

## Dental management for oncology patients: Integrative review

Manejo odontológico para pacientes oncológicos: Revisão integrativa

Manejo dental para pacientes oncológicos: Revisión integrativa

Received: 09/05/2024 | Revised: 09/11/2024 | Accepted: 09/11/2024 | Published: 09/17/2024

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### **Abstract**

This integrative review aimed to analyze scientific articles related to dental care that should be adopted by the dentist before, during, and after antineoplastic treatments, as well as to discuss the most frequent oral complications that arise as a result. It is essential to have dental professionals as part of the multidisciplinary team providing care to this patient profile, in order to treat, prevent, delay, or mitigate the emergence of complications from antineoplastic therapy, as these can interfere with treatment continuity and, consequently, influence the case prognosis. For this study, the following descriptors were used: Dentistry; Cancer; Oral complications; Radiotherapy; Chemotherapy. The databases used in the search were: Virtual Health Library (VHL), Scielo, Pubmed, Medline, and Lilacs, where studies between 2014 and 2024 were searched in both English and Portuguese. As a result of the research, 134 articles were found. To select and include these articles in the present study, several steps were taken: first, titles and their respective abstracts were read; then, similar articles, articles that did not address the topic, those not available in English or Portuguese, and finally, articles not available in full and for free were excluded. 115 articles were excluded, leaving 15 articles for full reading. It is concluded that the presence of the dentist as part of the multidisciplinary team is important to adopt dental protocols aiming to prevent, reduce the intensity, or delay possible oral damage that may arise from oncologic therapy, in order to promote a better quality of life for the patient and avoid treatment interruption due to its occurrence.

**Keywords:** Dentistry; Medical oncology; Radiotherapy adjuvant; Antineoplastic agents.

### **Resumo**

Esta revisão integrativa teve como objetivo analisar artigos científicos que se relacionassem com os cuidados odontológicos que devem ser adotados pelo cirurgião-dentista antes, durante e após os tratamentos antineoplásicos, além de discutir sobre as complicações orais mais frequentes que surgem em decorrência dos mesmos. É indispensável a presença de profissionais da odontologia compondo a equipe multidisciplinar que atua nos cuidados a este perfil de paciente, para que se possa tratar, prevenir, retardar ou atenuar o surgimento das complicações advindas da terapia antineoplásica, uma vez que estas podem vir a interferir na continuidade do tratamento e, com isso, influenciar no prognóstico do caso. Para o presente estudo, foram utilizados os seguintes descritores: Odontologia; Câncer; Complicações orais; Radioterapia; Quimioterapia. As bases de dados utilizadas na busca foram: Biblioteca Virtual em Saúde (BVS), Scielo, Pubmed, Medline e Lilacs, onde foram pesquisados trabalhos entre 2014 e 2024,

tanto na língua inglesa como portuguesa. Como resultado da pesquisa, foram encontrados 134 artigos. Para a seleção e inclusão desses artigos no presente estudo, foram adotadas algumas etapas: primeiro, foi feita a leitura dos títulos e seus respectivos resumos; a seguir, foi feita a exclusão de artigos semelhantes, artigos que não abordaram a temática citada, que não estivessem disponíveis em inglês ou português, e, por fim, foram excluídos artigos que não estivessem disponíveis na íntegra e de forma gratuita. Foram excluídos 115 artigos, restando 15 artigos para a leitura integral do trabalho. Conclui-se que a presença do cirurgião-dentista compondo a equipe multidisciplinar é importante para que se possa adotar protocolos odontológicos visando evitar, diminuir a intensidade ou retardar possíveis danos orais que possam surgir em função da terapia oncológica, a fim de se promover uma melhor qualidade de vida para o paciente e evitar a interrupção do tratamento em função de seu surgimento.

**Palavras-chave:** Odontologia; Oncologia clínica; Radioterapia adjuvante; Antineoplásicos.

### Resumen

Esta revisión integrativa tuvo como objetivo analizar artículos científicos relacionados con los cuidados odontológicos que deben ser adoptados por el cirujano dentista antes, durante y después de los tratamientos antineoplásicos, además de abordar las complicaciones orales más frecuentes que surgen como consecuencia de los mismos. Es indispensable la presencia de profesionales de la odontología formando parte del equipo multidisciplinario que trabaja en los cuidados de este perfil de paciente, para poder tratar, prevenir, retrasar o atenuar la aparición de complicaciones derivadas de la terapia antineoplásica, ya que estas pueden interferir en la continuidad del tratamiento y, por lo tanto, influir en el pronóstico del caso. Para este estudio, se utilizaron los siguientes descriptores: Odontología; Cáncer; Complicaciones orales; Radioterapia; Quimioterapia. Las bases de datos utilizadas en la búsqueda fueron: Biblioteca Virtual en Salud (BVS), Scielo, Pubmed, Medline y Lilacs, donde se buscaron trabajos entre 2014 y 2024, tanto en inglés como en portugués. Como resultado de la investigación, se encontraron 134 artículos. Para la selección e inclusión de estos artículos en el presente estudio, se siguieron algunas etapas: primero, se leyeron los títulos y sus respectivos resúmenes; luego, se excluyeron artículos similares, artículos que no abordaron la temática mencionada, que no estaban disponibles en inglés o portugués, y, finalmente, se excluyeron artículos que no estaban disponibles en su totalidad y de forma gratuita. Se excluyeron 115 artículos, quedando 15 artículos para la lectura integral del trabajo. Se concluye que la presencia del cirujano dentista formando parte del equipo multidisciplinario es importante para poder adoptar protocolos odontológicos con el objetivo de evitar, disminuir la intensidad o retrasar posibles daños orales que puedan surgir como consecuencia de la terapia oncológica, con el fin de promover una mejor calidad de vida para el paciente y evitar la interrupción del tratamiento debido a su aparición.

**Palabras clave:** Odontología; Oncología médica; Radioterapia adyuvante, Antineoplásicos.

## 1. Introduction

Cancers are currently considered the leading cause of mortality worldwide. According to the National Cancer Institute, its high incidence and current prevalence make cancer a serious public health problem globally (INCA 2022), and within this context, this disease requires a multidisciplinary approach for its diagnosis and treatment in order to improve the quality of life and increase patient survival (Nogueira et al., 2022).

In the current scenario, cancer is considered a public health problem because it is estimated that in the coming decades its population impact will account for 80% of the over 20 million new cases projected for the year 2025 (Silva et al., 2021).

Treatment is carried out through surgery, chemotherapy, radiotherapy, bone marrow transplant, targeted molecular therapy, immunotherapy, or a combination of these methods. However, oncology patients undergoing antineoplastic therapy directly or indirectly affect the oral cavity (Castro et al., 2023) because current available treatments do not have the ability to distinguish tumor cells from healthy cells, leading to damage to healthy cells and significant oral cavity side effects (Velo so et al., 2023).

These complications occur because these treatments induce destruction and/or delay in cell division in cells with a high proliferation rate, such as those forming the oral mucosa, making it easier for oral lesions to develop due to the difficulty in cell renewal caused by the drug (Nogueira et al., 2022).

The most frequent complications generated by such therapies are: mucositis, xerostomia, radiation caries, osteoradionecrosis, oral infections, trismus, dysphagia, and dysgeusia. As these complications are common, it is necessary to

provide individualized dental care to oncology patients based on the disease stage, patient profile, type of therapy used, and the oral complication that has arisen. These care should occur before, during, and after oncological treatment (Castro et al., 2023).

The role of the dentist within the multidisciplinary team treating an oncology patient is to prevent and manage possible sequelae resulting from oncological treatment in the oral cavity, establish self-care measures, implement a standardized oral hygiene protocol to improve or prevent the onset of oral complications (Silva et al., 2021), as well as eliminate sources of oral infections, prevent and/or alleviate pain (Castro et al., 2023).

Regardless of the proposed antineoplastic treatment, it is very important for the patient to be referred to the dentist for an evaluation and treatment of any oral problems that may interfere with future treatment (Wolfgang, 2022).

This study aims to present, through an integrative review, how dental care can be conducted before, during, and after therapies for oncological treatments, as well as address the main oral complications resulting from antineoplastic therapies.

## **2. Methodology**

An integrative literature review was conducted, contributing to evidence-based practice in healthcare (Krzyszewski et al., 2023).

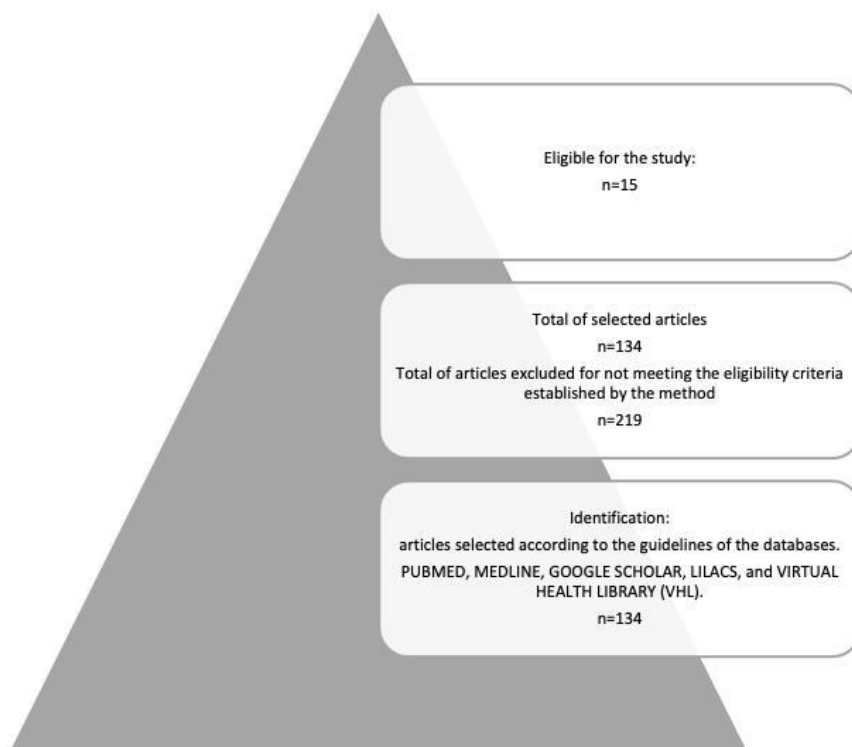
This work constitutes an integrative review of the scientific literature, analyzing studies related to the dental approach before, during, and after oncological treatment, and the main oral complications that occur in these patients when undergoing antineoplastic therapies.

A bibliographic search was conducted for data collection, and as this was a study with a defined time limit, the temporal scope began in the year 2014, and the search was restricted until the year 2024.

The research was conducted in the following databases: PUBMED, MEDLINE, GOOGLE SCHOLAR, LILACS, and VIRTUAL HEALTH LIBRARY (VHL). The descriptors used were: Dentistry, Medical Oncology, Radiotherapy Adjuvant, Antineoplastic Agents, Mucositis; Xerostomia. The Boolean operators used were: AND and OR.

For the inclusion and exclusion of studies, the title and abstract of all articles found were first read. Inclusion criteria considered articles that addressed the proposed theme and were available in Portuguese and English. Excluded were: duplicate studies, studies not available in full, and studies not available for free in English or Portuguese. A total of 134 articles were found, and 115 articles were excluded for not meeting eligibility criteria, leaving 15 articles for full reading (Figure1).

**Figure 1** - Flowchart related to search strategy.



Source: Research data (2024).

### 3. Results and Discussion

Table 1 describes the authors, year of publication, relationships, associations, and conclusions of the published articles. The analyzed characteristics were categorized to address the objectives: Scientific productions related to dental care in oncology patients and the possible approaches to oral complications that may arise from treatment, in order to improve the understanding of the dentist in dental practice for this patient profile. Analyzing the scientific production on oral problems found in chemotherapy or radiotherapy patients, proving the importance in dentistry.

**Table 1** - Distribution of selected articles for the integrative literature review.

Year/Author	Study Design	Objective	Relationships and associations	Conclusions
Devi et.al., 2014	Literature review	Discussing how dental care should be during and after head and neck radiotherapy	Analyzed the effects induced by radiotherapy that occur in the oral mucosa, salivary glands, bones, teeth, and facial and neck muscles, and addressed some possible treatments.	To minimize patient discomfort and morbidity, it is necessary to understand the deleterious effects of radiotherapy and introduce good oral care at home, as well as more frequent visits to the dentist before radiotherapy. This will allow for continued care during and after therapy.
Epstein et.al.,2014	Literature review	Identifying experienced and knowledgeable dental specialists to provide appropriate oral care to cancer patients, as well as integrating these care into overall oncological management.	Literature review focused on specific issues related to the oral cavity and adjacent structures in cancer patients, including early detection and diagnosis of oral malignancy and the systemic effects of cancer and its therapy that affect oral disease and treatment.	Due to the complexity conferred by the disease and its treatment, oncology patients require trained and experienced dentists for the treatment and/or prevention of oral cavity-related morbidities. Correct diagnosis and evidence-based prophylactic actions.

Nogueira et.al., 2014	Literature review	Analyzing the scientific production regarding oral problems found in chemotherapy or radiotherapy patients, proving the importance in dentistry.	Critically analyzed 11 scientific articles related to the main oral health problems in oncology patients, emphasizing dental treatment published in the last 10 years, found in the main databases.	A high rate of oncology patients presenting oral manifestations during or after antineoplastic treatment has been proven, highlighting the importance of the presence of a dentist in the multidisciplinary team caring for the health of these patients, aiming to improve the prognosis of the disease and the individual's quality of life, consequently increasing longevity.
Veloso et.al., 2023	Integrative Literature Review	Summarize studies on the importance of prevention and care of oral changes in dental management for patients undergoing treatment.	Gathered and synthesized the findings of studies regarding oral changes during cancer treatment and the importance of dental care for these patients. Emphasizing the importance of dental treatment associated with the treatment of this patient profile.	The role of the dentist in caring for oncology patients is of great importance, as oral health conditions impact the quality of life of these individuals. In short, this study contributes to the understanding of oral changes and care for the well-being of the patient.
Silva et.al., 2020	Literature review	Salientar através de uma revisão os possíveis cuidados que o cirurgião dentista precisa ter frente aos principais agravos bucais decorrentes do tratamento.	Sintetizou uma análise das principais complicações em pacientes com câncer de cabeça e pescoço submetidos a radioterapia, dentro de uma visão multidisciplinar.	Given the significant side effects on oral tissues, it is essential for the dentist to have knowledge so that they can act in the prevention and reduction of such damage.
Peterson et.al., 2024	Literature review	Identifying the gaps in access to clinically necessary dental care for cancer survivors.	Analysis of the scientific evolution of treatments and clinical management of oral mucositis in the last 30 years.	Recent scientific advancements and their clinical application in oncology continue to contribute to the maturation of research in the field of mucosal lesions caused by cancer treatments.
Ramanna, 2018	Literature review	Review the treatment modalities and essential preventive measures for managing post-treatment complications in oncology patients from a dental perspective.	Gathered the treatment modalities against cancer bringing the main preventive measures to avoid oral complications post oncological treatment.	The susceptibility to develop oral diseases arising from oncological therapy in cancer patients is common, and for this reason, it is extremely important to advise them about these complications, the importance of oral hygiene to prevent them, as well as the management of these conditions.
Cardoso et.al., 2020	Literature review	Search for academic publications on the specific aspects and knowledge for treating the side effects that manifest in the stomatognathic system of oncology patients and their possible complications that require care and support from the dentist.	Emphasized the importance of performing oral care for an oncology patient taking into account their current systemic state, as it will be a determinant for treatment. Additionally, it brought up the possibility of interaction between drugs being used simultaneously, as the inadvertent use of certain drug classes can lead to toxicity, nullification, or potentiation between drugs.	Alleviating the pain and anxiety of oncology patients is coherent and determinant for the improvement of the patient's overall systemic condition. Knowing and being able to treat oral alterations, palliative therapies for symptom relief, makes the dentist able to play a fundamental role in the life of the oncology patient, alongside a multidisciplinary team that performs interdisciplinary actions.
Wolfgang., 2022	Systematic literature review	Evaluate the need for dental care for cancer patients.	Highlighted the importance of visiting the dentist before starting oncological treatment because regardless of the type of cancer, oncology patients may have oral complications.	Cancer treatment presents specific oral complications, regardless of the type of treatment the cancer patient undergoes.

Silva et.al., 2021	Literature review	To highlight the most common mouth lesions found in studies so that the importance of the multidisciplinary team's role in minimizing oral complications that may arise can be emphasized.	Correlated studies seen by other authors, aiming for statistical numbers of oral cavity manifestations resulting from chemotherapy treatment.	These manifestations may be associated with poor oral hygiene. Therefore, it is necessary for the doctor to interact with the dentist, who should refer oncology patients for pre-chemotherapy treatment, acting in the prevention, control, and treatment of possible oral structure aggressions.
BOMFIM ET.AL., 2023	Literature review	Highlighting the relevance and importance of dentistry and stomatology in the face of oncological and palliative treatments, and the correct management of the patient.	Highlighted the importance of the role of the dentist in the prevention, correct diagnosis, and treatment of lesions present in the stomatognathic system that manifest due to cancer or its treatment.	It is essential for the dentist to accompany the oncology patient throughout the pre and trans-treatment stages, bearing in mind that lesions may arise during oncology treatment, with the aim of offering a better quality of life for the oncology patient during chemotherapy and/or radiotherapy treatment. However, the current literature review is still limited, mainly due to the lack of dentists in the oncology field.
Antunes., 2020	Literature review	Conducted a survey of oral complications that occur after head and neck cancer treatment and the procedures performed by the dentist as described in the literature.	Highlighted the changes resulting from antineoplastic treatment both in the long term and in the immediate term. And brought an approach to possible treatments for these conditions.	The dentist plays a fundamental role within the multidisciplinary team caring for oncology patients, for the diagnosis and management of conditions in the oral and maxillofacial complex resulting from this treatment.
Barbieri et.al., 2020	Literature review	Reviewing the literature on current prevention and treatment measures aimed at improving the quality of life of xerostomized patients.	Identified current measures for the treatment of patients with xerostomia and also addressed some care that can be used to prevent or treat such complications.	Complications arising from antineoplastic treatment affect the systemic condition of patients. It is of utmost importance that the dentist be part of the multidisciplinary team, along with the medical team, in order to diagnose and treat oral alterations resulting from therapy, providing relief from symptoms and consequent restoration of oral health.
Carvalho et.al., 2023	Literature review	Directing the attention of dentists towards planning and providing personalized care for oncology patients according to their needs and particularities.	Clarified the relationship between cancer and its impacts on dental practice. Demonstrating how dental management should be adapted to patients diagnosed with cancer.	The complications arising from antineoplastic treatment affect the systemic condition of patients. It is of utmost importance that the dentist be part of the multidisciplinary team, along with the medical team, in order to diagnose and treat oral changes resulting from therapy, providing relief from symptoms and consequent restoration of oral health.
Alquarni et.al., 2023	Case report	Describing palliative dental care for patients in need of end-of-life care in advanced stages of cancer and discussing the dental management of patients with advanced hematologic diseases.	Addressed palliative dental care and dental management of patients with hematologic diseases.	Palliative dental care can make a positive difference in the lives of patients with advanced hematologic-oncologic disease. We recommend that dentists be involved in the multidisciplinary palliative care team and provide comprehensive oral care.

Source: 2024 research data.

In light of the above, the presence of the dentist and the establishment of dental protocols, working together with the multidisciplinary team treating oncology patients, are of paramount importance, not only to improve the patient's quality of life, but also to try to prevent treatment interruption due to oral complications (Nogueira et al., 2022). Furthermore, it is also

necessary for the dentist in this multidisciplinary team to understand the magnitude and variety of the effects of antineoplastic treatments on the oral cavity, as well as the assistance and management of oral conditions presented by these patients (Veloso et al., 2023).

Ideally, the dentist should provide care to this patient profile before the start of oncological treatment, aiming to address preexisting oral problems in order to try to prevent the emergence of oral complications from therapy, which may arise during and even after treatment. These complications can interfere with treatment success, its continuity, and the disease prognosis (Castro et al., 2023).

Therefore, before starting antineoplastic treatment, it is extremely important to have a prior consultation with the dentist. This measure aims to make the patient as comfortable as possible for the start of therapy and to try to reduce the chances of oral complications or mitigate them if they arise. Oral manifestations caused by the side effects of antineoplastic treatment are common, and these side effects have a significant impact on the patient's quality of life under treatment. Additionally, inappropriate oral health will negatively impact the quality of life of these patients (Castro et al., 2023, Ribeiro et al., 2024).

Due to the recurrent oral problems in cancer treatment, some authors emphasize that a protocol should be established for the dentist to follow when treating this patient profile (Castro et al., 2023).

Authors Silva et al. (2021), Ribeiro et al. (2024), Castro et al. (2023), Devi et al. (2014), and Epstein et al. (2014) present in their studies some important steps that the dentist should take in the dental approach before, during, and after the end of therapy. They suggest that in the pre-therapy care, the dentist should: - Perform a clinical and radiographic examination by requesting a panoramic radiograph or radiographic survey of the patient, carefully evaluating the presence of: carious, endodontic, and periapical lesions, root resorptions, periodontal diseases, furcation lesions, tooth mobility, impacted teeth, and oral pathologies. Request the oncologist's diagnosis, medical history, treatment plan, and case prognosis before developing the dental treatment plan; evaluate the drugs used by the patient and their repercussions on dental treatment; perform sialometry and, based on the result obtained, judge if medication is necessary to stimulate saliva production if it still exists; Advocate for sealing open cavities with glass ionomer; correct poorly adapted prostheses or when it is not possible to suspend their use; provide patient guidance on the importance of plaque control, through the use of soft brushes, fluoride toothpaste, interdental brushes, and dental floss; provide written guidance to follow during treatment regarding diet, smoking, consumption of alcoholic or acidic beverages; removal of hyperplasias, fibromas, bone spicules, or tori when they interfere with prosthesis use; complete prophylaxis with a fluoride treatment to prevent the onset of caries lesions; removal of all extractions before radiotherapy with 10 to 21 days in advance to avoid the risk of osteoradionecrosis; perform all major surgeries 4 to 6 weeks before the start of radiotherapy.

The care/monitoring of oncology patients during the therapy phase should focus on maintaining oral health, treating oral side effects that arise, and reinforcing the importance of oral hygiene to prevent the emergence of oral complications (Castro et al., 2023). In this phase, Silva et al. (2021), Ribeiro et al. (2024), Castro et al. (2023), Devi et al. (2014), and Epstein et al. (2014) suggest some steps to prevent the emergence of some complications such as: Maintain oral hygiene with non-irritating fluoride toothpaste and dental floss; rinse with a fluoride solution containing 0.02% sodium fluoride for one minute three times a day before bedtime, after breakfast and lunch, and after that do not eat, drink, or rinse your mouth for 30 minutes after rinsing; to prevent oral mucositis, prior treatment with infrared laser should be performed on the same day as the first session of radiotherapy, and in the case of chemotherapy, it should start on the second day after the start of treatment; to prevent trismus or reduce it, the patient should perform mouth opening physiotherapy three times a day with the help of mouth

openers or spatulas and also undergo low-power laser therapy (infrared); the protocol to be established will depend on the complexity of the case evaluated.

After the end of oncological therapy, it is extremely important that these patients continue to be monitored by a dental team, as there are still chances of late oral complications such as cavities, trismus, and osteonecrosis. At this stage, it is important to ensure the maintenance of oral health (Silva et al., 2021; Ribeiro et al., 2024; Castro et al., 2023; Devi et al., 2014; and Epstein et al., 2014).

Both head and neck radiotherapy and chemotherapy are therapeutic methods that can trigger unwanted effects in the oral cavity; regarding chemotherapy, these effects and their severity will depend on factors such as: Type, dose, and frequency; while the effects of radiotherapy will depend on: The irradiated site, the volume of irradiated tissue, the dose, and the fraction of doses (Wolfgang, 2022).

Acute complications include mucositis, infections (viral, fungal, or bacterial), sialadenitis, xerostomia, taste dysfunction, and muscular and cutaneous fibrosis. Chronic complications include mucosal fibrosis and atrophy, dental caries, soft tissue necrosis, osteoradionecrosis, taste dysfunction, dysgeusia, and ageusia (Castro et al., 2023).

It is worth noting that antineoplastic therapies directly or indirectly affect the oral cavity, necessitating individualized dental care before, during, and after antineoplastic therapies (Castro et al., 2023).

The literature presents a series of oral pathologies that can arise, either due to immune system suppression as opportunistic infections, or as a consequence of radiation used on oral tissues (Bomfim et al., 2023). The effects of oncological therapies have a significant impact on the quality of life of patients according to Silva et al. (2021), who also emphasizes that inappropriate oral health contributes to a negative impact and further decreases the quality of life of oncology patients. According to Alquarni et al. (2023), a patient with multiple oral problems undergoing oncological therapies such as chemotherapy and head and neck radiotherapy has an increased risk of oral complications and infections.

Carvalho et al. (2023) mention that extractions of any nature should be avoided after antineoplastic therapy to reduce the risk of osteoradionecrosis. However, Ramanna et al. (2018) pointed out that the incidence of osteoradionecrosis in post-radiotherapy patients is 7%, and when undergoing extractions, this percentage decreases if antibiotic prophylaxis and antibiotic therapy are used alongside the extraction, and this percentage becomes even lower when hyperbaric oxygen therapy is used prophylactically in extractions.

Silva et al. (2021) indicates that after oncological treatment, definitive restoration of carious lesions that arise should be performed; however, Cardoso et al. (2020) suggests that these lesions can be treated using the Atraumatic Restorative Treatment (ART) technique, and after the removal of carious tissue, restorations should be made with glass ionomer, as this material acts as a fluoride releaser and can thus reduce the incidence of caries. He also advises against using amalgam as a restorative material in patients undergoing head and neck radiation, as amalgam is a secondary source of radiation and can cause contact lichenoid reaction.

#### **4. Conclusions**

It is essential for the dentist to accompany the oncology patient throughout the therapy stage, from pre-treatment to during and post-treatment, using procedures and protocols to interrupt, attenuate, delay, or prevent the onset of oral complications from oncological therapy, in order to offer the patient a better quality of life during and after treatment. The presence of the dentist as part of the multidisciplinary team that accompanies this patient profile is of utmost importance, not only for managing complications but also so that this patient can be supported in all possible areas and thus maintain their dignity and quality of life. The vast existing literature highlights the effectiveness of treatment protocols for oncology patients



in preventing complications. Therefore, the protocol implementation of these measures is recommended to prevent oral problems resulting from antineoplastic therapies.

## Conflict of Interest

There is no conflict of interest as this article is an integrative literature review.

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