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# Effects of a 980 nm Diode Laser as an Adjunct to Nonsurgical Periodontal Therapy on Periodontal Status and Inflammatory Markers in Patients After Myocardial Infarction: A Randomized Controlled Trial

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## Abstract

***Objective*:** The aim of this study was to evaluate the efficacy of diode laser (DL) therapy as an adjunct to nonsurgical periodontal therapy in the treatment of periodontitis in patients after myocardial infarction (MI).
***Methods*:** After given permission by Ethics Commission of the Pomeranian Medical University (KB-0012/06/12), 36 patients <65 years of age (mean: 56.3 ± 7.9) with periodontitis, 6 weeks to 6 months after MI were enrolled for the study. The control group ($n = 18$) received nonsurgical periodontal therapy, whereas the test group ($n = 18$) received nonsurgical periodontal therapy followed by laser therapy of the periodontal pockets with 980 nm DL, 1 W, continuous wave mode, and 20 sec per tooth side. Procedures were repeated twice at 5–7 day intervals. Clinical periodontal parameters and inflammatory markers in gingival crevicular fluid (GCF) [elastase, aspartate transaminase (AST), alanine transaminase (ALT) and interleukin (IL)-6, proteins], bloodstream [fibrinogen, high-sensitivity CRP (hs-CRP), IL-6, AST and ALT], and lipid fractions (triglycerides, high-density lipoprotein, low-density lipoprotein, and total cholesterol) were measured before treatment, 2 weeks, and 3 months after treatment.
***Results*:** The difference between groups in the reduction of periodontal pocket depth (PPD) in pockets ≥7 mm was found to be significant in the test group ($p < 0.05$). There was also a statistically significant reduction in the volume of GCF and hs-CRP concentration in blood 2 weeks after the completion of treatment in the test group ($p < 0.05$).
***Conclusions*:** Within the limits of this study, it can be concluded that in the nonsurgical treatment of periodontitis with patients after MI, the additional use of DL enables greater reduction of PPD in pockets ≥7 mm. In addition, a faster reduction of GCF volume and hs-CRP was noted in the laser group.

**Keywords:** diode laser, periodontitis, myocardial infraction, elastase, hs-CRP, gingival crevicular fluid

## Introduction

Periodontitis, a common chronic infection in humans,[1] is caused by an oral bacteria colonization of periodontal structures resulting in inflammation, connective tissue attachment loss, bone resorption, and periodontal pocket formation.[2] This process also leads to the increased production of gingival crevicular fluid (GCF), which is an exudate from surrounding vessels into the periodontal tissues. This consists of serum and periodontium—the derived components being

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