The prevalence of peri-implant complications is significantly rising clinically as implant treatment increases in the US. Peri-implantitis is a frequent enough occurrence in the dental practice that treatment needs to be accomplished to prevent loss of the implant. As with periodontitis associated with natural teeth, periodontal disease can affect implants. This can range from gingival inflammation in the absence of bone loss to significant bone loss when the disease process is not identified early in the process or a wait and see attitude is taken that leads to significant bone loss and then mobility of the fixture.

Treatment has traditionally involved elevating a flap at the site and mechanical debridement with surgical hand instruments to remove any granulation tissue present on the implant threads. Owing to the limitations of the surgical tools, this might require removal of additional bone to attempt to reach areas not visible. Success depends on debridging and sterilising all exposed threads, with success diminishing as more surface area is left untreated.

Owing to the small diameter of their flexible glass fibres, diode lasers offer several benefits for peri-implantitis treatment. This includes easier access to areas with limited access without the need to remove as much bone as may be required when only surgical instruments are utilised. Furthermore, the diode laser has the ability to stabilise the implant’s contaminated surface, eliminating any bacteria that caused the disease to prevent their hampering healing after treatment. An added benefit is bioutilisation of the osseous walls created by stem cells in the surrounding bone and soft tissue. This is important for regenerative therapy and tissue engineering to provide better healing. Thus, the diode laser is a good adjunct in the treatment of peri-implantitis, improving the clinical results observed with conventional methods."
Discussion

Peri-implantitis can be a challenge to manage. As this case illustrates, bone loss may have been progressing for an extended period before the clinician becomes aware of it. In order to achieve any success, treatment requires a surgical approach to remove any granulation tissue that has replaced bone overlying the implant. The benefit of the Picasso diode laser is that the fibre can be extended into areas around the implant that are difficult to reach in order to achieve better sterilisation and debridement without the need to remove additional bone for access, as would be necessary were only debridement with surgical hand instruments performed. The diode tip ensures better removal of the granulation tissue and site sterilisation to increase treatment success.

Conventional methods have reported mixed results regarding the ability to remove all of the granulation tissue from the exposed implant threads without altering the implant surface. The diode laser has been reported not to cause any visible surface alterations of either polished or coated implant surfaces. In contrast, surface alterations have been reported when irradiated with the pulsed ER:YAG laser.16

Scanning electron microscopy analysis has demonstrated no damage or alteration of titanium surfaces when in contact with a diode laser, regardless of the power setting. No visible difference between laser and non-lased titanium surfaces after irradiation has been reported. The result yields the best surface for guided tissue regeneration compared with either mechanical debridement, which can alter the surface by gouging the titanium or coating, or use of an Er:YAG laser.

Success in peri-implantitis treatment is strongly linked to the ability to eliminate the bacteria in the site that could hamper regeneration. This becomes more critical with implants that have been surface treated during manufacture to provide a better surface for integration. These manufacturer-treated implant surfaces yield a micro-roughness that bone responds well to during the initial integration, but that will harbour bacteria when peri-implantitis has occurred. Their removal in these micro-irregularities is difficult to achieve by mechanical means. The diode laser has the ability to decontaminate the exposed surface and threads without any negative effects.17

Once the site has been prepared, with the granulation tissue removed and all exposed surfaces decontaminated, osseous grafting is required to achieve the best healing long term. Without placement of osseous graft material to fill the osseous defects that resulted from the peri-implantitis, the site will most likely not achieve bone fill via organisation of a host clot in the void. Membranes too are recommended to allow the body to organise the osseous graft material before soft-tissue ingrowth can occur from the overlying flap, as soft tissue grows and heals at a much faster rate than hard tissue does. The membrane gives the hard tissue an advantage to overcome the soft tissues’ potential to invade the early osseous graft material. Placement of osseous graft material and barrier membranes has resulted in greater probing depth reduction and radiographic bone fill when either material is not used.4

The authors recommend avoiding probing these sites during the healing phase and thereafter because of the arrangement of connective tissue fibres found around implants. Implants, when viewed via a scanning electronic microscope, have the fibres in the gingival aspect where it connects with the implant surface running parallel to the long axis of the implant. This does not provide a physical barrier to the probe, allowing it to push bacteria deeper into the tissue, which may lead to inflammatory changes in the tissue. The fibre orientation around natural teeth is perpendicular to the tooth’s long axis, providing a physical barrier to the probe.

Conclusion

The key to successful peri-implantitis treatment is early identification to limit bone loss due to the inflammation and infection. The diode laser is a powerful adjunct in treating peri-implantitis, allowing better access to eliminate more granulation tissue than when only mechanical means are employed. It also provides the additional benefits of sterilisation of the area and inflammation of the bone and soft tissue to improve tissue regeneration. This case illustrated that the protocol presented can provide long-term predictable results, showing five-year maintenance of the grafted area and an absence of inflammation over that time.

Acknowledgement

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Editorial note: A list of references is available from the publisher.