RESECTION OF THE TOOTH APEX WITH DIODE LASER

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Summary. An “in vitro” experimental study has been carried out on 70 extracted teeth. A laser resection of the root apex has been carried out with diode laser beam with a wavelength of – 810 ± 10 nm. Sequentially a radiation with increasing power has been applied, as follows: 1,3 W, 2W, 3W, 4W, 5W, 6W, 7W, in electro surgery mode. Successful resection of the tooth apex has been performed at: 3W; 4W; 5W; 6W and 7W power. It was established that when laser resected the tooth apex carbonizes.

Key words: diode laser, apical osteotomy, "Denlase"

INTRODUCTION

Diode lasers are widely used in the treatment of abscesses, ulcers, teeth whitening, lengthening of tooth crowns, opened and closed curettage, gingivectomy, gingivoplastics, disclosure of implants, incisions, sterilization of root canals, pulp coagulation, gingival sulcus retraction and others [1, 2, 3, 4, 6, 9, 10, 14, 22, 25, 29].

One major problem in the process of the apical osteotomy is the complete resection of the apex of the operated tooth, located in cystic cavity. When the resection is incomplete, granulations remain around the apex and cause relapse. At the apex of the tooth, around the main canal, there are delta shaped microtubules [5, 7, 8, 11, 13, 15, 16, 17, 18, 19, 24, 26, 27, 28, 30]. Numerous microorganisms are found in these microtubules and they cannot be removed by resection with rotation instruments [12, 20, 21, 23, 31, 32]. In the available literature there are no experimental studies on the use of "Denlase" diode laser in apical osteotomy.
AIM

The purpose of the study was to establish the minimum power of the laser beam necessary for the apical tooth resection with a diode laser.

MATERIAL AND METHODS

For this purpose we used a diode laser „Denlase“, which has European certifications CE and TÜV and was kindly provided by „Optica Laser « for experimental work (Fig. 1).

![Fig. 1. Laser unit “Denlase”](image)

The study was performed on seventy extracted teeth divided in groups of ten. A laser resection of the root apex has been carried out with laser beam with a wavelength of – 810 ± 10 nm. Sequentially a radiation with increasing power has been applied, as follows: 1.3 W, 2W, 3W, 4W, 5W, 6W, 7W, in electrosurgery mode. In the study we applied continuous laser radiation – CW, in which the value of the output power is reduced by the amount of light scattered when passing along the optical fiber.

RESULTS

The obtained experimental results indicate that, at a minimum program specified power 1.3 W, as well as at 2W power resection has not been performed (Fig. 2).
Successful resection of the tooth apex has been performed at: 3W; 4W; 5W; 6W and 7W power. When laser resected the tooth apex carbonizes (Fig. 3).

To achieve the result at low emission power (3W and 4W) more time is necessary – an average of 56 s., while at larger power the time will be shortened to an average of 20 s. It should be held in mind that the experimental design was carried out in dry conditions, in which the absorption of the laser light from the tissue is maximal. The carbonized dental tissue can be easily removed by curette (Fig. 4).
Resection of the tooth ...

Fig. 4. Tooth with laser apical resection

CONCLUSION

The conducted experimental studies give reason to further investigations in this direction which can be the basis of clinical approbation of “Denlase” laser method for apical osteotomy.

REFERENCES