

## Remove Gingival Pigmentation with a Diode Laser

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### A clinical case that illustrates the use of a digitally pulsed high power diode laser with minimal anaesthesia for gingival de-pigmentation.

**BACKGROUND** Pigmented gingival tissue or gingival melanin pigmentation (GMP) is a common appearance in parts of the world populated predominantly by non-Caucasians, such as the Middle East and Asia. Literature review shows that the traditional treatment of this phenomenon has been surgical intervention, done in a number of methods<sup>1</sup>. However, the use of mechanical intervention can cause a severe trauma for the patient and does not treat the melanocytes, which are the actual cause of the problem. Moreover, with the traditional surgical treatment, the patient largely suffers for relatively small effect/success, with pigmentation returning back within a few months. Carbon dioxide and Er:YAG lasers<sup>2</sup> treatments are shown to be effective and less traumatic than the mechanical interventions, but still with up to a 30% recurrence rate of GMP in 6 months (Er:YAG laser). On the other hand, diode lasers (810nm) seem to show a marked advantage over Er:YAG<sup>3,4</sup>. This case review looks at the non-surgical use of a digitally pulsed diode laser for GMP removal<sup>5,6</sup>.

**CASE REPORT** My former dental nurse, a Filipino national, demonstrates a good example of extensive intrinsic gingival pigmentation (**Fig 1**), which she has had since birth. Often within the Middle East we see more localised gingival pigmentation, which is relatively easier to treat.



Fig 1 Pre-operative

The treatment protocol that was used for this treatment was published in the Laser Journal, in February 2009<sup>5</sup>, by Kenneth Luk, a Hong Kong based Dentist. It was based on laser treatment, with the use of ellexion claros 30W, digitally pulsed laser we have at our clinic.

### STEP 01

The patient was given half a cartridge of local anaesthetic, with the aim to preserve some sensation in the area to be treated and to allow for a certain level of numbing, against the action of the laser.

The laser used – ellexion claros, is a digitally pulsed diode laser with a wave length of 810nm, which means that the laser energy is absorbed by the melanin. The claros has a pulse frequency of 20,000 Hz, with a peak power of 30W and a pulse width of 15 microseconds, with an average power of around 10 Watts. With this setting, the laser beam is “on” the tissue for only 15 microseconds, of each interval cycle of 50 microseconds (20,000 such interval cycles every second), which makes around one third of the total cycle. The rest of the time is to allow for the tissue to cool down.

## STEP 02

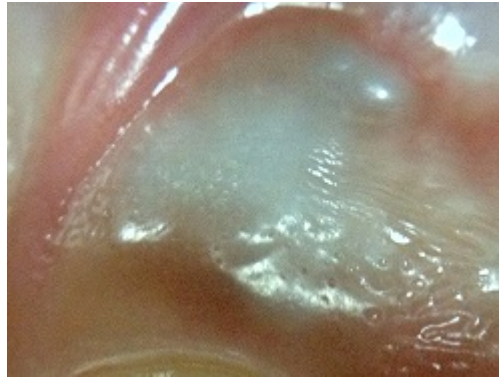
A non-initiated 600 micron fiber was used. It was ensured that all concerned are wearing 810nm specific safety glasses. The protocol asks for the clinician to start with the laser tip several centimeters away from the pigmented tissue and slowly bring it closer.

## STEP 03

Then, at around 12-15mm away, the laser was started by depressing the foot control and moving it closer until there is a visible reaction of the tissue from the laser light. This is when a slight blanching of the surface tissue can be seen. The indicative distance was maintained and the treatment was continued with simple paint-like movements, with the visible laser aiming beam penumbra (the aiming beam spot) at a reasonable speed, over the pigmented tissue, in order to get a general blanching over the entire area. The exposure time for this case was around 1 minute. The immediate post-operative result is shown in (Fig. 2), which shows the blanching of the tissue surface.



**Fig 2** Immediate post-operative



**Fig 3** Immediate post-operative close-up



**Fig 4** Immediate post-operative detailed view

A photograph of the post-operative tissue reaction above (the left central as a close up in Fig. 3 and 4), gives an excellent view of the 'blister' effect. The patient described the feeling to be similar to eating a very hot soup, with a resultant blister in the mouth. This technique is not painful and as far as this patient is concerned, there was no discomfort at all.

During this whole procedure, the patient should be quite comfortable and without any noticeable signs of pain or being in anyway unhappy with the treatment.

After the treatment, the healing process was discussed and the patient was advised to use chlorhexidine mouthwash twice per day.

**3 weeks follow up** Clinical pictures were taken in most of the days following the procedure. The formal review was done after 3 weeks and during the healing period the patient reported no trauma, feeling quite comfortable the whole time.

The formal review picture shows a significant improvement over the pre-operative area (**Fig. 5**). Being clinically critical, there is still some pigmented tissue on the gingival margin above the central incisors. However, when the possibility for 'touch up' was discussed, the patient declined, explaining that this result was so significant that she was delighted and did not want to go any further with follow up treatments.

It was unclear at the start what sort of relapse could be expected in a case like this (intrinsic pigmentation) and how long the result would remain stable. Whilst the absorption of the laser energy into melanin, destroying the melanocytes could be understood, the time taken for the body to rid the area of this melanin pigment was less clear. The stability of the results was reviewed on an ongoing basis and it seemed as if it was improving steadily over time.

**14 months follow up** At 14 months post-operatively, more photographs were taken (**Fig. 6**), which shows an excellent and stable result from a single treatment lasting around 1 minute.



**Fig 5** Follow-up 3 weeks



**Fig 6** Follow-up 14 months

Needless to say, the patient is delighted with the result and is an excellent promoter of this treatment within our clinic.

Unfortunately, due to family issues, the patient has returned to her native Phillipines and it is unlikely to get further post-operative pictures to demonstrate the longevity of the treatment in this case.

The reasoning behind using minimal amounts of anaesthetic was to be able to assess the patient's reaction to the treatment. Should there have been any pain, we would have aborted the treatment completely. Nevertheless, following the careful guidance from the ellexion local distributor, as well as the Area Representative, we were able to complete one atraumatic treatment, as planned. Dr. Luk suggests the use of water as a cooling method and this could also be incorporated into the technique, as there is a minimum absorption of the 810nm wavelength by water – much less than other diode wavelengths.

### Conclusion

The use of a digitally pulsed diode laser for GMP can be extremely effective and atraumatic, if it is based on the protocol described in this case study. This method can have a wide reach out in the Middle East and Asia, where an affordable, minimally invasive and comfortable procedure would satisfy the demands of many patients and I would encourage other colleagues to apply it.

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