft areas to fill voids left by bone decay and loss, for sinus grafts or for implants.

Preservation of such grafts should include at least a five-year shelf life at room temperature. Specific types of biological allografts for these uses are described next.

The block allograft eliminates the need for autogenous bone harvesting as it includes implantable cortico cancellous bone.

A secondary benefit of this allograft is that it virtually eliminates the need for a follow-up surgery, improving efficiency and shortening the patient’s rehabilitation time. The block allograft comes sterile and ready to use when needed. It makes a fine, stable ridge augmentation in preparation for subsequent implants in patients with verifiable loss of bone volume due to atrophy. Typical sizes are between 10 to 15 mm.

The cortical allograft includes a high-quality, malleable bony structure that can be used to effectively maintain spatial volume, such as the cases of sinus elevation, extraction sockets and augmented ridges. When implanted, it acts as a barrier membrane to bacteria and other decaying agents.

Subsequent dental implants are accomplished and supported by generation and remodeling of critical vascular bone tissues. Cortical allograft sizes range from 250 to 2,000 microns and volumes between 0.5 to 2.0.

The cancellous particulate allograft can absorb its own weight in fluid due to its malleability and elasticity. The allograft forms an exceptional biological incubation area via a demineralized matrix to allow the in-growth of red blood cells to aid the remodeling process. This allograft has been a reliable choice for many dental and oral surgeons as it is known for its effective and efficient bone regeneration properties.

During the regeneration process, healthy natural bone is incorporated into the remodeling. Future implantation for prosthetic therapy can be placed with great results due to the localized augmentation of the ridge. Extraction sockets with osseous defects are also effectively filled using the cancellous particu- late allograft. This unique allograft is also helpful in raising the floor of the maxillary sinus. Other applications include the reconstructive augmentation of the alveolar ridge and the reparation of defective infrabony periodontal structures.

If you are in the market to purchase human bone allografts, select products with the American Association of Tissue Banks accreditation to ensure you get the best uniform quality and standards.

Chips, blocks and powder: There are a variety of specialized allograft products that can be used in dentistry. (Photos/Provided by Dr. Jason Yamada)

About the author

Jason M. Yamada, DDS, MS, was born and raised in Honolulu and received his DDS degree from the University of Southern California and his specialty degree in periodontics and a master of science in oral biology from Northwestern University. He is currently assistant clinical professor in the advanced graduate education program in periodontics and implant surgery at Loma Linda University Dental School and has been a guest lecturer at both USC Dental School and UCLA Dental School. Yamada currently practices in Torrance, Calif., and Irvine, Calif., with an emphasis on implant surgery and restoration, microsurgery and periodontal surgery. He is the founder of the Implant and Periodontal Institute of Torrance (IPI) and has taught many general dentists as well as specialists on the topics of periodontal, cosmetic and implant surgery.