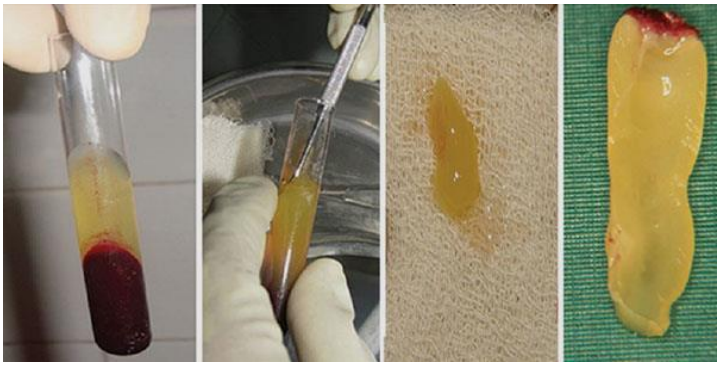
Bone grafts - Guided bone regeneration

Guided Bone Regeneration – Gbr



The most important factor for the success of the implantation procedure is considered to be the quantity, quality and geometry of the bone substrate to receive the implant.

On the other hand, every time a tooth is lost, the bone that surrounds and supports it is absorbed.

Bone absorption is a normal procedure and has to do with the mechanism of healing followed by bone loss (modelling - remodelling).

In cases where the bone size does not allow implant placement, there are techniques and a variety of bone grafting and materials that help us to increase it and give it the proper geometry that would be ideal for the placement of the implant. With the bone graft, we now have the opportunity not only to replace the bone where it is missing, but also the ability to promote new bone growth in the direction and area we want! This not only gives us the opportunity to place implants of appropriate length and width, but also gives us the opportunity to restore functionality and aesthetic appearance of the patient.

Types of bone grafts:

Autogenous bone grafts.

Autogenous bone grafts, known as autografts, are derived from the patient itself from whom will also be used. This graft is taken from somewhere in the mouth or body. Donor area can be chin, jaw, hip, skull. Autogenous bone grafts have the advantage of being a living material that contains live cellular elements that enhance bone growth. However, there is the disadvantage that a second procedure is required for harvesting the bone from other parts of the body or mouth.

Allogeneic graft.

Allogeneic bone or allograft is non-living human bone (from live donor or cadaveric donor) undergoing a dry vacuum freeze-dried process to extract all of its water. In contrast to the autogenous graft, the allogeneic graft can not produce the same new bone. Instead, it serves as a structural skeleton or scaffold where on this bone of the receptor region it will develop and finally replace the graft scaffold.

Xenogenic graft

Xenograft is derived from non-living bones of another species (not from human), usually bovine or pig. The animal bone is treated at very high temperatures to avoid the possibility of immunological rejection and infection of the recipient region. Like allogeneic implants, xenografts serve as a frame for scaffolding of the patient.

DBM/DFDBA

Drained bone matrix (DBM) / demineralized freeze-dried bone allograft(DFDBA) is a product consisting of processed bone marrow, collagen, proteins and growth factors.

This graft is available in the form of powder, πθττυ, chip or as a gel that can be injected through a syringe.

Both allografts and xenografts are more useful because they do not require a second procedure for bone harvesting, as in autografts. However, because these two options (allografts and xenografts) do not have the bone-forming property of the graft itself (they only form the scaffold), the regeneration of the bone of the area may last longer than that of the autografts.

Bone grafts substitutes:

As a substitute for the use of real bones (human or animal), many synthetic materials are available as a safe and proven alternative. Bone graft substitutes and synthetic materials also have the advantage of not requiring a second bone-collection process by the patient.

Synthetic or alloplastic implants

Synthetic grafts consist of other materials in combination with growth factors to achieve benefits.

Some combinations may include: complex collagen / ceramic (which resembles natural bone synthesis); DBM is combined with bone marrow cells, which help in the development of new bone or complex collagen / ceramics / autograft.

Morphogenetic Bone Proteins

Bone morphogenetic proteins (BMP) are proteins that are naturally produced in the body and promote and regulate bone formation and play an important role in healing the trauma.

Autologous Dental Graft

Finally, reference should also be made to the Autologous Dental Graft, which is based on the technology that allows us to use the extracted tooth of the patient for bone grafting. Dentin, the substance of the tooth, has almost the same texture as the bone. Thus, after tooth extraction, it is pulverised and treated with chemicals to clean and disinfect. This process converts the extracted natural tooth into a biocompatible autologous graft, rich in growth factors, which promotes rapid healing of the wound.

Bone grafts, regardless of origin, are biomaterials that are subject to special treatments and sterilisation methods and are provided in special packaging by different companies.

All types of bone grafts give a wide range of choices to the surgeon, which is based on their origin, the time they absorb their scaffolding, their roughness, their shape, their processing, and finally their usability. Each bone graft choice has its own dangers and its own benefits.

At **Panorama Dental Center** we use bone grafts of well-known companies (Geistlich, Botiss), recognized through many research studies, with long-lasting clinical experience.

Membranes

Above the area where the graft was placed, we apply special membranes to separate the area where the bone graft has been placed and we wish to regenerate it from the soft tissue area. This prevents the gum epithelial cells from penetrating into the graft bone scaffold.

The membranes are generally separated into absorbable and non-absorbable films. In the latter, a new surgical opening should be performed after the creation of a new bone to remove it. Something that is not done on absorbable membranes.

There are membranes of titanium, collagen, polylactic acid, polyglycolic acid, Teflon etc.

Autologous PRF

Finally, there is the autologous PRF, a platelet-rich fibrin matrix in which platelet cytokines, growth factors and cells are separated after a procedure and over a certain period of time.

This matrix can serve as an absorbable membrane, promotes healing (stimulates bone mineralization and the formation of new blood vessels), manages inflammation, reduces bleeding and scarring. It is a method to facilitate recovery after surgical procedures. This process reduces the likelihood of post-operative complications by promoting healing. It brings better results, is safe and does not require the procedure with other drugs, or chemical agents or donor cells, except for a small amount of patient's blood.

The procedure is as follows:

- Blood is taken from a vein into a tube.
- The tube is placed in a centrifuge where the cells are separated into the bottom of the tube and the top layer, as a concentrate, is extracted by syringe.
- The concentrate can be used in the recipient area within two hours.

Plasma has been used in maxillofacial surgical procedures since 1990.

Sinus lift

In cases where we want to replace the posterior region of the upper jaw (especially the molar region) with dental implants, the width of the sinus can limit the choice of the size of the implant.

It is known that in the case of loss of the upper posterior teeth the lower and lateral walls of the sinus extend beyond the alveolar bone.

Also, the absorption of the crest that accompanies any tooth extraction greatly reduces the height of the bone between the crest and the ground of the sinus, giving an inappropriate bone geometry for future implantation.

To address this problem, we are guided by the technique called sinus lifting (closed and open method) and aimed at raising the bone at a height between the crest and the ground of the sinus.

The lifting technique is a well-predicted surgical technique for increasing the volume of residual crest and, depending on the access path to the membrane of the sinus, is divided into closed and open-type.

In the open type, after revealing the lateral wall of the sinus, we open a bony window using milling to reach the membrane that covers the inside of the cavity, and try to detach and push it upwards with special tools. This enables us to grab a sufficient amount of bone graft into the cavity of the sinus, which after a period of about eight months will be ossified and this area will thus be able to accept the implants.

In the closed type the access to the inside of the sinus is done without opening a bone window. We use special type osteotomes that by fine manipulations help us locally lift the ground of the sinus and place the implant at the same time, using or not using grafting materials.

Simultaneous placement of the implant can be done with the open lifting as long as there is at least 5 mm of bone from the crest to the lower wall of the sinus. While in order to be able to execute the closed-type lifting, the distance of the cavity ground to the alveolar ridge should not be less than 6 to 8 millimeters.