

Er:YAG laser and orthodontic surgery: gingivectomy and surgical exposure of impacted teeth.

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AIM OF THE STUDY

The aim of this study was to compare two different techniques (blade technique versus laser) during two different orthodontic steps:

- surgical exposure of an impacted tooth;
- gingivectomy.



For each clinical observation the relevant laser setting parameters and operative conditions have been recorded. Energy used is greater when delivered on soft tissue (output 400mJ) and decrease for enamel preparation (bracket placement) (80 to 100 mJ). Low frequency is used for enamel preparation.

DISCUSSION

The Er:YAG laser has the maximum peak of absorption for water and hydroxyapatite. Considering it is a cold laser, it leads to a minimal thermal elevation into the tissues with consequent less diffusion in depth and less damages to the tissue involved. The use of this laser leads bleeding cut.

The Er:YAG laser has evidenced in addition an appropriate use for bracket placement because it helps for a better etching on the tooth enamel even if the need for orthophosphoric acid immediately following the laser treatment, has been demonstrated (Bertrand MF et al, 2003). Its cutting efficiency on soft tissues as well as on hard tissues has been demonstrated (Hibst R. Laser Surg. Med 1992). There are no thermal side effects on pulp or surrounding tissues (Hilbst R. and Keller U.Proc SPIE 1990).

CONCLUSION

The use of Er:Yag laser had lead the following advantages (on both cases the operations were carried out on children):

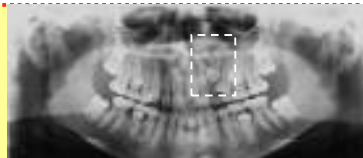
- No anesthesia
- No post operative oedema and pain
- Fast tissue regeneration.

CLINICAL REPORT

Er:YAG laser Fidelis Plus™ (Fotona, Slovenia) - Air/water spray

Operculectomy: preoperative findings.

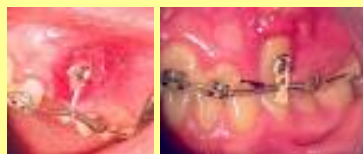
Surgical exposure of impacted teeth (see tooth 23, X-ray and clinical views) should be done once the 3D X-rays diagnosis has been conducted (buccal or palatal approach). In this case the external crown contour palpation makes sure the vestibular surgical approach is possible.



The following parameters were used:

- Output power: 400 mJ.(soft tissues) to 80/100 mJ (enamel preparation for bracket placement).
- Frequency: 5 Hz.
- Handpiece: sapphire tip (diameter 0,8mm).
- Theoretical Power Density: 400 W/cm² .
- Theoretical Fluence: 80 J/cm².
- Pulses number : 151.
- Photons number : 60x10¹⁷.
- Laser working time: 30.35 sec.

Bracket placement. One week later



Two weeks later One year later (case closed)

- Gingivectomy: preoperative view (lack of eruptive forces: teeth 12 and 22)
- In order to speed up the eruption of 12 and 22, a surgical approach was performed.



- Output power: 250 mJ.
- Frequency: 15 Hz.
- Handpiece: sapphire 0.8mm tip,
- Theoretical Power Density: 750 W/cm² .
- Theoretical Fluence: 50 J/cm².
- Number of pulses: 225.
- Number of photons: 362,53x10¹⁹.
- Laser working time: 15 sec.



one week post-operative view (case still open)