



## Bone Grafting Basics and Science in a simplistic manner

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The entire dental field is in an uproar over what bone graft material to use and buy. However, in a very simple to understand format as will be shown, any vendor or representative will be able to assist their client doctors with what to order, when and why.

First, we have to keep in mind that there are basically 2 types of bone material.

There is the hard block types used for major space rebuilding and there are the particulate or soft types of bone grafting material. These softer ones are the most common and the most widely used.



Rib



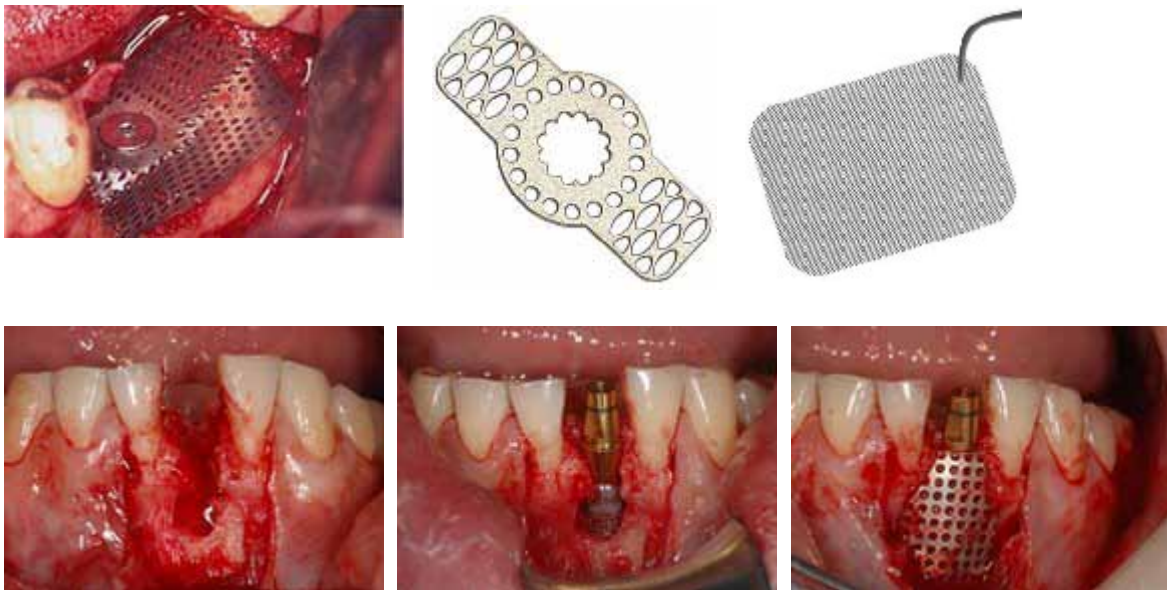
Soft, Particulate Types

The blocks, rib, hip, and other solid portions of bone are used to rebuild a specific site or area and must be attached and kept immobilized for a number of months by way of fixation screws or pins. These blocks will have a higher learning curve as the proper handling of the bone and the soft tissue closure is paramount to the success of the graft. Then, upon the supposed time frame of healing, the bone is uncovered, the screws removed and the site should be well sized for the future implant placement.

Now, the softer side to grafting... Human allograft products come in many forms, shapes and obviously its uses vary just as much. The newer bovine and synthetic blends are also a part of the everyday armamentarium.

Human allografts come in various formats. However, the 2 main styles are demineralized and mineralized. Lets keep in mind that mineralized has more components than demineralized as we can tell by the name. So, by the same token... mineralized will stay around the graft site longer than the demineralized variety. If all factors are similar and primary closure can be obtained, then any of these products will work equally as well. But, if there is any site missing one or more walls and the need to maintain the space is critical, then we need to rethink what products to use. If all we are having to rebuild is a small portion of a buccal wall after an extraction, then mineralized will work fine with a membrane for proper coverage. If the defect is larger then a titanium mesh or screen will need to be positioned and possibly screwed down in order to support the underlying bone graft and keep it in place during healing and ossification.

### Mesh Procedure:



### Basic Science:

The larger the particles of the graft material, the more space that exists in between each particle to its counterpart. Therefore, it will last longer before being resorbed or converted.

The smaller particles will resorb faster but are better suited for smaller defects and for filling voids around implants, roots and furcations. The difference between cortical and cancellous is less obvious. Keep in mind that cancellous is medullary or spongy bone and has more air space between the particles. So, the cancellous bone allows for more blood to circulate through out. Cortical bone is harder and does not resorb as quickly or as

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easily. The best part of this is that cortical bone actually carries the BMPs ( bone morphogenic protein)for bone growth.



Cancellous Powder



Cortical/Cancellous Granules

Now, all these grafts need a very good blood supply for them to work. So, the placement of these into the sites requires careful manipulation and to not be over condensed to allow for the blood to trickle through. While I say to not over condense, I do mean to use a bone condenser to properly bring the material together and eliminate air voids.

#### Description of the many varieties and some of their uses:

**Demineralized Particulate:** Uses are in sockets, defects of varying types but as long as vertical or corner support is not needed. Solid membrane coverage is needed.

**Mineralized Particulate:** Uses are for the same as above, but more so when a smaller amount of vertical or corner support is needed. A solid membrane cover is needed. At times, titanium reinforced membranes may be needed for additional support.

**Soft Sponge Blocks:** Uses are for sockets, sinuses and filling in for the sandwich technique in the ridge split techniques.



Cancellous Block



Cancellous Cubed

**Gels and putty:** Uses are for areas in sockets where immediate placement will be done to fill the void left by the difference in sizes between the root and the implants. Also, where a defect needs to be filled that has many craters.



## Demineralized Bone Matrix Putty

My personal favorite is a combination graft of cortical/cancellous material. This one allows for use in many sites and for many reasons.

In the elderly, ill, or immuno suppressed, an additional product like PRP for growth factors would be better suited for more predictability.

Companies have been ramping up the race for the use of stem cell addition in dental graft materials. The use of stem cells, and the turbo charging of growth factors with spinning blood will allow the dental surgeon an increased advantage in reconstructing areas of defects never before capable of being rebuilt without huge surgical interventions and secondary donor sites causing increased morbidity and increased levels of pain and anxiety.



In closing, this explanation is quite simple and certainly additional information and training needs to be acquired in order to fully understand these products and the handling of each. For comments and or additional information on training courses , visit [www.idecseminars.com](http://www.idecseminars.com) or call 1-800-634-0525.

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