|  |
| --- |
| **Name:** |
| Jack Melms |
| **Group:** |
| Group 7A-4 |
| **Basic Science Question:** |
| What are the different types of bone grafting materials commonly used in dentistry? |
| **Report:** |
| The first material used in dental bone grafting is the patient’s own bone. This type of graft, termed an autograft, includes the removal of bone from a certain site on a patient and the subsequent relocation to the deficient area. Bone can be harvested directly from the mandible or from elsewhere on the body. Autografts involve a more complicated surgery since bone has to be removed from the patient, but provide the benefit of living cells. Collagen membranes can be used to cover the grafts. Allografts also involve human bone, but it is not harvested from the patient. Most bone used in allografts comes from cadavers and requires treatment to prevent immune reactions from the patient. This results in no live cells within the bone, but preserves the pateint’s bone in other parts of the body. Bone used in alloplasts can be one piece, but is most commonly used in particulate form. Xenografts are very similar to allografts, but differ in the sense that uses non-human bone to rebuild the patient’s bone. The most common types of bone used in xenografts are bovine (cattle) and porcine (pig). Grafts often consist of bovine bone and porcine collagen. Similarly to allografts, xenografts don’t use live cells but do prevent bone loss from the donor site. Alloplasts are resorative bone procedures that do not use bone. Biphasic calcium phosphates (BCPs) made of β-tricalcium phosphate and hydroxyapatite are most commonly used in this technique. Calcium phosphates have osteoconductive properties which allow for bone cells to attach, proliferate and differentiate. Hydroxyapatite is meant to mimic the composition of the mineralized part of natural bone. Bone restoration relies on using BCPs as scaffolds for osteoblasts to enter and lay down bone matrix. The hydroxyapatite will remain longer than the BCP and β-tricalcium phosphate, which will be resorbed and replaced with new bone.  |
| **References:** |
| Avila-Ortiz G, Chambrone L, Vignoletti F. Effect of alveolar ridge preservation interventions following tooth extraction: A systematic review and meta-analysis. J Clin Periodontol. 2019 Jun;46 Suppl 21:195-223. doi: 10.1111/jcpe.13057. Erratum in: J Clin Periodontol. 2020 Jan;47(1):129. PMID: 30623987.Serrano Méndez CA, Lang NP, Caneva M, Ramírez Lemus G, Mora Solano G, Botticelli D. Comparison of allografts and xenografts used for alveolar ridge preservation. A clinical and histomorphometric RCT in humans. Clin Implant Dent Relat Res. 2017 Aug;19(4):608-615. doi: 10.1111/cid.12490. Epub 2017 May 2. PMID: 28466494.Kheur MG, Kheur S, Lakha T, Jambhekar S, Le B, Jain V. Does Graft Particle Type and Size Affect Ridge Dimensional Changes After Alveolar Ridge Split Procedure? J Oral Maxillofac Surg. 2018 Apr;76(4):761-769. doi: 10.1016/j.joms.2017.11.002. Epub 2017 Dec 2. PMID: 29202263.Rh Owen G, Dard M, Larjava H. Hydoxyapatite/beta-tricalcium phosphate biphasic ceramics as regenerative material for the repair of complex bone defects. J Biomed Mater Res B Appl Biomater. 2018 Aug;106(6):2493-2512. doi: 10.1002/jbm.b.34049. Epub 2017 Dec 20. PMID: 29266701.Nejat, R., DDS. (2018, May 07). Dental Implant Bone Grafts: Autograft, Allograft and Xenograft. Retrieved from https://www.dentalimplantsusa.com/dental-implants/types-of-bone-grafting/ |