

**MULTIDIMENSIONAL APPROACH TO PAIN IN PATIENTS WITH OROPHARYNGEAL  
CANCER: THE ROLE OF LASER THERAPY IN PALLIATIVE CARE**

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**Abstract**

Pain associated with oropharyngeal cancer is a complex phenomenon resulting not only from tumor progression but also from adverse effects of oncological treatments, especially chemotherapy and radiotherapy. In this context, oral mucositis stands out as one of the most frequent clinical complications, characterized by painful lesions that impair essential functions such as eating, swallowing, and

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communication, significantly affecting patients' quality of life. Therefore, the adoption of therapeutic strategies that address pain in its multiple dimensions—integrating physical, functional, emotional, and social aspects—is essential. This study aimed to analyze the multidimensional approach to pain in patients with oropharyngeal cancer, with emphasis on the role of low-level laser therapy in palliative care. A narrative literature review was conducted based on scientific articles, books, and official documents published between 2021 and 2025 addressing head and neck cancer, orofacial pain, oral mucositis, palliative care, and laser therapy. The findings indicate that low-level laser therapy has beneficial effects in the management of oral mucositis, promoting significant pain reduction, acceleration of the healing process, modulation of the inflammatory response, and improvement in oral functionality. These outcomes contribute to greater patient comfort, improved adherence to oncological treatment, and preservation of dignity throughout the disease process. It is concluded that low-level laser therapy is a safe, effective, and relevant therapeutic strategy when integrated into a multidimensional pain management approach within palliative care for patients with oropharyngeal cancer.

**Keywords:** Multidimensional approach, Oropharyngeal cancer, Palliative care, Pain, Laser therapy.

### INTRODUCTION

Head and neck cancer represents a major public health problem worldwide due to its high incidence, therapeutic complexity, and significant impact on the quality of life of affected individuals. Within this group of neoplasms, oropharyngeal cancer stands out because it involves anatomical structures essential to vital functions such as speech, swallowing, and breathing, in addition to showing a strong association with persistent and debilitating orofacial pain (Macedo; Silva; Almeida, 2019; Vilarim et al., 2022). These characteristics make clinical management challenging, especially in advanced stages of the disease.

Pain in patients with oropharyngeal cancer has a multifactorial etiology and may be related to tumor growth, infiltration of tissues and neural structures, local inflammatory processes, and adverse effects of antineoplastic treatments such as radiotherapy and chemotherapy (Brook, 2021). Moreover, manifestations such as oral mucositis, xerostomia, secondary infections, and painful ulcerations contribute significantly to intensifying the physical and emotional suffering of the oncology patient (Andrade; Moraes; Carvalho, 2025).

Studies indicate that orofacial pain may present as an initial symptom of oral and oropharyngeal cancer, interfering early with functionality, nutritional status, and communication, and also negatively affecting mental health and social interaction of affected individuals (Fernandes et al., 2022; Vilarim et al., 2022). Thus, pain should not be understood solely as a physiological event, but as a complex subjective experience involving physical, psychological, social, and spiritual dimensions.

In this context, a multidimensional approach to pain becomes fundamental, as it recognizes the need for integrated and individualized interventions capable of addressing the multiple demands of the patient with oropharyngeal cancer. Such an approach presupposes the combination of pharmacological strategies, complementary therapies, psychosocial support, and humanized care, especially within the scope of palliative care (Oliveira et al., 2024).

Palliative care is defined as an active and comprehensive approach intended to promote the quality of life of patients and families facing life-threatening illnesses, through prevention and relief of suffering, appropriate management of pain and other physical symptoms, as well as emotional, social, and spiritual support (Lima; Cohn, 2025). This perspective breaks with the reductionist view that associates palliative care exclusively with the dying process, reaffirming it as a right to health and human dignity throughout the entire course of the disease.

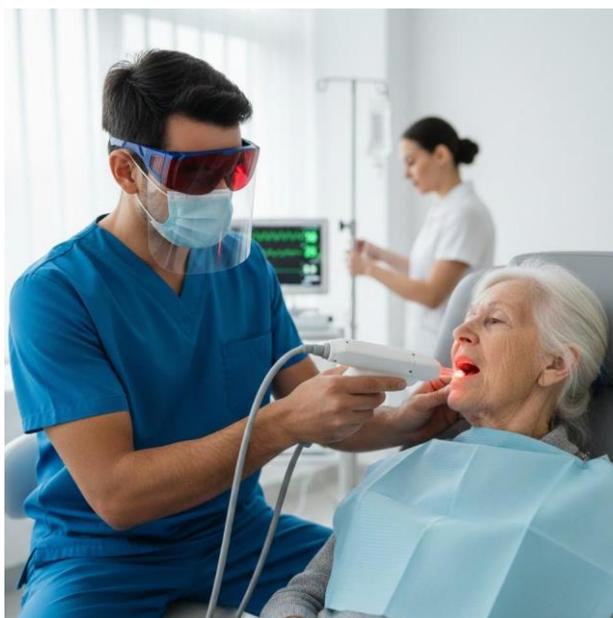
In oropharyngeal cancer, palliative care plays a central role in controlling pain and complications arising from oncological treatments. Among these complications, oral mucositis is highlighted, characterized by mucosal inflammation, painful ulcerations, and increased risk of infections, and is

considered one of the main causes of suffering and therapeutic interruption in patients undergoing chemoradiotherapy (Ferreira; Soares; Pereira, 2023; Dourado; Farias; Aguilar, 2024).

Given this scenario, low-level laser therapy has been widely studied as an effective therapeutic alternative for managing oral mucositis and relieving pain in oncology patients. It is a noninvasive technology with biophotomodulatory effects capable of reducing the inflammatory process, stimulating tissue healing, promoting analgesia, and improving local microcirculation, with low rates of adverse effects (Eleutério; Pontes; Oliveira, 2024; Silva; Alves; Martins, 2024).

### **Figure 1**

*Application of low-level laser therapy in the oral cavity of patients with oropharyngeal cancer in palliative care.*



Source: Gemini - Google (2026).

The scientific literature indicates that the use of low-level laser therapy contributes significantly to reducing pain intensity, decreasing the severity of oral mucositis, and improving the quality of life of patients undergoing aggressive oncological treatments (Queiroz et al., 2023; Nascimento; Rodrigues; Rocha, 2024). Case reports and clinical studies demonstrate that regular laser application supports

maintenance of oral feeding, reduces the need for systemic analgesics, and enables greater adherence to antineoplastic treatment (Rabelo; Guedes, 2023; Silva et al., 2022).

In addition to managing mucositis, recent research indicates the palliative potential of laser technologies in different types of cancer, including reduction of tumor-related pain and functional improvement in patients with advanced neoplasms (Algarin et al., 2024; Siqueira; Ramos; Lopes, 2024). In oropharyngeal cancer, this resource assumes special relevance given the high prevalence of severe pain and the rapid clinical progression observed in certain cases (Minami et al., 2023). The incorporation of laser therapy in the context of palliative care reinforces the importance of multiprofessional practice and patient-centered care. Health professionals must be trained to comprehensively assess the individual's needs, considering not only the biological aspects of pain but also its emotional and social repercussions, promoting interventions that respect the autonomy and dignity of the oncology patient (Oliveira et al., 2024).

From an ethical and care perspective, the use of low-level laser therapy in palliative care represents a significant advance in promoting comfort and reducing suffering, aligning with principles of humanized care and the right to health. Its appropriate application requires technical-scientific knowledge, careful assessment, and integration with other therapeutic strategies, ensuring safety and effectiveness in pain management for patients with oropharyngeal cancer (Lima; Cohn, 2025).

In view of the above, the objective of this study is to analyze the multidimensional approach to pain in patients with oropharyngeal cancer, emphasizing the role of low-level laser therapy as a therapeutic strategy in palliative care, with a focus on pain relief, reduction of oral complications, and promotion of quality of life and comprehensive care for the oncology patient.

## **METHODOLOGY**

This is a qualitative study with a descriptive and exploratory approach, developed through an integrative literature review, with the purpose of analyzing the multidimensional approach to pain in

patients with oropharyngeal cancer, highlighting the role of low-level laser therapy in the context of palliative care. The choice of this methodological design is justified by the need to gather, synthesize, and critically analyze recent scientific production, enabling an expanded understanding of the available evidence on the investigated topic.

Data collection was carried out through a systematized bibliographic search in recognized scientific databases, including PubMed/MEDLINE, SciELO, LILACS, Web of Science, and Google Scholar. These databases were selected because they concentrate relevant publications in the fields of oncology, palliative care, cancer pain, and complementary therapies. oncology, palliative care, cancer pain, and complementary therapies.

Controlled and uncontrolled descriptors were used, defined based on the Health Sciences Descriptors (DeCS) and the Medical Subject Headings (MeSH), combined using the Boolean operators AND and OR. The main descriptors employed were: cancer pain, oropharyngeal cancer, head and neck cancer, palliative care, low-level laser therapy, oral mucositis, and quality of life. Search strategies were adapted according to the specificities of each database, aiming to increase the sensitivity of the search.

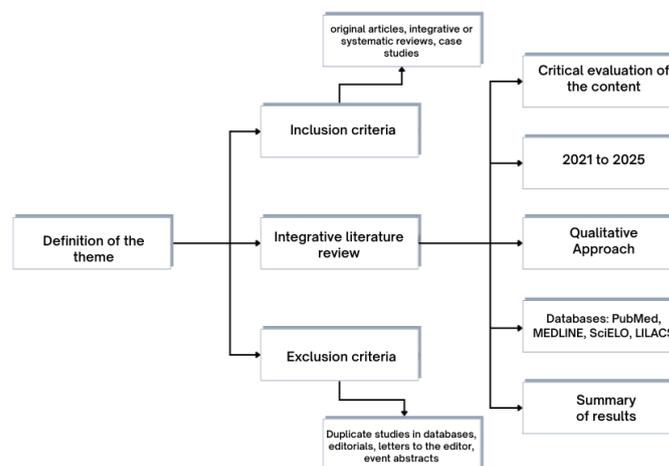
The study included original scientific articles, literature reviews, case reports, and institutional documents addressing the use of low-level laser therapy in managing pain and oral complications in patients with head and neck cancer, with emphasis on oropharyngeal cancer and the palliative care context. Full-text publications available in Portuguese and English were considered, published between 2021 and 2026, in order to encompass updated and relevant evidence.

Duplicate studies were excluded, as were works not directly related to the proposed topic, incomplete publications, abstracts from scientific events, editorials, letters to the editor, and studies whose approach did not encompass pain, laser therapy, or the palliative context. Articles dealing exclusively with surgical procedures or oncological therapies without an interface with pain management or palliative interventions were also excluded.

The study selection process occurred in three distinct stages. Initially, titles and abstracts were read to identify thematic relevance. Next, potentially eligible articles underwent full-text reading to confirm adherence to the previously established inclusion criteria. Finally, the selected studies were organized into an analysis matrix containing information such as author, year of publication, type of study, objectives, main results, and contributions related to the use of laser therapy in pain management for patients with oropharyngeal cancer.

**Figure 1**

*Flowchart of the study selection process included in the integrative review.*



Source: authors (2026)

Data analysis was conducted in a qualitative and interpretive manner through critical and systematized reading of the selected studies. Findings were grouped into thematic categories defined based on content recurrence and the relevance of the results presented in the literature. The main analytical categories encompassed: multidimensional approach to pain, impact of pain on quality of life, oral mucositis as an aggravating factor of pain, efficacy of low-level laser therapy, and laser therapy in the context of palliative care.

The synthesis of results sought to identify convergences and divergences among studies, as well as gaps in scientific knowledge, enabling an in-depth understanding of the role of laser therapy as a complementary strategy in the palliative care of patients with oropharyngeal cancer.

As this is an integrative literature review study that uses exclusively secondary data in the public domain, submission to a Research Ethics Committee was not necessary, as recommended by Resolution No. 466/2012 of the Brazilian National Health Council. Nevertheless, all ethical principles were respected, including fidelity of information, methodological rigor, and correct citation of the sources used.

This study recognizes as limitations the dependence on the methodological quality of the included works, as well as the heterogeneity of the research designs analyzed, which may interfere with the generalizability of results. In addition, the scarcity of studies specifically on laser therapy applied exclusively to patients with oropharyngeal cancer in palliative care constitutes a challenge for consolidating more robust evidence.

### **RESULTS AND DISCUSSION**

The analyzed studies show that oral mucositis remains one of the most frequent and debilitating complications associated with antineoplastic treatments, especially in patients undergoing chemotherapy, radiotherapy, and combined therapies for head and neck cancer. The reviewed literature demonstrates a high prevalence of mucositis, significant impact on pain, eating, speech, treatment adherence, and quality of life, as well as increased risk of secondary infections and prolonged hospitalization time.

The results show consensus regarding the central role of low-level laser therapy (LLLT) as an effective therapeutic strategy for both prevention and treatment of oral mucositis. In general, studies report significant reduction in pain intensity, acceleration of the healing process, decrease in the clinical grade of mucositis, and improvement in oral functionality, corroborating recent evidence that positions LLLT as a prominent nonpharmacological intervention in the management of oral complications in oncology.

The integrated analysis of scientific productions indicates that oral mucositis results from a complex inflammatory process involving direct epithelial damage, release of pro-inflammatory cytokines, alteration of the oral microbiota, and impairment of tissue regeneration. Brook (2021) highlights that

early adverse effects of radiotherapy include erythema, ulceration, and intense mucosal sensitivity—factors that contribute to worsening pain and temporary interruption of oncological treatment. These findings reinforce the need for therapeutic strategies that not only treat lesions but also act on the underlying inflammatory mechanisms.

In this context, laser therapy is presented as a technology with biomodulatory properties capable of stimulating cell proliferation, increasing ATP production, modulating inflammatory mediators, and promoting angiogenesis, thereby fostering tissue repair more rapidly and with less pain. Studies indicate that these effects translate clinically into reduced lesion healing time and decreased need for systemic analgesics.

The results also indicate that patients with oral and oropharyngeal cancer present a high symptom burden, with orofacial pain as an initial symptom or as a direct consequence of oncological therapies. Fernandes, Chiacchiaretta, and Scarpel (2022) demonstrate that orofacial pain negatively impacts quality of life, interfering with sleep, social interaction, and patients' emotional status. Similarly, Vilarim et al. (2022) identify a high prevalence of pain as an initial symptom associated with reduced functionality and impairment of activities of daily living.

According to the studies, incorporating laser therapy helps mitigate these impacts by promoting pain relief and better tolerance to treatment. Ferreira, Soares, and Pereira (2023) highlight that patients undergoing LLLT presented lower pain intensity and better acceptance of food intake, which favors maintenance of nutritional status and reduces the risk of dehydration and weight loss. These findings are particularly relevant given that malnutrition is a negative prognostic factor in oncology patients.

Beyond effects on mucositis, the literature points to the use of laser technologies in different oncological contexts, including palliative approaches. Algarin et al. (2024) describe the palliative role of lasers in melanoma treatment, emphasizing this technology's potential for local control of lesions, symptom relief, and improvement of patient comfort. Although the primary focus of this study is oral

mucositis, such evidence reinforces the versatile character of laser technology as a therapeutic tool in comprehensive oncological care.

The data also indicate that the efficacy of laser therapy depends on technical parameters such as wavelength, power, application time, and frequency of sessions. Queiroz, Rocha, and Ferreira Junior (2023) emphasize that standardized protocols are associated with better clinical outcomes, especially in preventing mucositis in patients undergoing head and neck chemoradiotherapy. However, methodological heterogeneity among studies is still observed, which hinders direct comparison of results and points to the need for greater standardization of clinical protocols.

**Table 1**

*Characteristics of included studies and main outcomes related to laser therapy in oral mucositis*

<b>Author/ Year</b>	<b>Population/Context</b>	<b>Main objective</b>	<b>Main results</b>
Andrade <i>et al.</i> (2025)	Oncology patients with oral mucositis	Evaluate management of mucositis with laser therapy and photodynamic therapy	Significant pain reduction, accelerated healing, and improved quality of life
Dourado <i>et al.</i> (2024)	Patients undergoing chemoradiotherapy	Analyze the efficacy of laser therapy in mucositis treatment	Decrease in mucositis grade and reduced need for analgesics
Ferreira <i>et al.</i> (2023)	Oncology patients with oral lesions	Assess the importance of laser therapy in mucositis	Functional improvement, pain relief, and better acceptance of food intake
Queiroz <i>et al.</i> (2023)	Patients with head and neck cancer	Investigate preventive and therapeutic use of laser	Reduced incidence and severity of oral mucositis

Rabelo and Guedes (2023)	Patient undergoing radiotherapy	Assess clinical response to laser	Lesion regression and effective pain control
Nascimento <i>et al.</i> (2024)	Oncology patients	Analyze the use of low-level laser	Favorable evidence regarding safety and efficacy

Source: Authors (2026)

Another relevant aspect identified concerns the use of laser therapy as a preventive strategy. Nascimento, Rodrigues, and Rocha (2024) demonstrate that early laser application in oncology patients significantly reduces the incidence and severity of oral mucositis. These findings are consistent with Rabelo and Guedes (2023), who report, in a case study, marked clinical improvement after introducing LLLT in a patient undergoing head and neck radiotherapy.

The literature also indicates benefits of laser therapy in oncological lesions of the oral cavity beyond mucositis. Siqueira, Ramos, and Lopes (2024) describe positive effects of laser therapy in oncological lesions, with reduced inflammation, improved healing, and symptomatic relief. Silva et al. (2024) reinforce LLLT as a viable, safe, and low-cost therapeutic alternative, especially in resource-limited settings.

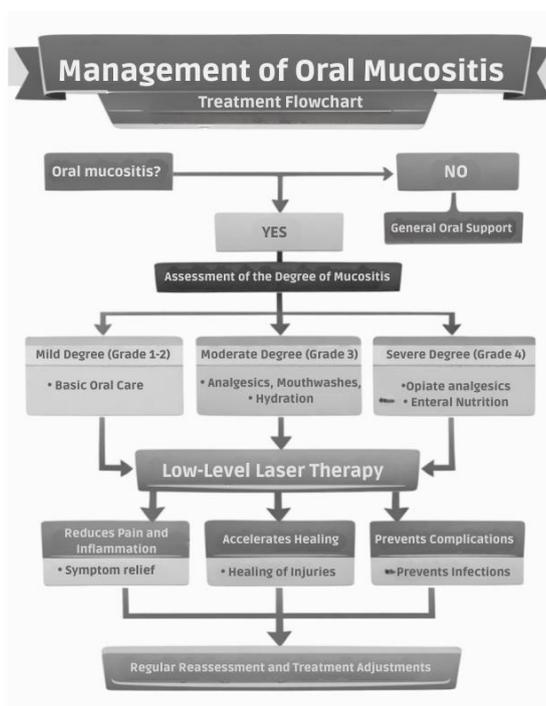
Regarding head and neck cancer, studies highlight the clinical complexity of these patients, who often present multiple concomitant symptoms such as dysphagia, xerostomia, severe pain, and speech alterations. Macedo, Silva, and Almeida (2023) describe the impact of these manifestations on functionality and quality of life, underscoring the need for integrated multiprofessional approaches. In this scenario, laser therapy emerges as a complementary technology that can be incorporated into the therapeutic plan in coordination with other interventions.

Minami et al. (2023) report the rapid evolution of oropharyngeal cancer, emphasizing the aggressiveness of certain neoplasms and the importance of early management of treatment-associated complications. These findings reinforce the relevance of strategies aimed at reducing therapeutic interruptions, as severe mucositis is one of the main causes of temporary suspension of radiotherapy and chemotherapy.

In the surgical field, Sievert et al. (2021) analyze outcomes of transoral laser microsurgery and transoral robotic surgery in oropharyngeal squamous cell carcinoma, evidencing favorable oncological and functional results. Although these procedures use laser technology in a context distinct from LLLT, such evidence contributes to broadening understanding of the role of laser technologies in the overall management of head and neck neoplasms.

**Figure 3**

*Flowchart of oral mucositis management including low-level laser therapy*



Source: Authors (2026)

Studies also emphasize the importance of palliative care in the context of advanced cancer. Lima and Cohn (2025) stress that palliative care should not be understood as synonymous with end-of-life care, but as an approach focused on promoting quality of life, relieving suffering, and guaranteeing the right to health. Oliveira et al. (2024) reinforce the relevance of palliative care in patients with advanced-stage oral cancer, highlighting the need for pain control, management of oral lesions, and psychosocial support.

In this context, laser therapy can be integrated into palliative practices as a tool for symptom control, contributing to pain reduction and improved oral comfort. Algarin et al. (2024) note that the palliative use of laser technologies is associated with improved well-being, which directly aligns with principles of contemporary palliative care.

The occupational etiology of oropharyngeal cancer, addressed by Nikkilä et al. (2023), broadens understanding of risk factors associated with these neoplasms by highlighting environmental and occupational exposures. These data reinforce the importance of prevention and health surveillance strategies, as well as the need for service preparedness to manage treatment-related complications such as mucositis.

**Table 2**

*Clinical benefits of low-level laser therapy in the management of oral mucositis*

Assessed dimension	Observed benefits
Pain	Reduction of pain intensity and decreased need for systemic analgesia
Healing	Acceleration of tissue repair and regression of ulcerated lesions
Inflammation	Modulation of inflammatory mediators and reduction of edema
Oral function	Improved chewing, swallowing, and speech

Quality of life	Greater comfort, well-being, and adherence to oncological treatment
Therapeutic continuity	Reduction of interruptions in chemoradiotherapy

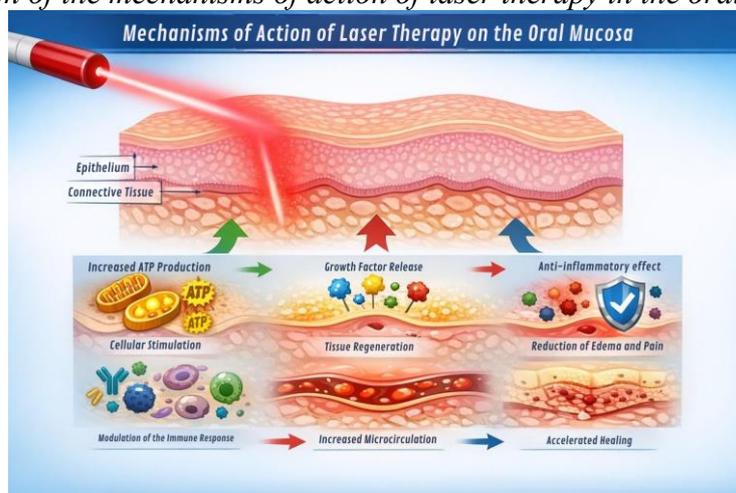
Source: authors (2026)

Overall, the analyzed results indicate that low-level laser therapy shows consistent evidence of efficacy in managing oral mucositis, with positive impact on pain, healing, oral functionality, and quality of life. However, the heterogeneity of methodological designs, technical parameters, and assessment instruments used in studies points to the need for randomized clinical trials with greater methodological rigor to strengthen the level of scientific evidence.

In addition, there is a recognized need for training multiprofessional teams for correct application of laser therapy, ensuring safety, standardization, and maximization of therapeutic benefits. The incorporation of this technology into institutional protocols should be accompanied by clear evidence-based guidelines and systematic monitoring of clinical outcomes.

**Figure 4**

*Schematic representation of the mechanisms of action of laser therapy in the oral mucosa*



In summary, the findings reinforce that low-level laser therapy constitutes a relevant intervention in oncology, especially in the management of oral mucositis in patients with head and neck cancer. Its use is associated with reduced morbidity, improved quality of life, and support for continuity of antineoplastic treatment. These results support the recommendation of its incorporation as a complementary strategy in care protocols, aligning with guidelines for comprehensive and humanized care for oncology patients.

## **CONCLUSION**

A multidimensional approach to pain in patients with oropharyngeal cancer proves essential for a comprehensive understanding of the suffering associated with the disease and oncological treatment. In this context, pain is not limited to a physiological phenomenon, but involves emotional, functional, social, and psychological dimensions that directly affect the patient's quality of life. Therefore, it becomes indispensable to adopt therapeutic strategies that consider the complexity of the clinical picture and promote symptom relief in a comprehensive manner.

Oral mucositis is configured as one of the main clinical manifestations responsible for intensifying pain in patients undergoing chemotherapy and radiotherapy in the head and neck region. Ulcerative lesions associated with inflammation and secondary infection compromise basic functions such as eating, swallowing, and communication, aggravating physical and emotional suffering. This scenario highlights the need for interventions that act simultaneously on pain control, tissue recovery, and preservation of oral functionality.

In this context, low-level laser therapy stands out as a relevant therapeutic tool within a multidimensional approach by acting on the biological mechanisms of pain and inflammation and by promoting lesion healing. The analyzed scientific evidence demonstrates that this intervention contributes significantly to reducing pain intensity, improving oral comfort, and optimizing response to oncological treatment, without presenting significant adverse effects.

Integrating laser therapy into palliative care broadens its applicability, since such care aims not only at prolonging life but above all at promoting the patient's well-being and dignity. By enabling effective symptom control and reducing suffering, laser therapy aligns with palliative principles and reinforces the importance of interventions that consider the patient as a whole, respecting physical, emotional, and social needs.

The analysis of studies indicates that pain management in patients with oropharyngeal cancer should be conducted in an integrated manner, combining pharmacological resources, physical therapies, and psychosocial interventions. In this context, laser therapy acts as a complementary component that enhances the effects of other strategies, contributing to more effective care centered on the patient's experience.

However, despite favorable results, gaps remain in the literature regarding standardization of laser therapy application protocols and evaluation of long-term effects. The methodological heterogeneity of studies hinders comparison of results and reinforces the need for more robust research that allows consolidation of consistent evidence for clinical practice.

Thus, future studies are recommended to investigate low-level laser therapy as part of integrated pain management models, considering different dimensions of care and distinct stages of oropharyngeal cancer. It is also suggested to include outcomes related to quality of life, psychosocial impact, and oral functionality, contributing to the improvement of therapeutic strategies and to the consolidation of a truly multidimensional approach to pain.

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