Surgical management of peri-implantitis

Specialist Periodontist, Dr Jeremy Vo, explains how he has embraced AIR-FLOW® technology in the management of Peri-Implantitis

By Dr Jeremy Vo

Surgical intervention is often required in the treatment of advanced peri-implantitis lesions. Peri-implantitis is defined as an inflammatory process around an implant, with soft tissue inflammation and loss of supporting marginal bone.

The aim of surgical therapy is to allow access for the decontamination of implant surfaces which have been exposed to oral biofilms. Several approaches for implant decontamination have been described and can be broadly categorised to include mechanical, chemical and laser instruments.

Mechanical removal of hard and soft deposits can be achieved with rubber cups, curettes, and/or ultrasonic devices. Curettes of different materials have been manufactured, specifically for the debridement of implant surfaces. These materials include steel, titanium, carbon-fibre, Teflon and plastic. Ultrasonic devices with polycarbonate or PEEK-coated tips are also specific for implant surfaces. A more aggressive approach has been proposed which involves intentional removal of the implant threads. This is known as ‘implantoplasty’ and the aim is to produce a polished, smooth collar which better supports oral hygiene compared with the original rough surface of the implant.

Chemical decontamination is aimed at displacing the implant surface by direct application during surgery. Following elevation of the soft tissues, the implant surface can be rinsed with several different substances including chlorhexidine, sodium chloride, hydrogen peroxide and citric acid. Unfortunately, no chemical agent has shown superior results when compared with others.

Laser decontamination was used in attempts to disinfect the implant surface and achieve clinical outcomes. The evidence is, however, weak and has not shown significant improvement when compared with conventional mechanical therapy.

There are three main approaches for surgical intervention including:

1. Access surgery
   The primary aim of access surgery is to decontaminate the implant surface. Commonly, intrasulcular incisions will allow the conservation of the soft tissue around the implant once the mucoperiosteal flaps are elevated. Inflamed peri-implant tissues are degranulated and the implant surface is decontaminated. A clinical study with 5 years follow-up reported complete resolution of advanced peri-implantitis lesions in 42% of implants and 65% survival of implants.

2. Regenerative surgery
   Regenerative surgery is aimed at improving hard tissue integration around the implant (re-osseointegration) as well as remodelling recession of the peri-implant mucosa. Following mucoperiosteal flap elevation, the implant surface is decontaminated and the intrabony defect is degranulated. Various approaches to bone grafting have been described. Bone substitute materials such as Bio-Oss® (Geistlich Biomaterials) can be used to fill the intrabony defect which is then covered with a resorbable or nonresorbable membrane. A 4-year clinical study found significant reductions in probing pocket depth and radiographic defect fill with a regenerative technique involving Bio-Oss® and Bio-Gide®.

3. The clinical approach
   The development of biofilms on the implant surface plays a significant role in the initiation and progression of peri-implant disease. The bacterial microflora is composed predominantly of Gram-negative anaerobes and is similar to microflora found around teeth with severe periodontitis. Unfortunately, in the management of peri-implantitis, no definitive gold standard has been identified for implant decontamination. Implant surface roughness and irregularities can enhance bacterial attachment and prevent adequate instrumentation. The tips of the curettes are often too large to reach the deeper parts of the thread.

Recently, a powered air-abrasive system utilising Erythritol (a sugar substitute) has been proposed as an effective method of biofilm removal from the implant surface that is safe on hard and soft tissues (EMS AIR-FLOW® El.20kA, Electro Medical Systems (EMS)). The abrasiveness of Erythritol is low and it does not cause extensive damage to the surface topography of the implant compared with the use of conventional steel curettes or ultrasonics. Furthermore, in vitro data suggests that it has an antimicrobial effect.

Once the implant surface has been decontaminated, the morphology of the bony defect may help determine the most suitable surgical approach. Generally, if the defect is circumferential with intact bony walls, or has an intrabony component, the use of a regenerative approach will provide improved clinical outcomes. On the other hand, if the defect is supra-bony or the implant presents with some degree of buccal dehiscence, an apically repositioned flap would be indicated in these non-aesthetic areas.
The following case study illustrates a protocol that was used to treat advanced peri-implantitis. The case was treated successfully with a 6-month follow-up. Success was defined by a reduction in probing pocket depths (>4mm), along with a reduction of soft tissue redness and bleeding on probing.

Case Study: Regenerative approach for treatment of peri-implantitis

A 70-year-old female was referred for advanced peri-implantitis in the mandible. She presented complaining of pain and she also noticed discharge from one of the anterior implants. Her medical history was non-contributory and she was a non-smoker.

Clinical examination revealed 5 implants in the mandible supporting a fixed full arch reconstruction. Probing pocket depths were over 8 mm, around 3 of the anterior implants. The distal implants had normal probing depths. CBCT imaging revealed an intrabony component of 6.5 mm for the implant in the 43 position, 4.2 mm at the 41 implant and 3.1 at the 33 implant.

A preparatory phase was carried out, including assessment of oral hygiene and non-surgical implant decontamination in 1 session. After 6 weeks, the patient underwent surgical treatment. This comprised of full thickness mucoperiosteal flaps being raised and the chronic inflammatory tissue removed from the defects around the 3 implants with the use of tenon curettes. The implant surface was then decontaminated using EMS AIR-FLOW® technology with very fine erythritol powder (EMS AIR-FLOW PLUS Powder). The implants were also irrigated and cleansed with saline-soaked cotton foams.

A crater shaped defect was present around all the implants at the proximal and lingual surfaces, however the implants had a dehiscence on the buccal aspect. The flaps were lifted with BioOss granules (Geistlich) and Bio-Gide was placed to cover the defects. Lastly, the flaps were repositioned and secured with mattress sutures. The full arch prosthesis was repositioned and secured with mattress sutures. The full arch prosthesis was repositioned and secured with mattress sutures. After therapy, the patient underwent a protocol that was used to treat advanced peri-implantitis: a randomized controlled clinical study. The case was treated successfully with a 6-month follow-up. Success was defined by a reduction in probing pocket depths (>4 mm), along with a reduction of soft tissue redness and bleeding on probing.

Figure 3a-c. Sequence of surgical therapy: flap elevation revealing chronic inflammatory tissue; debridement and decontamination of implant surface; and defects filled with Bio-Oss and covered with Bio-Gide and mucoperiosteal flaps are repositioned and sutured.

Figure 4. Post-op intra-oral photo at 6 months after therapy.

Figure 5. Post-op radiographs at 3 months after therapy.

Figure 6. Post-op intra-oral photo of at 3 months after therapy.


