INTRODUCTION:

Initiation of the prosthetic phase of dental implant treatment may require soft tissue modification to uncover the implants or customize the emergence profile. This can be accomplished by several methods. Cutting instruments (i.e., Scalpel or tissue punch) have been the traditional method utilized to incise through the soft tissue to the underlying implant. This approach results in a bleeding edge which may interfere when impressions are taken at the same appointment. Post operative sensitivity may also result at the fresh cut edge. Typically a delay of 2 weeks is required before impressions may be taken so that bleeding doesn’t hamper the accuracy of how the soft tissue is captured.

An alternative to the blade, electrosurgery has been an alternative to the blade and which can cauterize the soft tissue cut edges, decreasing post operative bleeding. Yet, two negatives present to the use of electrosurgery in and around dental implants. A grounding plate is placed on the patient a distance from the oral cavity, as electrosurgery requires a circuit to be formed between the monopolar tip intraorally and the surgical unit. Current flows between the electrosurgery tip through the soft tissue to the grounding plate, completing the circuit with the metallic implant conducting the current along the path. Temperature increases over a threshold of 10 degrees C at the osseous interface with the implant may lead to bone loss and possible de-integration of the implant, as has been reported. A general recommendation is to avoid electrosurgery units in and around dental implants. Additionally, tissue shrinkage is often reported as electrosurgery affects cell layers deep to the surface and combined with the temperature increase noted locally in the soft tissue. This necessitates a delay between uncovery and impressions so that the gingival margin captured is stable when the prosthetics is returned for insertion.

Clinically, diode lasers are becoming increasingly utilized in dental practices due both to lower costs to implement this technology then the more expensive CO₂ and ND:YAG lasers and the wide range of effective treatment afforded by these devices. Diode lasers, such as the Picasso (AMD Lasers, Indianapolis, IN, www.amdlasers.com) provide sufficient power to modify soft tissue in and around the dental implant for uncovery or alteration of the gingival margin to improve the esthetics. These operate within the temperature range that has been recommended, negating...
negative effects observed with other uncovery methods to the soft and hard tissue around the implant. An added benefit, coagulation is controlled allowing impressions to be taken at the time of uncovery without fear of blood interfering with the accuracy of the gingival aspect of the impression. Because tissue cutting with the diode does not affect deep cellular layers of the gingiva, tissue shrinkage is not a concern and gingival healing does not need to complete before impressions can be taken unlike with an electrosurgery unit.

CASE REPORT:
A 30 year old female patient presented with severely malposed maxillary central incisors tipped facially presented with a desire for esthetic improvement. Minimal bone was present over the facial of the central incisors, as noted on a CBCT. Treatment options were presented to the patient which included: orthodontics to correct esthetics or extraction of the central incisors, placement of implants at these sites and restorations on the anterior teeth. The patient indicated that she did not wish to pursue an orthodontic treatment option due to the time involved and concerns for longevity of these malposed centrals.

The patient presented for surgery and local anesthetic was administered utilizing 4% Septocaine with 1:200,000 epi (Septodont, Lanchester, PA, USA). The central incisors were atraumatically extracted. The right and left lateral incisors and left canine were prepared for crowns as part of the esthetic treatment plan. These teeth would support a provisional bridge during the healing and integration period. Osteotomies were prepared at both central incisor extraction sockets to reangle the implant axis more palatally and place the implants in better prosthetic positions. A 4mm wide 24 degree Co-Axis implant (Keystone Dental, Burlington, MA) was placed into the osteotomy at each central incisor orienting the prosthetic axis to a vertical position while the implants body followed the trajectory of the premaxilla. A low healing screw was placed into each implant and osseous graft material (NovaBone, Jacksonville, FL) was placed on the facial to thicken the resulting contour and fill any defects present in this bone. The soft tissue was closed with resorbable PGA sutures. A stent previously created over a wax-up fabricated on the study models of the ideal esthetics was filled with an auto-cure provisional resin (Perfectemp 10, DenMat, Lompoc, CA, USA) and seated over the anterior and allowed to set intraorally. Upon setting, the stent and provisional was removed intraorally, trimmed and polished. The material at the implant (provisional pontic) sites was shaped to a bullet shape to assist in forming an emergence profile in the soft tissue and preserve the papilla’s. These pontics were modified to not be in contact with the healing screws present on the implants so that during function on the provisional bridge the implants would not be accidently loaded.

Following a six month integration period, the patient returned for initiation of the restorative phase of treatment. The provisional bridge was removed and preservation of the papilla’s was confirmed with a natural emergence profile within soft tissue. (Figure 2, 3) The healing screws were not visible and covered by healthy non-inflamed gingival tissue. Local anesthetic (4% Septocaine with 1:200,000 epi) was administered as infiltration into the papilla around the two implant sites. The Picasso diode laser was set at 2.5 watts in continuous mode with an initiated tip. At the
center of the depression over each implant, the diode tip was activated and inserted into the site until the cover screw was encountered then utilizing a circular motion it was moved outward until the entire cover screw was exposed. (Figure 4) This was then repeated with the adjacent implant. (Figure 5) The diode laser cuts the soft tissue, coagulating bleeding from the cut edges. Open tray implant impression abutments were placed into the implants and part seating was verified radiographically. An impression of the maxillary arch was taken utilizing Aquasil heavy body VPS (Caulk, Milford, DE, USA) in a Mira Advanced Implant tray (Hager Worldwide, Hickory, NC, USA) and Aquasil Ultra syringed around the preparations and implant abutment heads. Healing abutments were placed into the implants to maintain the soft tissue exposure of the implants. (Figure 6) The previously placed provisional bridge was tried in and modified at the pontics to allow the bridge to fully seat over the healing abutments and luted with a provisional cement (Fuji Temp LT, GC America, Alsip, IL, USA).

Prosthetics were returned two weeks later from the lab (DenMat Labs, Lompoc, CA, USA). The provisional bridge was removed and residual cement removed from the natural abutments with hand instruments. The healing abutments were removed, the soft tissue demonstrating good periodontal health and a lack of inflammation where it had been modified by the diode laser. (Figure 7) Ceramic crowns were tried in on the laterals bilaterally and the left canine. Screw retained zirconia based implant crowns inserted on the implants at the central incisors. A radiograph was taken verifying fit of the implant prosthetics. A torque wrench was utilized to tighten the fixation screws on the implants to 30 Ncm and the ceramic crowns were luted with Panavia SA resin cement (Kuraray, NY, NY, USA). Occlusion was checked and adjusted where needed.

CONCLUSION:
Diode lasers are a useful adjunct to soft tissue modification to uncover dental implants or esthetically recontour the gingival margin. They provide better safety than electrosurgery maintaining a temperature profile within the safety zone of bone. This does not cause tissue shrinkage that can affect the esthetic outcome. As the diodes tip provides simultaneous cutting and coagulation (hemostasis) a clear advantage to the use of a scalpel or tissue punch immediate impressions can be accomplished without site bleeding affecting the accuracy of the capture of the soft tissue contours and position. Patient post operative comfort is also increased and the diode improves healing by stimulation of the surrounding tissue.

References: