

# Successful Management for the Treatment of Mucositis by Topic Photobiomodulation in the Oropharyngea and Systemic Region of Primitive Carotid Artery in Patients with Breast Cancer

## Short Communication

### Introduction

Oral mucositis (OM) is an alteration of the oropharyngeal mucosa that affects recurrent cancer patients during therapeutic processes, and chemotherapy is the main cause of this complication, with functional and nutritional damages that directly influence the lowering of the state of general health of the patient, in addition to interfering in the prognosis of the disease. OM is one of the most common acute complications in this period, which manifests itself secondary to chemotherapy and severely affects the lives of cancer patients. In more severe cases, they can lead to treatment interruptions, resulting in consequences such as nutritional deficiency, ulcerative infections of the lesions and a possible evolution to the systemic lethal condition. Approximately 60% of patients receiving conventional radiotherapy for head and neck cancer and more than 90% of patients undergoing combined therapy (chemotherapy and concomitant radiotherapy) or altered fractionation develop OM [1]. And up to 40% of chemotherapy patients progress to OM, especially when the regimens include 5-FU, methotrexate, cisplatin, doxorubicin, cyclophosphamide and docetaxel [1]. These inflammatory and painful processes caused by OM, can progress to ulcerative lesions that facilitate the microbial pathogens to invade the lesion, predisposing to fatal local and systemic infections [2]. The pathogenesis of OM is linked to decreased cell renewal in the basal layers of the epithelium, due to the effects of chemotherapy and radiotherapy of the head and neck.

OM has four physiological phases [3]

- Inflammatory or vascular
- Epithelial
- Ulcerative and bacteriological
- healing [3]

Several treatments were tested in order to act in the curative and preventive phase of OM through oral supplementation with glutamine [4], sucralfate [5], amifostine [6] and chlorhexidine rinses [7], but none of them showed ideal relief symptoms and reduction in the intensity or duration of injuries. Currently, the management related to OM with greater efficacy is being

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associated with the use of Low LASER Level Therapy (LLLT) that promotes anti-inflammatory, analgesic and healing functions, in addition to preventing secondary infections (antimicrobial agents). However, the physiological progression of mucositis, and the biological mechanisms involved during the course of the disease, describe very well all the physiological phases and the respective treatment options [8]. For this reason, world literature converges on the importance of LLLT as the most promising procedure in containing this pseudomembranous oral morbidity. Several trials associated with the use of LLLT in the management of OM have shown attenuation of peak severity and shortened duration of injuries. Previous studies attributed the increase in wound healing and the potential for pain relief by LLLT to microscopic and molecular findings, such as increased cell division and modification of nerve conduction through the release of endorphins and enkephalins, respectively [9,10,11,12]. At the Ribeirão Preto Cancer Hospital - São Paulo-Brazil, patients with breast cancer have been treated with LBI with good results.

**Keywords:** LASER; Cancer; Oncology; Chemotherapy; Mucositis; Photobiomodulation; Carotid

In this study at the Ribeirão Preto Cancer Hospital, results were obtained using Photobiomodulation, through the use of LLLT

supervised by the dental sector, through the techniques of Topical Photobiomodulation (PBMT) in the oral cavity [13] and Systemic Photobiomodulation (PBMS) transdermal in the primitive carotid artery [14] in order to prevent the appearance of lesions in the oropharyngeal region, promote analgesia and decrease the inflammatory process of the oral mucosa.

## Methods

Patients undergoing breast cancer therapy (n=12) through chemotherapy (methotrexate, cisplatin, doxorubicin, cyclophosphamide and docetaxel) and followed the protocol of PBMT applications in the oral cavity (protocol: major salivary glands, glossopharyngeal region, cheek mucosa, palate region and interproximal papillae) and transdermal PMBS in the primitive carotid artery. Mucositis severity was clinically assessed and measured according to the World Health Organization-WHO (WHO) oral mucositis scale, while pain severity was measured using a visual analog scale (VAS) before and after applications.

## Results

Immediate pain relief was achieved in 98.3% of patients after the first application. Based on the functional scale, grade III mucositis (unable to ingest solids) was reduced in 97.8% of cases.

## Conclusion

LLLT (PBMT and PBMS) was well tolerated and showed beneficial effects in the management of OM, reducing cytotoxic symptoms caused in the pharyngeal region by chemotherapeutic agents with a positive impact on quality of life during cancer treatment.

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## Conflicts of Interest

The authors have no conflict of interest to declare.

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