Appropriate and necessary oral care for people with cancer: guidance to obtain the right oral and dental care at the right time

Joel B. Epstein, Pelin Güneri & Andrei Barasch

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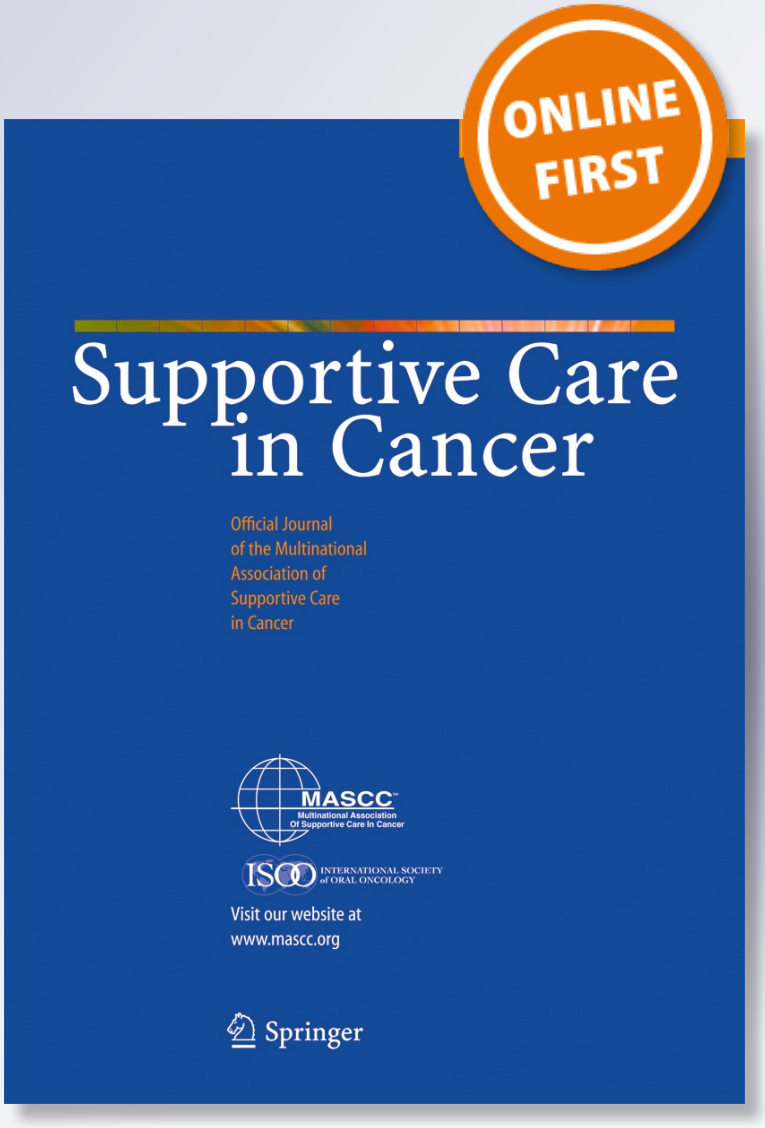

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ORIGINAL ARTICLE

Appropriate and necessary oral care for people with cancer: guidance to obtain the right oral and dental care at the right time

Joel B. Epstein · Pelin Güneri · Andrei Barasch

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Abstract
Purpose The identification of experienced and knowledgeable dental specialists to provide appropriate oral care for cancer patients, as well as the integration of this care within general oncology management, may be a challenge. This paper discusses the general and additional requirements for dental care providers to support the cancer patient and provide prevention and/or treatment for oral complications of cancer therapy.
Methods We performed a literature review of specific issues regarding the oral cavity and adjacent structures in the cancer patient, including detection and early diagnosis of oral malignancy. We incorporated the systemic effects of cancer and its therapy that affect oral disease and treatment. We present a summary of how to seek expert dental care for cancer patients and for referral from the dental and medical community.
Results Due to the complexity conferred by the disease and its treatment, cancer patients require educated, experienced dentists for treatment and/or prevention of oral-related morbidity. Correct diagnosis and evidence-based prophylactic and therapeutic oral care can significantly improve patient quality of life and reduce morbidity and healthcare costs.
Conclusions The knowledge and expertise of dental professionals regarding prevention/treatment of complications and secondary malignant lesions in cancer patients are critical. Integration of oral care with the oncology care and in survivors requires effective communication between dental and medical providers beginning ideally at diagnosis. These clinicians may be identified at the cancer center, nearby hospital dental programs, and, less commonly, in the community.

Keywords Cancer treatment protocol · Oral mucositis · Oral mucosa · Oral manifestations · Second neoplasms

Introduction

Increasing numbers of survivors of cancer and of people living with cancer present new clinical challenges and increase the need for collaboration between physicians and dental professionals. Advances in cancer treatment include intensity-modulated radiotherapy (IMRT), image-guided radiotherapy (IGRT), ARC therapy, proton therapy, surgical technique (e.g., laser, robotic surgery, implants, vascularized tissue transfer), dose-dense chemotherapy regimens, targeted agents, immunotherapy, and maintenance therapy. These advances have led to improved cure rates, increased survivorship, and a growing number of people living with cancer [1–3].

Dental care for these populations represents a clinical challenge, which mandates collaboration between physicians and dental professionals. Many community dental practitioners are not ideally prepared to provide treatment to this medically complex type of patient. Dental specialists with sufficient training and experience should be sought in order to provide appropriate, safe, and effective oral care for these patients. Similarly, patient education regarding potential oral side

J. B. Epstein
Samuel Oschin Comprehensive Cancer Institute, Cedars-Sinai Medical Center, Los Angeles, CA, USA

J. B. Epstein
Division of Otolaryngology and Head and Neck Surgery City of Hope National Medical Center, Duarte CA, 8500 Whilshire Blvd, Suite 800, Beverly Hills, CA 90211, USA

P. Güneri (✉)
Department of Oral and Maxillofacial Radiology, Ege University School of Dentistry, Bornova 35100, İzmir, Turkey
e-mail: peleen_2000@yahoo.com

A. Barasch
Department of Dental Medicine, Winthrop-University Hospital, 259 First Street, Mineola, NY 11501, USA

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effects, their prevention and/or amelioration, as well as necessary prophylactic information is an integral part of the oral and systemic care for these patients.

General considerations in cancer therapy and impact on oral condition

Patients with head and neck cancers may be treated with surgical resection, external beam radiotherapy and/or brachytherapy, and systemic drugs (chemotherapy and/or targeted agents), depending on the location, stage, and histology of the tumor and the clinical condition of each patient [2, 4]. Treatments may be provided as single modality for early stage, localized disease, or more commonly, due to late stage diagnosis, using combined modalities of care [2, 5–7].

People with cancers of the hematopoietic system typically receive myelosuppressive and immunosuppressive therapy that may include hematopoietic stem cell transplants (HSCT). These patients present additional complex care needs due to both the primary cancer and the medical complexities during survivorship, potentially with high risk of multiple oral/dental problems and therapy-related oral complications. Oral/dental care before, during, and following cancer therapy requires coordination with the medical providers, as oral disease may affect the timing and efficacy of cancer therapy and, conversely, cancer therapy may affect the feasibility and outcomes of dental treatment [2, 5, 7–18].

Cycled chemotherapy with or without targeted therapies for patients with non-oral solid tumors may also lead to oral complications. For these patients as well, dental care must be delivered in the setting of the underlying medical condition [2].

Oral complications of cancer therapy

Oral compromise during cancer therapy, including mucositis, infection, hyposalivation, taste change, and pain, can be significant [5, 7, 9]. These side effects and toxicities can alter all aspects of oral and oropharyngeal functions affecting diet (taste, dry mouth, chewing, and swallowing) and therefore nutrition. Furthermore, speech, ability to maintain oral hygiene, wearing dental prostheses, and appearance may negatively influence oral health, social, and emotional wellness [2, 19–22]. These side effects may also affect the ability to deliver cancer therapy as planned and thus, systemic health, outcomes of cancer therapy, and the cost of care [2, 5, 9, 20, 22–40].

The above-mentioned oral and dental effects of cancer therapy are mostly acute conditions. Additional chronic complications include risk of necrosis of soft and hard tissues (osteoradionecrosis and osteonecrosis risk with osteolytic inhibitors (e.g., bisphosphonates and denosumab)) [25, 41], dental caries [25], disruptions in dental growth and development [42], graft vs. host disease (GVHD) in HSCT patients [43, 44], fibrosis/trismus (limited movement of soft tissue including lips, tongue, neck, jaw, as well as esophageal stricture and motility), dysgeusia, dysphagia, salivary gland dysfunction, and chronic pain (neuropathic, temporomandibular disorders, dental, and periodontal) [1, 2, 9, 20, 21, 23–25, 28, 31, 33, 34, 37–39, 45–53]. The impact of these conditions upon oral and systemic health and general well-being is significant.

Oral care principles

Prevention of these oral complications, early recognition, diagnosis, and management often bridge expertise in both medical and dental cares. With timely and effective care of acute oral complications, completion of planned cancer treatment protocols can be supported for best outcomes, including improved cure rates [5, 14, 22, 24, 27, 29]. Unfortunately, cancer patients often have suboptimal oral health prior to cancer diagnosis [9, 54–56] and, therefore, are at increased risk for odontogenic (potentially life-threatening) infections during cytotoxic therapy. They may also have an increased risk for mucositis [9, 5, 55].

Cancer survivors

Following cancer therapy, most survivors experience life-long risk for oral and dental disease: for example, any traumatic incident or oral infection originating from periapical and periodontal foci may cause bone necrosis after radiotherapy, with a similar risk for patients on prolonged osteolytic inhibitor therapy for bone metastases of cancer [2, 5, 7, 38, 57]. Hence, pretreatment dental assessment is critical and in some cases is the only opportunity for management of preexisting dental conditions that may lead to significant and difficult to manage complications during and/or following cancer treatment [2, 5, 23, 54–56, 58].

The needs of patients following cancer therapy may be best addressed by appropriate treatment prior to initiation of cancer remedies and with active dental prevention in place [38, 47]. Therefore, as suggested by the British Association of Head and Neck Oncologists, all cancer patients should be assessed by "a suitably qualified dental practitioner" before and after their main treatment [59], and integrated multidisciplinary health care teams including dental expertise must be the initial step to provide optimum treatment for cancer patients [5, 7–11, 13–17, 47]. As stated by the International Society of Oral Oncology, "an accurate knowledge of the burden of illness, effective prevention, and treatment of oral complications associated with cancer therapies is necessary for management of the numerous oral complications of cancer therapy." (http://www.mascc.org/assets/documents/Oral_Care-Summary-Oral_Complications_Systematic_Reviews.pdf., Accessed on 02.11.2013).

Clearly, early planning and coordination between the dentist and the oncology team must occur, so that appropriate oral care can be provided at the appropriate time. Additionally, urgent and emergent dental needs may be managed when the patient is best able to tolerate the treatment, provided at a time of lowest risk to the patient or with appropriate medical support, to facilitate best outcomes which may reduce the need for additional hospitalization and intensive medical care that may impact survival and increase economic burden of treatment [9, 18, 19, 28, 60, 61]. Therefore, oral and dental care before, during, and following cancer therapy are an important part of cancer treatment [7] and are best provided by educated and experienced dental providers, with good communication with the oncology team [47].

Sequence of oral care prior to, during, and following cancer therapy

The role of the dental provider in the integral care of the oncology patient consists of ongoing involvement from disease diagnosis through survivorship. Oral care of oncology patients should begin soon after diagnosis, with recognition of local-regional conditions including potentially malignant oral disease and oral findings of systemic cancers that may present with local signs and/or symptoms [2]. It continues with dental examination/diagnosis and management of common oral diseases in preparation for cancer therapy and prevention and management of oral complications during treatment and survivorship [2, 7, 10, 23]. Follow-up of the patient during cancer therapy is dependent on the type of therapy and potential oral effects. Head and neck cancer and hematological malignancy patients should be consulted at least weekly, while other solid tumor patients may be followed on an as needed basis.

Oral care in survivorship is also based on the specific disease and patient's oral condition. Generally, close follow-up is indicated for detection of recurrence or second malignancy. Frequent dental recalls should also be in order, particularly for patients with hyposalivation and/or immune compromise. This continuing involvement contributes to patient oral comfort and potential avoidance of inherent oral complications but may allow completion of planned cancer therapy affecting outcome of cancer treatment and long-term general outcomes.

It is essential that an informed and experienced dentist who is familiar with oro-dental needs of cancer patients and has an understanding of the impact cancer and cancer therapy may have upon dental treatment be part of the oncology team or at least be consulted [2, 62]. Integrated oncology teams have been suggested to provide the complex range of services across the cancer continuum. Also, supportive care services, such as education, psychosocial support, speech therapy, nutritional counseling, genetic counseling, or other types of supportive care should be provided [7, 10].

Oral/dental health care is clearly more complex in these patients and requires experienced providers and integration with the medical care [56, 59]. Considering onset, duration, and nature of the cancer therapy, and the patients' oral and dental needs, dental treatment should be planned at the time of cancer diagnosis and before initiation of therapy (Table 1) [1, 2, 4, 7, 9, 23, 56, 60, 63, 64]. This plan should include oral hygiene instruction, as well as necessary dental and/or surgical interventions to minimize imminent risk of infection and pain and to address future risk of dental disease.

Pretreatment oral/dental care must also include preventive strategies directed to the specific oral and dental condition and the cancer and systemic status of the patient [2, 7, 63]. Since dental needs of each patient are unique, and treatment modalities for medically compromised patients should be planned individually for every person, this dental program must be based upon the patient's oral and dental status, previous dental care, and periodontal tissues' condition, cancer diagnosis, comorbid medical conditions, planned cancer therapy, knowledge of oral complications of therapy and prognosis, and maxillofacial/prosthetic rehabilitation of the cancer-related areas and defects [2, 5, 9, 23, 28, 29, 60]. This extensive background requires specific dental education that is not part of the typical dental school curriculum and is often beyond the training and experience of the community dental practitioners.

In addition to prevention and proper management of oral complications of cancer therapy, detection of signs, and diagnosis of recurrent oral cancer in the same area, or second and/or metastatic cancer in previously treated people, also requires extensive training and experience [2, 17, 65–67]. Patients with previous cancer in the upper aerodigestive tract have the potential to develop local recurrences or second primary tumors [1, 68, 69]. When a suspicious condition is observed, the need to achieve diagnosis and the implications of the results should be discussed with the patients in order to promote understanding and compliance [70]. Oral squamous cell carcinoma (OSCC) patients require a dentist to discuss their oral health/teeth, chewing/eating, pain in head and neck, saliva, swallowing, and speech as their major concerns [11, 71]. This is also important in terms of dental maintenance, because an appropriate dental care plan shall be constructed on individual patient basis with careful analysis of the risks and the benefits of dental intervention [7].

Providers of oral care for cancer patients

The cancer team and the dental provider require the expertise to initiate the prevention and management of the oral complications prior to, during, and following cancer therapy [2, 7, 20, 23, 45, 54, 63, 64,] and, also, have a mandate for early detection of new or recurrent cancer in the head and neck

Table 1 An ideal design for a model dental strategy prior to cancer therapy [1, 23]

Oral assessment of cancer patients	
Preradiation treatment	Prechemotherapy treatment
Definitive diagnosis	Definitive diagnosis
Medical history and current medical status	Medical history, systemic status (CBC etc.)
Dental history/past dental care/dental hygiene status	Dental history/past dental care/dental hygiene status
Complete dental exam (e.g., mucosal dental exam, periodontal, temporomandibular joint)	Complete dental exam (e.g., mucosa, dental exam, periodontal, with focus on sites of symptomatic infection)
Radiographic survey (panoramic and adjunctive periapicals or full-mouth periapicals)	Adjunctive tests as indicated (e.g., dental imaging, pulp tests, cultures)
Saliva tests (unstimulated and stimulated saliva volumes)	Prognosis for cure vs. palliation
Assessment of mouth opening before radiotherapy	Planned treatment/date of treatment (should be finished at least 10 days before initiation of cancer therapy)
Adjunctive tests as indicated (e.g., pulp tests, cultures, range of jaw opening, saliva volume)	
Prognosis for cure vs. palliation	
Proposed treatment (radiation dose/number of fractions)/date of treatment and radiation fields/chemotherapy, transplant	

and oral environment. Currently, few cancer centers have experienced dental practitioners integrated in the cancer team and available to provide appropriate oral care prior to, and throughout cancer continuum; and even fewer have integrated dental treatment services on site [7, 24, 28, 47, 72]. Some centers have consultants and some have no organized or experienced dental providers to call upon for best care [72].

Another major obstacle is funding for dental services, which can be a challenge in the oncology community. One can look at these integrated services as "medically necessary," but the limited community base of knowledge is also challenging [47, 56]. If these patients fail to receive the appropriate care, they have an increased risk of dental problems during or after cancer treatment and oral complications in the cancer continuum, which results in economic and health burden [56].

In a large study, only 35 % of oral cancer patients had a regular dentist and dental care [67] and about 22.7 % of cancer care centers for pediatric patients have a nurse in the oncology team who is responsible for oral care issues [42]. Even though an experienced dentist who can work as a consultant to coordinate the dental care of patients by liaison with primary care dental practitioners is essential, dental assessment is recorded in only 8.5 % of the 6,458 patient registrations (551 patients) and 12.8 % of the 4,297 of patients with treatment plans [73].

Current conditions

In community practice, many dental care providers are not prepared to manage oral complications of cancer patients based upon limited undergraduate training (and often even graduate training), limited continuing education, and limited experience in managing medically complex patients, all resulting in a lack of experience in this complex healthcare field [14, 64, 67, 74]. The level of knowledge of dental professionals regarding prevention of common, anticipated complications in cancer patients is also critical, because previously treated cancer patients may have unusual presentation and course of oral conditions, which makes the recognition, diagnosis, and management of such complications challenging. Undergraduate dental curricular demands paired with the lack of general access of most dental schools to this type of complex patients account for the difficulties for the necessary experience to be obtained through undergraduate education. Hence, special postgraduate programs are the only viable alternative for dental practitioners to gain exposure and knowledge in this relatively underserved area of oral care.

In a survey of general dental patients regarding selection of dental providers, key features reported by patients were competence (90 %) [75, 76] and reputation of the dentist (70 %) [76]. The identification of specifically trained dentists in the setting of cancer care requires increased attention to provider training and experience [73]. Expertise may be available at the cancer center, nearby hospital dental programs, university, and, less commonly, in the community. These experienced providers can be identified by noting training, experience, academic, and research activity. The care can be delivered or guidance can be provided to less-experienced community dentists to ensure appropriate oral care at the right time in the cancer continuum. Increased training of dental professionals in oncology can be embedded in residency/graduate programs and hospital services to increase patient care resources

Table 2 Guidelines for the patients and providers in seeking expert care for cancer patients and for referral from the dental and medical community

Steps to ensure appropriate oral care in cancer patients and survivors	Advice accessing informed expert dental/oral care in cancer patients and survivors	How to evaluate dental expert provider
Insure that prevention of uncommon oral complications are integrated with cancer therapy	Cancer center on site providers or list of expert community providers	Knowledge of cancer diagnosis, cancer treatment, and implications for oral care
Insure that oral care is provided by a dentist familiar with cancer therapies and their expected effects	Inquire at tumor support groups/web sites, prior dentist	Previous experience and ongoing experience with oncology care
Provide dental team with information and material detailing expected side effects and physiologic changes, both oral and systemic	Consider oral evaluation and treatment planning by experienced/integrated provider to guide community providers if special care not required. Insure invasive procedures are discussed with cancer center team.	Training (residencies, graduate programs, specifically hospital experience)
Educate patient in mouth and dental issues of concern [11]	Community dentists should obtain information from cancer center or dentists experienced in oral care of oncology patients	Current hospital appointments, specifically oncology appointments
Follow-up to include more frequent visits for dental needs and potential early detection of recurrent/new primary tumor [11]	Unique services and expertise may be needed such as: imaging, saliva study, microbial study, cell sampling, biopsy	Leading experts will have publications in oral oncology (evaluate by search of the dentist on: Pubmed.com, Google Search, Google Scholar)
Educate community dental provider that oral/dental treatment may require referral	Referral for unique/unusual findings to experienced dental provider	Continuing education presented (reflects recognized expertise in education by professional communities)
	Unique dental/oral therapy available at some cancer/transplant centers	Membership in related societies (e.g., dental oncology, medical oncology groups)
Special/persisting/unusual conditions may require referral		Continuing education attendance/study clubs/ national and international meetings
Oral care must be integrated with medical management in all cancer treatment modalities, especially in HSCT [2]		
Information your dentist should request past medical history if treated with radiation therapy: radiation fields/volume treated, past and current chemotherapy; current medical status including relevant medical laboratory results [2, 64] medications including bone health medications, chemotherapy and immunosuppressives		Web sites of provider
Multidisciplinary team and high level expertise may be required in complex cases [2, 21, 64,73,]		

[11]. In some countries, hospital dental training and oral medicine training may include experience in oncology that results in increased expertise in the management of these complex care patients (Table 2).

Conclusion

Knowledge, experience, interaction, and, ideally, integration with the oncology team provide the assurance of best appropriate oral and dental care for cancer patients. Given the complexities of oral and dental care that may be unique in oncology, the need to understand the cancer diagnosis and stage, the treatment provided or planned, the prognosis of cancer treatment, the complications of therapy and the impact of the medical issues that continue following cancer therapy, and the identification of experienced and knowledgeable dental providers in the community may be a challenge [59, 73]. The financial difficulties are also significant, even when dental insurance is available, due to the extensive and complex needs and even more challenging when dental insurance is limited or not available [62, 71]. The definition of "medically necessary oral/dental care" and other means of funding the costs of care are not well defined. These issues become of greater

importance with increased survival, ongoing cancer treatment (control of cancer, maintenance therapy), and continuing advances in cancer care [2].

Conflict of interest None

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