systematic reviews of the MASCC/ISOO and is of assistance in addressing: bisphosphonate osteonecrosis [16], dysgeusia [17], oral fungal infection [18], oral viral infection [19], dental disease [20], osteoradionecrosis (ORN) [21], trismus [22], oral pain [23], xerostomia and salivary gland hypofunction [24, 25] and mucositis [26–34].

## Basic oral care

Basic oral care (BOC) is defined as the activities that should be part of the patient's routine care during periods of cancer treatment in order to maintain good oral health and reduce the risk for local inflammation and infection, as well as systemic infection originating from the oral cavity.

The objectives of BOC are the following: (1) prevention of infection: to prevent infections of the oral mucosa and the periodontium and to prevent regional spread and systemic infection; (2) pain control: reduce discomfort and pain in the mouth; (3) maintain oral functions: promoting oral nutritional intake, oral fluid intake and capability to speak; (4) managing the complications of the cancer treatment: reduce the adverse effect of radiation therapy, chemotherapy and newer targeted therapies (Table 1); and (5) improve QoL of the patient (Fig. 1).

The recommendations will be presented per objective. However, some practice recommendations address several objectives.

These objectives have relevance before, during and after cancer therapy. Prevention and management of long-term complications and maintenance of oral and dental health are relevant for patients lifelong following the completion of cancer therapy.

## Recommendations

Before chemotherapy/HSCT

*Prevention of infections*

A comprehensive dental and oral evaluation is the recommended standard of care prior to high-dose chemotherapy/HSCT in order to eliminate sources of infection, both odontogenic and non-odontogenic. The dental treatment plan should be definitive. It has been shown that dental treatment prior to chemotherapy/HSCT may prevent the additional death of 18 out of every 10,000 patients and may reduce systemic infections by approximately one-third (250 versus 318 out of every 1,000 patients) [35]. Ideally, an initial appointment should be scheduled as early as possible in order to allow sufficient time to deliver emergent and urgent dental needs including dental extractions as well as professional periodontal care (e.g. dental cleaning and oral hygiene instruction) and to allow time for tissues to heal post-operatively/post-dental extractions, preferably with a healing period of 2 weeks. Principles of treatment planning in patients prior to chemotherapy were suggested by an experts' forum and can be found online [1, 13]. Nevertheless, time constraints as well as the medical condition itself may require modification of the dental treatment plan [36, 37]. Dental treatment planning requires that the dentist understands principles of oncology care, the diagnosis and treatment plan for the patient. It also requires close consultation with the medical team especially regarding unresolved oral health issues that may interrupt or complicate cancer treatment. Integrated health care teams promote integrated health care planning. Patients need to be informed about the dental treatment plan. There may be elective additional dental needs at the time of the examination that can be addressed after the chemotherapy or HSCT, when the patient's overall health status allows, and it has been approved by the medical management. Close coordination and communication between the different disciplines involved is therefore necessary and is facilitated by integrated health care teams.

*Pain control*

Prior to chemotherapy or HSCT, the dental health care provider should take steps to ensure no traumatic and anatomic factors may induce pain during and after cancer treatment. Therefore, as part of the dental evaluation, the dentist should eliminate potential sources of intra-oral trauma such as ill-fitting dentures, orthodontic appliances, deficient/rough restorations, traumatic dentition and dental calculus.

Furthermore, cancer therapy itself commonly results in pain [38, 39, 23]. A consultation with an oral medicine specialist or a dentist experienced in managing oral complications is recommended if atypical pain develops during the delivery of oncology care.

*Maintaining oral function*

Based on the need to eliminate sources of infection prior to chemotherapy, non-restorable teeth, including exposed root tips, severely periodontally involved teeth, and impacted teeth with signs of pericoronitis, should be extracted. Due to time constraints, a determinative approach should be adopted for restorable teeth (i.e. tooth extraction if there is insufficient time to confirm that a focus of pulpal/periapical infection is resolved, and sites of periodontal infection require definitive management). Often, in neglected dentitions, this principle dictates multiple extractions. The elimination of sharp or fractured teeth, restorations and prostheses will prevent trauma to the oral mucosa and thus will reduce risk for oral bleeding and infection. The dentist should consider a dental plan that will restore the occlusal surface to the level that will allow the patient to eat comfortably. The medical team should be aware of the patient's oral status and adjust foods to the chewing capabilities of the patient. A nutritionist's consultation may be needed.

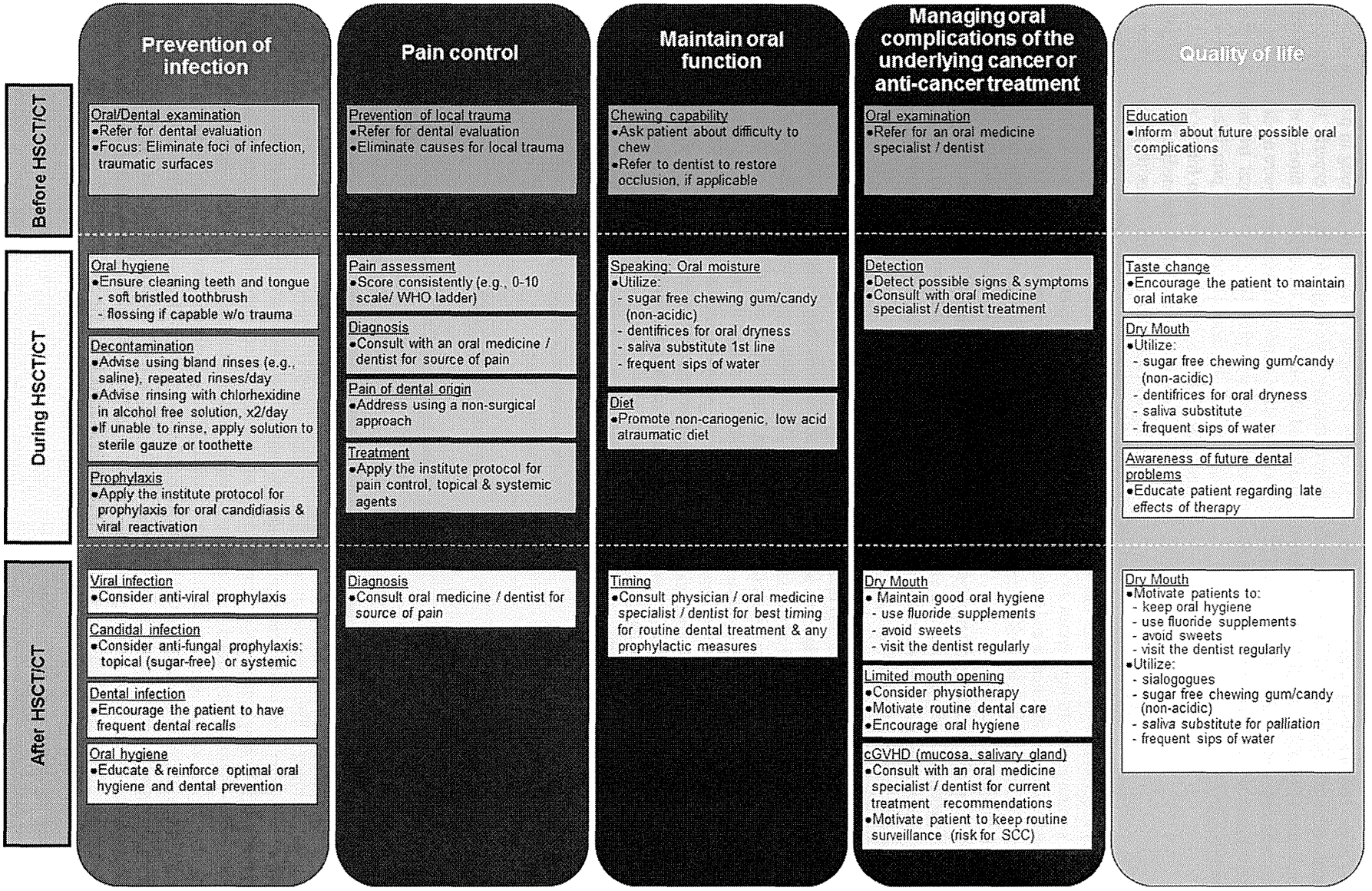


**Fig. 1** *HSCT* haematopoietic stem cells transplantation, *CT* chemotherapy, *WHO* world health organization, *cGVHD* chronic graft versus host disease, *SCC* squamous cell carcinoma

*Managing oral complications of treatment*

Considering that this section is aimed at patients pre-chemotherapy/HSCT, it is unlikely that they would have oral complications related to their cancer treatment. The underlying disease however may present with oral manifestations. The medical and dental team should recognize the potential for oral involvement of the underlying disorder and refer the patient for a complete oral evaluation if an oral symptom is reported or oral lesion is observed.

*QoL*

It is important to provide support and help the patient to understand what is expected during chemotherapy or HSCT; oral survivorship issues can be introduced, for example, the expected and usually reversible mucositis and hyposalivation. Possible long-term consequences and prevention strategies should be communicated. Assistance of clinical coordinators or social workers may be needed for coordinating the delivery of the treatment.

During chemotherapy/HSCT

*Prevention of infections*

Maintenance of good and intensified oral hygiene is a fundamental component of BOC. Gingival and mucosal inflammation caused by oral bacteria and mucosal barrier injury increases the risk of bacteremia. Intensive oral hygiene can reduce the incidence and severity of mucositis [40, 41]. Additionally, it has been reported that oral and periodontal assessment and management reduce the risk of infection and fever associated with oral conditions [42–45]. Lastly, minimizing gingivitis and periodontitis will result in less gingival bleeding. Therefore, patients benefit from maintaining good oral hygiene thereby keeping the oral microbial load low.

Oral hygiene refers to the actions taken to remove dental plaque from the teeth, to reduce the amount of oral bacteria in the oral cavity and to wash away solid debris. Plaque left on the gingival margin may cause gingivitis, which can lead to bleeding of the gums and infection in immunocompromised patients. Compliance may be compromised due to oral pain, nausea and other complications during cancer treatment; however, it is important to encourage the patient to adhere to the treatment protocol. The additional use of topical anesthetics/analgesics can help make this task easier in times when oral mucositis is present such as viscous xylocaine, dyclonine or diphenhydramine for those with allergies to esters and amides; topical analgesics such as doxepin and opioids may also reduce pain thus facilitating oral care [23]. When oral hygiene is compromised, the addition of chlorhexidine (CHX) as an oral antiseptic could be considered due to its reducing impact on the oral microflora. The MASCC/ISOO clinical practice guidelines found no evidence to support CHX rinse in the management of oral mucositis; however, this does not imply that it should not be used for other purposes, such as prevention of infection. Topical applications may cause local adverse events (for example, CHX may induce reversible staining of dental and oral tissues), and the patient should be so informed.

A combination of different oral hygiene products will achieve best removal of plaque from all surfaces of the teeth. Brushing should be continued two to three times a day. An ultra-soft or a soft toothbrush with bristles softened in hot water is preferred. Air-drying the toothbrush between uses is recommended. The toothbrush should be replaced regularly; in addition, some authors recommend the replacement of toothbrush after each neutropenic cycle [46]. Toothpaste with fluoride is recommended [47]. High concentration fluoride toothpastes (e.g. 1.1 % sodium fluoride) are available by prescription and should be provided if increased risk of dental caries is anticipated. A non-mint-flavored toothpaste may be suitable during days of mucosal injury. Likewise, toothpastes containing sodium dodecyl sulfate (surfactant) should be avoided if it irritates the mucosa. Brushing with sponge brushes is optional but less effective to remove dental plaque and preventing gingivitis [48], although with the addition of a CHX solution, effectiveness increases [48]. Additional measures to remove dental plaque from between teeth, crowns/bridges or dental implants and from the tongue should be continued using devices that the patient is familiar with in order to avoid self-injury due to lack of experience [49].

Frequent rinsing with bland solutions is recommended although it should be emphasized that oral rinses are not a substitute for mechanical cleaning. The neutral formulas are basically salty water and/or baking soda rinse (0.9 % saline and/or 0.5 % sodium bicarbonate solution, respectively) [7, 13]. Oral rinses with active agents can be combined as long as there is no antagonism between the active agents (for example, calcium phosphate rinse, CHX rinse) [7, 13]. The efficacy of these agents for mucositis prevention is debated in the literature. However, the anti-microbial effect of CHX is not questioned, and the washing effect of these liquids is valid. Notwithstanding that, CHX use is limited to twice daily for the duration of the neutropenia [50–52]. The non-alcoholic and non-flavored CHX digluconate 0.12–0.2 % solution may be easier to tolerate for patients with sensitive oral mucosa. Scientific evidence about the effectiveness of CHX in various concentrations, duration of rinse and cross-reaction is available in the literature [53, 54]. Oral adverse effects are usually reversible (teeth and tongue discolouration and taste changes) [55]. Possible substitute for topical disinfectants are octenidine and polyhexanide.

Removable dental prosthesis should be cleaned in a similar manner with mechanical aids and multiple washes, and when not in use (during nights, or as often as the patient can

accommodate), the dentures should be placed preferably in a cleaning solution or in water. A range of cleaning solutions for dentures is available (e.g. CHX, enzymes, sodium hypochlorite, oral rinses or peroxide solutions). However, there is limited evidence to suggest the use of a specific cleaning solution or recommend that one solution should be preferred over another in terms of health of the denture-bearing mucosa [56]. Despite this, however, the use of a watery solution to clean the dentures and in which to store the dentures when not in use will assist in maintaining the integrity of the acrylic.

Other components of the BOC refer to prophylaxis against oral candidiasis and viral reactivation [19, 18]. The protocols for this can vary considerably between medical centers. This variability may reflect the doctrine of the medical team in a certain location but also the geographical variability in the oral microflora and resistant strains [57]. It is advised that the oral cavity be examined on a daily basis for early changes including possible signs of oral infection. An oral medicine specialist or experienced dentist may assist whenever oral pathology is suspected.

*Pain control*

Pain control is an important element, particularly since during this period, oral mucositis may develop [58–60]. This topic has been extensively reviewed [23, 7, 61, 62, 13]. Generally, it is important to conduct a pain score on a regular basis. There are several pain ladders that can be used to score the pain level [63, 10].

Treatment will be adjusted individually according to the patient response to first lines of treatment. These include topical analgesics/anesthetics and mucosal coating agents (listed in Guide for Oral Care in Cancer Therapy [7]) and non-opioids and opioids analgesics (pain management is reviewed elsewhere) [62, 31]. The advantage of topical agents is the paucity of adverse effects. However, most of the evidence-based data refer to systemic medications, including patient-controlled analgesia [12, 64]. The importance of neuropathic pain in cancer patients due to chemotherapy and in tissue damage due to mucositis has been of increasing interest and is an important reason for pain continuing despite the use of topical agents and nociceptive analgesics [23, 62]. Non-pharmacologic modalities (such as low-level laser therapy, relaxation/imaginary techniques, hypnosis) to relieve pain are well reported in the literature and can be used as an adjunctive modality [62].

*Maintaining oral function*

Pain control alone is insufficient to allow oral function during the time period at risk for oral mucositis. Another early effect of chemotherapy is dry mouth. Without the lubricating effect of saliva, the oral mucosa is in continuous friction with other mucosal surfaces, teeth and with oral intake. The ability to eat, swallow and speak can be impaired when the mouth is dry. Therefore, interventions to keep the mouth moist are important. This includes palliation by sipping or spraying water or various saliva substitutes and mechanical-taste stimulants (chewing gum, sweet–sour candies) and the use of frequent bland rinses [7, 24, 13]. Some clinicians suggest using the spray or mouth-rinse during daytime and gel during night since the moisturizing effect of the more viscous consistency of the gel tends to last longer. It is important that any saliva stimulants are sugar-free and low in acid in order to avoid increased risk for dental decay, tooth sensitivity and erosion. Likewise, keeping the lips lubricated will prevent lips from getting dry and fissured. Some clinicians prefer lanolin- or cocoa butter-based lipsticks/creams over petroleum-based products.

The patient's diet should be adjusted to the mucosal sensitivity level. This may include avoiding crispy/rough foods and acidic, spicy and hot foods in order to increase the likelihood that the diet will be tolerable, particularly if oral mucositis is evident. If topical anaesthetics are used to control mucosal sensitivity, patients should be instructed to chew and swallow carefully in order to avoid trauma or aspiration. A nutrition specialist and the responsible physician should be consulted if food intake is limited.

*Managing oral complications of chemotherapy/HSCT*

The list of acute oral complications (Table 1) is long and represents the complexity of these patients. This topic is beyond the scope of this paper. Generally, each of these diagnoses should be addressed separately according to the current best evidence.

*QoL*

QoL questionnaires, such as EORTC OH-17 and OHIP-14, may facilitate the monitoring of the oral complications. The combination of pain control, prevention of local infection and maintaining saliva secretion contribute considerably to oral health-related QoL. However, some of the oral complaints may resolve with time in some patients such as taste change or saliva dysfunction. For example, most patients will regain taste function as early as a few weeks after the end of chemotherapy/HSCT, while in others, taste dysfunction may persist for as long as 2 years post-HSCT [65]. Despite difficulties, it is important to encourage the patient to maintain oral intake while suffering from dysgeusia [66, 17].

Dry mouth also impacts QoL. As described above, complaints can be relieved with systemic sialogogues and to some extent by stimulation by topical means. Studies have shown that patients consider the complications of oral mucositis and dry mouth as very debilitating when asked for their perception of the entire period of hospitalization following HSCT [67]. Therefore, the health care provider should address these complaints seriously and support the patient.

After chemotherapy/HSCT

*Prevention of infections*

Infections developing after chemotherapy/HSCT are common in two instances. Firstly, when white cell counts are low, the patient is at risk for infections; the most common are candidal and herpetic infections [18, 19]. These immunosuppressed patients are likely to be prescribed with antibiotics, which in turn will change the oral microflora and will contribute to emergence of oral candidiasis. Therefore, if the patient is neutropenic or the dose of an immunosuppressive agent is increased, a prophylactic dose of an anti-fungal and anti-viral may be considered, if not already in place. Secondly, when a dry mouth is long-standing, the patient is at risk of oral candidiasis and dental damage. Therefore, if repeated candidal infections occur, the clinician should consider instituting a prophylactic anti-fungal treatment. In patients treated with topical corticosteroids for oral chronic graft versus host disease (cGVHD) (see below), the risk for oral candidiasis further increases. For effective prevention of oral candidiasis, in patients having dentures, the denture should be decontaminated with the same anti-microbial agent to prevent recontamination of the oral cavity by the denture's microbial flora.

Dental disease should be considered as a source of infection and therefore should be managed routinely. Risk factors for dental decay, such as hyposalivation, should be addressed. Dental providers must be informed and may need to be directed with respect to avoiding invasive treatment. Procedures that generate aerosols (e.g. removal of dental plaque deposits using an ultrasonic scaler), which may lead to aspiration, should be minimized if the patient is immunosuppressed. It is critical that dental treatment be provided in the context of the systemic status of the patient. Integrated medical and dental teams function best in this regard. The nursing team should encourage patients to visit an experienced dental professional to address dental needs whenever blood counts stabilize and to consult with the oncology team to assist in dental care, specifically surgical intervention. Immune reconstitution may take months after the HSCT, even when hematological status is apparently normal and any dental intervention should be provided in the context of systemic health, and again with experienced health care teams [68].

*Pain control*

Pain aetiology in the long-term post-transplant phase differs from acute pain in the immediate time period post-chemotherapy/HSCT. Chronic mucosal diseases such as GVHD become the main reason for pain. Symptomatic gingival involvement of cGVHD (desquamative gingivitis) may further limit the patient's ability to brush the teeth. In addition, local infection, dental disease and neuropathic causes of oral pain are common causes of oral pain in patients following chemotherapy or in HSCT survivors. Topical palliative treatment for oral cGVHD may be helpful [8, 69]. In addition to therapy directed to the pain, it is important to direct the therapy to the underlying disease, such as GVHD [8, 69]. Additional topical and systemic and complementary pain management techniques are available (reviewed in Epstein et al.) [62]. Expectations for full control of pain are often limited by systemic adverse effects.

*Maintaining oral function*

Following the stabilization of blood counts and immune status, patients should be advised to have dental needs addressed, particularly the dental needs that were identified at the initial appointment and were not considered a priority to complete prior to the chemotherapy/HSCT. Treatment planning, particularly any potential surgical care, must be planned with the medical team prior to intervention. Dental preventive strategies can be reinforced. Dental rehabilitation (e.g. crowns, bridges, dentures) will enable the patient to perform basic oral functions. Medical centers may vary in the duration of the time-window in which dental treatment is avoided.

The role of saliva in maintaining oral function is a constant factor to consider. Methods to relieve salivary hypofunction and/or xerostomia (the objective and subjective components of dry mouth, respectively) may be best managed by use of sialogogues when residual function is documented; palliation is outlined above. Management modalities, such as acupuncture and intra-oral electro-stimulator, may be considered [24, 70].

*Managing oral complications of chemotherapy/HSCT*

In addition to chronic oral complications (i.e. cGVHD, dry mouth), it is important to inform the patients with salivary dysfunction that they are at increased risk for dental decay [71]. Management of hyposalivation should be addressed. The patient should be motivated to maintain oral hygiene, use fluoride supplements (may be applied directly onto the dentition or in individual trays, in-office as well as in-home methods), avoid sweets and visit the dentist regularly. Artificial sweeteners can be used as a substitute for sugar-based sweets. In this regard, xylitol is preferred as it is not a digestible carbohydrate for *Streptococcus mutans*, the main caries pathogen, and is a neurostimulant of salivary secretion at higher doses (6–12 g $day^{-1}$) [72]. In patients with elevated risk to high plaque levels, the addition of CHX and remineralizing agents such as calcium- and phosphate-based products should be considered [73].

Chronic GVHD may manifest as scleroderma-like disease with progressive damage decreasing the elasticity of oral tissues. Limited mouth opening can disturb the patient's basic oral functions and may even put the patient at risk for aspiration. The ease of performing and receiving dental care can be

increasingly difficult because of this limited mouth opening; unfortunately, little can be done to treat established scleroderma [74, 75] although physiotherapy with an active exerciser has been suggested to delay its progression. Additional pharmacologic and surgical treatment modalities have been reported [75]. When scleroderma-type cGVHD has developed, extra care should be delivered to maintain oral hygiene and treat all the dental needs before mouth opening will limit the capability to deliver dental treatment.

Patients with cGVHD are at a greater risk for oral squamous cell carcinoma (SCC) [76]. Therefore, these patients should be under routine surveillance by their oral health care provider at least once a year or more frequently depending on the level of oral cGVHD involvement.

Patients post-HSCT are often treated with high-dose steroids, which in turn result in osteoporosis. The treatment for osteoporosis is mostly with bisphosphonates, which are associated with osteonecrosis of the jaws (ONJ). Additional anti-resorptive and anti-angiogenesis drugs (denosumab, bevacizumab and sunitinib) were reported to be associated with ONJ [77]. The guidelines of the American Academy of Oral and Maxillofacial Surgery address the prevention, treatment and dental management of patients on these medications [78].

Children are also at risk of developing disturbances in dental development and craniofacial growth (see 'Pediatric patient population' section) particularly those subjected to total body irradiation (TBI) at an early age. Eruption of teeth should be monitored. Growth and development may also be altered if puberty is affected by cancer therapy.

*QoL*

Dry mouth negatively impacts QoL [79]. It has been reported that protocols including TBI have a greater tendency to cause irreversible damage to the salivary glands [80]. However, less toxic conditioning regimens may also have a long-term effect on salivary function [81]. Following chemotherapy/HSCT, dry mouth may be a result of the cytotoxic treatment itself and also due to the use of multiple drugs that may affect salivary secretion. Involvement of the salivary glands with cGVHD can also reduce salivary secretion. Treatment trials with systemic sialagogues may be offered to the patient [8]. Efficacy of sialagogues varies between patients, and adverse effects and interaction with other medications have to be considered. Persistent taste dysfunction is anticipated to affect diet, oral intake and QOL, as well as impacting caloric and nutrient intake with systemic implications [66].

Pediatric patient population

This has been covered in the guidelines on dental management of pediatric patients receiving chemotherapy, HSCT and/or radiation published by the American Academy of Pediatric Dentistry. In this position paper, we would like to point to several specific aspects [82, 9, 83].

*Pain control*

Children may have difficulty communicating and describing their pain. Selection of a suitable pain scale depends on the comprehension level of the patient. Topical oral administration of local anaesthetics such as lidocaine and benzocaine in children should be avoided because of the risk for serious adverse effects including deaths [84].

*Prevention of infections*

Ideally, children should be referred for an initial consult to a pediatric dentist integrated with the cancer team [83].

Many children preparing for chemotherapy/HSCT have pre-existing oral diseases, and those with high caries prevalence are at risk to develop new lesions. Advanced decay may develop into a source of infection. Fluoride preparations include toothpastes, and fluoride supplements (gels, rinses or varnishes) prevent dental caries. If a higher fluoride concentration is required and the oral mucosa is sensitive, it is recommended to use a neutral pH fluoride gel.

*Maintaining oral function*

Optimal oral care is needed in order to minimize oral problems and discomfort before, during and after treatment as well as the possible acute and long-term effects of therapy on the developing craniofacial complex. Patient and parents' education plays a major role to achieve collaboration for long-term surveillance. It is important to emphasize the need for regular follow-up visits at a dental office and in complex cases with an experienced oral medicine professional.

*Managing oral complications of chemotherapy/HSCT*

Generally, the same concepts of management used in adults are applicable for children with the exception of drugs that are registered specifically for use in adults. Additionally, it should be noted that some of the clinical practice guidelines defined by leading international organizations are generalizing adult and pediatric patient population. Thus, effectiveness of a specific intervention may not be guaranteed in pediatric patients.

One particular aspect of salivary dysfunction in children is that they rarely complain about mouth dryness, even though they objectively have a very low salivary output. An interview that focuses on everyday situations may reveal signs and symptoms of mouth dryness [85].

In respect to potential dental source for oral complication, it was suggested that extraction of loose primary teeth will reduce the risk for bleeding during periods of thrombocytopenia. This

aspect should be discussed with the patient and the parents during the dental clearance prior to the chemotherapy/HSCT.

## Discussion

This position paper represents expert opinion of experienced clinicians in the field of oral oncology, hematology and nursing. The systematic reviews about oral complications for cancer patients tend to state guidelines that are evidence-based only. As a result, there are gray zones where practitioners are left without guidelines and without consensus of how to care for patients. This position paper provides a base for consensus and provides recommendations with the goal of presenting current best clinical practices.

An important aspect of promoting improved oral care of patients undergoing chemotherapy/HSCT is by developing an integrated treatment team including medical, dental, nursing, nutrition, physical therapy and counseling providers. Training and continuing education programs will ensure that the knowledge will diffuse to an extensive community of health care providers, which in turn could make a positive impact on patients' health care.

This position paper is directed at the entire multidisciplinary health care team (Fig. 2). Terminology to describe the

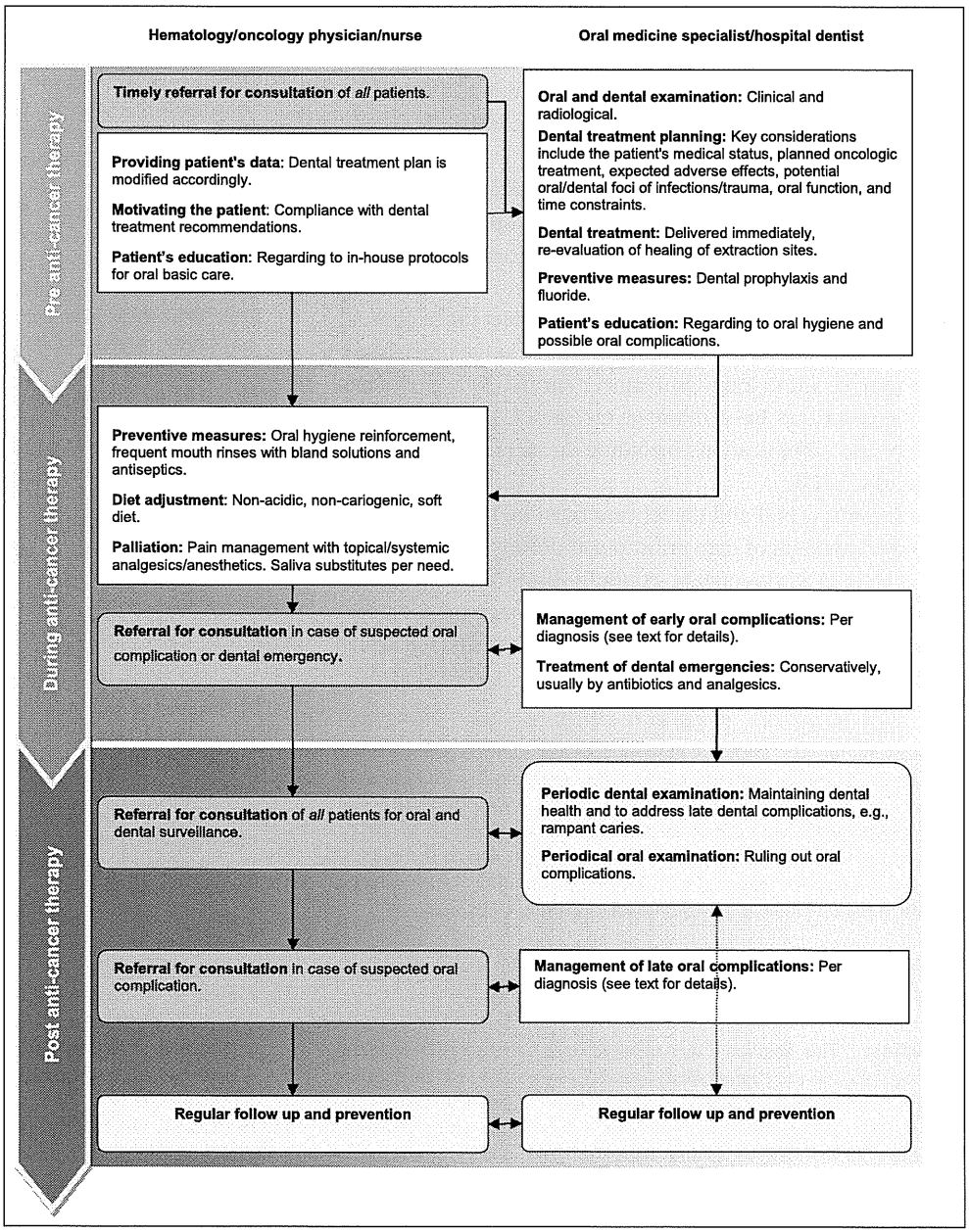


**Fig. 2** Suggested collaboration of hematology/oncology and oral medicine/dental teams as part of basic oral care for oncologic patients

dental professional varies across the globe. A global term ('dentist') was therefore used in this manuscript to refer to a dental–oral care provider who is educated and experienced in delivering oral health care for oncology patients. Such knowledge should include understanding of the implications of the medical background on the dental treatment plan and managing oral complications. The primary dentist in the community may have an important role in the preparation of the patient ahead of their chemotherapy/HSCT and in routine dental care following the treatment but will need guidance of the oncology team or the hospital dental team. The axis between the primary dentist, the dentist/oral medicine specialist at the cancer center and the medical team is essential for adequate and timely clearance of dental and oral infections. To this end, the dentist in the community should have continuing education about the dental treatment planning in oncology in general and for hematology-oncology patients and those following HSCT. More information for dental practitioners about the recommended treatment can be found in the literature [7, 20, 13, 83, 86].

As the profile of HSCT changes from myeloablative protocols to non-myeloablative protocols, the spectrum of oral complications and management recommendations may also change. Shorter nadir and lower incidence of severe oral mucositis may lead to new insights with respect to the optimal timing to resume routine dental treatment. On the other hand, there may be more long-term cancer survivors, and patients may be older and have more severe pre-existing dental pathology and complications including an increase of the incidence of GVHD.

In summary, oral and dental care must be recognized as a critical component of care prior to and during chemotherapy/HSCT and in survivorship. A multi-disciplinary team approach is the key for success in the management of oral complications in hematology-oncology patients including those undergoing HSCT.

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**Disclaimer** This Position Paper is based on a narrative review of the existing data and the clinical observations of an expert task force composed of professionals experienced in the diagnosis and management of oral complications in hematology patients. It is meant to state the recommendation of MASCC/ISOO and EBMT for basic oral care in hematology–oncology patients and hematopoietic stem cell transplantation recipients. It is not replacing the MASCC/ISOO oral mucositis clinical practice guidelines.

The Position Paper is informational in nature. The authors caution that the strategies described in the Position Paper might not be suitable for every, or any, purpose or application. This Position Paper cannot substitute for the individual judgment brought to each clinical situation by the patient's health care providers. As with all clinical materials, the Position Paper should be used with the clear understanding that continued research and practice could result in new knowledge or recommendations.

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ORIGINAL ARTICLE

# Distribution of oral mucosal bacteria with *mecA* in patients undergoing hematopoietic cell transplantation

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**Abstract**
*Purpose* We recently reported frequent detection of antibiotic-resistant bacteria on the oral mucosa during the period of hematopoietic cell transplantation (HCT) and suggested an association between oral mucositis and antibiotic-resistant bacterial infection. Methicillin-resistant *Staphylococcus* spp. were frequently detected, and the oral cavity may be a reservoir of the gene mediating methicillin resistance, *mecA*. Here, we examined the frequency of *mecA* carriers in patients undergoing HCT.
*Methods* Fifty-nine patients (male (M)=37, female (F)=22, 47.3±11.0 years) receiving HCT were enrolled in this study. Buccal swab samples were obtained four times from day −7 to day +20 (once/week), and *mecA* was detected by PCR. Fifty-two subjects without systemic disease, who completed dental treatment, especially periodontal treatment (M=21, F=31, 55.4±14.2 years), were also enrolled as controls and checked for *mecA* on the oral mucosa.
*Results* Seventy-six percent (45/59) of the HCT patients carried *mecA* at least once in the study period (days −7 to +20), while no control subjects had *mecA*. The frequency of *mecA* carriers was 19.2 % from days −7 to −1, while it was significantly increased on days +7 to +13 and +14 to +20, with frequencies of 60.9 and 63.2 %, respectively ($P<0.01$, ANOVA).
*Conclusions* *mecA* was detected in oral mucosa of patients undergoing HCT. The high detection frequency of staphylococci resistant to penicillin and beta-lactams in our recent report was supported.

**Keywords** Hematopoietic cell transplantation · Oral mucosa · Bacteria · *mecA* · Antibiotic-resistant

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## Introduction

Oral mucositis is one of the most common symptomatic complications associated with chemotherapy, especially hematopoietic stem cell transplantation (HCT) [12, 13]. Severe mucositis is associated with not only intolerable pain but also the possible risk of systemic bacteremia. Oral mucositis is a significant cause of suffering and morbidity in patients receiving myeloablative chemotherapy [1].

Severe mucositis is associated with a risk of systemic infection related to bacteremia. Our recent studies showed that not only normal oral flora but also opportunistic bacteria appear on the oral mucosa. Bacterial substitution of mainly coagulase-negative staphylococci (CoNS) for streptococci occurred frequently on the oral buccal mucosa after HCT, and other bacterial species not usually found in the normal flora were also identified [9]. We reported that multidrug-resistant opportunistic bacteria appearing in the gingiva may be involved in fatal sepsis [11]. Furthermore, many antibiotic-resistant bacteria were detected in the oral cavity after HCT, especially during the period in which the severity of oral mucositis reaches its peak [10]. CoNS and *Staphylococcus aureus* with penicillin and beta-lactam resistance were detected [10].

Penicillin and beta-lactam resistance among staphylococci is mediated by point mutations in penicillin-binding proteins (PBPs) [2]. Methicillin resistance in staphylococci is mediated by the *mecA* gene complex, which is located on a unique molecular vector called the staphylococcal chromosome cassette (SCC*mec*) [3]. SCC*mecs* carry mobility genes and integrate in a site-specific manner into a highly conserved locus in the *Staphylococcus* chromosome.

The present study was performed to determine the distribution of oral mucosal bacteria with *mecA* in patients undergoing hematopoietic cell transplantation.

## Materials and methods

### Subjects

Fifty-nine patients (male (M)=37, female (F)=22, 47.3± 11.0 years) receiving HCT at Okayama University Hospital from 2011 to 2012 were enrolled in this study. The diseases of these patients are shown in Table 1. Autologous HCT, conventional allogeneic HCT, and reduced-intensity stem cell transplantation (RIST) were administered to 12 (M=8, F=4, 56.8±9.5 years), 13 (M=9, F=4, 42.4±10.6 years), and 34 (M=20, F=14, 54.6±11.4 years) patients, respectively. Fifty-two patients without systemic diseases, who visited the Department of Periodontics, Okayama University Hospital (M=21, F=31, 55.4±14.2 years), were also enrolled as controls. A total of 111 subjects were enrolled in the study. Informed consent for examination of oral bacteria was obtained from each subject, and the Ethics Committee of Okayama University Graduate School of Medicine, Dentistry, and Pharmaceutical Sciences approved this study (no. 457).

**Table 1** Diseases of patients

| Diseases | Type of HCT | | | Total |
|---|---|---|---|---|
| | Autologous | Allogeneic | | |
| | | Conventional | RIST | |
| Acute myelogenous leukemia | | 8 | 9 | 17 |
| Acute lymphoblastic leukemia | | 3 | 1 | 4 |
| Chronic myelogenous leukemia | | 1 | 1 | 2 |
| Malignant lymphoma | 12 | 1 | 12 | 25 |
| Aplastic anemia | | | 2 | 2 |
| Myelodysplastic syndromes | | | 8 | 8 |
| Myelofibrosis | | | 1 | 1 |
| Total | 12 | 13 | 34 | 59 |

### Oral management

Intensive oral care was performed for all HCT subjects as in our previous report [10]. All HCT subjects received were referred to dentists, and necessary dental treatment was completed before HCT. All subjects received instruction regarding self-management of oral hygiene, tooth brushing after every meal and before going to bed, and oral rinsing with normal saline solution every 3 h during the day was also indicated. Nurses, dental hygienists, and dentists performed these oral managements in cases in which the patient's condition was poor. No antibiotic rinses were used.

All control subjects were in maintenance phase after completion of dental treatment, especially for periodontal treatment. Therefore, their oral hygiene was well maintained. Subjects who had systemic diseases were excluded. All subjects confirmed that they had not received antibiotic treatment for at least 3 months prior to enrolling in the study.

### General infection control for HCT subjects

All HCT patients were isolated in a room equipped with a laminar airflow system and received trimethoprim-sulfamethoxazole as prophylaxis against *Pneumocystis carinii*. Fluoroquinolone for prophylaxis against bacterial infection and fluconazole for prophylaxis against fungal infection were administered orally. Prophylaxis against herpes virus infection with acyclovir was also given. Neutropenic fever was managed according to the guidelines of Hughes et al. [5]. Briefly, empirical antibiotic therapy was administered promptly in all neutropenic patients at the onset of fever and in afebrile patients who were neutropenic but who had signs or symptoms compatible with infection. A fourth-generation cephalosporin (e.g., cefepime) or carbapenem (e.g., meropenem) was administered intravenously as empirical antibiotic therapy. G-CSF (lenograstim 5 μg/kg/day or filgrastim 300 $\mu g/m^2$) was given intravenously for 60 min starting on day 1 or day 5 and was continued until the absolute neutrophil count exceeded 500/μL.

### Collection of bacterial samples

Microbial samples were obtained from HCT patients about 2 h after breakfast by swabbing from the whole surface of the buccal mucosa regardless of whether mucositis was observed. Collection of bacterial samples was performed four times (days −7 to −1, days 0 to +6, days +7 to +13, and days +14 to +20) for each patient (a total of 236 times in 59 patients). However, samples could not be collected 27 times because of the patents' conditions. A total of 209 samples were subjected to *mecA* detection procedures.

Microbial samples were also obtained from control subjects once just after a checkup and before any dental

intervention at our hospital. Thus, the dental treatment on the checkup day could not affect the results of this study. A total of 52 samples from 52 control subjects were subjected to *mecA* detection procedures.

### Detection of *mecA*

1. Bacterial DNA extraction
   Cotton swab samples were suspended in 1 mL of PBS(−) (Gibco BRL, Grand Island, NY). Aliquots of 500 μL from each suspension were transferred into new tubes and pelleted. Pelleted samples were resuspended in 200 μL of InstaGene matrix (Bio-Rad Laboratories, Hercules, CA) to extract total bacterial DNA. Aliquots of extracted DNA were subjected to polymerase chain reaction (PCR).
2. Confirmation of bacterial DNA
   First, to confirm that bacterial DNA was obtained appropriately, PCR amplification of the 16S ribosomal RNA gene (16S rDNA) was performed. The PCR mixture (25 μL) contained 12.5 μL of 2× AmpliTaq Gold® 360 Master Mix (Applied Biosystems, Carlsbad, CA), 10 pmol of forward and reverse universal primers (forward 5′-GTG STG CAY GGY TGT CGT CA-3′ and reverse 5′-ACG TCR TCC MCA CCT TCC TC-3′) [7], and a 2.5-μL aliquot of extracted DNA. PCR cycles were as follows: initial cycle at 95 °C for 10 min; 35 cycles at 95 °C for 1 min, 56 °C for 1 min, and 72 °C for 2 min; and a final extension at 72 °C for 5 min. Amplified products were subjected to 2 % agarose electrophoresis, and 120-bp DNA fragments were confirmed by ultraviolet light after ethidium bromide staining.
3. *mecA* detection by PCR
   *mecA* detection by PCR was performed as described previously [4]. The PCR mixture (25 μL) contained 12.5 μL of 2× AmpliTaq Gold® 360 Master Mix (Applied Biosystems), 10 pmol of primers (forward 5′-TGC TAT CCA CCC TCA AAC AGG-3′ and reverse 5′-AAC GTT GTA ACC ACC CCA AGA-3′), and a 2.5-μL aliquot of extracted DNA. PCR cycles were as follows: initial cycle at 95 °C for 10 min; 35 cycles at 95 °C for 30 s, 52 °C for 30 s, and 72 °C for 1 min; and a final extension at 72 °C for 7 min. Amplified products were subjected to 2 % agarose electrophoresis, and 284-bp DNA fragments were confirmed by ultraviolet light after ethidium bromide staining.

### Statistical analysis

Differences in *mecA* carrier frequencies were compared by Fisher's exact test or ANOVA using the statistical software IBM® SPSS® Statistics version 21 (IBM Corporation, NY). In all analyses, $P<0.05$ was taken to indicate significance.

## Results

### Confirmation of bacterial DNA by PCR detection of 16S rDNA

The 16S rDNA PCR-amplified fragment was detected from 191 samples out of 209 prepared DNA samples from 59 HCT patients. The 16S rDNA was not detected in 18 samples, and *mecA* was also not detected from all these 18 samples in the following analysis. It was considered that in these 18 samples, the bacterial gene sample could not be collected appropriately because some technical error might have occurred in the sample correction due to the patients' condition; therefore, these were excluded from further analysis. The collection rate of bacterial DNA from the oral mucosal swab was 91.4 %. The 16S rDNA fragment was successfully amplified by PCR from all samples from the control group ($n=52$).

### Frequencies of *mecA* carriers in groups of HCT patients and control subjects

The frequency of *mecA* carriers in whom *mecA* was detected at least once during the study period (days −7 to +20 from HCT) was compared with that of the control group. The results are shown in Table 2 and Fig. 1. Seventy-six percent (45/59) of HCT patients carried *mecA*, while none of the control subjects had *mecA*. The difference in frequency of *mecA* carriers between HCT patients and control subjects was significant ($P<0.01$ Fisher's exact test).

### Transition of the frequency of *mecA* carriers in HCT patients

The transition of the frequency of *mecA* carriers on the oral mucosa before and after HCT is shown in Fig. 1. The detection

**Table 2** Frequency of *mecA* carriers in whom *mecA* was detected at least once during the study period (days −7 to +20 from HCT) and in control subjects

| | *mecA* | | | Total |
|---|---|---|---|---|
| | + | − | | |
| HCT group | 45 (76.3 %) | 14 (23.7%) | * | 59 |
| Control group | 0 (0 %) | 52 (100%) | * | 52 |
| Total | 45 | 66 | | 111 |

*$P<0.01$, Fisher's exact test

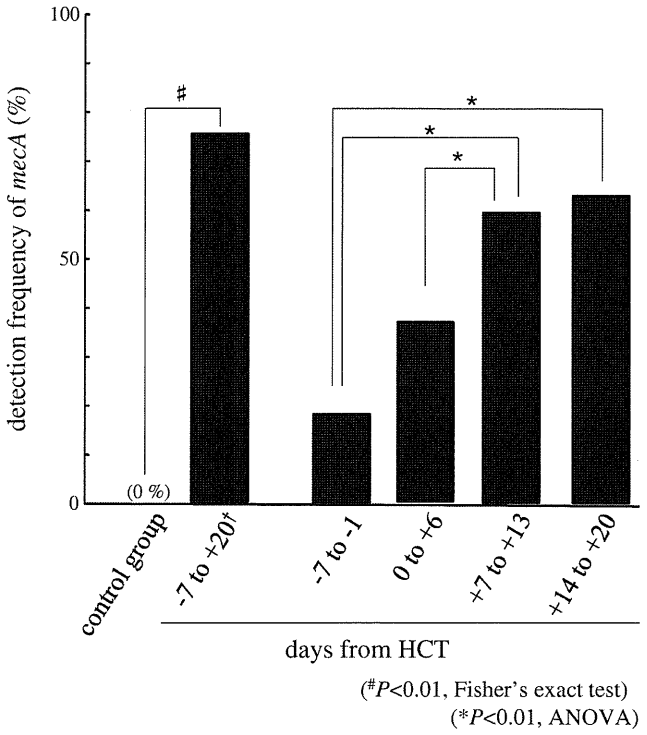


**Fig. 1** Frequency of HCT patients in whom *mecA* was detected at least once during the HCT period, and transition of the frequency of *mecA* carriers in HCT patients. The difference in frequency of *mecA* carriers between HCT patients and control subjects was significant ($^{\#}P<0.01$, Fisher's exact test; the *dagger* represents the frequency of *mecA* carriers in whom *mecA* was detected at least once during days −7 to +20 from HCT). The detection frequencies of *mecA* increased significantly with time after HCT. The frequency of *mecA* carriers was 19.2 % at days −7 to −1 from HCT, while it increased significantly at days +7 to +13 and days +14 to +20, with frequencies of 60.9 and 63.2 %, respectively ($^{*}P<0.01$, ANOVA)

frequencies of *mecA* increased significantly with time after HCT. The frequency of *mecA* carriers was 19.2 % on days −7 to −1 from HCT, while it was significantly increased from days +7 to +13 and days +14 to +20, with frequencies of 60.9 and 63.2 %, respectively ($P<0.01$, ANOVA) (Table 3).

**Table 3** Transition of the frequency of *mecA* carriers in HCT patients

| Days from HCT | *mecA* | | Total |
|---|---|---|---|
| | + | − | |
| −7 to −1 | 10 (19.2 %) | 42 (80.8 %) | 52 |
| 0 to +6 | 20 (36.4 %) | 35 (63.6 %) | 55 |
| +7 to +13 | 28 (60.9 %)* | 18 (39.1 %) | 46 |
| +14 to +20 | 24 (63.2 %)* | 14 (36.8 %) | 38 |

$^{*}P<0.01$, ANOVA, compared with days −7 to −1

## Discussion

The results of the present study indicated the presence of *mecA* in the oral cavity after HCT. The detection frequencies of *mecA* increased significantly with time after HCT. These results support those of our recent study indicating the detection of many CoNS and *S. aureus* with penicillin and beta-lactam resistance in the oral cavity after HCT [6].

In our recent study on antibiotic sensitivity of bacteria on the oral mucosa after HCT, CoNS with high degrees of resistance to penicillins and beta-lactams and methicillin-resistant *S. aureus* (MRSA) were detected [6]. We expected *mecA* detection based on our recent study using the culture method, while the frequency of *mecA* carriers on the oral mucosa was very high, over 60 % from days +7 to +20, which was beyond our expectation. This could be because a fourth-generation cephalosporin was mainly administered intravenously as empirical antibiotic therapy. A more in-depth analysis of these patients compared to HCT patients who were negative before HCT as well as the patients who got positive during treatment might be interesting and might corroborate our assumption that the administration of a fourth-generation cephalosporin was responsible for this increase in *mecA* detection. We will try to perform a multicenter study to increase subject number and would like to confirm our assumption.

The *mecA* gene complex is located on a unique molecular vector called the staphylococcal chromosome cassette (SCC*mec*) [3]. SCC*mecs* are considered to be transferred into *S. aureus* from a coagulase-negative species [6, 14]. The tendencies of *mecA* detection frequency may differ between institutes because of their policies of antibiotic use, while we speculate that the oral cavity just before and after HCT may be a reservoir and could be a transfer space of the genes regulating antibiotic resistance as *mecA*. Recent research strongly suggests that oral hygiene may also be a reasonable strategy to control methicillin-resistant CoNS to eventually lower the MRSA burden in medical facilities [8]. Maintenance of good oral hygiene after HCT may contribute to reducing the presence of genes regulating antibiotic resistance in the oral cavity and antibiotic-resistant bacterial infections.

In conclusion, *mecA*, which mediates penicillin and beta-lactam resistance, was detected from the oral mucosa immediately before and after HCT. The high detection frequency of staphylococci with resistance to penicillins and beta-lactams in our recent report was supported at the molecular level.

**Acknowledgments** This study was supported by a Grant-in-Aid for Young Scientists (B no. 22791836 and no. 24792024 to YS) from the Japan Society for the Promotion of Science, and a Health and Labour Sciences Research Grant (24120701) from the Ministry of Health, Labour and Welfare, Japan

**Conflict of interest** We have no conflicts of interest in this study.

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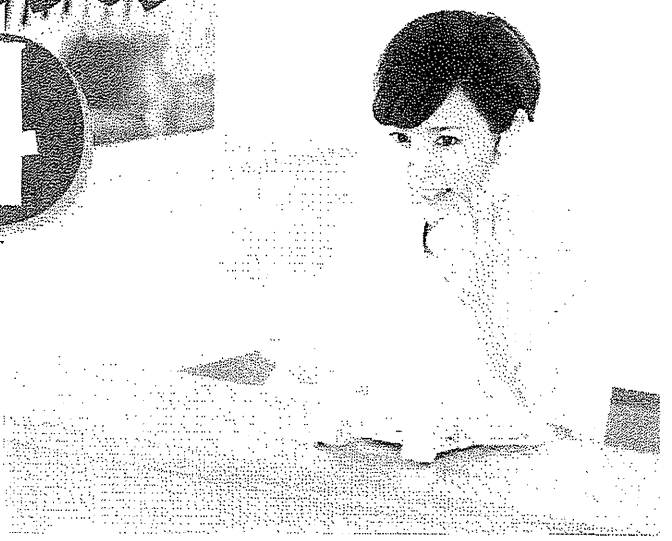
徹底解説！訪問歯科診療

# 寝たきりでも快適な生活を送るための訪問歯科



**高齢化社会を迎えた日本では、各方面で高齢者の健康と暮らしを守る取り組みが行われています。体が不自由になって歯科に通院できない高齢者のために、口腔ケアを中心とした「訪問歯科診療」のシステムが地道に取り組まれ、注目を集めています。**

文／信夫京子　イラスト／塩浦信太郎　写真提供／菊谷 武

## 歯科医に通院できない人を支える訪問歯科診療

すでに"超高齢化社会"に入った日本では、高齢者の生活をどう支えていくかが大きな課題となっています。平均寿命は男女ともに延び続け、平成22年には男性は79・55歳、女性は86・30歳にまで達しており、世界でも有数の長寿国です。しかし、平均寿命は延びても、高齢者が健康で自立した状態にある"健康寿命"が同様に延びている訳ではありません。さらに要介護人口は年々増加し、寝たきりの高齢者も増加の一途をたどっています。

若く元気な時は意識することの少ない「口の健康」ですが、高齢者にとっては口の状態が心身に大きく影響を与えます。しかし、寝たきりなどになると、歯医者に通って治療を受けることができなくなり、口の不具合をそのまま放置する場合も多くなるようです。日本歯科大学口腔リハビリテーション多摩クリニックの院長、菊谷武先生に高齢者の口のトラブルについて伺いました。

「口の状態が悪化し、食べる、話すといった口の機能が衰えると、全身にさまざまな弊害が起きてきます。食が細くなって体力や免疫力が低下したり、唾液の分泌が低下して口の汚れが残りやすくなり、むし歯や歯肉炎などにもなりやすくなります。さらに状態が悪化すれば、糖尿病や心臓病のリスクが高くなり、認知症の加速にも繋がりかねません。」

このような状態を改善するために、訪問歯科診療が行われているといいます。医者の往診と同じように、自宅またはホームなどの施設、歯科の無い入院施設などに歯科医や歯科衛生士が訪れ、治療や口腔ケアを実施します。診察の対象となるのは、寝たきりの高齢者だけでなく、通院の難しい重度の障害を持つ人や認知症の人などです。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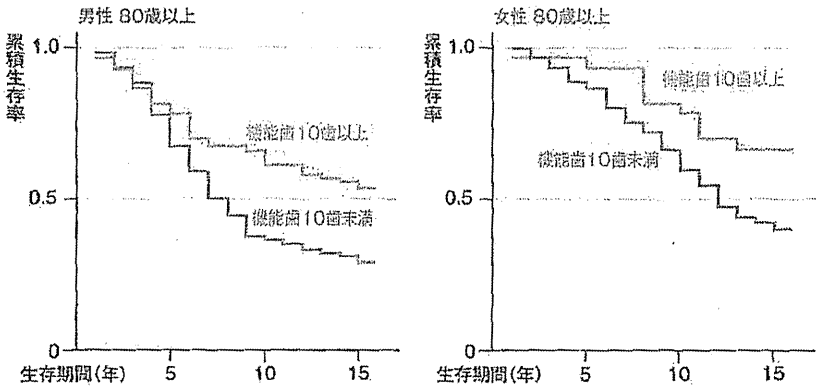
専門は高齢者の摂食・嚥下障害に対するリハビリテーション、口腔腫瘍患者の術後機能回復、口腔ケア。日本歯科大学歯学部卒業。現在、岡山大学、広島大学、徳島大学、九州歯科大学、琉球大学の非常勤講師を務める。「基礎から学ぶ口腔ケア」（学研）など一般にもわかりやすい著書など多数。

## 訪問歯科診療が必要な患者とは?

・身体的に1人で外出や移動が困難な人
寝たきりまたはそれに近い状態の高齢者、重度の障害を持つ人など。
・認知症で外出や診察室での診療が困難な人
・精神障害などで外出や診察室での診療が困難な人

## 歯の本数が多いほど寿命がのびる!

機能歯数(10歯未満/10歯以上)と生存曲線




Fukai K et al.,Geriatr Gerontol 7;314-347,2007

※特定の40歳以上の住民5,730名を15年間継続した調査の中で、80歳以上の高齢者は男女ともに機能歯数(噛める歯の数)と生命予後(生存年数)との間に関連があることが認められた。

## 高齢者の健康を守る基本は口腔ケア

噛むことができる歯の本数が多い高齢者ほど、寿命がのびる傾向にあることは調査で確認されています。しかし、体が自由に動かない、認知症があるなどで、歯磨きやうがい、歯垢除去などの口腔ケアが行き届かなくなると、口の中には細菌が繁殖し、むし歯や歯肉炎、歯槽膿漏などで噛める歯が少なくなり、症状がひどくなると歯を失うことも多いようです。

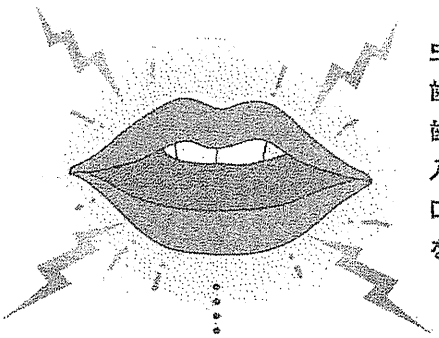
また、口の中の細菌が増えることは、誤嚥性肺炎(ごえんせいはいえん)の危険も増加するそうです。

高齢になると食べ物や唾液が誤って気管に入る「誤嚥」が起きやすくなり、口内で増殖した大量の細菌が肺に流入するためだといいます。

特別養護老人ホームの入所者を対象にした2年間の調査では、きちんとした口腔ケアを行うことで口中の細菌数が減り、肺炎の発症が4割、死亡が5割減少したという結果も出ています。さらに、口腔ケアの刺激によって口腔内の機能が回復し、誤嚥しにくくなるという効果も認められました。

誤嚥性肺炎のように、口のトラブルが命に関わることもあります。また、これ以外にも左図のようにいろいろな悪影響が考えられ、寝たきりの高齢者が安全に暮らし、生活の質を高めるには、適切な口腔ケアと口のトラブル改善が重要になってきます。

## 高齢者の口のトラブルによる悪影響



虫歯
歯肉炎
歯周病
入れ歯の不具合
口の機能低下
を放置すると…

### 誤嚥性肺炎の危険

咀嚼や嚥下が上手くできなくなり、細菌を含んだ唾液や食べ物を誤嚥してしまうことを繰り返すと肺炎を起こしやすくなる。

### 転倒の危険

歯(奥歯)の咬み合わせが悪かったり、入れ歯を装着していないか合っていない場合、上下の歯がしっかりと噛み合っていないために重心が定まらず、転びやすくなる。

### 認知機能の低下

歯や口の機能にトラブルがあって、口から食べることが少なくなると、脳への刺激がなくなる。また、「食事」という楽しみがなくなることで、気持の張りがなくなり、認知機能にも影響する。

### 低栄養の危険

口の機能にトラブルがあると食べられるものが限られるなどして、栄養状態が悪くなりやすい。

### インフルエンザの危険

口の中が汚れて雑菌が繁殖すると、細菌のだす酵素によってのどの粘膜が荒れてしまい、インフルエンザのウイルスが体内に入り込みやすくなる。

### 糖尿病や心臓病のリスク

歯周病があると、糖尿病や心臓病のリスクが格段にあがることがわかってきた。

## 訪問歯科医療の役割

訪問歯科治療に詳しい菊谷武先生に訪問歯科診療について伺いました。

「訪問歯科診療は、寝たきりで歯科に通えない人にとっては大切なシステムです。しかし、設備の整った診療室ではなく、患者さんの枕元で行う治療には自ずと限界があることは知っておいてください。危険性のない治療範囲としては、軽度のむし歯や歯肉炎などです。むしろ、患者さんの口腔機能を最善に保つため、入れ歯の調整や口腔の清掃、機能の回復・維持のための指導などが重要な役割になってきます」

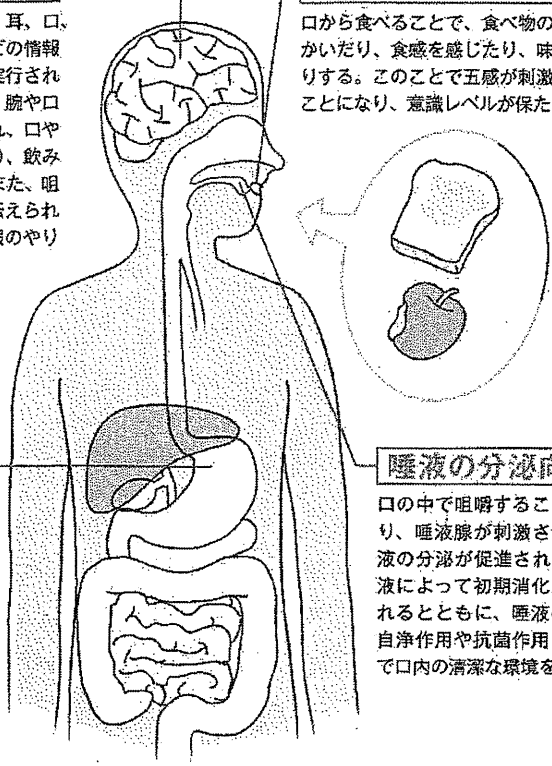
高齢者の訪問歯科医療では、患者さんの体調やほかの疾病を考慮しながら、患者さん自身が持つ力を最大限に発揮できるように咀嚼や嚥下などの〝口腔機能〟を管理することが役割となります。

治療内容としては、むし歯や歯肉炎、歯周病の治療に、入れ歯の調整や修理、口腔ケアになりますが、重点が置かれるのは口腔ケアになります。

訪問歯科診療では、実際に高齢者の介護をするヘルパーや訪問看護師などのスタッフとコミュニケーションをとり、日常の口腔ケアを指導することも大切な役割になるといいます。また、左図のように口から食べることにはいろいろなメリットがあるので、患者さんの状態に合わせて適切な食事指導も行うそうです。

よく噛めるようにと入れ歯にこだわる方が多いのですが、よく噛めるかどうかは、歯も大事ですが、実は口が動くかどうかの方が影響は大きいそうです。口の筋肉や舌を上手く使って、口に入って来た食べ物の動きをうまくコントロールできないと、噛んだり飲み込んだりはできないのです。咀嚼や嚥下が上手くいかなくなったら、患者さんの状態に合わせた口の体操やマッサージなどの指導もおこないます。

### 口やのどを使って食べるメリット



**脳の活性化**

食べ物を前にすると、目、鼻、耳、口、手を介して臭いや手ざわりなどの情報が脳に伝わる。食べる動作が実行される場合、脳から命令が出され、腕や口唇が動いて食べ物が取り込まれ、口やのどの筋肉が働いて噛み(咀嚼)、飲み込む(嚥下)動作が行われる。また、咀嚼や嚥下による刺激は、脳に伝えられる。このようにさまざまな情報のやり取りされ、脳は活性化する。

**意識レベルの向上**

口から食べることで、食べ物の匂いをかいだり、食感を感じたり、味わったりする。このことで五感が刺激されることになり、意識レベルが保たれる。

**消化器の活性**

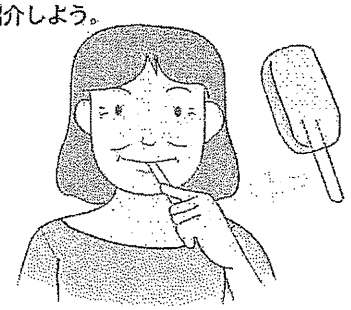
口から食べることで五感が刺激され、脳に情報が伝えられることで消化器官も活動を始める。胃、腸、肝臓など各器官が活動を始め、消化の準備を整える。

**唾液の分泌向上**

口の中で咀嚼することにより、唾液腺が刺激され、唾液の分泌が促進される。唾液によって初期消化が行われるとともに、唾液の持つ自浄作用や抗菌作用の働きで口内の清潔な環境を保つ。

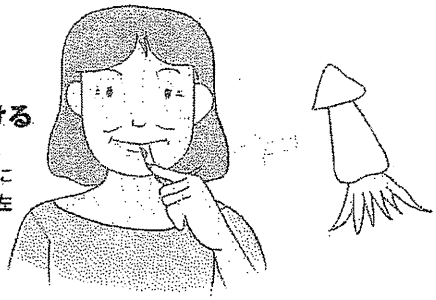
### 訪問歯科診療で教わる簡単〝お口体操〟

口の中の食べ物を噛み砕くには、歯や口の筋肉の複雑な動きがスムーズに行われる必要がある。食べるためには歯以外にくちびる、頬、舌、下顎などを使って、食べ物を巧みにまとめて歯の上に移動し、すり潰す動きを行なわなければいけない。噛む力や巧みさが低下している人が気軽にできる体操を紹介しよう。



**噛む力(パワー)をつける**

口にアイスキャンデーの棒などをくわえ、グッと噛みしめる。



**噛む巧みさをつける**

するめを片側の歯で噛み、手を使わずに反対側の歯に移動さえて噛む。これを左右繰り返しておこなう。

## 訪問歯科診療でできることを知っておこう

訪問歯科診療を依頼する場合は、診療範囲に限界があることを認識して、上手に利用しよう。

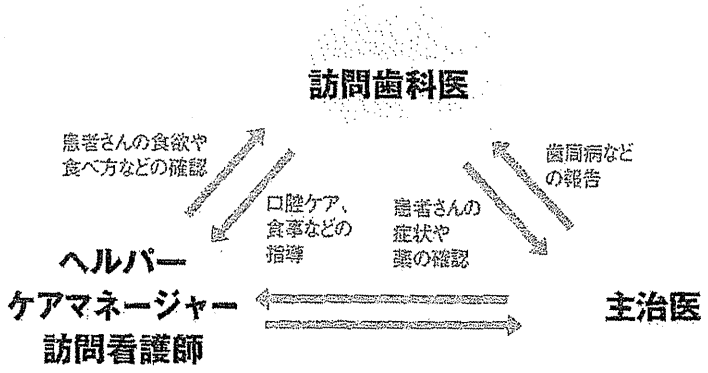
- 軽度のむし歯治療（P66 参照）
- 入れ歯の調整、修理（P72 参照）
- 口腔ケア
- 口腔機能の維持・改善につながる体操やマッサージ
- 適切な食事指導

### 頼む側の心得

- 車いすなどの手段が使える場合は、なるべく歯科医に行って治療を受ける。
- "何でもできます"という広告には疑問を持ち、よく調べてから依頼すること。
- 高度な治療や難しい抜歯などは、歯科で行うことを勧める先生はトラブルが少ない場合が多い。

## 安心できる訪問歯科診療医を探すには

高齢者の訪問歯科診療は、単独で歯だけを見る診療ではない。ケアマネージャーや訪問看護師、医者などの介護スタッフと連携を取り、使用している薬や食事の様子などをチェックし、総合的に患者さんの口を管理できなくてはならない。介護スタッフが認識している訪問歯科医ならば、上手くチームワークを組んで治療をしてもらえる可能性が高い。




### 訪問歯科診療の費用について

- 基本的に保健診療で行います。
- 訪問歯科診療は以下の３つの料金が発生します。
  診療費＋居宅療養管理指導費＋治療費
- １割負担の人の場合、在宅での訪問歯科診療費は1回850円、居宅療養管理指導費は1回350～850円
  （月上限2400円／介護保険の居宅療養管理指導費が適用）。
  治療費は通常の保険診療料金となります。
- 介護保険の居宅療養管理指導費は、歯科医師の診療1回500円（月２回まで）、歯科衛生士の診療1回350円（月４回まで）。
- 施設などでの診療は料金が異なるので、訪問歯科医に確認してください。

## 訪問歯科診療を開始する時に注意したいこと

人が寝たきりになるまでの経過には主に3パターンあるといいます。

50～60代に脳梗塞などの大病を患い、そのまま20年以上寝たきりになる人が全体の2割、もともとが虚弱で、徐々に寝たきりになる人が7割、ずっと元気でいて最後だけ寝込む人が1割です。

7割の人は寝たきりになる前にかなり時間があります。この期間に、どれだけ歯の治療をきちんとできるかが、寝たきりでも快適な生活を送れるかの鍵になります。

「寝たきりになってから慌てないように、ある程度の年齢になったら口の中に貯金しておくことが大切。自分の足で行けるうちは歯医者に通い、きちんと治療をおこなっていれば、寝たきりになっても大事には至りません、訪問歯科診療のケアで充分に過ごすことができるでしょう。」

と菊谷武先生は老後に備えた歯のケアを提唱しています。

訪問歯科診療を開始する時は、まず、今までかかっていた歯科医に問い合わせてみてください。患者さんの歯の状態を把握しているので、安心して治療を御願いできます。その先生が訪問診療をおこなっていない場合は、地元の歯科医師会に問い合わせたり、ヘルパーやケアマネージャー、訪問看護師、主治医に聞いてみましょう。介護のスタッフと連携が取れる訪問歯科医を紹介してもらえるかもしれません。