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## **Practical guidelines for physicians in promoting oral health in frail older adults**

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## **Practical guidelines for physicians in promoting oral health in frail older adults**

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## **Abstract**

Good oral health in old age is particularly important for maintaining adequate oral function, preventing pain and discomfort, controlling localized or systemic inflammation, sustaining social interaction and preserving quality of life. Given that oral health is an integral part of general health and well-being, and that major chronic systemic and oral diseases share common risk factors, oral health prevention and promotion should be embedded within routine medical assessment and care provision. The role of medical physicians, particularly primary care physicians, geriatricians and elderly care physicians, in community and long-term care facilities in assessing and promoting oral health in frail older adults is critical and has been emphasized in recent European recommendations. All physicians should appreciate the importance of oral health and incorporate an initial oral health screening into routine medical assessment and care. A short interview with patients and carers on current oral health practices may help to assess the risk for rapid oral health deterioration. The interview should be followed by an oral health assessment, using validated tools, for non-dental health care providers. Based on these findings the physician should decide on necessary follow-up procedures which may include oral health counseling and/or dental referral. Oral health counseling should include advice on daily oral, mucosal and denture hygiene, denture maintenance, dietary advice, smoking cessation, limitation of harmful alcohol consumption, management of xerostomia and frequent dental review. To enable physicians to perform the tasks recommended in this publication appropriate teaching at both undergraduate and postgraduate levels must be delivered in addition to provision of appropriate continuing education courses.

## Introduction

The “World Report on Ageing and Health” by the World Health Organisation (WHO) <sup>1</sup> stated that “*Oral health is a crucial and often neglected area of healthy ageing*”. Oral diseases constitute a major public health challenge particularly amongst poor, disadvantaged and socially marginalized older people, who bear a disproportionate burden of pain, and impaired function in swallowing, eating, tasting, smiling, and communicating.<sup>1,2</sup> Frail older adults have poorer oral health compared to their functionally independent counterparts.<sup>2</sup> Adequate oral health in old age is particularly important not only for maintaining adequate oral function but also for maintaining social interaction, self-esteem, quality of life and personal dignity.<sup>2-4</sup> Given that oral health is an integral part of general health and well-being, and that major chronic and oral diseases share common risk factors,<sup>1,2</sup> it is crucial that all health professionals identify and prevent common oral conditions in the population<sup>5,6</sup> and particularly in frail and care-dependent older adults.<sup>7</sup>

The European College of Gerodontology (ECG) and the European Geriatric Medicine Society (EuGMS) have recently published policy recommendations on improving oral health in older adults, particularly in frail and care-dependent elders with limited access to dental care.<sup>7</sup> These recommendations stress the value of multidisciplinary collaboration, and integration of oral health screening into routine medical assessment and care. Among the suggested action plans were the development of appropriate legislation, guidelines and protocols for oral health prevention and promotion in community and institutional facilities (i.e. rehabilitation centres, long-term care hospitals, assisted living, residential

care and nursing homes) and the education of non-dental healthcare providers in oral health assessment based on clearly described competencies. These competencies include: being able to appreciate the importance of oral health for general health, wellbeing and quality of life, assessing and adapting medication use to protect oral health, performing an initial oral health assessment, identifying enabling and disabling factors (such as behaviour and attitude of the patient and / or care-givers) regarding maintaining daily oral care, identifying common oral conditions and habits in older adults, appropriate referral to dental professionals, offering preventive oral health counseling to patients and carers, and communicating oral health findings and interventions to the other members of the health care team.<sup>7</sup>

The aim of this document is to describe practice guidelines and clinical tools for physicians, particularly primary and elderly care physicians, and geriatricians, for promoting oral health in frail and care-dependent older adults, based on the competencies previously described in the European recommendations.<sup>7</sup>

### **The association of oral health with general health in older adults**

A growing body of evidence has revealed a number of significant associations between oral health and general health. In particular, a number of systematic reviews, meta-analyses and consensus reports have shown significant associations between periodontal disease, and atherosclerotic vascular disease (ASVD),<sup>8-11</sup> diabetes mellitus, mainly type 2,<sup>9,12</sup> and aspiration pneumonia.<sup>13</sup> Periodontal disease is a chronic inflammation caused by micro-organisms in the dental biofilm causing a progressive destruction of the tooth supporting tissues. The disease starts usually early in life and is very common in old age. It is considered one of the leading causes of tooth loss.

Periodontal disease is significantly associated with ASVD, particularly in middle age, but it is still unclear if there is any causative involvement as the two diseases share many common risk factors, such as age, cigarette smoking, and diabetes mellitus.<sup>10,11</sup> There is moderate evidence that periodontal treatment reduces systemic inflammation as evidenced by reduction in C-reactive protein (CRP) and improvement of both clinical and surrogate measures of endothelial function, but more research is necessary.<sup>11</sup> The American Journal of Cardiology and Journal of Periodontology Editors' Consensus recommended that periodontal evaluation should be considered in patients with ASVD who have signs or symptoms of gingival disease, significant tooth loss, and/or unexplained elevations of hsCRP or other inflammatory biomarkers.<sup>8</sup> Both dentists and physicians should collaborate to optimize CVD risk reduction, including via periodontal therapy.<sup>8</sup>

Tooth loss, another common finding in old age, has been associated with carotid artery plaque prevalence<sup>14</sup> and circulatory mortality,<sup>15</sup> but more research is necessary to clarify these associations. Three potential biological mechanisms explaining the link between the number of teeth and mortality are inflammation, infection, and diet and nutrition.<sup>15</sup> In addition, the social determinants of health may also present a common risk factor.

Also, a bi-directional association between periodontitis and type 2 diabetes has been reported. Periodontitis is associated with poorer glycaemic control among people with type 2 diabetes and patients with more severe periodontal disease face more severe diabetes complications; on the other hand poor glycemic control is associated with increased risk and severity of periodontitis.<sup>12</sup> There is also evidence of a clinically meaningful reduction of HbA1C levels in people

with type 2 diabetes after periodontal therapy.<sup>16</sup> Therefore, the International Diabetes Federation and the European Federation of Periodontology highlighted the role of medical health professionals in investigating the presence of periodontitis in patients with diabetes.<sup>12</sup> The physician should ascertain that patients with diabetes are asked about signs and symptoms of periodontal disease and receive appropriate oral health education and periodontal care from a dentist when necessary.<sup>12</sup>

It should be noticed that periodontal care should start early, in order to prevent not only tooth loss, but also the potential effect of a cumulative systemic damage which may continue even after the teeth are lost due to severe periodontitis.<sup>14</sup>

Periodontal pockets, poor oral hygiene and denture wearing during sleep have been associated with aspiration pneumonia, a leading cause of mortality in frail older population, especially when swallowing disorders are present.<sup>13,17</sup> Respiratory pathogens are more frequently found in the mouth of older nursing homes residents compared to ambulatory patients.<sup>18</sup> Findings from RCTs have shown that approximately one in 10 cases of death from pneumonia in elderly nursing home residents may be prevented by improving oral hygiene.<sup>18</sup> Improved oral hygiene consisting of tooth brushing after each meal, cleaning dentures, once a day, and professional oral health care once a week, seems an effective intervention to reduce the incidence of aspiration pneumonia in hospitalized or institutionalized older people.<sup>19</sup>

Longitudinal data from the Kashiwa study in Japan has defined “oral frailty” as poor status in  $\geq 3$  of the following indicators: number of natural teeth, chewing ability, articulatory oral motor skill, tongue pressure, and subjective difficulties

in eating and swallowing, potentially leading to poor nutritional status.<sup>20</sup> Oral frailty significantly predicted onsets of physical frailty, sarcopenia, need for long-term care and mortality.<sup>20</sup> Further research on this association may identify specific oral health measures which prevent negative health outcomes in old age.

A number of reports indicate a bilateral association between nutrition, dietary intake and oral health.<sup>21,22</sup> On one hand, oral health status (particularly natural tooth loss) may have implications for dietary intake and food choice, whilst on the other hand nutrition plays a key role in the aetiology of oral diseases such as caries and periodontal disease, which subsequently can cause difficulty in eating, thereby reducing the ability to consume a healthy diet. To break this vicious cycle, it has been recommended that an oral examination including a simple chewing performance test should be part of routine procedures for geriatric hospital admissions.<sup>23</sup>

Poor general condition in frail and care-dependent older adults increases the risk of rapid oral health deterioration (ROHD) due to physical and cognitive impairment impacting on daily oral hygiene. Patients with cognitive impairment<sup>24</sup>, depression<sup>25</sup> and manual dexterity issues<sup>26</sup> (including parkinsonism and rheumatoid arthritis) usually face difficulties in maintaining appropriate oral hygiene regimes, elevating their risk for ROHD. Hyposalivation and xerostomia, often related to systematic medications, systemic diseases and head and neck radiotherapy further increase the ROHD risk, in turn causing dysphagia, dysgeusia, speaking and chewing problems, diminished taste, burning mouth, plaque accumulation, dental caries, periodontal disease, oral candidosis and denture-related lesions.<sup>27-30</sup>



Although oral and general health are significantly associated, few studies have investigated the knowledge and skills of primary care physicians to assess oral health and offer oral health counseling in older patients. The existing information indicates that oral health knowledge of physicians is not adequate, and a systematic oral health assessment for older people in primary care and in nursing homes is rarely performed.<sup>31,32</sup> A study on incoming internal medicine trainees in New York revealed that the participants had inadequate knowledge regarding periodontal disease; 82% never asked their patients whether they were diagnosed with periodontal disease, 76% never screened their patients for periodontal disease, and 23% never referred patients to a dentist for evaluation and care.<sup>33</sup>

### **Performing a patient interview on oral health practices and how to assess the risk for ROHD**

A patient/caregiver interview is an important tool to obtain oral health related information that helps formulate an individual diagnosis and treatment/maintenance plan. A system revision approach can reveal a number of relevant risk factors for ROHD among older adults.<sup>34</sup> The most relevant risks are summarized as “7-Ds”: Dementia, Depression, Dexterity, Drugs, Diabetes, Demotivation and Diet. However other individual risk factors can also affect ROHD such as hyposalivation caused by using continuous positive airway pressure (CPAP) for treatment of chronic obstructive pulmonary disease (COPD) or secondary to cancer treatment.

In order to provide a more accurate assessment of the risk for ROHD<sup>34</sup> the authors propose the inclusion of six oral health-related questions in the patient/caregiver interview. The questions, the related risk of ROHD and the

suggested follow-up are presented in Table 1. It should be noted that the responses to some of these questions require immediate oral examination and/or onward dental referral. However, as oral health problems in frail older people are often underreported and underdiagnosed, an initial oral examination is recommended for all patients.

### **How to perform an initial oral health assessment and decide when to refer to a dentist**

Early diagnosis of oral pathology and oro-functional impairment can be undertaken by a physician who should refer appropriately selected patients for a detailed oral examination with a dentist. An oral examination should be part of each (geriatric) assessment and be included in the routine examination of head, ears, eyes, nose and throat.<sup>5,6</sup>

An initial oral health screening should be short, easy to perform, and be part of an examination tool that considers oral symptoms, normal anatomy and function, thus allowing for an appropriate diagnosis by the physician. The most common tools for initial oral screenings by non-dental healthcare providers are THROAT (The Holistic and Reliable Oral Assessment Tool) (see *Supplementary Material*),<sup>35</sup> BOHSE (Brief Oral Health Status Examination) (see *Supplementary Material*),<sup>36</sup> and its simplified version OHAT (Oral Health Assessment Tool)<sup>37</sup> (Figure 1). Online training in using the OHAT may be accessed at: <https://igec.uiowa.edu/gerialearning>. These screening tools have demonstrated adequate validity and reliability and evaluate anatomical characteristics (lips, gums/gingiva, tissues/mucous membrane/palate/floor of mouth, tongue, natural teeth), as well as other important factors (saliva, oral

cleanliness/smell, pain and presence of dentures). For each screening tool, individual examination categories receive a numerical score thus clearly indicating severe oral health problems and the need for onward dental referral.

Amongst the most common chronic oral health conditions are caries (tooth decay) and periodontal disease (gum disease) which can both cause pain, discomfort and tooth loss as well as systemic complications. Caries is indicated by brown / black discoloration or cavities on the teeth and roots. Periodontal disease can be identified by red and swollen gums which bleed during tooth brushing, eating or spontaneously (Figure 2). Dental disease is often accompanied by accumulation of dental plaque or deposits covering the teeth (Figure 2). Patients presenting with caries and periodontal disease should receive initial counseling from the physician and be referred to a dentist for further treatment. Changes in colour, morphology and volume of other areas of the oral mucosa should be readily inspected by a dentist, as they can be related to infection, inflammation or oncology (Figure 3). Pain in the mouth, eating problems, dysphagia, and xerostomia/ hyposalivation can negatively impact oral function and quality of life and should also be reported to a dentist.

An assessment of chewing efficiency and eating ability in frail older people with sarcopenia, dysphagia or protein-energy malnutrition is very important. Apart from a simple recording of the number of teeth or occluding pairs of teeth, chewing efficiency should be measured using a simple two-colour chewing gum test with visual or, if possible, opto-electronical inspection.<sup>38</sup>

## **Principles of oral disease prevention in older people**

### *Prevention of dental caries and periodontal disease*

Dental caries and periodontal disease represent the two most common reasons for natural tooth loss in old age. The prevalence of both diseases is high, with untreated dental caries being the most common chronic disease affecting humans worldwide.<sup>39</sup> Prevention of periodontal disease (Figure 2) refers to reducing the development of clinically detectable gingival inflammation (gingivitis) that may ultimately progress to attachment and alveolar bone loss (periodontitis). Consistent evidence demonstrates that primary prevention strategies should be based on patient-performed control of the dental biofilm and routine professional mechanical plaque removal (PMPR) by the dental hygienist or the dentist.<sup>40</sup> In addition, the control/management of common risk factors such as smoking and diabetes forms an important part of prevention of periodontal disease in which a physician can play an important role. In patients with diabetes the current evidence indicates that professional care accompanied by meticulous home care is both safe and effective.<sup>12</sup>

The most important risk factor for caries is the accumulation of a dental plaque biofilm which is then associated with tooth demineralisation. In older adults, exposed root surfaces are more vulnerable to demineralization than the coronal surfaces. Brushing with fluoride toothpaste at least twice a day is recommended. In individuals with high caries risk, root caries incidence, may decrease by changing a conventional toothpaste (1450 ppm fluoride) to a 5000 ppm fluoride toothpaste, when prescribed by a dentist <sup>41-43</sup>. For primary and secondary prevention of root caries lesions, a recent meta-analysis revealed that regular use of dentifrice containing 5000 ppm fluoride and quarterly professionally applied chlorhexidine or silver diamine fluoride varnishes may inactivate the existing and/or reduce the initiation of new root caries.<sup>42</sup> Silver

diamine fluoride has historically been used in young children with rampant “bottle caries”, but is today no longer licensed in some countries. Nevertheless, an increasing number of publications support silver diamine fluoride use for root caries prevention and arrest in older populations, extending from those functionally independent with high to extreme caries risk to those highly dependent with limited access to care and increased caries risk.<sup>44</sup> Chemical agents should be combined with meticulous dental hygiene and diet control to optimize the caries-controlling effect.

#### *Prevention of denture-related conditions*

Older patients with removable dentures may frequently suffer from denture-related conditions such as denture stomatitis, denture hyperplasia, traumatic ulcers and poor denture fit. Oral candidosis is common in patients wearing dentures combined with hyposalivation and should be treated with topical/ or systemic antifungal agents and appropriate patient instructions on dentures’ maintenance. Denture-related conditions may be prevented and treated by daily removal of bacterial biofilm from the dentures and the oral tissues, removal of dentures at night, and frequent dental visits to check dentures’ fit and function.<sup>45</sup>

#### *Prevention of hyposalivation and xerostomia (feeling of dry-mouth)*

As hyposalivation is a significant risk factor for dental caries and periodontal disease, relevant prevention strategies should be recommended. The physician should first assess the occurrence of hyposalivation and xerostomia. This may further require evaluation and modification of the patient’s medication list by adding an equally effective, but less hyposalivation-inducing medication. In

addition, the physician may need to manage any systemic diseases associated with hyposalivation and xerostomia (i.e. diabetes, Sjögren syndrome), control common side effects such as oral candidosis, and refer the patient to the dentist if necessary. The condition can be managed with non-pharmacological (see following paragraph) and pharmacological interventions (sialagogues such as pilocarpine, cevimeline, application of physostigmine to the oral mucosa, taking into consideration potential adverse-effects).<sup>28,46</sup>

### *Prevention of oro-pharyngeal cancer*

The major risk factors for oro-pharyngeal cancer (Figure 3) are tobacco and excessive use of alcohol.<sup>47</sup> As oro-pharyngeal cancer shares common risk factors with cancer in other parts of the body, physicians can play an important preventive role. Any suspicious oral lesion (ie. exophytic lesion, ulcer, white or red plaque) or lesion that persists two weeks after removal of possible causes should be further investigated.

### **Oral health counseling**

Depending on the previously reported oral health problems and prevention principles, a Personal Care Package (PCP) may be used to provide individual oral health counseling to frail older adults and their caregivers, adapted to the level of care-dependence, socio-medical context and living conditions (Table 2). Oral health promotion counseling to caregivers who may supervise, assist or provide oral hygiene to the patient is critical. The physician may offer advice on effective communication techniques with patients with cognitive and behavioural problems when performing oral hygiene.

### *Counseling for daily care for teeth and dentures*

Natural teeth should be brushed at least twice a day for approximately 2 minutes with a medium/soft toothbrush and fluoride toothpaste. When there is a high caries risk, the dentist may prescribe a 5000 ppm fluoride toothpaste. In patients with dexterity problems, powered toothbrushes, sonic toothbrushes or specially adapted toothbrush can be used. The interdental spaces should be cleaned once a day using dental floss (although not easily applied in patients with reduced manual dexterity), interdental brushes or jet tip oral irrigators. It is also important to clean the tongue with a soft toothbrush or tongue cleaner/scraper to remove bacteria that cause bad breath or infections in the mouth and dentures. In bedridden patients, particularly with dysphagia, it is important to further clean the oral mucosa with a soft toothbrush or gauze to remove any food particles, debris or plaque trapped in the mouth. Mouthwashes based on chlorhexidine,<sup>48</sup> possibly diluted 50:50 with water to avoid a burning sensation, or essential-oils<sup>49</sup> may be used, combined with tooth brushing, to control the amount of oral bacteria, gingival inflammation and plaque formation. Any side-effects of chlorhexidine, including tooth staining, calculus build up, transient taste disturbance, burning sensation, and other oral mucosa effects<sup>48</sup> should be considered in relation to the frail patient's benefit.

Dentures should be labelled to identify the owner in nursing homes and residential care. They should be brushed twice daily with a denture brush and a non-abrasive denture cleanser or liquid soap and rinsed after every meal.<sup>45,50</sup> The combination of mechanical cleaning with daily use of chemical agents (eg. alkaline peroxide solutions) is highly recommended.<sup>45,50</sup> When immersed in denture cleaning solutions, dentures should be stored away from the patient to avoid accidental drinking. For older individuals with difficulties brushing their

dentures or for use in nursing homes and hospitals, ultrasonic cleaning combined with immersion in a cleanser solution may be applied.<sup>50</sup> It is very important to remove the dentures at night for the prevention of denture stomatitis and aspiration pneumonia.<sup>45,51</sup> When denture stomatitis is present, then both the patient and the dentures should be additionally treated with antifungal and antimicrobial medications as prescribed by the dentist. The oral mucosa of edentulous persons should also be cleaned with a soft toothbrush or gauze.

#### *Xerostomia and hyposalivation counseling*

Counseling for patients suffering from hyposalivation and xerostomia includes meticulous daily oral hygiene, use of high fluoride or other products advised by the dentist, regular dental visits, smoking cessation and dietary counseling (avoid acidic and sugary food and drinks).<sup>28,46,52</sup> As salivary flow can be triggered by masticating, non-mixed food should be preferred whenever it can be chewed. Daily measures to alleviate symptoms include moistening the mouth with frequent water intake, using lip lubricants to protect lips from dryness, using saliva substitutes to moisten oral tissues and improve denture fit, and using saliva stimulants such as sugarless chewing gums with xylitol.<sup>28,52</sup>

#### *Dietary counseling*

The physician should offer all patients advice on healthy and unhealthy dietary habits. It is important to limit sugars, sweetened liquids, sticky foods, slowly dissolving candies, refined and processed foods, between-meal cariogenic snacks, acidic foods, and drinks including carbonated beverages, as they may cause caries and tooth erosion.<sup>21</sup> Very hot food and drinks should also be



avoided as they are potentially involved in oral cancer promotion.<sup>47</sup> After consuming acidic foods, the mouth should be rinsed with plenty of water to avoid tooth erosion. Encouraging older patients to eat more fresh fruit and vegetables, cheese, and milk may help to keep oral tissues healthy.

Older people with dentures often face chewing difficulties. Therefore, patients and caregivers should be advised on appropriate food selection and preparation, including cutting it into small portions, chopping, mashing or moistening before chewing.<sup>21,53</sup> Medications containing sugar should be either replaced with sugar free alternatives or given at mealtimes.<sup>54</sup>

#### *Regular dental check-ups*

The physician should recommend regular dental check-ups particularly when the patient is frail and care-dependent. Dental reviews should be scheduled every 3-6 months for the dentate and partially dentate<sup>55</sup> and every 12 months for edentulous patients. The option of domiciliary dental care should be highlighted to both patients and carers.

#### *Control of unhealthy habits*

The physician should offer advice on tobacco use cessation and limitation of harmful alcohol consumption to protect both oral and general health.

### **Implications for Practice, Policy, and/or Research**

Oral health prevention strategies in frail older persons should be based on the principles of the Health Field Concept<sup>56</sup> considering health as an outcome of human biology, environment, lifestyle, and health care organization. As a consequence, there is a need for multidisciplinary collaboration, recognizing

that multiple interventions are needed to properly address the determinants of oral health in older adults.

Physicians treating older patients, particularly geriatricians, elderly care physicians and primary care physicians should be involved in oral health screening of older patients in practice, at home and in institutional care. They should understand, recognize and judge the importance of dental disease, oral pathology and functional impairment, offer oral health counseling to patients and their caregivers, manage oral conditions as appropriate, and refer patients to oral health professionals where needed.

In order to achieve an integrated approach and to promote and implement collaborative practice in geriatric oral health, it is essential that the following conditions are fulfilled: geriatric oral health programs should be developed for non-dental health care providers at all levels of education; inter-professional education should facilitate collaboration and consequently improve health outcomes in frail older people; collaborative practices must enable comprehensive services by working with patients, their (informal) caregivers and communities in order to provide the best quality and continuity of care across different care settings; inter-professional teamwork has to guarantee the level of collaboration and coordination between involved professions (e.g. physicians, nurses, dentists, dieticians, speech therapists and others) delivering patient-centred care.

As outlined in the minimum core competencies for family medicine residents<sup>57</sup>, residents are expected to be able to “individualize standard recommendations for screening tests and chemoprophylaxis in older patients based on life

expectancy, functional status, patient preference and goals of care“. A similar “educational goal“ has been published by the European Geriatric Medicine Society (EuGMS) and the European Union Specialist Section - Geriatric Medicines (UEMS-GMS)<sup>58</sup> stating, that graduates should know about primary and community care of older patients. Very recently, EuGMS and the European College of Gerodontology (ECG) have published recommendations on learning objectives in training of non- dental healthcare professionals addressing oral health assessment and promotion of older adults.<sup>7</sup> In this publication authors do not only address knowledge gain, but also the improvement of attitudes of staff towards oral health promotion. Changing the attitude of professionals involved in the care of older people towards more preventative care planning, will raise the need for inter- and multi-professional collaboration amongst many stakeholders. This approach emphasises the need for a life-long learning approach<sup>59</sup> in terms of inter-professional education and training.<sup>60-62</sup> Improving awareness and changing the scope of practice of the health workforce in various systems will help to address the current needs of ageing societies.

### **List of figures**

**Figure 1.** Oral Health Assessment Tool (OHAT) for dental screening.

Reproduced from: Chalmers JM, King PL, Spencer AJ, Wright FAC, Carter KD. The Oral Health Assessment Tool - Validity and reliability. Australian Dental Journal 2005;50:191-199, Figure 1, p. 197, Publisher: John Wiley and Sons, with permission from the Australian Dental Association.

**Figure 2.** Periodontal disease. A large amount of dental plaque is accumulated on the teeth surface.

**Figure 3.** Oral cancer (courtesy of Professor Jan Zapala, Chair of Cranio-Maxillofacial, Oncological and Reconstructive Surgery, Institute of Dentistry, Faculty of Medicine, Jagiellonian University Medical College, and Ludwik Rydygier's Specialistic Hospital, Poland).

#### **Conflict of interest**

The authors declare no conflicts of interest.

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Table 1. Six oral health-related questions to be added to a medical interview, the respective risk of rapid oral health deterioration (ROHD), and their follow-up procedures.

Oral health-related question	Follow-up procedure	Risk of ROHD
Is there anything bothering you in your mouth?	<b>YES</b> - Oral exam and/or referral to a dentist <b>NO*</b>	<b>Increased</b>  -
Do you feel your mouth dry?	<b>YES</b> - Review medical history; review medication list for possible changes to reduce xerostomic effects; consider non-pharmacological and pharmacological interventions; oral exam and/or referral to a dentist <b>NO*</b>	<b>Increased</b>  -
Do you have natural teeth, dentures or both?	Answer to this question will guide the way next three questions should be formulated	
How often do you brush your teeth/denture(s)?	<b><i>Dentate with or without dentures</i></b> <b>&lt; 1/day</b> - Counseling on daily care; then oral exam and decision on dental referral <b>≥ 1/day</b> - Review oral care practices and offer counseling* <b><i>Edentulous wearing complete dentures</i></b> <b>&lt; 1/day</b> - Counseling to improve frequency; then oral exam and decision on dental referral <b>≥ 1/day</b> - Check the denture and consider counseling for improvements on cleaning if visibly soiled*	<b>Increased</b>  -  <b>Increased</b>  -
(If dentate) Do your gums bleed on brushing, eating or spontaneously?	<b>YES</b> - Oral exam and/or referral to a dentist <b>NO*</b>	<b>Increased</b>  -
Did you have a dental visit in the past 12 months?	<b>YES*</b> <b>NO</b> - Oral exam and/or referral to a dentist	- <b>Increased</b>

\* A further initial oral health assessment is recommended in all older patients, irrespective of their answers to the questionnaire, followed by a decision on the need for dental referral.

**Table 2.** Oral health counseling for older patients and their caregivers offered by the physician in practice, at home and in institutional care. Oral care advice should be adapted to the individual's needs in collaboration with the dentist.

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The natural teeth should be brushed at least twice a day for approximately 2 minutes with a medium/soft toothbrush and fluoride toothpaste. If brushing with a manual toothbrush is difficult, a powered or sonic toothbrush can be used. The interdental spaces should be cleaned once a day.

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The dentures should be brushed at least twice a day with a non-abrasive denture cleanser or liquid soap (don't use a dentifrice). Mechanical cleaning should be combined with chemical cleansing agents.

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The dentures should be removed at night and stored in water with a denture cleanser solution, unless otherwise advised by the dentist.

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The oral mucosa of edentulous individuals should be rinsed with plenty of water after meals to remove any remaining food particles and/or cleaned with a soft toothbrush or gauze.

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The toothbrush and denture-brush should be left to air dry.

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The tongue should be cleaned on a daily basis.

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Individuals with severe tooth loss and denture wearers should receive appropriate food selection and preparation counseling to improve masticatory function, dietary and nutritional intake.

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Dentate adults should limit sugar-containing, refined and processed foods, between-meal cariogenic snacks, acidic foods and drinks, and carbonated beverages to protect the natural teeth from dental caries and erosion. After consuming acidic foods and drinks the mouth should be rinsed with plenty of water.

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Advice should be offered on smoking cessation and limiting alcoholic beverages.

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Appropriate preventive and palliative advice should be offered to individuals with hyposalivation/ xerostomia.

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Regular dental visitations should be scheduled every 3-12 months. The individualized dental appointments' schedule will be advised by the dentist.

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**Figure 1**

Resident: _____		Completed by: _____		Date: ____/____/____
Scores – You can circle individual words as well as giving a score in each category (* if 1 or 2 scored for any category please organize for a dentist to examine the resident)				
Category	0 = healthy	1 = changes*	2 = unhealthy*	Category scores
Lips	smooth, pink, moist	dry, chapped, or red at corners	swelling or lump, white/red/ulcerated patch, bleeding/ulcerated at corners	
Tongue	normal, moist roughness, pink	patchy, fissured, red, coated	patch that is red and/or white, ulcerated, swollen	
Gums and tissues	pink, moist, smooth, no bleeding	dry, shiny, rough, red, swollen, one ulcer/sore spot under dentures	swollen, bleeding, ulcers, white/red patches, generalized redness under dentures	
Saliva	moist tissues, watery and free flowing saliva	dry, sticky tissues, little saliva present, resident thinks they have a dry mouth	tissues parched and red, very little/no saliva present, saliva is thick, resident thinks they have a dry mouth	
Natural teeth Yes/No	no decayed or broken teeth/roots	1-3 decayed or broken teeth/roots or very worn down teeth	4 + decayed or broken teeth/roots, or very worn down teeth, or less than 4 teeth	
Dentures Yes/No	no broken areas or teeth, dentures regularly worn, and named	1 broken area/tooth or dentures only worn for 1-2 hrs daily, or dentures not named, or loose	more than 1 broken area/tooth, denture missing or not worn, loose and needs denture adhesive, or not named	
Oral cleanliness	clean and no food particles or tartar in mouth or dentures	food particles/tartar/plaque in 1-2 areas of the mouth or on small area of dentures or halitosis (bad breath)	food particles/tartar/plaque in most areas of the mouth or on most of dentures or severe halitosis (bad breath)	
Dental pain	no behavioural, verbal, or physical signs of dental pain	are verbal &/or behavioural signs of pain such as pulling at face, chewing lips, not eating, aggression	are physical pain signs (swelling of cheek or gum, broken teeth, ulcers), as well as verbal &/or behavioural signs (pulling at face, not eating, aggression)	
<input type="checkbox"/> Organize for resident to have a dental examination by a dentist <input type="checkbox"/> Resident and/or family/guardian refuses dental treatment <input type="checkbox"/> Complete Oral Hygiene Care Plan and start oral hygiene care interventions for resident <input type="checkbox"/> Review this resident's oral health again on Date ____/____/____				TOTAL SCORE: <b>16</b>

**Figure 2**



**Figure3**

