

Two- and four-year follow-ups after adjuvant photodynamic therapy in the surgical regenerative therapy of periimplantitis. *Clinical and immunological outcomes assessment*

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Background & Aim

Periopathogenic bacteria trigger the deleterious immunological reaction of the host tissue causing progressive surrounding bone loss, subsequently leading to periimplantitis onset ^{1,2}. Periimplantitis therapy aims to completely eradicate bacteria from the implant surface by performing appropriate surface decontamination, resulting in implant survival and simultaneous reparation and regeneration of surrounding periimplant tissues. An adjuvant method to surgery, photodynamic therapy (PDT) was proposed as a treatment method for periimplantitis ^{3,4}. The study aimed to assess clinical and immunological parameters at two- and four- year after periimplantitis regenerative therapy, using two methods of implant surface decontamination.



Clinical and radiography outcomes in the test group

Material & Methods

52 diagnosed periimplantitis lesions in 40 systemically healthy patients (mean age 57.6 ± 6.4) were recruited and randomly divided into two groups during surgery. In the test group, PDT was used for implant decontamination surface while in the control group 1% of chlorhexidine gel was applied. Clinical parameters: bleeding on probing (BOP), periimplant probing depth (PPD), clinical attachment level, and immunological parameters (IL-17, IL-1 β , IL-6) analysed by ELISA, were assessed at one-year, two-year and four-year after the surgical procedures.

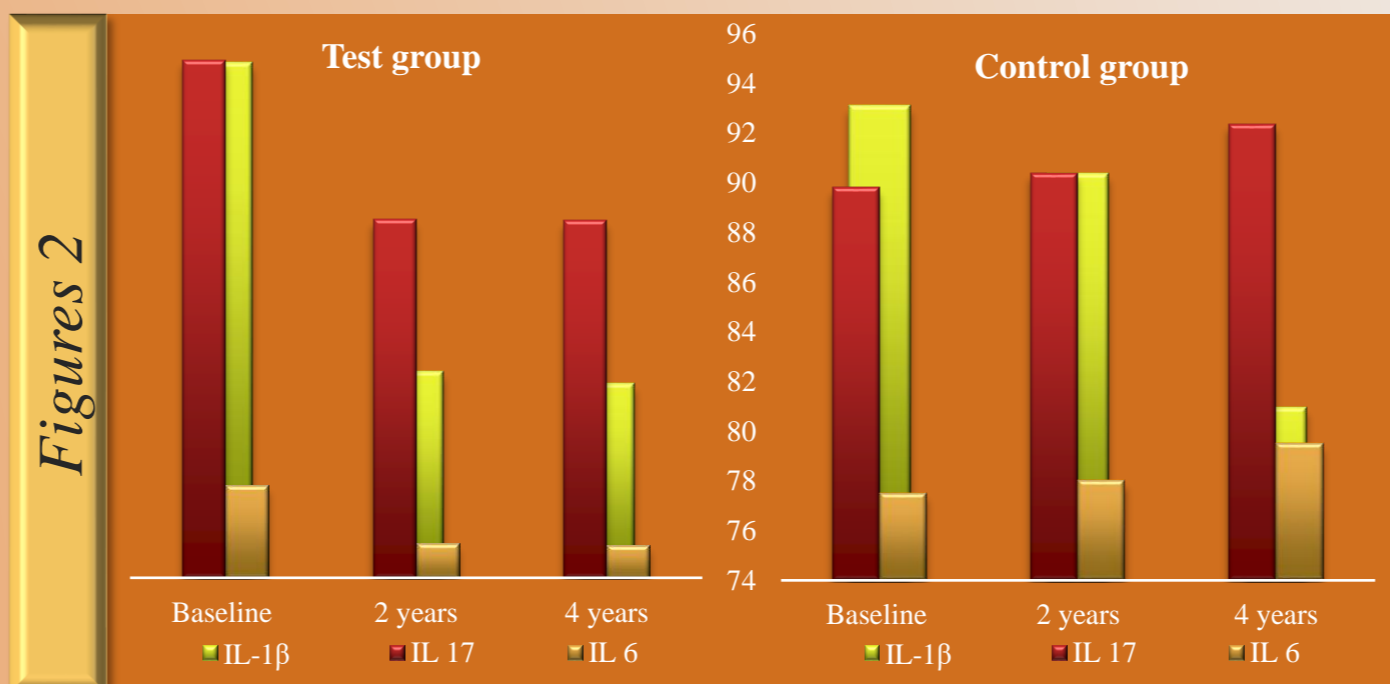
Results

In total, 29 patients with 37 treated periimplantitis lesions completed the four-year study. Both groups showed statistically significant reductions in clinical and immunological parameters one- and two-year postoperatively. In the test group, all clinical parameters remained stable over four years compared to one- and two-year of follow-ups (Figure 1, 3).

Table 1

		Test group	Control group	p-value
PPD, SD \pm mean	Baseline	5.1 \pm 0.68	5.45 \pm 1.15	0.178
	1 year	2.59 \pm 1.3	3.76 \pm 1.45	0.023
	2 years	2.62 \pm 1.22	3.93 \pm 1.13	0.001
	4 years	3.15 \pm 0.98	4.76 \pm 1.45	0.021
BOP, SD \pm mean	Baseline	86.7 \pm 19	84.84 \pm 26.3	0.761
	1 year	4.7 \pm 9.6	9.3 \pm 12.35	0.213
	2 years	4.67 \pm 9.03	8.02 \pm 12.55	0.169
	4 years	11.33 \pm 14.2	23.8 \pm 38.2	0.078

There was a significant statistical reduction in terms of PPD in test groups compared to the control group, during all follow-ups ($p < 0.05$, Table 1). IL-17, IL-1 β and IL-6 levels decreased significantly in the test group compared to the control two- and four-year postoperatively ($p < 0.05$, Figure 2).



Figures 3



Clinical and radiography outcomes in the test group: before treatment, intraoperative view of implant surface decontamination by means of PDT, and outcomes 4 years postoperatively

Conclusion

The two- and four-year outcomes demonstrated that PDT appears to be a useful adjuvant method to the surgical regenerative treatment of periimplantitis resulting in stable clinical parameters and pro-inflammatory cytokines reduction.

References:

- Sanz, M., & Chapple, I. L. (2012). *J Clin Periodontol*, 39 Suppl 12, 202-206.
- Novaes Jr et al. (2020). *Int J Periodontics Restorative Dent*, 6, 917-923.
- Chambrone, L, et al. (2018). *J Periodontol*, 89, 783– 803.
- Rakasevic D. & Gabric D. (2021). Current Concepts in Dental Implantology - From Science to Clinical Research. *IntechOpen*.