Aesthetic laser therapy correction of physiological gingival hyperpigmentation

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A beautiful smile is dependent on many factors. One of those factors is the gingival scaffold Symmetry, proportion, as well as colour and appearance of the gingiva are critical to an aesthetically pleasing smile. Physiological gingival hyperpigmentation does not present as clinical pathology requiring intervention, nonetheless it may be of aesthetic concern to the patient. Minimally invasive intervention by means of cryosurgery, electrosurgery, laser therapy or other may produce dramatic change in the appearance of the patient’s smile with a sustainable, long-term aesthetic outcome.

Hereafter a case is presented demonstrating laser therapy removal of gingival hyperpigmentation with stable, pink gingival aesthetics at the 2-year follow-up.

Case report
A 34-year-old female patient of Indian descent presented by referral to a specialist in periodontics and oral medicine at her request for “pink gums”. The patient was a non-smoker and the medical history was non-contributory. Examination of the face denoted multiple, poorly defined hyperpigmented macules of the lips, mild in severity and greater in number on the lower lip. The patient’s high smile line was noted with excessive gingival display, the extent of which involved hyperpigmentation, blue-black/dark brown in colour (Fig. 1). Introral examination denoted a healthy, largely restorative-free dentition, with exemplary oral hygiene maintenance.

Hyperpigmentation was noted involving the attached gingiva of both mandible and maxilla, with the latter greater in severity (Fig. 2). The Oral Pigmentation Index in terms of pigmentation intensity (heavy clinical pigmentation) and scored 2 on the Takashi melanin pigmentation index in terms of its extension (formation of continuous ribbons extending from the neighbouring solitary units). In both the mandible and the maxilla the hyperpigmentation appeared mostly as singular, postoperatively extending, macular lesions with well demarcated borders limited central to the mucogingival junctions. A diagnosis of physiological gingival hyperpigmentation was made and intervention for aesthetic correction was indicated (the patient initially sought treatment of the maxilla only). Digital smile design (DSD) and smile analysis of the patient indicated need for correction of the altered passive eruption. Depigmentation of the affected areas as well as crown lengthening by laser gingivoplasty was opted for. The working field was retracted and isolated (Opticator, Ivoclar Vivadent) and local anaesthesia achieved by slow infiltration of a 4% articaine with adrenaline (1:200,000) local anaesthetic solution (Ulistem™ forte, 3M ESPE). The area, mucosa and teeth surfaces, were cleaned with sterile gauze soaked in chlorhexidine gluconate aqueous solution (never use an alcohol solution with medical lasers). An Er,Cr:YSGG laser (Waterlase Plus 2.0, Biolase) was used for all the periodontal soft tissue surgeries.

The crown lengthening by gingivectomy was first carried out as per the DSD guide, with a fine tip (MGG8), applied more parallel to the tooth, with the unit’s power settings at 75Hz, with water and air settings 90 and 40 respectively thereafter. A broader, chisel tip (MGG1) was interchanged for the depigmentation/gross de-epithelialization, with power settings increased to 9W at 2780nm. The tip size and power allowed for faster removal of tissue with water and air settings on for cooling. Broad, gradual strokes de-epithelialized the pigmented areas up to 1–2 mm beyond the lesions’ borders. To conclude the procedure, the unit was set to ‘laser handpiece’ mode, with lowered power settings at 1–1.5W at 75Hz, and water and air off for hemo-stasis, leaving a layer of coagulum that would aid with the tissue healing. After the entire affected area was de-epithelialized (Fig. 3) post-operative instructions were given (no tooth brushing near the treated area for 1 week, rinse with chlorhexidine mouthwash 3 times daily (Audeo C, Nova Pharmaceuticals), soft diet avoiding spicy/irritating foods). The patient was recalled at 4 weeks post-operative having had no pain or discomfort, and demonstrating complete healing of the entire treated area (Fig. 4). There were no areas of hyperpigmentation noted (Fig. 5). The patient was reressed as zero for both pigmentation indices following dental bleaching the patient presented at the 2-year recall with no notable signs of regimens. The patient remained a score of zero on both indices. The gingival contour and colour remained stable with aesthetic results pleasing to the patient (Fig. 6).

Discussion
Pigmentation of the gingiva may pose an aesthetic concern to the patient seeking cosmetic correction thereof. Laser de-epithelialization is an evidence-supported, beneficial treatment modality. “Laser” is an acronym for light amplification by stimulated emission of radiation. Possibly the first report of laser radiation on oral soft tissues was as early as 1960. The first commercial laser for use in dentistry, the diode 980 nm diode laser, was introduced in 1990. At present, a range of laser wavelengths are used in dentistry for a plethora of applications (Table 1). The fundamental mode of action of lasers is that waves consisting of photons (basic unit of radiant energy, light) travel at the speed of light and these waves can be defined by their wavelength and amplitude. Amplitude is the vertical height of the wave, and in lasers this corresponds to “brightness”, its potential energy to do work. Wavelength is the distance between two corresponding points on the wave – the unit typically in laser dentistry is...
The ablative action of the laser over a wider area allowed for removal of the superficial gingival layers rather than the desired target of the basal and suprabasal area. The ablative process can be performed at an early stage postoperatively, remaining stable over the long-term, contributing greatly to an aesthetically pleasing smile.

**References**

5. Walfish P. Laser light: a tool for the utilization of the superficial gingival layers rather than the desired target of the basal and suprabasal area. The ablative process can be performed at an early stage postoperatively, remaining stable over the long-term, contributing greatly to an aesthetically pleasing smile.