The minimalinvasive laser surgical crown lengthening

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_The surgical crown lengthening is a procedure, which is probably not performed as often as it should be. There are multiple medical indications for this operation. Not only do we need it for example to modify the red-white aesthetics, but this operation should be done in many other cases. If a patient has too short clinical crowns, which would give not enough retention for restorations we should prepare a more suitable situation by surgical intervention. Especially with ceramic-restorations, which need adhesive attachment, we often have problems. The preparation margin should be supra- or paragingival. This is often not the case, so it is more difficult to have a clean and dry operation area, while attaching the restoration. If we would perform a surgical crown lengthening before preparation, things would be a lot easier afterwards. Last but not least we often have to distort the biological width. This will result in chronically inflamed areas around the restoration. If we know that the defect of the tooth is going to force us to damage the biological width, we have to perform a surgical crown lengthening before starting with the planned treatment. So why is it, that this operation is performed so rarely? The answer is easy to give. The conventional treatment with scalpel, bone milling cutter, needle and thread is not easy, is bloody and risky and often associated with pain for our patients. In addition, we have to wait several weeks for the healing process to end, which will retard the actual treatment. Therefore it is obvious, that many dentists and patients will look for a compromise and will risk functional and/or aesthetic degradation.

To solve this problem we would need a possibility to perform a surgical crown lengthening fast, save, painless and with shorter healing time. This is where it comes to laser dentistry. The right lasers, used in the right way, will serve us all these benefits.

The right treatment will now be shown by the author in a case presentation. The crown lengthening was done with a combination of an 810 nm diode laser and an Er,Cr:YSGG laser.

Intentionally we wanted to show a case of the upper jaw front. In those cases we need a high amount of predictability, which is given in the laser surgery. As well as we can present a nice documentation.


Fig. 1


Fig. 2


Fig. 3

_Clinical procedure

The following case report should show the clinical guidelines how to use different wavelengths in this treatment. It would be possible of course to perform a crown lengthening with just an erbium laser, as it absorbs mostly in water and therefore works on gingival and on bone. But under clinical aspects it is our opinion, that the combination of diode an erbium laser is very useful. Because of the gingivectomy with a diode laser—in this case the laser "Q 810" by ARC lasers—the operation field is not bleeding and shows good clarity. With good clarity it is no problem to measure the new biological width by ablating the bone with an erbium laser.

At first it must be ascertained how much tissue we have to remove and how much space exists from the limbus alveolaris to the top of the gingiva. This is carried out by means of measurement with a PA probe under anaesthesia. If the measurement is concluded, we are able to mark the tissue, which is to be removed. This is helpful for the following reshaping of the gingiva (Figs. 1, 2 & 3). Then we can begin with the excision of the soft tissue. In this case we used 2.8 watts in the cw mode. In this setting a speedy work is reached under excellent coagulation (Figs. 4 & 5). If the modelation of the gingiva is concluded, we immediately can begin with the ablation of the bone. If we remove 2–2.5 mm of bone, the basis for a new biological width is created.

The ablation with an erbium laser is carried without thermal damage under good visibility. In this case the "Waterlase MD" Cr:YSGG laser with 2,780 nm wavelength by the company "Biolase" was used. The Ablation of the bone is possible without a flap, minimum-invasive and without thermal damage. These were important factors for the patient to decide positive for this intervention. The bone-ablation is checked within the treatment by means of using a PA probe (Fig. 6 & 7).

In this case after the surgical steps were carried out we did a shaping of the incisors. Veneers are planned for a nice aesthetical result. But a functional pre-treatment is necessary. The final situation directly at the end of the crown lengthening is nice and already gives an improved aesthetic result (Fig. 8) to the patient. After one week there is hardly something to be seen (Fig. 9). The healing was without complications; there were no scars, no swelling or pain. Merely during the day of the treatment, the patient took a painkiller. This was purely prophylactic on our advising. In the fol-

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Fig. 4


Fig. 5


Fig. 6


Fig. 7


Fig. 8


Fig. 9

lowing no more medication was necessary. The normal oral hygiene was taken up again after four days. Before that, the area of the crown lengthening should be left out of the brushing procedure. Only oral rinse was used adjuvant in the first days after surgery. After two to three weeks the healing is concluded solidly. The patient is contented and other therapeutic measures—in this case the construction of the canine guidance and veneers—can be begun. This approach is only because we are working in the front tooth area. If we are working for example on molars and the aesthetics are not too important, we can do our further treatment after six to ten days.

_Benefits

The advantages for the dentist are obvious. A time needing, bleeding surgical approach with flaps, stitches and the risk of afterwards appearing scars can be avoided. Also a solidly healed result is to be realised in short time. This means that we can begin earlier with the next restorative treatments.

By the non-invasive approach the dentist can achieve an increased compliance for a treatment, which no patient wants to have. We can expand our methods in aesthetic surgery, pre prosthetic surgery and simplify our work. Also the financial benefits and the positive propaganda offer unmistakeable advantages. For our patients the advantages are also evident. A bloody, surgical intervention of this kind is substantially more pleasant by the application of laser light, than in the conventional approach. Also the post surgical healing is generally without any complications. A shorter duration of the surgery and good healing also gives the opportunity for the patient to have this procedure done without changing his normal everyday life. To sum up, one can say that for "laser dentists" possibilities come up which are not to be reached conventionally. Own therapy can be improved, expanded and one can treat his patients non-invasive, careful and with good predictability. A classic „win win situation".

_Summary

There are many Indications for a surgical crown lengthening. Even though the indication-list is long, this treatment is not very often done. This is probably, because it is difficult and demanding to perform and often painful for our Patients. To solve this Problem, we have the opportunity to use lasers instead of the conventional technique. The laser surgical crown lengthening is done fast, not very difficult and gives a great amount of safety and comfort to our patients._

_contact laser

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