CureOs Bone Graft

CureOs -TriCalcium Phosphate/Silicate Bone Grafts are synthetic, osteoconductive, 80% porous, interconnected macroporosity and microporosity structured, resorbable and biologically compatible bone graft substitute materials<

CLINICAL APPLICATIONS

CureOs -TriCalcium Phosphate/Silicate Bone Grafts are used in ;

-General bone defects repairment
-Metaphysial defects repairment
-Reconstruction, augmentation and filling maxillofacial region
-Arthrodesis and benign tumor treatment
-Spinal defects repairment
-Sinus rifts
-Filling of endodontic defects
-Ridge augmentation
-Cavity filling in bone tissues

KEY FEATURES & BENEFITS

-Silicate - Substituted Technology
-High Lebel of Biocompatibility
-Osteoconductivity
-High Level of Porosity
-Fully Synthetic & Safe
-Osseointegration
-Rapid Resorption Rate
-Ready to Use & Easy to Apply

CureOs® BLOCKS BONE GRAFT

During the design and production of the product, it was ensured that the interconnected pore structure, in which the bone cells can be placed, is considered.
The balance between bone construction and destruction shifts in the direction of destruction in the so-called osteoporosis diease with aging. The artificial bone tissue is used to strengthen the bone construction in the osteoporosis disease which decreases the mineral density of the bone and increases the fragility with the changes in the microstructure. Bone tissue is controlled by the blood-based regulators, the physical environment, the neural network surrounding the perioosteum, and the genetic structure of the person. Developed artificial bone tissue is

designed to allow this control. (Keskin DS, Tezcaner A, Korkusuz P, Korkusuz F, Hasirci V. Collagen-chondroitin sulfate-based PLLA-SAIB-coated rhBMP-2 delivery system for bone repair. Biomaterials 2005;26:4023-34).

The balance between construction and destruction is called homeostasis. It can be assumed that construction and destruction has completely renewed in about 4 to 10 years depending on the size of the bone. Unlike other tissues and organs, bone tissue repair is like form of self-renewal, which is called regeneration. The regeneration and repair is not occurred without blood circulation. Therefore, the product is designed to allow renewal of bone and blood circulation as pore diameter and total porosity. (Çırpar M, Korkusuz F, Korkusuz P. Kemiğin yapısal ve fiziksel özellikleri. In: Akçalı İD, Gülşen M, Ün K, editörler. Kas-iskelet sistemi biyomekaniği. Adana: Güneş Tıp Kitapevleri; 2009. p. 227-250).

The growth plate that provides the longitudinal growth of the bone is physiology. While epiphysis provides support to the articular cartilage, metaphysis is present in the metaphysis where the spongiform bone is found intensely. On the other hand, functional resistance, carrier and compressive strength come front in the diaphysis where the most thick and dense of the cortical bone is. Artificial bone producers bring together both cortical and spongiform bone (cancellous), as well as approaches that combine two of them recently. Artificial bone tissue shaped according to the place where it will be used can vary from dust and particles to structural blocks that represent the long bone or spine. Besides the material properties of the bone tissue, its hierarchical structure also affects its mechanical properties. (Çırpar M, Korkusuz F, Korkusuz P. Kemiğin yapısal ve fiziksel özellikleri. In: Akçalı İD, Gülşen M, Ün K, editörler. Kas-iskelet sistemi biyomekaniği. Adana: Güneş Tıp Kitapevleri; 2009. p. 227-250).

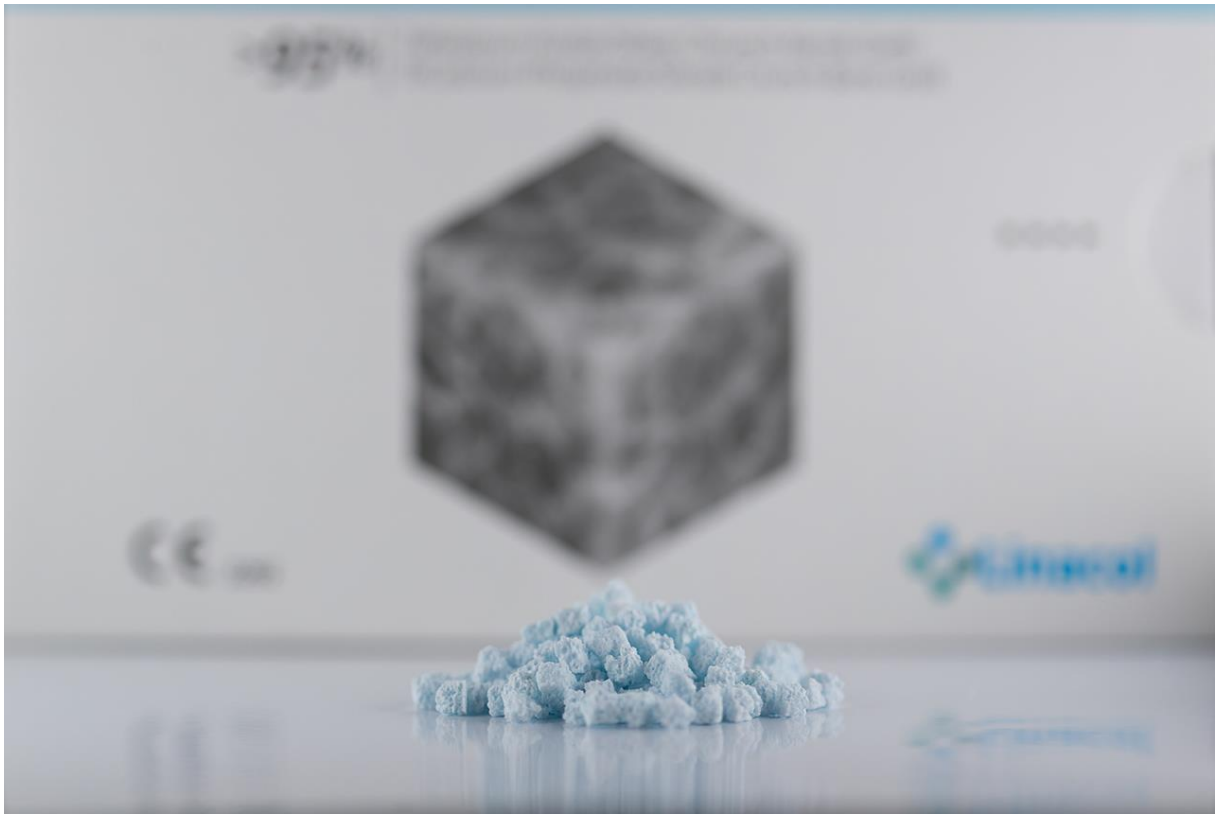
The solubility ratios of bioceramics are expressed by the KSP value. Sintered HA solubility is the lowest bioseramic and the KPS value is between 10-50 and 10-60. KPS value of bone is 10-32. The KPS value of calcium phosphate cements is the same as bone. The KPS value of betatricalcium phosphate is about 10-20 and the KPS value of calcium sulphate is about 10-8. The reason for these substances to dissolve at different times when applied to the human body is the KPS values. In

addition, as their porosity increases and their density decreases, the dissolution rates of bioceramics increase naturally. Due to its chemical structure, surface area, pore size and porosity, almost all artificial bone tissue ceramics of mineral origin, when applied to tissue, initiate an inflammatory process similar to that of early fracture healing. The first cells that interact with artificial bone tissue are monocytes and are assumed to cause the release of interleukin (IL) -1 beta (B), IL-6 and tumor necrosan agent alpha (TNF-a). The endothelial cells and neutrophils cause factors making vessel, and prostaglandin 2 starting solubility. Immediately after bone destruction, fibroblast growth factor (FGF) 2 starting bone repair, platelet derived growth factor (PDGF) and transforming growth factor (TGF) beta is released and then process is started. In this way, the artificial bone tissue collapses from one side and the other is replaced by the new bone tissue. The relationship between bone and artificial bone tissue may differ in the presence of radiotherapy, systemic diseases such as diabetes affecting the circulation, drugs used as anti-inflammatory or steroid, and infection. Decomposition of the artificial tissue and giving its place to the new bone tissue take place from the outside to inside and from the periphery to center. In order to increase the mechanical properties of artificial bone tissue that exemplifies the intercellular network, silicon is added to the composition of glass. (Korkusuz P, Korkusuz F. Hard tissue-biomaterial interactions. In: Yaszemski MJ, Trantolo DJ, Lewandrowski KU, Hasırcı V, Altobelli DE, Wise DL, editors. Biomaterials in orthopedics. New York: Marcel Dekker; 2004. p. 1-40), (Vakıfahmetoğlu Ç, Park J, Korkusuz F, Öztürk A, Timuçin M. Production and properties of apatite-wollastonite ceramics for biomedical applications. In: Ravaglioli A, Krajewski A, editors. Ceramics, cells and tissues: nanotechnology for functional repair and regenerative medicine. Rome: Consiglio Nazionale Delle Ricerche; 2008. p. 242-51)

Although the local inflammatory response to bioceramics has been reported, it is thought that the sterilization method may cause this reactive response. In the process of osteogenesis, the cells must be connected to each other in order to advance into the bioceramics. New bone formation is faster in bioceramics with pore diameter 300-600 micrometer. As the pore diameter increases, mechanical strength decreases despite the acceleration of new bone production. It is known

that human spongiform bone is 85% porous, 70-95% of its pores are connected to each other and respond to the direction of construction under physiological loads. (Aras NK, Yılmaz G, Alkan S, Korkusuz F. Trace elements in human bone determined by neutron activation analysis. J Radioanal Nuc Chem 1999;239:79-86). Therefore, it has been tried to give similar features to artificial bone tissue.
Bone tissue is the deposition of many minerals and trace elements other than calcium and phosphate. In recent years, these elements have been tried to be included in the composition of bio-systems. There are some studies about adding sodium and magnesium to the structure of bioceramics. Bone grafts and bone substitutes are increasingly used to treat bone defects during reconstructive procedures such as trauma, bone infections, congenital anomalies, musculoskeletal tumor surgery, revision arthroplasty surgery, and spinal surgery. The clinical success in use is determined by the structural integration of the formed bone with the surrounding bone tissue as a result of the reconstructed bone and the mechanical strength of the formed bone to function.

The graft materials used have one or more of osseointegration, osteogenesis, osteoconductive or osteoinductive properties.
TCP is dissolved and resorbed faster than hydroxyapatite frequently used in graft materials. Since the pore structure is very small and there is no connection between the pores, bone cells cannot progress into the structure without resorption. Therefore, the granular form of TCP is more useful as a bone graft. Surfaces containing high calcium phosphate ion concentrations and local microenvironment affect TCP resorption. The presence of TCP and local storage of calcium phosphate crystals stimulate osteoclasts. Since osteoblastic activity increases depending on increasing of osteoclastic activity, new bone formation occurs. (TOTBİD Türk Ortopedi ve Travmatoloji Birliği Derneği Dergisi, 2004, Cilt:3, Sayı: 3-4)
To date, no objection has been reported due to use. Edema, infection, postoperative bleeding, hematoma and soft tissue ulcers can be observed as a result of using the product. The effect of use in mothers and pediatric patients during pregnancy is not known.

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