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Title: Low-level laser therapy as a supplementary treatment in patients with moderate to severe persistent asthma

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Body: Background: Conventional medications for asthma can not affect peripheral and smaller airways of the respiratory tract because of the extension and unavailability of these airways. Low-level laser (LLL) therapy was introduced as a supplementary treatment option in managing the patients with moderate to severe persistent asthma. Methods: The study was a double-blind placebo controlled clinical trial. Patients were allocated to two groups; one group received medical treatment plus LLL as an add-on therapy, and the other group was managed with medical therapy with sham-LLL. Results: Thirty-three patients (26 female and 7 male) with a mean (SD) age of 46.2 (9.8) years with moderate to severe persistent asthma participated in the study. Patients were randomly assigned to two groups; intervention group (22 patients) and non-intervention group (11 patients). General linear model showed that mean FEV1 and PEF values differed significantly after LLL therapy between laser and placebo groups ($p < 0.002$, $p < 0.0001$ respectively). Paired samples t-test showed a significant difference in the mean values of FEV1 ($p = 0.001$) and PEF ($p < 0.0001$) for pre-radiation and post-radiation values. Also, our findings also revealed that laser radiation caused a statistically significant reduction on asthma severity grade ($p = 0.004$); number of medical visits ($p < 0.0001$); daily symptoms ($p < 0.001$) and nocturnal symptoms ($p < 0.0001$) in the intervention group compared with the placebo group. Conclusions: Given the simplicity of use and acceptable efficacy, LLL can be considered as a complementary therapeutic option in combination with conventional asthma treatments in patients with mild to moderate symptoms.