Regenerative Surgery

Patient Information leaflet – Guided Tissue Regeneration / Regeneration / Bone grafts

This leaflet explains more about how regenerative materials may be used including the benefits, risks, and alternatives. This section focuses on the materials used for regenerating bone during surgical treatment. If you have any questions or concerns, please do not hesitate to speak to your dentist or periodontist caring for you.

What are the causes of bone loss?

Bone loss can have many different causes e.g. accidents or inflammation of the gums and bone due to gum disease or abscesses and infections around teeth. In addition, after teeth have been removed the height and thickness of the jaw bone shrinks due to the lack of mechanical loading.

How can bone be regenerated or reconstructed?

Human bone possesses the ability to regenerate, in other words, rebuild missing bone. In most cases, it still needs some assistance and artificial materials can also be used safely to provide more bone. Using human bone alone works well but means that bone needs to be taken from somewhere else. In most cases it can simply be harvested from the area that we are working in and you don't feel anything different. Artificial bone graft materials support the body's own bone regeneration by forming a scaffold which provides a template as well as space and time for the body's own bone to fill in. These are known as bone substitutes or grafts.

A membrane is often placed over the area of bone healing and serves as a protective barrier which prevents rapidly growing soft tissue from invading the space that should be occupied by the slowly reforming bone. This is a process called 'Guided Tissue Regeneration'.

Bone substitutes and membranes can be either synthetic (made in the lab) or animal derived (usually natural products that are bovine or porcine derived and sterilised and processed using methods allowing them to be made safe for use. Due to the great similarity to human tissue, these materials are optimally suited to promote new bone formation and tissue healing in the human body. They are integrated into the tissue during the course of healing and then broken down gradually by the body's own processes. Membranes are usually broken down with a couple of months whereas bone substitutes take longer. Sometimes gels containing stem cell derived products can be used that stimulate the body's own bone to regrow

What materials are currently used in regeneration or reconstruction?

Autogenous bone - Your body's own bone used to fill the bone defect or area or bone loss, usually used in combination with other bone substitutes and membranes.

Bio-Oss® - A bone substitute or bone graft material, made from the mineral part of the bones from cow. The organic constituents are removed during manufacture making it safe to use as only the hard bone structure containing calcium compounds remains. It takes approximately 6 months for at least 50% of the material to be absorbed and gradually replaced by your body's own bone over a long period of time, although some may remain.

Bio-Guide® - A membrane prepared from pig collagen. The protein collagen is found in humans and is one of the main component of our skin, tissues and bone. This material has been used for many years safely alongside Bio-Oss and other bone substitutes

EthOss® A synthetic product made without any human or animal bone, and contains a biomaterial comprised of Beta Tricalcium Phosphate and Calcium Sulphate It generally takes 3 months for 50% of the material to be replaced by your own bone, the remaining material is absorbed over the following months.

Emdogain® A protein-based gel that stimulates formation of new gum and bone tissue. The protein amelogenin is derived from pig and manufactured to be made safe for use in the mouth. Emdogain is scientifically well documented and has been used worldwide in medicine and dentistry.

When can this type of treatment be used?

Treating Gum disease
Sometimes it is possible to treat bone loss caused by gum disease at the same time as cleaning an area during gum surgery. This can be done by using specialist regenerative materials to try and re-grow the bone that has been lost. Regenerative treatment is not possible in all circumstances and depends on the pattern of bone loss. X-rays and can help to assess whether an area may be suitable, and your periodontist may suggest this as an option for you. It is essential that the more simple methods of treating gum disease (like improving your oral hygiene and any advanced deep cleaning, is carried out before regenerative treatments to eliminate any inflammation and ensure a good response of the tissues. Your oral hygiene needs to excellent for any type of regeneration to work.

Before or during Implant placement
If the existing amount of bone is not sufficient to provide long term success of an implant, regenerative materials may be used to support and augment the jaw bone when placing dental implants. This means that the implant has a little more support, the gum tissues are supported better and the implant can be placed at the same level as the neighbouring teeth. This can help to improve the overall appearance as well as provide more tissue to help keep the implant clean. The material is placed into the area that is needed and it will be used to support the implant. Sometimes the graft material will be placed at the same time as placing an implant or in some cases first, to create new bone for the implant to be placed at a later date. Not all implant procedures need a bone graft and you will be advised if you need one.

Extensive bone damage after trauma or injury
Bone reconstruction after extensive bone loss after an accident or injury which has resulted in the loss of teeth.

Sinus floor augmentation
To help provide more bone under the sinus to help replace top teeth at the back of the mouth

Root resection or cyst removal
To help reconstruct bone after a root of a tooth has been removed or a cyst resected.

Extraction sockets
To preserve the tissues and reduce the amount of bone and gum that is lost after a tooth extraction.

What is Periodontal Surgery?

Evidence shows that approximately 60-70% of pockets respond to simple treatment such as improving oral hygiene and advanced deep cleaning (root surface debridement), but there may be some areas (usually the deepest pockets or teeth with difficult root anatomy) that remains after a course of deep cleaning. Periodontal surgery may therefore be recommended to provide a more predictable outcome and improve the chances of holding onto your teeth. For example, back teeth have more than one root and the areas where the roots diverge (furcations) are difficult areas to get to. Sometimes deep pockets exist which are within the bone and cannot be reached easily without a surgical approach. Inflammation will persist in these areas as long as bacteria are allowed to colonize them.

Surgical procedures to manage gum disease generally aim to clean root surfaces that are inaccessible with simple deep cleaning as well as to help improve the shape and position of the gums to make it easier for you to be able to access and clean the areas at home (Pocket Reduction). Periodontal surgery encompasses several different types of procedures and may also involve bone regrowth (regeneration) and covering areas of gum recession (grafting) to improve the situation. Gum specialists (Periodontists) are trained in handling gum tissue finely and delicately

What happens during the treatment?

- Surgical gum procedures are carried out under local anaesthetic.
- After making a small incision around the edge of the gum, it is lifted away just enough to be able to clean the root surfaces under direct vision using the same instruments used during simple deep cleaning that you would have had already (fine ultrasonics and hand operated cleaning instruments (curettes)
- Any infected or inflammatory tissue (granulation tissue) during the process.
- Occasionally some of the infected pocket lining or gum is removed to reshape the gum any irregular bone affected by the disease smoothed. This allows the gum tissue to be repositioned better, nearly always at a slightly lower position, helping to reduce the pocket.
- You should not feel any discomfort during the procedure.
- We would usually remove any sutures after 1-2 weeks. This also gives us an opportunity to check how it is healing.

What should I do after the surgery?

- As the surgery is generally carried out under local anaesthesia, most patients can carry out their daily activities as normal. There are of course some things to be careful of in terms of eating and drinking soon afterwards and how to keep the area clean.
- You will need to be careful not to eat anything hot for 2-3 hours whilst it is still numb so that you do not accidentally burn yourself and be careful not to bite your lips/cheeks or tongue.
- Avoid hard and sharp foods such as crisps, biscuits, chocolates, crusty breads, granola or similar cereals.
- Have a reasonably soft diet for the first few days (semi-fluid on the first day).
- It is important not to disturb the stitches, so we would ask you not to brush that area for 2 weeks until the stitches have been removed
- Use an antiseptic mouthwash - either a warm salt water rinse or Corsodyl mouthwash (or even both). You should use the Corsodyl mouthwash for 1 minute in your mouth. Gently bathe the area and do not spit it out vigorously but let the antibacterial drip out slowly over a basin (this is so you do not disturb the stitches or the graft).
- Your periodontist or nurse will go through with you the things you can and can't do on the day of the surgery too. Your aftercare instructions may vary depending on the treatment you receive.

Can I do anything before the surgery to help?

Keep the area as clean as possible using the oral hygiene regime you have been shown. You can supplement your cleaning with a Corsodyl mouthwash for one week before. You can also take some painkillers like ibuprofen 400mg 1 hour before the surgery. If you smoke, ensure that avoid it before the surgery and for at least two weeks after. If you need help stopping, call the practice to speak to a dentist, your doctor, or your local pharmacy.

What can I expect after the surgery - are there any risks?

- Some discomfort is expected after any surgical procedure and this is manageable usually with simple painkillers such as paracetamol and ibuprofen.
- Other possible complications after surgery include swelling and bruising but less common with these types of procedures.
- Occasionally the gums may bleed after the surgery for 1-2 days before it gets better.
- The teeth may temporarily feel looser after the surgery
- The teeth may become sensitive to hot, cold, and sweet as the pocket is being reduced. This means there will be some gum recession.
- You may notice that spaces therefore feel slightly bigger or longer. This means you may be able to get a slightly larger interdental brush between the teeth after it has healed.
- There is a chance that the graft may not take and it is important therefore that we avoid any infection and ensure that we do not disturb the graft, particularly for the first 2 weeks.

What are the benefits – why should I have regenerative gum surgery?

By lifting the gum away from the teeth, we can see the roots better and perform more thorough cleaning and plaque removal, allowing us to control the disease better. It also gives us the opportunity to remove any infected or inflammatory (granulation tissue) and assess the area of bone loss to see if the bone defect can be regenerated to ultimately provide more support for the tooth, or reshaped to make it easier to clean the teeth. It also means that as you can access the difficult areas to clean, the chances of holding onto your teeth for longer will be higher.

Are there any alternatives?

No treatment: The result of not having treatment will depend on how severe the gum disease is and how deep the remaining pocket is after deep cleaning. With no treatment, the gum disease is likely to get worse, your teeth may become painful and you are likely to lose your teeth sooner. Studies have shown that teeth that still have deep pockets after active treatment are at higher odds of being lost within 11 years (5mm pocket; odds = 7x higher, 6mm pocket; 11x higher, 7mm pocket; 64x higher), reference – Matuliene 2008.

Regular scaling and advanced deep cleaning: A further course of advanced deep cleaning followed by regular routine cleaning by the dentist or hygienist would be advised to slow the disease down.

Pocket reduction surgery: This still involves a surgical procedure, but sometimes the bone defect may be too large to regenerate and instead the area is surgically cleaned and the gum and bone reshaped to allow better access for cleaning. This may result in some more gum recession around the teeth but will help to control the gum disease more predictably and allow you to clean the area better, ultimately helping you retain the teeth for longer.

Extraction of some teeth: Removal (extraction of teeth) may be an acceptable alternative if your gum disease is severe. However, this may mean that you need replacement teeth such as a denture or bridge and need to return to your dentist for this treatment. Implants to replace teeth are not suitable whilst there is active gum disease in the mouth and are more likely to fail in patients who have suffered from gum disease. Some people find it easier and more enjoyable to eat with natural teeth than artificial teeth and gum disease treatment can therefore be helpful to hold on to the teeth for longer. However, if your front teeth have a poor appearance because of gum disease, a denture may look better. Extractions would reduce the time spent treating your gums now and in the future.

Will I need follow up appointments?

You will need a follow up appointment 1-2 weeks after surgery, often to remove any stitches. This may be followed by further appointments for reviews and gentle cleaning. The regimen for treatment or maintenance long term is often assessed around two to three months after surgery following a repeat detailed pocket chart.

Who is treating me?

Dr. Viren Vithlani has completed his Specialist Training in Periodontology at Guy's Hospital in London. He has been a qualified dentist since 2007 and has completed an approved specialist training pathway. All medically qualified dentists including specialists will only carry out procedures they are trained to do. All Specialist Periodontists go through this type of formal training before they are registered as a Specialist with the General Dental Council.