TREATMENT OF CHRONIC MARGINAL PERIODONTITIS WITH A ND-YAG LASER, COMPARATIVELY WITH THE CLASSICAL SURGICAL TREATMENT

Viorel IBRIC CIORANU¹, Vasile NICOLAE², Sorin GHISE³, Sorin IBRIC CIORANU⁴

1. Prof., PhD, “Lucian Blaga” University of Sibiu, Faculty of Dental Medicine, OroMaxilloFacial Surgery Clinic
2. Assoc. Prof. PhD, “Lucian Blaga” University of Sibiu, Faculty of Dental Medicine, Dental Prosthetics and Implantology Clinic
3. Dentist, Private practitioner, Specialist in Periodontology and Lasertherapy, Sibiu
4. Trainee physician, OroMaxilloFacial Surgery, “Lucian Blaga” University of Sibiu, Faculty of Dental Medicine, OroMaxilloFacial Surgery Clinic

Corresponding author: maxfaxes@yahoo.com

Abstract

The scope of the investigation was a comparative study between the classical surgical techniques applied in the treatment of chronic periodontitis and the adjuvant laser therapy.

Materials and method. The study was performed on a batch of 20 patients diagnosed with progressive chronic periodontitis, subjected to the classical surgical treatment - namely flap intervention in an operative field - versus a group of 18 patients with the same diagnosis, in whose case the surgical intervention was combined with ND-YAG laser phototherapy.

Results and discussion. Chronic periodontitis appear as morbid entities with plurifactorial, both local and general, usually complex causes. As all patients under analysis suffered from an advanced stage of the disease, flap intervention was practised. However, utilization of laser as an additional technique of periodontal surgery gave better results. In advanced stages of the disease, the only viable alternative remains the surgical removal of the granulation and osteitic tissue from the periodontal pockets, elimination of the abnormal gingival proliferations, in parallels with a harmonious reinsertion of the gingival festoon.

Conclusions. Clinical investigations demonstrated that, in spite of the similar results registered in certain cases, a more rapid healing was noticed through laser utilization, as due to the vasodilatation produced at the level of microvascularization and to stimulation of neovascularization, and reduction of oedema in the affected zone.

Keywords: chronic periodontitis, surgical treatment, ND-YAG laser treatment

1. INTRODUCTION

The more and more frequent teeth loss caused by chronic marginal periodontopathies called for the elaboration of new and modern treatment methods. The simple elimination of the local factors causing progressive chronic marginal periodontopathies is insufficient, once it attains only an apparent clinical healing, so that a complex surgical treatment, corroborated with the treatment of the general factors, based on modern procedures, becomes absolutely necessary.

The surgical treatment aims firstly at a total removal of the granulation, osteitic tissue present in the periodontal pockets. Once known the special - antiinflammatory, analgetic, decontaminating in the removal of the pathological tissues, biostimulating and regenerating - effects of laser upon tissues, this new tool has been successfully employed in periodontal surgery [1,2].

2. MATERIALS AND METHOD

To demonstrate the higher efficiency of the surgical techniques applied in the treatment of advanced (progressive) marginal chronic periodontites and of the laser-based procedures, a comparative study has been peformed, along an 18 month period, on two batches of patients suffering from this disease.

In this respect, a group of 20 patients diagnosed with progressive marginal chronic periodontopathy were subjected to the classical surgical treatment - namely flap intervention in an operative field - versus a group of 18 patients with the same diagnosis, in whose case the surgical intervention was combined with ND-YAG (Fig 1).
The diagnosis was decided on the basis of clinical and radiological examinations. Considering the advanced stage of the malady, established after the professional hygienization step (supra- and subgingival scaling, surface smoothing and polishing, local antiinflammatory treatment), the preferred solution was the open field surgical intervention for the elimination of pathological tissues in the first group of 20 patients, by the classical technique with Gracey-type curettes, as well as with bone curettes, the radicular surfaces being polished with pile subgingival files and diamond stones, under flame, at moderate rotation, under continuous cooling with physiological serum.

The patients were followed up along an 18 month period. The sex composition of the patient groups was similar, the men-women ratio being 9:11 in the former and 8:10 respectively, in the latter.

In both groups, the age values ranged between 36 and 68 years. The follow up period after thread removal and the clinical and radiological examinations were performed each 3 months in the first year and each 6 months, respectively, in the second year.

In cases of abnormal mobilities of the groups of operated teeth, their stabilization with fixed arch bars was performed. The oral-dental hygiene was strictly applied, concomitantly with stimulation of local trophicity through systematic brushing, according to a correct technique, utilization of gingival stimulators for an active mastication, permanent control of the dental plaque, and an active involvement of the patient in all these activities.

3. RESULTS

The evolution recorded in the first group of patients, treated by the classical method, was satisfactory, the suture threads being removed after 7 days while, after 3 weeks, the gingiva showed a normal aspect, all functions being completely resumed.

In the second group of subjects, treated by ND-YAG laser phototherapy, a favourable evolution was also evidenced along the various therapeutical stages. (Fig 2)
The control performed after 3 month evidences a 2 mm gingival retraction which, 6 months later, is of 3 mm. In the second group of patients, healing was more rapid, the pain experienced and the post-operative oedema being significantly reduced, so that, 10 days after surgery, the functions of the dental-maxillary apparatus were completely recovered.

Application of such a modern technique permitted a simple and more easy removal of the granulation tissue (ER LP 200 my/20 Hz), gingival debridement, polishing of flap’s inner side, scaling and smoothing of the radicular surfaces, and de-epithelization of flap’s external surface.

The control performed after 6 months shows a normal aspect of the gingival festoon, no periodontal pockets, and a gingival retraction of only 2 mm.

4. DISCUSSION

The laser is a light quantic amplifier emitting a mostly coherent electro-magnetic radiation, whose frequency ranges from the UV level up to the visible spectrum.

The laser radiation differs from the normal light by [3]:
- very high energetic density;
- spatial and temporary coherence;
- microchromatism;
- directionality of the laser fascicle;
- a high ordering degree, permitting concentration of a higher energy amount on a reduced surface;
- luminosity;

The laser is formed of 3 main parts [3]:
- the active laser material
- the pump, through which inversion is performed
- optical resonator.

According to the operation mode, 2 types of laser are distinguished:
- impulse laser
- laser with a continuous working mode.

As to the active laser material, there may be distinguished [4]:
- laser with gas (He-Ne, CO2)
- laser with solid body (Nd: YAG, ER YAG)
- laser with colouring agent
- laser with semiconductor
- chemical laser
- laser with free electron

The lasers with low emission power (LLLT) have a biostimulating effect [5] based on the following mechanisms:

1. Trophic effect through cell biostimulation by:
   - ionic action upon the intra- and extracellular liquids
   - stimulation of some intracell elements, improvement of cell metabolism and of the phosphorylation process
   - acceleration of colagen synthesis

2. Antiinflammatory effect [2, 6] through:
   - reduction of prostaglandine secretion
   - membrane repolarization
   - diminution of another group of chemical mediators of inflammation – namely, prostacyclines

3. Analgetic effect [2, 7] through:
   - stimulation of the Aα nervous fibers and blocking of the painful influx at the level of the posterior horns from the medullary grey substance
   - the antalgic effect of the laser with He-Ne is obtained through its utilization in continuous modulated emission at 5 Hz, fixed at 5 impulses per second.

The ND-YAG laser employed in the present investigation is the most important solid body laser, possessing a high emission power, similar to that with CO2, emitting radiations with an 1064 micrometer wavelength, and having a possible biostimulating effect, in cases of low doses, with a positive influence upon bone regeneration [8].

This type of laser may be also used in the surgical treatment of marginal periodontopathies, as it permits a very good and efficient removal of the inflammed tissue from the periodontal pockets, concomitantly with bacterial decontamination and profound sterilization [9], and a higher visibility of the operative field in the absence of bleeding.

In the two groups of subjects, diagnosis was
decided on the basis of clinical and radiological examinations. Considering the advanced stage of the malady, established after the professional hygienization step (supra- and subgingival scaling, surface smoothing and polishing, local antiinflammatory treatment), the solution preferred was the open field surgical intervention for the elimination of pathological tissues in the first group of 20 patients, by the classical technique, with Gracey-type curettes, as well as with bone curettes, the radicular surfaces being polished with pile subgingival files and diamond stones, under flame, at moderate rotation, under continuous cooling with physiological serum.

Application of this modern technique permitted a simple and more easy removal of the granulation tissue (ER LP 200 my/20 Hz), gingival debridement, polishing of flap’s inner side, scaling and smoothing of the radicular surfaces, and de-epithelization of flap’s external surface.

5. CONCLUSIONS

The surgical treatment (flap intervention) applied in advanced phases of the periodontal disease – along with the other treatment methods and on strictly observing the peculiarities of each case in part - remains the best option to consider. Utilization of ND-YAG laser for the application of such techniques contributes significantly - by means of its well-known beneficial effects - to patients’ healing.

References