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Review > [Eur J Pediatr](#), 177 (1), 7-17 Jan 2018

A Systematic Review and Meta-Analysis of the Effect of Low-Level Laser Therapy (LLLT) on Chemotherapy-Induced Oral Mucositis in Pediatric and Young Patients

Mengxue He¹, Binghua Zhang², Nanping Shen³, Na Wu⁴, Jiwen Sun³

Affiliations

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Abstract

Oral mucositis is one of the most frequent complications after chemotherapy, occurring in approximately 52 to 80% of children receiving treatment for cancer. Recently, it has been suggested that the use of low-energy laser could reduce the grade of oral mucositis and alleviate the symptoms. In 2014, Multinational Association of Supportive Care in Cancer/International Society of Oral Oncology has recommended low-level laser therapy in prevention of mucositis for hematopoietic stem cell transplantation patients because of its beneficial effects in majority of recent studies. However, the recommendation was made for adult patients, not pediatric patients. Data about the effect of low-level laser therapy in pediatric patients is limited. This study aims to synthesize the available clinical evidences on the effects of low-level laser therapy (LLLT) in the prevention and treatment of chemotherapy-induced oral mucositis (OM). A meta-analysis was performed using trials identified through the Cochrane Central Register of Controlled Trials, Embase, MEDLINE, Web of Science, China Biology Medicine (CBM), Wanfang Database, and China National Knowledge Infrastructure (CNKI). Data on occurrence, duration, and severity of oral mucositis were collected. All randomized controlled studies and clinical controlled studies comparing LLLT to routine qualified prevention or treatment during or after chemotherapy were critically appraised and analyzed. We found 8 qualified clinical trials with a total of 373 pediatric patients; the methodological quality was acceptable. After prophylactic LLLT, the odds ratio for developing OM was significantly lower compared with placebo (OR = 0.50, 95% CI 0.29 to 0.87, P = 0.01), the odds ratio for developing grade III OM or worse was statistically significantly lower compared with placebo (OR = 0.30, 95% CI (0.10, 0.90), P = 0.03), and the OM severity was statistically significantly lower compared with placebo (SMD = - 0.56, 95% CI (- 0.98, - 0.14), P =

0.009). For therapeutic LLLT, the OM severity was significantly reduced compared to routine care (SMD = - 1.18, 95% CI (- 1.52, - 0.84), P < 0.00001). Oral pain was also reduced after LLLT over routine care (MD = - 0.73, 95% CI (- 1.36, - 0.11), P = 0.02).

Conclusion: Prophylactic LLLT reduces mucositis and severe mucositis and decreases the average severity of oral mucositis in pediatric and young patients with cancer. Therapeutic LLLT also reduces the average severity of oral mucositis and oral pain. Further research should investigate the optimal parameter of LLLT in pediatric and young patients, and studies with higher methodological quality should be performed. What is known: • Low-level laser therapy (LLLT) was recommended by Multinational Association of Supportive Care in Cancer/International Society of Oral Oncology; however, evidences about LLLT on oral mucositis in pediatric and young patients were insufficient and lack supportive synthesized data. • Recently, there have been several new RCTs or CCTs for pediatric patients or young adults. What is new: • Prophylactic LLLT reduces the occurrence of mucositis and severe mucositis and decreases the average severity of oral mucositis in pediatric and young patients. • Therapeutic LLLT reduces the average severity of oral mucositis and oral pain.

Keywords: Chemotherapy; Low-level laser therapy; Oral mucositis; Pediatric patients.

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