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Efficiency of low-level laser therapy in reducing pain induced by orthodontic forces.

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Abstract

OBJECTIVE: The aim of this study was to investigate the effect of low-level laser therapy (LLLT) on reducing post-adjustment orthodontic pain via evaluation of gingival crevicular fluid (GCF) composition changes at the level of prostaglandin-E(2) (PGE(2)) and visual analogue scale (VAS).

BACKGROUND DATA: LLLT has been found to be effective in pain relief. PGE(2) has the greatest impact on the process of pain signals and can be detected in GCF in order to investigate the response of dental and periodontal tissues in a biochemical manner.

MATERIALS AND METHODS: Nineteen patients (11 females and 8 males; mean age 13.9 years) were included in this study. Maxillary first molars were banded and then a randomly selected first molar at one side was irradiated (λ 820 nm; continuous wave; output power: 50 mW; focal spot: 0.0314 cm²); exposure duration: 5 sec; power density: 1.59 W/cm²; energy dose: 0.25 J; energy density: 7.96 J/cm² for each shot), while the molar at the other side was served as placebo control. The GCF was collected from the gingival crevice of each molar to evaluate PGE(2) levels, before band placement, 1 and 24 h after laser irradiation. Pain intensity was analyzed at 5 min, 1 h, and 24 h after band placement by using VAS.

RESULTS: Although no difference was found in pain perception at 5 min and 1 h, significant reduction was observed with laser treatment 24 h after application ($p < 0.05$). The mean PGE(2) levels were significantly elevated in control group, whereas a gradual decrease occurred in laser group. The difference in PGE(2) levels at both 1 and 24 h were statistically significant between two groups ($p < 0.05$).

CONCLUSIONS: The significant reductions in both pain intensity and PGE(2) levels revealed that LLLT was efficient in reducing orthodontic post-adjustment pain.

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