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# Photobiomodulation and photodynamic therapy for the treatment of oral mucositis in patients with cancer

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## Abstract

**Background:** Photobiomodulation therapy (PBM-T) can penetrate soft tissues and exert analgesic and healing effects, and is thus a promising alternative for prevention and treatment of oral mucositis (OM). The aim of this study was to evaluate the efficacy of PBM-T, alone or combined with photodynamic therapy (PDT), for treatment of OM in cancer patients.

**Methods:** Fifty-six patients were recruited from the Oncology Department of a teaching hospital. Patients underwent grading of OM and were divided into two groups (n = 28 each): PBM-T and PBM-T + PDT. In the PBM-T group, low-level laser was applied to 61 points in the oral cavity, once weekly for 4 weeks (wavelength 660 nm, power 100 mW, energy density 142 J/cm<sup>2</sup>, spot energy 4 J, irradiation time 40 s). In the PBM-T + PDT group, in addition to PBM-T as described above, patients rinsed with 20 ml of photosensitizing mouthwash (curcumin 1.5 g/L) and the oral cavity was irradiated with a blue (468 nm) LED for 5 min.

**Results:** Significant reductions in OM grade were observed after application of PBM-T or PBM-T + PDT (p < 0.0001). PBM-T + PDT resulted in a shorter time to resolution of lesions compared to PBM-T alone (p = 0.0005).

**Conclusions:** PBM-T, alone or combined with PDT, can be used for the treatment of OM. PDT + PBM-T in particular accelerated the OM healing process, reducing time to lesion remission from 15 to 11 days.

**Keywords:** Laser therapy; Mucositis; Photochemotherapy; Photodynamic therapy; Stomatitis.

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