

# Geriatric Dentistry: Integral Component to Geriatric Patient Care

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## Abstract

Geriatric dentistry is the branch of dentistry that emphasizes dental care for the elderly population and focuses upon patients with chronic physiological, physical and/or psychological changes or morbid conditions/ diseases. Oral health reflects overall well being for the elderly population. Compromised oral health may be a risk factor for systemic diseases commonly occurring in age. Conversely, elderly patients are more susceptible to oral conditions due to age-related systemic diseases and functional changes/decay. Oral health evaluation should be an integral part of the physical examination, and dentistry is essential to qualify geriatric patient care. In this paper, we briefly review current issues and topics in geriatric dentistry that reinforce the need for interdisciplinary care/research of the elderly.

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**Key words:** geriatric dentistry, oral health, general health

## Introduction

In the U.S. Surgeon General's first Report on Oral Health in America, the mouth is referred to as a mirror of overall health [1], reinforcing that oral health is an

integral part of general health. In the elderly population poor oral health has been considered a risk factor for general health problems. On the other hand, older adults are more susceptible to oral conditions or diseases due to an increase in

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chronic conditions and physical/mental disabilities. With advances in oral health promotion and oral disease prevention in industrialized countries, more people retain their natural teeth into their old age as compared to a half-century ago. The number of edentulous elderly (>60 years old) in the U.S. has declined to 25% (vs. 56% in 1957); and among the dentate elderly, they have an average number of  $19 \pm 0.2$  teeth [2]. Therefore, dental services for the elderly are shifting from removable prosthetic-centered care to comprehensive treatment including restorative dentistry, periodontal therapy, oral surgery, endodontics, and even cosmetic dentistry, orthodontics and implants.

The dental management of the elderly population is different from that of the general population because special considerations for age-related physiological changes, complications of chronic condition/therapy, increased incidence of physical/mental disabilities, and social concerns are required. Therefore, special knowledge, attitudes, and skills are necessary to provide oral health care to the elderly. Geriatric dentistry, as part of general dentistry, emphasizes dental care for the elderly population and focuses upon older patients with chronic physiological, physical, and/or psychological changes or disorders. We have previously reviewed the scope of

geriatric dentistry and training curriculum content in the United States [3]. In brief, essential topics for geriatric dentistry education include demographic aspects of aging, aging theories and biology, age-related changes in physiology and psychology, socio-economic status of the elderly, common age-related diseases and their management, impact of systemic diseases on oral health and its converse, oral lesions/pathology in the elderly, treatment planning, delivery of oral health services, nutrition in aging, and geriatric health education/promotion. Geriatric dental education should be taught both at the predoctoral and postdoctoral level to oral health providers, and other health care professionals such as physicians and nurses, and to caregivers and patients.

In this review, we briefly discuss current issues and topics in geriatric dentistry. The purpose of this discussion is not to provide specific details on any one subject, but rather to emphasize the necessity for interdisciplinary approaches to geriatric patient care.

### **Effect of Aging on Oral Tissues (Gerontology of the Oral Cavity)**

Data on the effect of aging on oral tissues are scarce. Often there is no clear demarcation between normal physiological aging and pathological diseases. Losses of

tooth translucency and surface details (e.g. perikymata and imbrication lines) are common changes during aging. Abrasion, attrition, and erosion of teeth usually increase with advancing age [4]. The dental pulp becomes smaller because of secondary dentin and pulp stone formation, and sometimes root canals become totally sclerosed [5,6]. Losses of tooth support structures (periodontium) are also commonly seen in elderly patients [6,7]. An increased loss of epithelium attachment and alveolar bone in the elderly may be a result of an increase in dental plaque and calculus rather than chronic age-related changes *per se*. It is not known whether older individuals are more susceptible to periodontal infections compared to other age groups. As gingival recession increases, resulting in exposure of root surfaces to the oral environment, the prevalence of root surface caries increases in the dentate elderly population.

It should be noted that oral tissues are not limited to the teeth and supporting structures (periodontium) but also include salivary glands, temporomandibular joint, orofacial/mastication muscles, oropharyngeal mucosa, and oral sensory/motor nerve systems. Current studies suggest that oral physiology is generally intact at older ages. Normally, morphologically observed changes in oral tissues do not cause dramatic functional

changes during aging. However, there may be some specific changes in individual tissues during aging, e.g., salivary gland function, taste, tactile sensation and swallowing [8-11]. The clinical significance of these specific changes is currently unclear. Research in oral health during aging is still in an early stage and further study in this area is necessary.

### **Oral Health and General Health in the Elderly**

Oral health has a critical impact on the functional, psychological, and economic aspects of the overall quality of life. Oral health affects the elderly with regards to diet and nutrition intake, psychosocial interaction, and general well-being. The oral cavity is a portal of entry for microbial infections. Common oral diseases such as periodontal diseases and dental caries are the result of bacterial plaque accumulation. Recent correlation studies have raised concerns about the possible linkage between oral infection/chronic inflammation and systemic disease development/progression (Table 1) [12,13]. Bacteria from the oral flora have been recovered from infection sites in other organs of patients with aspiration pneumonia or endocarditis. A recent case report documented a hemopoietic transplant recipient who

developed *Candida krusei* sepsis from pre-existing oral colonization [14], suggesting a direct linkage between oral infection and systemic infection. Oral infection-induced chronic inflammation, i.e., periodontal disease, has also been associated as a risk factor or predictor for several cardiovascular diseases because cytokines elicited by oral inflammation might mediate the initiation/progression of these diseases [12,15]. Establishment of a causal relationship between oral health and these systemic diseases is currently an emerging research field in geriatrics.

The oral-systemic diseases linkage is a special health concern for the elderly since effective oral hygiene is usually compromised in patients with physical and neurological changes. Accordingly, elimination of the oral flora burden should be emphasized for geriatric patient care. In addition, many systemic diseases and conditions have oral manifestations, which may be the initial sign of a number of clinical diseases. Oral examination and oral health evaluation should be integrated components of a routine physical examination.

### **Risk Factors Associated with Oral Diseases and Conditions in the Elderly**

Elderly patients, unlike their younger counterparts, experience additional risk

factors for oral diseases and conditions. Multi-pharmacy, physical impairment and neurological/psychological changes are common among the elderly, resulting in drug-associated oral diseases/conditions (e.g., dry mouth, gingival hyperplasia and lichenoid reaction) and poor oral hygiene due to physical disability and neglect (Table 2).

Several studies suggested that 68-95% of persons 65 years or older take medication. The average number of drugs (prescription and/or non-prescription) used by this group is 1.4 to 4.3 [16,17]. With physiological aging and multiple pathologies, elderly patients are more susceptible to drug interactions and adverse effects [18,19]. One profound side effect of multi-pharmacy is xerostomia (mouth dryness). Saliva is the primary oral defense mechanism in maintaining tooth structure against oral infections. Saliva contains multiple antimicrobial factors, buffering systems, supersaturated calcium phosphates, large lubricant molecules, and digestive enzymes. Salivary hypofunction usually causes rampant and severe oral diseases such as caries and *Candida* infection. Without adequate salivary function, quality of life also is likely to be compromised since salivary moisture offers lubrication for taste, speech, chewing, and swallowing. In addition, certain medications commonly prescribed

for the elderly can cause enlargement of gingival tissues (e.g., phenytoin sodium and calcium channel blockers) or induce lichenoid reaction (e.g., hydrochlorothiazides and ACE inhibitors or angiotensin II receptor antagonists). Although lichenoid lesions of the oral mucosa are usually benign and asymptomatic, a very small number of cases develop malignancy [20]. Today, with increasing numbers of new therapeutic agents marketed by pharmaceutical companies, unexpected oral complications sometimes ensue. As a possible example, recent reports raise concerns that patients undergoing long-term bisphosphonate treatment for metabolic bone disease or osteoporosis might be at risk for developing osteonecrosis of the jaw (called bisphosphonate-related osteonecrosis of the jaw; BRONJ) [21]. Clinically, modification of prescribed medications is required for managing drug-related side effects such as lichenoid reactions or xerostomia in the oral cavity. Additionally, oral disease prevention may be required for patients prior to prescribing bisphosphonates.

Age-related disorders themselves contribute to higher risks for oral condition in the elderly. Diabetes is a risk factor for advanced periodontal disease and *Candida* infection. Patients who suffer from

cognitive deficits of Alzheimer's Disease or other dementias lose the ability to perform proper oral hygiene. Poor oral hygiene leading to dental infections may in turn further exacerbate agitation in demented patients and impede medication effectiveness in patients with diabetes.

### **Common Oral Diseases and Conditions in the Elderly**

Similar to the general population, caries and periodontal disease remain the two major dental problems in elderly patients (Table 3). As gingival recession increases, resulting in dental root surface exposure to the oral environment, the prevalence of root surface caries increases in the dentate elderly population. Epidemiological studies in the United States showed that more than 50% of older individuals (65 years and older) had experienced root caries [22]. In addition, older persons frequently suffer from recurrent or secondary coronal caries. In Taiwan as in other industrial countries, the prevalence of periodontitis and missing teeth increases with age [23].

Oral mucosa conditions also are more prevalent among elderly populations. *Candida* infection and denture related lesions are common oral manifestations in geriatric patients. The oral cavity of elderly patients is also vulnerable to viral

infection (e.g., *Herpes simplex* and *Herpes zoster*), autoimmune-related disorders (e.g., erosive lichen planus, pemphigus vulgaris, pemphigoid), and burning mouth (syndrome) due to immune dysfunction, nutritional deficiencies, chronic conditions, and cognitive alterations. The incidence of oral cancers also increases with advancing age. Dentists and other health care professionals should recognize the oral manifestations of these disorders and provide proper management.

### **Special Consideration of Dental Care for Elderly Patients**

Geriatric patients are generally classified into three groups based on functional living ability; functionally independent, frail, and functionally dependent. Special approaches and treatment goals for oral health are different for each group [24,25]. Regardless of functional status, the elimination of acute dental infection and pain should be achieved for all elderly patients. Oral disease prevention is still the central focus for the elderly population as for other patient populations. Special oral hygiene measures, however, are required for the elderly. For example, toothbrush or dental floss devices with larger handles may be provided to patients with limited manual dexterity resulting from arthritis and/or

stroke. An alternative treatment plan (such as adding fluoride therapy) and instruction should be given to these patients and their caregiver/family advocates. Likewise, oral hygiene should be provided as part of general hygiene for patients who have compromised cognitive function and live in long-term care facilities. Regardless of dentate status, it is recommended that the elderly make dental visits at least every six months for clinical re-evaluation and, depending upon ability to perform oral hygiene for prophylaxis. Those with reduced ability to perform oral self care should be seen more frequently for prophylaxis. Since denture-related and other oral mucosa lesions are common in the elderly, edentulous patients should be periodically evaluated by dental professionals. Further, in the United States, many states have laws mandating annual dental services to residents in nursing facilities by licensed dentists and/or dental hygienists (e.g., Texas State Senate Bill 34, 2001).

Geriatric patients usually have at least one age-related change and/or disorder that may affect patient management and treatment planning. Clinical conditions, such as hypertension, anticoagulation therapy, and hypoglycemia, can trigger emergency crises during dental treatment. Patients with diabetes often have cardiovascular diseases and are more

susceptible to infection if the disease is not properly controlled. Although controversial, antibiotic prophylaxis may be necessary for dental procedures in frail elders to prevent infection of replaced joints and cardiac prosthetic valves. While dental health care workers provide their professional judgment regarding these special conditions, consultations with other health professions are often required to optimize patient care. All health care providers should be familiar with the treatment guidelines from professional organizations to facilitate interaction among interdisciplinary care groups [see, e.g., the most recent Prevention of Infective Endocarditis: Guidelines from the American Heart Association (AHA) [26]]. Unlike the former guideline, the new AHA guideline has limited preventive antibiotic use prior to invasive dental procedures in patients with artificial heart valve, history of infective endocarditis, certain specific and severe congenital heart diseases, and a cardiac transplant with valve problem. Oral health providers, as part of the overall health care system, are often in the front line in detecting age-related morbid conditions/diseases through routine oral examination. Medical history and evaluation, as well as vital signs, i.e., temperature, respiratory rate, blood pressure, pulse rate and rhythm, as well as presence of pain or significant

weight loss should routinely be recorded for dental patients. We have demonstrated that one-third of physician consultations resulted in an alteration in dental treatment plans and 8% of consultations led to commencing medical treatment [27].

While specific health problem management during dental treatment of the elderly remains a real challenge for dentists, treatment of oral diseases themselves is equally challenging. Many treatment modalities are still empirical. Cervical overhangs are a common problem for interproximal restorations due to deep subgingival root caries. Dentists should be aware of advances in dental materials and new treatment modalities for diseases commonly seen in geriatric patients. Hybrid/resin ionomer is a newly developed restorative material that releases fluoride and is advocated for use in patients with a high caries risk [28]. Despite years of effort in the area of prosthodontics, difficult problems remain associated with the treatment of full denture patients with atrophic alveolar ridges. Clinicians and researchers continue their search for solutions to oral health problems faced by the geriatric population.

## Conclusion

The elderly population is increasing in industrialized societies worldwide. With

the decline of caries and periodontal diseases in the younger age groups, dental professionals will be expected to take care of more elderly dentate patients. The management of the elderly population differs from that of the general population because of age-related physiological changes, the presence of age-related conditions/diseases, increased incidence of physical and mental disabilities, and also social and economic concerns. Geriatric dentistry is a specialized multidisciplinary branch of general dentistry designed to provide dental services to elderly patients. Today, oral changes occurring during aging are not clearly understood. Many treatment modalities for geriatric patients are still experimental. Further studies in geriatric dentistry both at the clinical and basic science level are necessary. Oral health is linked to general well being for the elderly. Conversely, adverse oral health has been identified as a risk factor for several systemic disorders/diseases. Dental care should be integrated into overall health management of all geriatric patients.

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Dental social worker collaboration. Interprofessional geriatric dental care. Strategies for successful interprofessional consultations. Expansion of the dental workforce. Access to care for older adults. The impetus behind the initiative to expand the dental workforce. Past President, American Society of Geriatric Dentistry Professor and Director Geriatrics and Gerontology Section Department of General Dentistry Henry M. Goldman School of Dental Medicine Boston University Boston, MA USA. This edition first published 2014 © 2014 by John Wiley & Sons, Inc. Editorial Offices 1606 Golden Aspen Drive, Suites 103 and 104, Ames, Iowa 50010, USA The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK 9600 Garsington Road, Oxford, OX4 2DQ, UK. Geriatric patient psychological and emotional considerations during dental treatment. *Gerodontology* 2009; 26:72-7. Integral Component to Geriatric Patient Care. *Taiwan Geriatrics & Gerontology* 2008; 3(3):182-9. 7. Ettinger RL. Oral health and the aging population. *J Am Dent Asso* 2007; 138:5S-6S. 8. Klein DR. Oral soft tissue changes in geriatric patients. *Bull. N.Y. Acad. Med* 1980; 56(8):721-7. 9. Pajukoski et al. Salivary flow and composition in elderly patients referred to an acute care geriatric ward. *Oral Surg Oral Med Oral Radiol Endod* 1997; 84:265-71. Geriatric dentistry: medical problems as well as disease- and therapy-induced oral disorders. *Schweiz Rundsch Med Prax* 1994; 83(10):273-82. 15. Gilbert GH, Duncan RP, Heft MW, Dolan TA, Vogel WB. Dental care should be integrated into overall health management of all geriatric patients. Acknowledgement The authors would like to thank Liang-J iunn Hahn (Professor Emeritus, School of Dentistry, College of Medicine, National Taiwan University) for his encouragement and support during the preparation of this manuscript and Dr. Howard Dang for his thorough review and critiques of this manuscript. Documents Similar To 5. Geriatric Dentistry- Integral Component to Geriatric Patient Care. Carousel Previous Carousel Next.