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Review article

An Overview of the Oral Health Challenges in Breast Cancer Patients

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Abstract
Breast cancer has developed to become the leading type of cancer in females. Breast Cancer therapy impacts oral health. A small proportion of BCa patients have received specific information from their dentists about the effects of therapy on oral health. Oral complications from cancer treatments are among the adverse effects breast cancer survivors can experience. Yet such complications are often overlooked in cancer survivorship care. Although many breast cancer survivors are undergoing adjuvant endocrine therapy, little is known about the possible oral side effects of this treatment. This review provides an overview of the oral health challenges associated with breast cancer and its treatment, with particular emphasis on dental care considerations before, during, and after cancer therapy.
Keywords. Oral Health; Breast Cancer; Adverse Effects; Quality Of Life; Dental Care

Introduction

Breast cancer continues to be the most frequently diagnosed cancer in women globally(1). A range of treatment approaches—such as chemotherapy, radiation therapy, and extended hormonal therapy using aromatase inhibitors (which can last up to eight years)—are employed to manage the disease and support long-term remission(2). For cases of oligometastatic breast cancer, surgery and radiotherapy are typically the primary treatment choices(3). Advances in combination therapies, including regimens based on anthracyclines and taxanes (such as AC–T) and docetaxel combined with cyclophosphamide (TC), have significantly improved survival for patients(4). Unfortunately, these medications come with a range of adverse effects that can harm overall health and reduce quality of life(5).

Among the various areas affected, oral health and hygiene are particularly vulnerable during chemotherapy(6). Patients undergoing or recovering from breast cancer treatment often experience higher rates of dry mouth, mucositis, tooth loss, and bleeding gums(7). Chemotherapy can also impair nutritional status, further affecting patients' well-being. Failing to regularly evaluate and monitor the condition of both soft and hard oral tissues, as well as overlooking preventive measures, may seriously compromise treatment results(8). Collectively, these issues contribute to a decline in oral health-related quality of life(9).

Current preventive and treatment strategies—including oral hygiene protocols, cryotherapy, topical anaesthetics, anti-inflammatory drugs, and growth factor therapies in specific cases—provide only limited and variable effectiveness(10). This modest success stems from the intricate, multifactorial nature of chemotherapy-induced mucositis (CIM), which is primarily initiated by direct DNA damage to epithelial cells and oxidative stress, and is then exacerbated by inflammatory responses and the breakdown of mucosal barrier function. As a result, there remains a substantial need for biologically grounded supportive approaches that can work alongside current care practices to improve outcomes meaningful to patients(11). This review aims to provide a comprehensive overview of dental care considerations in breast cancer patients, highlighting the oral complications associated with cancer therapy and strategies for their prevention and management.

We performed a literature search on the main public scientific databases (PubMed, Cochrane, Embase, and CrossRef) for manuscripts published from 2000 to April 2026, using combinations of the following keywords: ‘breast cancer,’ ”dental care” ‘chemotherapy,’ ‘quality of life,’ oral mucositis,’ 'xerostomia,” “osteonecrosis,” “oral health.” Furthermore, we identified additional data by checking the references of other relevant reviews, guidelines, and published papers in this field, and through experts’ advice

Dental Care Before Chemotherapy in Breast Cancer Patients

The dentist plays an essential role in a patient's care before, during, and after chemotherapy treatment(12). Before any procedures, the oncologist must update the dentist on the patient's health status, the specifics of the disease, and the planned antineoplastic treatments(13). A comprehensive examination includes reviewing the dental history, obtaining baseline radiographs (such as periapical, bitewing, and panoramic images), assessing periodontal and endodontic conditions, and evaluating the prognosis of existing restorations. Identifying potentially malignant signs and symptoms is vital. Diagnostic procedures, such as quantitative sialometry, can help assess, anticipate, and manage xerostomia and reduced saliva production (14). To create an appropriate and effective treatment plan, the dentist also needs to consider several factors. Specifically, he or she needs to understand that although odontogenic infections are uncommon, they can cause bacteremia in patients with compromised immune systems (15). It is important to treat all potential causes of oral inflammation.

Furthermore, when combined with the decaying, missing, and filled teeth/surfaces (DMFT/S), the periodontal index (PI) and the gingival index (GI) can give a clear picture of a patient's dental hygiene and serve as a trustworthy predictor of future illness. Lastly, the dentist plans the course of treatment based on the patient's immunological health and the amount of time available prior to the start of chemotherapy. After that, the patient has to receive counselling and information on the

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potential oral side effects of chemotherapy(15) . Dental treatments that occur before chemotherapy should be conducted with caution by the clinician(16). Precise denture fitting and modifications to any irritation-causing prosthesis should be finalised. The patient receives specific guidance on oral hygiene and caries prevention. It is highly recommended to carry out tartar removal, administer dental fluoridation, and use chlorhexidine. Chlorhexidine exhibits bactericidal effects against both gram-positive and gram-negative bacteria by disrupting the cell membrane and cellular enzymes. A concentration of 0.12% chlorhexidine has been shown to reduce bleeding and plaque levels and decrease the presence of Streptococcus mutans in saliva(17).

Dental Care During Chemotherapy in Breast Cancer Patients

Dental care should be avoided while undergoing chemotherapy. It is best to put off invasive procedures like extractions. The dentist needs to be aware of the patient's level of immunosuppression during chemotherapy. Cariogenic foods must be avoided, and dental hygiene must be maintained at a satisfactory level(18). The use of chlorhexidine and fluoride can promote dental health. While some individuals can only tolerate swabbing with a specific finger brush, tooth brushing can occur once the mouth pain subsides. It is advised to use toothpaste with 1,450 parts per million sodium fluoride. Dental procedures that are invasive and traumatic have to be discontinued. Therefore, limited surgical procedures, or even no extraction, should be performed. Because of the significant risk of infection, tooth scaling and root planing are not advised. Complications of chemotherapy, such as xerostomia, candidiasis, pain, and oral mucositis, must be managed at the time of their presentation(13). Oral complications associated with cancer therapy are frequent and can be classified as early or late onset. Early, or acute complications, are those that start during therapy and resolve within 1 month of completion. Acute complications include oral mucositis, dysgeusia, xerostomia, candidiasis, and dysphagia(19).

Oral mucositis (OM) is one of the most frequent side effects of chemotherapy. It is an acute inflammatory response of the oral mucosa. Inflammatory cell infiltration, epithelial disruption, and ulceration are the hallmarks of OM. It appears four to seven days after the start of a high-dose course and goes away two to four weeks after the course is finished. Methotrexate, bleomycin, fluorouracil, and doxorubicin are medications that frequently result in OM(20). After chemotherapy, mucositis peaks seven to ten days later. Erythema is the initial symptom, which is followed by a burning feeling. There is oedema and ulceration, which interfere with speech, swallowing, and feeding. Erythema turns into profound ulceration and severe pain when the illness is at its peak. Opioids and dietary adjustments may then be required. After treatment is finished, the ulcers go away in two to three weeks, leaving no scars. They have a pseudomembrane covering them when they appear. They don't have a clear outline. They favour the floor of the mouth, the soft palate, the buccal and labial mucosa, and the tongue's lateral surface(21). Age, malnutrition, pre-existing medical conditions, poor oral health, trauma, liver disease, and kidney function are risk factors associated with patient features. The risk of OM is increased by periodontal disease(22).

Research has shown that the likelihood of acquiring OM increases with drug dosage and frequency. Drugs that affect DNA synthesis, such as antimetabolites (methotrexate, 5-Fluorouracil) and purine analogues, increase the occurrence of OM up to 60%(23). The Multinational Association of Supportive Care in Cancer/International Society of Oral Oncology (MASCC/ISOO) has released guidelines for OM/S prevention and management after cancer therapy(24). These guidelines include recommendations for solid tumour chemotherapy-related OM/S outside head and neck cancer therapy and for hematopoietic stem cell transplant (HSCT)-related treatment (e.g., multiagent combination oral care and cryotherapy) (25). The MASCC/ISOO guidelines have not been extended to address OM/S resulting from non-chemotherapy treatments (e.g., targeted therapy; immunotherapy) and non-conventional chemotherapy treatments (e.g., antibody-drug conjugates) used to treat solid tumours, despite providing doctors with some assistance in preventing and managing chemotherapy-induced OM/S. Some management recommendations for OM/S are included in the current National Comprehensive Cancer Network (NCCN) supportive care guidelines(26).

Treatment choices for chemotherapy-induced OM are frequently empirical rather than evidence-based, and the best management techniques are still up for debate. Finding the best preventive measures is crucial given the significant clinical and financial burden of OM(27). Laser therapy, cryotherapy, professional oral hygiene, antimicrobial agents, Lactobacillus brevis lozenges, zinc supplementation, and benzydamine were found to be the most effective treatment or prevention methods for treating OM in a systematic review. Benzydamine hydrochloride has been shown in randomised controlled trials to be effective in lowering the incidence and severity of OM in patients undergoing chemotherapy or radiation(28). Cancer treatment-related xerostomia is a complex, complicated illness that has a substantial influence on patients' quality of life. Clinicians should be adept at identifying severe cases of xerostomia and putting suitable treatment plans in place that are customised to each patient's requirements(29). The symptoms of xerostomia and patients' oral health and well-being may be improved by muscarinic agonists, innovative radiation therapy techniques, salivary replacements, saliva stimulants, oral moisturising products, and nutritional supplements. One of the well-known recommended methods for treating xerostomia brought on by cancer treatment is surgery, such as a submandibular salivary gland transplant(30).

Dental Care After Chemotherapy in Breast Cancer Patients

After therapy is finished, late or chronic complications arise and, in certain situations, may be irreversible. Hyposalivation, trismus, caries related to xerostomia, osteonecrosis, and dysphagia are a few examples of chronic consequences. After cancer treatment is finished, patients should continue to follow their dentist's suggested recall schedule and maintain good dental hygiene, which includes using fluoride toothpaste and varnish(31). Additionally, the dentist should check for anti-resorptive and/or anti-angiogenic drugs taken during cancer therapy and update the patient's medication list (32).

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Dental Care in A Breast Cancer Patient Taking A Bone-Modifying Drug

Treatment with bone-modifying agents (BMAs) such as bisphosphonates (BP) and denosumab is associated with a risk of medication-related osteonecrosis of the jaw (MRONJ). Even with appropriate treatment, MRONJ may persist and affect the quality of life and oral function(33). A recent joint guidelines paper from the American Society of Clinical Oncology (ASCO) and Ontario Health (OH) discusses the use of adjuvant BP for all primary breast cancer patients who are postmenopausal (natural or therapy-induced). Breast cancer affects 300,000 new patients per year in the USA and about 2,000,000 globally; the majority are postmenopausal; therefore, the use of adjuvant BP may raise the incidence of MRONJ(34). The ASCO/OH recommendations state that the following therapy choices (arranged alphabetically) are supported by the strongest evidence:

• 1600 mg of clodronate orally every day for two to three years
• 50 mg of ibandronate orally every day for three years
• For three years, provide 4 mg of zoledronic acid (zoledronate, ZA) intravenously once every six months.
• For two years, provide 4 mg intravenously once every three months.

Regardless of the type of dental procedure, the oncology care team should advise patients to let the dentist know that they are receiving treatment with Bisphosphonate, whether in planned, current, or previous dosages(35). This is crucial because patients may fail to record intravenous therapies administered in an ambulatory care setting every two years. The information flow on all other comorbidities and drug lists is enhanced by this exchange. The dental care team should be informed that bisphosphonates may be used to treat individuals with non-metastatic breast cancer(36). Patients should be advised by the dental care staff to maintain their periodontal health and have regular dental examinations both during and after adjuvant bisphosphonate medication. As a preventative step, patients should be urged to maintain careful daily dental hygiene(37). Between the high risk of MRONJ in patients with metastatic breast cancer and the low risk in people with osteoporosis, elective dento-alveolar surgery is thought to present a moderate risk for MRONJ in patients on adjuvant BP(34). It is unknown when an elective invasive bone surgery should be performed in relation to bisphosphonate dosage(36) . To enhance wound healing and lower the risk of MRONJ, if dento-alveolar surgery is judged necessary, it is hypothesised that it is better to carry out the procedure as soon as you can. Hold off on administering the subsequent bisphosphonate medication until sufficient osseous healing is seen following the dento-alveolar operation(38). A more cautious dento-alveolar surgical approach is recommended for patients with numerous risk factors, such as intravenous Bisphosphonate, diabetic patients, or patients who administer corticosteroids for MRONJ or a greater cumulative dose of Bisphosphonate, such as those receiving the ZA dose for metastatic cancer(39).

Conclusions

There doesn't seem to be much published research that concentrates on treating BC patients and the effects of their oral health issues. Recent advancements in cancer treatment have significantly raised survivability. Because of this, there is an increasing need to continue managing this population's oral health care. Appropriate and prompt care of these problems has the potential to significantly reduce morbidity, even if many of the acute and chronic oral toxicities of cancer therapy are essentially unavoidable. Before beginning cancer treatments, a thorough dental evaluation and prompt treatment continue to be essential preconditions. Several guidelines should be prioritised for clinical practice:

- Give acute infection priority: When the medical timeline permits, conditions like abscesses, symptomatic apical periodontitis, and severe periodontal disease should be treated as soon as possible, preferably 10–14 days before the start of surgery or radiation therapy.
- Customise preventative measures: management for chemotherapy patients should concentrate on reducing mucositis and fungal infections. Clinicians may need to treat acute infections quickly in urgent cancer cases while delaying the treatment of long-term, asymptomatic diseases.
- Incorporate new evidence and tools: New strategies, including structured patient education procedures, improved imaging for subclinical oral infection detection, and adjunctive platelet-rich fibrin (PRF) in extraction sites, may facilitate more accurate, risk-based dental decision-making. To determine the best timing and scope of dental procedures for individuals with compromised health, further high-quality prospective studies are crucial. Based on available data, oncological care pathways should incorporate systematic dental clearance as a realistic approach.

Author Contributions

Samah M. Anayb[1]; Writing, resources, and supervision. All authors have read and agreed to the published version of the manuscript. Jamila M. AL-Mowashem[2]: Review &editing

Conflicts of Interest

The authors declare no conflicts of interest.

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