

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



Rakasevic D¹, Lazic Z², Rakonjac B³, Nikolic Jakoba N¹, Aleksic Z¹

¹ Department of Periodontology and Oral Medicine, School of Dental Medicine, University of Belgrade

² Department of Implantology, Military Medical Academy, Belgrade

³ Institute of Microbiology, Military Medical Academy, Belgrade



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.

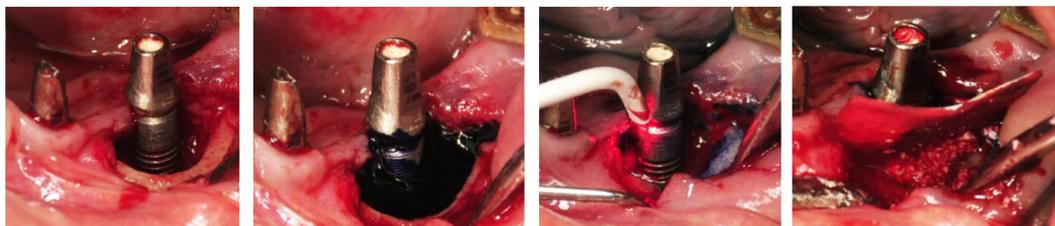
Material and methods

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 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

Peri-implant Probing Depth				
Group	Measure	Measure	Mean Difference (I-J)	Sig. ^b
Photodynamic therapy	Before	After	1.573	.000
	Before	After	2.474	.000

All patients showed statistically significant improvement with tested procedures on peri-implant pockets (F=242,136; p<0,001; Eta2=0,829) .

		Photodynamic therapy		Chlorhexidine therapy	
		Count	Column N %	Count	Column N %
MR before	No	13	46.4%	15	62.5%
	Yes	15	53.6%	9	37.5%
MR after	No	15	53.6%	17	70.8%
	Yes	13	46.4%	7	29.2%
BOP before	No	0	0.0%	0	0.0%
	Yes	28	100.0%	24	100.0%
BOP after	No	23	82.1%	12	50.0%
	yes	5	17.9%	12	50.0%

There were significant reduction of bleeding on probing and plaque index compared with control group.

Plaque index				
Photodynamic	Before	After	1.773	.001
Chlorhexidine	Before	After	3.474	0.05

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 ramosum	✓ 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

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