ACUTE PHASE OF HEALING - LASER ASSISTED POCKET DEBRIDEMENT VERSUS CONVENTION HAND INSTRUMENTATION

Prof. dr. Ana Minovska
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1. Periodontal pocket

2. ER:YAG laser in periodontal treatment

3. The Wound Healing Process
   - Remodeling
   - Proliferative
   - Inflammatory
   - Phases

Periodontal healing
1. Periodontal pocket

1. PLAQUE
   Pathogenic microorganisms

   Antigens
   LPS
   Virulence factors

   PMN
   Antibodies

2. Inflammatory immune response

   Cytokines
   Prostanoids
   MMPs

3. Connective tissue and bone metabolism

   Clinical symptoms of disease

4. Non-genetic risk factor

5. Genetic factors

Modified from R. Page, K. Kornman, 1997
2. **ER:YAG laser in periodontal treatment**

There are many hundreds of publications about effects of ER:YAG laser compared to conventional periodontal treatment, but comparison between various clinical studies or between laser and conventional therapy is difficult at best and likely impossible at the present:

- Different laser wavelengths;
- Wide variations in laser parameters;
- Differences in experimental design;
- Lack of proper controls;
- Differences in severity of disease and treatment protocol;
- And measurement of different clinical endpoints.
- Insufficient reporting of parameters that, in turn, does not allow calculation of energy density;
Since no studies have reported the effects of low intensity level Er:YAG irradiation on acute phase of healing, after pocket therapy, the aim of the present study was to provide **Immunohistochemical and histomorphometric analysis** of acute phase of wound healing following laser assisted pocket debridement compared to conventional hand instrumentation.

**Material and Method**

For the purpose of the study a **split-mouth design** was performed. A total of 15 pairs of contralateral single- and multirooted teeth were included. Each tooth of each contralateral pair had to exhibit attachment lost $\geq 5$ mm on one aspect of the tooth.

**Determination of:** Myeloperoxidaza, CD68, CD3, CD20, Vimentin, CD34.

The tissue biopsy was taken from the soft tissue wall of the periodontal pocket 24 and 72 hour after preformed periodontal treatment.
CONCLUSIONS

HIGHER CD34 EXPRESSION (ENDOTHELIAL PROLIFERATION) IN THE LASER TREATED GROUP AFTER 72H DESPITE LESS EXPRESSED INFLAMMATORY RESPONSE IN THE LASER TREATED TISSUES.

CAN BE ADDRESS TO LASERS TRANSFER OF ENERGY TO SURROUNDING TISSUES IN THE FORM OF HEAT ABLE TO INDUCE A HEAT SHOCK RESPONSE.

FURTHER RESEARCH IS STILL REQUIRED FOR THE INTERACTION OF THESE IMMUNE CELLS, THEIR SECRETORY PRODUCTS, AND OTHER WOUND ELEMENTS BEFORE OUR UNDERSTANDING OF THE MECHANISM OF WOUND HEALING, AFTER LOW-LEVEL ER:YAG IRRADIATION, IS COMPLETE.

IN THE PRESENT STUDY WE DEMONSTRATED THAT THE HEALING PATTERN OF GINGIVAL CONNECTIVE TISSUE AFTER LOW-LEVEL ER:YAG IRRADIATION IS CHARACTERIZED BY LESS MARKED INFLAMMATION.

AS RESULT OF A VERY NARROW ZONE OF THERMAL MECHANICAL ABLATION WITH MINIMAL COLLATERAL THERMAL MECHANICAL DAMAGE.