



Feature

Gingival Augmentation: High Powered 970nm Diode Laser

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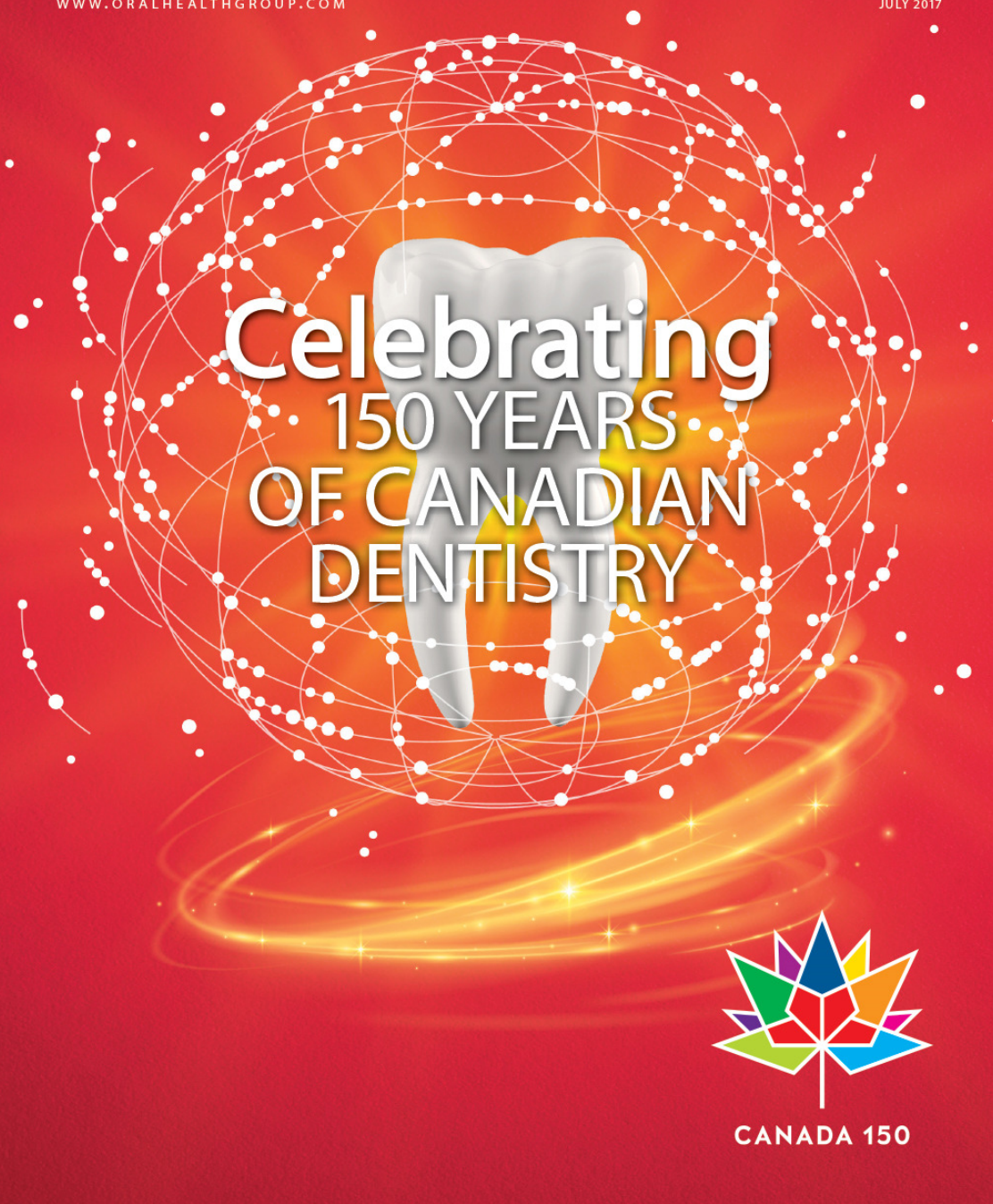
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Early analysis and diagnosis of soft tissue abnormalities and discrepancies enhances the clinician's ability to attain the best possible outcomes with minimally invasive procedures. All too often, conditions are allowed to progress to their more advanced stages due to the erroneous thought process that the treatment is more disruptive than the pathologic condition itself. Today, with the use of properly controlled advanced technologies, this concept of waiting and watching is fortunately in decline.

A prime example of the benefits of early intervention is the use of a high-powered, well-controlled laser to perform a gingival augmentation procedure in order to gain a wider zone of attached gingiva. The goal of this procedure is to prevent any additional loss of tissue, and to increase the healthy band of the keratinized gingiva that is attached to the underlying osseous structures and is pleasing esthetically. Additionally, and often most importantly to the patient, the goal is to attain the desired outcome with the least amount of discomfort, both during and post-operatively, and at the lowest possible cost.

To accomplish the treatment objective, the clinician needs to have a comprehensive understanding of the composition of the tissues in the treatment area, and how these various types of tissues appear, regenerate, and heal. Alveolar mucosa is the thin, soft, fragile, unattached mucous membrane that is apical to the attached gingiva, covering the dental alveoli. It is a continuation of the mucous membrane of the cheek, lips, and floor of the mouth.

Keratinized oral mucosa is firmly bound to the tooth and the underlying structures. The zone of attached gingiva is the width of tissue between the mucogingival junction, separating it from the alveolar mucosa and the bottom of the gingival sulcus or periodontal pocket. The width of attached gingiva is determined by subtracting the pocket depth from the total amount of keratinized gingiva. The role of the keratinized attached gingiva is to provide the periodontium with increase resistance to external injury and the stabilization of

the gingival margin against physical forces. It is more resistant to the irritation from plaque and other microorganisms than the mucosal tissue. Basically, the role of the keratinized attached gingiva is to assist in protecting the underlining osseous structures.

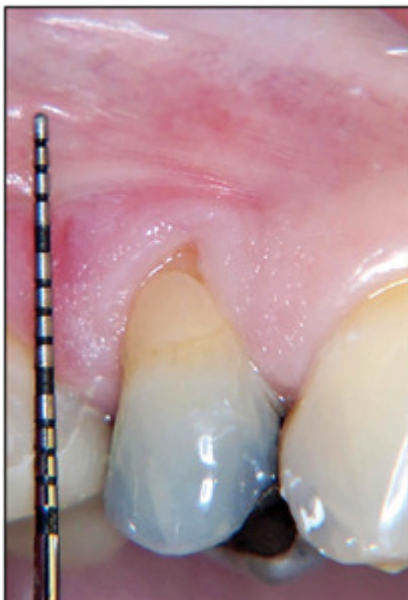
In a healthy situation, its width is generally 3-5 millimeters (mm). The amount of attached gingiva is generally considered to be insufficient if it is less than 3 mm, or if the manipulation of the lip or cheek induce a movement of the free gingival margin.

Traditionally treatment to correct an inefficiency in the attached gingiva has been to perform a free gingival or pedicle graft. Today, with early intervention and the use of a laser with an appropriate wavelength, power, and control, successful outcomes can often be accomplished with a simple, one-minute procedure using only a topical anesthetic.

In the adjoining case report, the patient presented with some mild recession and an inadequate zone of attached gingiva (1 mm) and periodontal sulcus of 0.5 mm on the facial aspect of the maxillary first premolar (**Fig 1**).

Fig. 1

Pre-Op.



After pre-operative photographic documentation, a gingival augmentation procedure was performed at the same appointment as the discovery and diagnosis using the SIROLaser Advance Diode Laser with a wavelength of 970 nanometers (nm). Due to the efficiency of the laser, the entire procedure was

completed in less than one minute, utilizing only topical anesthetic (Cetacaine liquid). An ablation technique with the 320 micron fiber in light contact with the tissue traversed the surgical site both horizontally and vertically in a cross-hatching pattern. The parameters were: pulsed mode, peak pulse power of 14 watts per pulse, with a short duty/emission cycle of 21% allowing for a thermal relaxation time of 79% for the tissue to cool between pulses. This produced an average power of only 3 watts, with the fiber continually moving at a moderate hand speed.

Due to the much higher absorption of the 970 nm wavelength in water than other diode wavelengths, this laser uses both conduction and radiation modalities to raise the tissue temperature in order to vaporize the tissue. This enhanced absorption enables the use of water for convection cooling and control of the remaining tissue to create an environment that enhances the curative process and assists in providing the desired outcome of healing by secondary intention.

To achieve the anticipated effect there must be a zone of attached gingiva pre-operatively to provide the necessary growth factors for healing. Additionally, the extent of tissue removal must be at least twice the width of the desired amount of attached gingiva to be gained. The depth of tissue ablation (removed by vaporization) must be through the basement membrane to enable the appropriate tissue regeneration (**Fig. 2**). The tissue needs to be ablated without carbonizing (burning/blackening) the remaining tissue. Carbonization of the remaining tissue will interfere with the healing process and will not provide the desired outcome.

Fig. 2

Immediate Post-Op.



Immediately post operatively, post-operative photographic documentation was acquired and an oral hydrogel wound dressing (SockIT gel, MCMP, LP, Grand Prairie, TX) was applied to the surgical site. The dispenser with the remaining SockIT gel was given to the patient for home use to be liberally applied several times a day, as often as desired, to relieve any discomfort and to minimize microbial activity. Post-operative instructions were given verbally and in writing and the patient was instructed to return for routine hygiene care.

The procedure was submitted and reimbursed by the patient's dental insurance as a gingivoplasty, which has a fee that is substantially less than that of a grafting procedure.

At the one-year post-operative follow up hygiene appointment, the area was examined and photographed showing a very satisfactory outcome with the amount of attached gingiva now more than 3 mm (**Fig 3**). The patient was extremely pleased with both the esthetics and the outcome, with a special appreciation for the simplicity and the minimal cost of the procedure in both time and expense.

Fig. 3

One-year follow up.



The post-operative discomfort reported by the patient was very minimal. The patient stated that they returned to work immediately after the appointment with no disruptions or limitations in their duties. Additionally, the patient reported that when they had any post-operative sensation it was completely and immediately eliminated with the application of the SockIt gel.

Conclusion

Early diagnosis and proactive treatment in the management of all abnormalities, specifically those involving oral soft tissues, leads to simpler procedures, reduced costs, greater case acceptance, and most importantly, enhanced outcomes. The requirements include the appropriate technology (correct laser), suitable training, and clinical knowledge about the tissue, the laser, and the procedure. **OH**

Oral Health welcomes this original article.

About the Author

Dr. Scott Benjamin is a native of the Tri-County area and is a graduate of SUNY Buffalo, School of Dental Medicine and has been in full-time private practice in the Tri-Town Area for over 25 years. He has been a leader in computerized dental practice management since its' infancy. He was Academy of Laser Dentistry President (2014-2015).

