

Bone Grafting

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EDITORIAL NOTE

Bone grafting is a procedure where damaged or diseased bones are replaced by an artificial or natural substitute. Bone grafting can be done anywhere in your body. In some cases, bone is harvested from the patient's own body for bone grafting. Sometimes bone tissues donated from cadavers are used to perform bone grafting. Sometimes when fracture results in the loss of bone or a large part of bone crumbles away, then in that case bone is not fully healed until and unless bone grafting is done. In this bone grafting procedure, a surgeon inserts a new piece of artificial, synthetic or natural piece of bone in the place where the bone needs healing. Most bone grafts are expected to be replaced and reabsorbed as the natural bone takes time to heal. Osteoconduction (guiding the reparative growth of the natural bone), Osteogenesis (graft material contains living bone cells which contribute to bone formation) and osteoinduction (encouraging undifferentiated cells to be active osteoblasts) is the principle which is involved in successful bone grafts. Bone tissues can regenerate completely that is why bone grafting is possible. Surgeons that perform bone grafting procedures are craniofacial surgeons, dental surgeons, oral surgeons, implantologists etc.

Bone grafts act as a mineral reservoir that induces new bone formation. Bone grafts have no antigen-antibody reaction and are bioresorbable. Due to congenital malformations, surgery and

trauma, ridge defects are developed. Bone grafts are classified on the basis of material groups: a. Allograft-based bone graft, it involves allograft bone, used alone or in combination with materials like Grafton. b. A cell-based bone graft is used to generate new tissues. c. Factor-based bone graft is natural and is used alone or in combination. d. Polymer-based bone graft uses nondegradable and degradable polymers alone or in the combination with materials. e. Ceramic-based bone graft is used alone or in combination with materials like OsteoGraf etc.

A new bone grafting technique is developed which is known as Segmental Additive Tissue Engineering, which allows creating large scale, personalized bone grafts. Scientists from UNSW Sydney developed a ceramic-based ink that may allow in future 3D-print bone parts that could be used to repair damaged bone tissue. Recent research shows that patient's own stem cells can be used to grow new bone; the biomaterial used to create the new bone comes from the patient's stem cells. An article from china shows that bioactive factors-imprinted scaffold vehicles for promoting bone healing. Bioactive factors like cytokine and growth factors have been known to be involved in regulating wound healing of bone. Researchers at Texas A&M University have created superior bone grafts using primitive stem cells. Researchers at A&M University found that these stem cells create very fertile scaffolds which are needed for the bone to regenerate at the site of repair.

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