Efficiency of photodynamic therapy in the treatment of peri-implantitis: A randomized controlled clinical trial

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Peri-implantitis is defined as an inflammatory lesion of peri-implant tissues. Primary goal of peri-implantitis therapy is to resolve the inflammation as well as to stop the progression of disease. Eradication of the causative bacteria and peri-implant pockets as well as decontamination of the implant surface are essential to achieve predictable and stable clinical results. Photodynamic therapy is defined as an oxygen dependent photochemical reaction that occurs by action of low energy single frequency light (diode laser) and activation of the photochemical materials (photosensitizer), without side effects on implant surface and peri-implant tissue. The aim of this study was to evaluate clinical and microbiological outcomes, prior to and following the treatment of peri-implantitis, using surgical methods with or without an adjunctive photodynamic therapy.

Material and methods

40 systemically healthy patients with peri-implantitis diagnosed (n=52) were divided into two groups (experimental and control group).

Prior to surgical treatment, all patients have undergone an initial periodontal therapy (mechanical debridement) of peri-implantitis in order to reduce the inflammation while in the experimental group, after the initial periodontal therapy, the adjuvant photodynamic therapy (aPDT), was applied in the same visit.

In the experimental group (28 implants) photodynamic therapy was used for decontamination of implant surface and peri-implant tissues during the surgical procedure. Decontamination of implant surface and peri-implant tissues in the control group (24 implants), was performed with chlorhexidine gel followed by saline irrigation.

Bleeding on probing (BOP), plaque index (PI), peri-implant probing depth (PPD), mucosal recession (MR), and clinical attachment level (CAL) were recorded at baseline and at 3 months after the surgical treatment. Samples for microbiological identification were collected before therapy, during surgical therapy and 3 month after therapies. Anaerobes’ identification systems using enzymatic tests were applied for the identification of the isolated anaerobes.

Results

All patients showed statistically significant improvement with tested procedures on peri-implant pockets (F=242.136; p<0.001;Eta2=0.829).

<table>
<thead>
<tr>
<th>Photodynamic therapy</th>
<th>Chlorhexidine therapy</th>
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<tbody>
<tr>
<td>Count</td>
<td>Column N %</td>
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<td>MR before</td>
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<td>BOP after</td>
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There were significant reduction of bleeding on probing and plaque index compared with control group.

77 Isolated anaerobe bacteria’s from 52 implants surface before any treatment procedure

- Prevotella intermedia
- Porphyromonas gingivalis
- Fusobacterium nucleatum
- Staphylococcus aureus
- Peptostreptococcus spp
- Actinomyces naeslundii
- Clostridium randosum
- Actinomyces odontolyticus
- Streptococcus viridans
- Veillonella spp

In the experimental group there was significant reduction of red and orange bacteria complex, compared with control group, immediately after decontamination and three month after therapy.

Conclusion:

The results of this study indicate that the photodynamic therapy can be used as an effective adjuvant therapy for decontamination of implant surface and surrounding peri-implant tissues in the treatment of peri-implantitis.

Reference