

Delay in the Diagnosis of Oral Squamous Cell Carcinoma and Misuse of Low-Level Laser Therapy (LLLT) in Dentistry: Case Report

Retraso en el Diagnóstico de Carcinoma de Células Escamosas Orales y Mal Uso de la Terapia con Láser de Baja Potencia en Odontología: Reporte de Caso

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ABSTRACT: This case report highlights the delay in the diagnosis of oral squamous cell carcinoma (OSCC) and the inappropriate use of low-level laser therapy (LLLT) in dentistry. OSCC is a malignant neoplasm that affects the oral cavity and can have severe consequences if not diagnosed and treated appropriately and promptly. The patient presented with a persistent oral lesion that was initially diagnosed as a traumatic injury and treated with LLLT, which led to a delay in the correct diagnosis of OSCC. The case emphasizes the importance of early detection and proper management of oral lesions to prevent the progression of malignant conditions. It also emphasizes the need for professional knowledge regarding the applicability of LLLT in dental practice. Dental professionals should be vigilant in recognizing suspicious oral lesions and promptly refer patients for further evaluation and appropriate treatment to ensure optimal outcomes.

KEY WORDS: oncology, low-level laser, oral diagnosis.

INTRODUCTION

Oral cancer is considered a public health problem in Brazil, due to high incidence rates and a high rate of late diagnosis, resulting in elevated morbidity and mortality rates. Squamous cell carcinoma (SCC) is the most common malignant neoplasm found in the oral region, originating from the epithelial tissue and exhibiting aggressive behavior that can lead to early cervical metastasis. According to the National Cancer Institute (INCA), Brazil has the highest incidence rate of oral cancer in South America, with SCC being the most frequent histological type (Dedivitis *et al.*, 2004; Brazil, Ministry of Health, National Cancer Institute, 2009, 2022).

Despite the aggressive nature of this type of cancer, in its early stages, it may present mild or even absent symptoms and small lesions that can go unnoticed during a physical examination, which further

complicates early diagnosis. This highlights the importance of oral diagnosis, in which healthcare professionals should pay attention not only to the clinical examination but also to a detailed patient history in order to identify risk factors for OSCC. The main risk factor associated with oral cancer is tobacco smoking, but other factors include alcohol consumption, human papillomavirus (HPV) infection, and unprotected sun exposure, the latter being associated with malignant lesions on the lip (Dedivitis *et al.*, 2004; Brazil, Ministry of Health, National Cancer Institute, 2009, 2022).

Before even considering early diagnosis of oral cancer, it is important to understand the significance of prevention. Prevention programs in primary healthcare, with active participation from community health agents, are a promising approach to educate the population about OSCC. Encouraging self-

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examination of the oral cavity is also an effective strategy for early diagnosis (Vidal *et al.*, 2003).

Oral diagnosis is not only important for recognizing oral cancer but also for enabling dentists to establish an effective treatment plan for other lesions that may affect the oral cavity, especially those with the potential to become malignant, such as proliferative verrucous leukoplakia, inverted tobacco pouch palate, erythroplasia, oral submucosal fibrosis, erythroleukoplakia, granular leukoplakia, laryngeal keratosis, and actinic cheilitis (Neville, 2016).

Technology is revolutionizing the daily practices of medical and dental professionals, and in this context, there is broad use of lasers. LASER, an acronym for Light Amplification by Stimulated Emission of Radiation, is a widely utilized technology that represents electromagnetic radiation with unique characteristics, including a single wavelength that propagates coherently in space and time, in a collimated and unidirectional manner. It has therapeutic effects documented in scientific literature, such as analgesia, anti-inflammatory properties, tissue bio-stimulation, and potential antimicrobial effects through photodynamic therapy (Spivakovsky *et al.*, 2015; He *et al.*, 2018).

The use of Low-Level Laser Therapy (LLLT) in dentistry can be a great asset for professionals in resolving various cases due to its anti-inflammatory, bio-modulating, and tissue repair potentials. However, it should not be employed before a proper diagnosis is made (Campos *et al.*, 2016; Lee *et al.*, 2018).

The literature presents controversies regarding the potential effects of LLLT on malignant cells, as the use of laser therapy may lead to increased proliferation of these cells. However, there is currently no consensus on this topic in the literature, which is why the use of LLLT is contraindicated for malignant lesions and those with potential for malignancy. Furthermore, employing low-level laser therapy for malignant lesions would delay the initiation of surgical, radiotherapeutic, or chemotherapeutic treatment, worsening the prognosis of the case (Sperandio *et al.*, 2013; Martins *et al.*, 2020).

The objective of this case report is to contribute to a more technical, scientific, and conscientious dental practice, emphasizing the importance of prevention, early detection, and accurate diagnosis of oral lesions and oral cancer, considering the morbidity and mortality associated with late diagnosis. Additionally, it aims to raise awareness about the incorrect use of LLLT.

METHODOLOGY

This is an original and primary case report containing important information about the pathological process, performed procedures, and the participant (Lakatos & Marconi, 2003; Pereira *et al.*, 2018).

The participant and her family signed an informed consent form, allowing the disclosure of the case for academic purposes. This subproject is part of a study approved by the Research Ethics Committee of the University of Pernambuco, under opinion number 3,184,856. The study was conducted at the Oncology Center of the Oswaldo Cruz University Hospital of the University of Pernambuco - CEON/HUOC/UPE.

The photos illustrating the case are from the private collection of Dr. Aurora Vidal.

CASE REPORT

MM, female, 88 years old, born in a city located in the Metropolitan Region of Recife, Pernambuco, Brazil. Sought specialized care for the diagnosis of an oral lesion. According to the patient and family members, the lesion was "growing" despite being under dental care for five months and receiving low-level laser therapy (LLLT) sessions for the past three months to resolve this wound located on the right buccal mucosa, which did not seem to respond to treatment (Fig. 1).



Fig. 1. Clinical appearance of an ulcerated oral lesion located on the right buccal mucosa, under laser therapy, provided by the patient's family, prior to specialized diagnostic assessment. Personal collection of Dr. Aurora Vidal.

The patient attended the appointment conscious, oriented, cooperative, and hypertensive. During the initial consultation, an anamnesis was conducted, where the patient reported using sodium risedronate for over ten years and wearing a complete upper denture and a removable partial lower denture. A panoramic radiograph was also analyzed, showing no significant alterations (Fig. 2). In the intraoral physical examination, it was observed that MM presented complete upper edentulism and partially dentate lower arch. Additionally, an exophytic, extensive, and ulcerated lesion was detected on the right buccal mucosa (Fig. 3). The extraoral physical examination did not reveal any abnormalities.



Fig. 2. Radiographic view (panoramic X-ray) showing partial dentition in the lower arch and edentulous in the upper arch. Personal collection of Dr. Aurora Vidal.



Fig. 3. Clinical appearance of an exophytic, extensive, and ulcerated oral lesion located on the right buccal mucosa at the time of biopsy and subsequent diagnostic confirmation of moderately differentiated squamous cell carcinoma (AP. H23-004257). Personal collection of Dr. Aurora Vidal.

sessions. An incisional biopsy was performed, and the histopathological report confirmed moderately differentiated squamous cell carcinoma (AP. H23-004257). MM was immediately referred to a head and neck surgeon to proceed with the necessary examinations and receive appropriate oncological treatment and specialized follow-up.

This case report is highly significant as it highlights errors that delay the diagnosis of oral lesions, including oral cancer, which can compromise oncological treatment and the patient's life. After all, the longer the delay in diagnosing a malignant lesion, the worse the prognosis of the case.

DISCUSSION

The diagnosis and subsequent initiation of treatment in advanced stages of oral cancer is a reality in Brazil. A study conducted according to the National Information System of Hospital Cancer Records (SisRHC) in 2019 showed that the most common diagnostic stages were stages III and IV, which represent the most advanced phase of the disease and have a worse prognosis (Soares *et al.*, 2019).

Late diagnosis of oral cancer can be associated with various factors, such as patients' lack of knowledge about the disease and its risk factors, delays in obtaining specialized consultations in the public healthcare system, and errors in the initial diagnosis or deficiencies in the training of professionals to detect early-stage or potentially malignant lesions (Soares *et al.*, 2019). The importance of a dentist prepared to make an early diagnosis is essential for a favorable prognosis since this professional has contact with the patient's mouth even before they start experiencing any symptoms related to a lesion, which initially may be silent.

Despite advances in the field of oncology, surgical resection, radiation therapy, and chemotherapy remain the main therapeutic modalities against the disease. However, although they can be effective in treatment, these therapeutic modalities (unimodal or multimodal) can cause significant morbidity with direct and indirect effects on the structures of the oral cavity, such as mucositis, xerostomia, osteoradionecrosis, and oral infections (Vieira *et al.*, 2012; Vidal, 2015; Hong *et al.*, 2018).

In the present case, there was a failure in the initial diagnosis, as the lesion was initially treated as traumatic, a trauma caused by the dental prosthesis. The treatment

MM was instructed about oral care and advised to discontinue the use of dentures. Furthermore, she was requested to stop the low-level laser therapy

plan proposed by the dentist was low-level laser therapy (LLLT) sessions to modulate the healing of the injured tissue. Even after 3 months of laser treatment without resolution of the case, the professional did not reconsider the approach and consider a new diagnosis.

The use of LLLT in this case delayed the correct diagnosis of squamous cell carcinoma and consequently the initiation of treatment, which could have been diagnosed early, favoring the prognosis of the case. Furthermore, the effects of LLLT on malignant lesions are still not well understood, and studies on the topic are limited and contradictory. Some studies indicate that LLLT can modify cellular behavior, so it is generally contraindicated for proliferative or dysplastic lesions that may potentially transform into neoplasms¹². However, other studies suggest that photobiomodulation with LLLT itself is not associated with negative outcomes in such cases (Martins *et al.*, 2020).

The mechanism by which laser acts at the cellular level is still not fully understood. The most accepted theory is that a photobiological phenomenon involves the conversion of laser light energy through biochemical and physical processes. Photoreceptors absorb this energy and facilitate cellular metabolism, promoting proliferation and tissue repair (He *et al.*, 2018).

Therefore, it is preferable not to use LLLT in malignant lesions and those with the potential for malignancy. Moreover, its use does not provide resolution for these types of lesions, as seen in the described case. Therefore, the use of LLLT in such cases will only lead to a delayed initiation of effective treatment, resulting in a worse prognosis for the patient.

CONCLUSION

It can be concluded that the delay in oral diagnosis is still a reality in the majority of cases, leading to unfavorable prognoses for patients. This delay may be significantly related to failures of the dentist in the initial diagnosis. The use of tools like LLLT in the treatment of oral lesions has been highly favorable in dentistry, but it should only be performed after thorough investigation and accurate diagnosis of the lesions. This ensures effective treatment of the patient without compromising oncological treatments and prognoses of malignant lesions, as in the reported case.

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RESUMEN: Este informe de un caso destaca el retraso en el diagnóstico del carcinoma espinocelular oral (CEC) y el uso inapropiado de la terapia con láser de baja potencia (LBP) en odontología. El CEC es una neoplasia maligna que afecta la cavidad oral y puede tener graves consecuencias si no se diagnostica y trata de manera adecuada y oportuna. La paciente presentó una lesión oral persistente que inicialmente se diagnosticó como lesión traumática y se trató con LBP, lo que llevó a un retraso en el diagnóstico correcto del CEC. El caso enfatiza la importancia de la detección temprana y el manejo adecuado de las lesiones orales para prevenir la progresión de condiciones malignas. También resalta los riesgos asociados con el uso inapropiado de la LBP en la práctica odontológica. Los profesionales de la odontología deben estar atentos a las lesiones orales sospechosas y remitir a los pacientes de manera oportuna para una evaluación adicional y un tratamiento adecuado, con el fin de garantizar mejores resultados.

PALABRAS CLAVE: oncología, láser de baja potencia, diagnóstico oral.

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