

Oral Health and Ageing: A Literature Review

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ABSTRACT

Background: *The number of persons aged sixty years and over is increasing worldwide. Oral health in the elderly is frequently under-appreciated. The aim of this narrative literature review is to highlight oral health problems affiliated with ageing and to bring about awareness of these conditions in the elderly.*

Results: *Older individuals have poor oral health due to physiological age induced changes in teeth and oral mucosa, edentulism, dental caries, periodontal disease, xerostomia and oral cancer. Oral health problems in the elderly negatively impact their quality of life.*

Conclusion: *Poor oral health in the elderly adversely impacts general health and quality of life. An integrated and multidisciplinary approach is important for preventing oral diseases and improving and maintaining oral health in the elderly.*

Keywords: Ageing, oral health, quality of life

Salud Oral y Envejecimiento: Una Revisión Bibliográfica

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RESUMEN

Antecedentes: *El número de personas de 60 años o más está aumentando en todo el mundo. Con frecuencia se subestima la salud oral de los ancianos. El objetivo de esta revisión de la literatura narrativa es resaltar los problemas de salud bucodental asociados con el envejecimiento y contribuir a la concientización de estas condiciones en los ancianos.*

Resultados: *Las personas mayores tienen salud oral pobre debido a los cambios fisiológicos inducidos por la edad en los dientes y la mucosa oral: edentulismo, caries dentales, enfermedad periodontal, xerostomía y cáncer oral. Los problemas de salud oral en los ancianos impactan negativamente su calidad de vida.*

Conclusión: *La pobre salud oral en los ancianos afecta negativamente su salud general y su calidad de vida. Un enfoque integral y multidisciplinario es importante para prevenir, enfermedades bucales y mejorar y mantener la salud bucal en ancianos.*

Palabras clave: Envejecimiento, salud oral, calidad de vida

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INTRODUCTION

Globally there has been a considerable increase in persons aged sixty year and over. This number has been estimated to increase substantially in the coming years. In fact, the number of older persons is the fastest growing age group (1). As the number of older people increases, it is important to acknowledge their oral health concerns and how their oral health affects their quality of life.

Poor oral health in this age group is generally manifested as a high prevalence of edentulism (loss of teeth), dental caries, periodontal disease, xerostomia and oral cancer (2). Oral health problems in the elderly have been shown to negatively impact on their daily life, particularly among those who are edentulous (2, 3).

Oral health and general health are not dissociable, oral health is a component of general health (3). Furthermore, there exists a relationship between poor oral health and poor general health that is attributable to common shared risk factors (2). Studies have shown associations between: periodontal disease and diabetes (4); edentulism and ischaemic strokes (5) and poor mental health (6). Moreover, these chronic diseases, other infections and especially tooth loss are more commonly seen in the elderly (7).

The oral health of older people is often not prioritized, despite its fundamental role in nutrition (1) and its interrelationship with general health (2, 3). This narrative review aims to highlight some of the most common oral health problems seen in older people. Knowledge of how oral health impacts overall health and the quality of life of older persons could bring about awareness of this frequently overlooked aspect of health in the elderly and could also assist with the development and tailoring of oral healthcare policies for this population.

Age related changes to teeth

One of the major causes of tooth loss in older adults is root caries (8). The increased incidence of root caries in the elderly is directly related to the bacterial species salivary mutans *streptococci*, *lactobacilli* and *Actinomyces* (9). Gingival recession and periodontitis may lead to root caries. Since these conditions are more commonly seen in older persons, they are at a higher-risk of developing root caries. The incidence of root caries in patients older than 60 years is twice that of 30 year olds (10). Likewise, studies have shown that dental caries, periodontal disease and oral mucosal diseases are more frequently encountered in older persons (11). Additionally, the use of removable prosthetic appliances to substitute loss of

teeth has also been identified as a risk factor for root caries (12).

The hardness and the elastic modulus of old enamel can rise by over 12% causing an increase in the brittleness of teeth and a decrease in the permeability (13). Thinning around the neck of teeth, often related to the use of hard bristled toothbrushes over many years of improper tooth brushing, is frequently observed (14). In addition, tooth wear in older patients due to abrasion, erosion or occlusal attrition can cause discoloration (from yellow to brown) and enamel loss (15).

The two age dependent changes that take place in dentin are referred to as physiological secondary dentin and dentin sclerosis. The dental pulp in teeth in older individuals undergoes structural changes such as diffuse calcification, narrowing of the root canals with increasing age, an increase in frequency and number and size of pulp calcifications and decreased pulp reparative function (16).

Ageing may also reduce the height of pulp horns, causing the pulp to shrink out of the crown in anterior teeth, reducing the distance between the chamber roof and floor in posterior teeth and causes the pulp to narrow concentrically in roots (17). The chance of having tooth damage severe enough to require a root canal or similarly invasive procedure triples over 65 years of age. However, due to the nerves losing their sensitivity, the pain may not be noticed at the early stages (14) and would require treatment in the later stages. Due to the aforementioned physiological ageing process in teeth, the anatomical differences of teeth in older persons must be taken into account during treatment planning and the appropriate endodontic procedures be carried out in order to have a successful root canal treatment in the elderly (18).

Age related changes in the oral mucosa

Ageing is associated with a decline in the protective barrier function of the oral mucosa. Some of the marked clinical changes seen are a smoother dorsum of the tongue with loss of filiform papillae, development of sublingual varices, reduced rate of wound healing, an increase in the ectopic sebaceous glands (Fordyce spots) in the lips and cheeks and an increased susceptibility to various pathological conditions such as candidal infections (16, 19). The delayed bone healing that occurs in older patients is directly related to the decline in the levels of the cyclo-oxygenase 2 (COX 2) enzyme, which plays an essential role in bone repair (17).

Research has shown that elderly patients may develop vesiculobullous, desquamative, ulcerative, lichenoid and infectious lesions of the oral cavity which could be due to the thinning of the stratified squamous epithelium which loses elasticity and atrophies with age (20).

Other oral mucosa changes seen in elderly persons include: denture-related stomatitis, epulis fissuratum, traumatic ulcers, irritation fibroma, recurring aphthous stomatitis, fissured tongue, haemangioma, melanin pigmentations and oral lichen planus (21). Additionally, when the age-related structural changes to oral mucosa are combined with immunologic variations, local trauma, systemic diseases, medications and poor nutritional status there may be substantial oral mucosal changes in an older adult (22).

Edentulism

Edentulism is prevalent worldwide (2) though there has been a general declining trend in its prevalence (23). The distribution of edentulism varies greatly between different countries and within the same countries (24). There is an association between socio-economic status (2), racial or ethnic groups (23), level of education, oral health awareness and attitudes to oral healthcare (24, 25). Edentulism proves to be a useful indicator of oral health, as it is able to predict the burden of oral diseases over time and the prevalence of dental extraction treatment (23). The main causes for tooth extraction, leading to tooth loss are severe dental caries and periodontal disease (2). Smoking tobacco also puts individuals at risk for edentulism. In developing countries where dental resources are often lacking, extraction frequently occurs (2).

Edentulous participants in a study, who used only one complete denture were at a higher chance for consumption of fruits and vegetable below the recommended daily amounts (26). Nutrients found in fruits and vegetable and dietary fibre consumption was found to be significantly lower in edentulous persons (27). It is well known that fruits and vegetables are important constituents of an acceptable, healthy diet and their consumption has a protective effect on the risk of cardiovascular diseases and cancer mortality (26). Furthermore, it has been shown that edentulism is independently associated with chronic diseases like coronary heart disease (28), electrocardiographic abnormalities (29) and mortality (30). The associations may be due to the impact that edentulism has on nutritional intake, status and body mass index (31).

In the elderly, it has been reported that tooth loss impacts the ability to chew and speak (32) which are important aspects of oral-health-related quality of life. Other aspects of oral-health-related quality of life that may be impacted by edentulism include participation in social and day to day activities, embarrassment to speak, smile or eat with others that may cause social isolation (24).

Oral cancer

Oral and oropharyngeal cancers are more common in older patients, whom at diagnosis had a median age of 62 years (33). In the year 2012 in the United States of America, more than half the patients who died from oral and oropharyngeal cancers were 65 years and older (34). Oral cancer is listed as the eighth most prevalent cancer worldwide (7, 35). It is more common in developing countries than developed countries (35) and in the male gender (7, 34).

Risk factors for oral cancers include tobacco use, heavy alcohol consumption, low socio-economic, educational levels and income (7, 35). Protective factors such as high fruit and vegetable intake (2, 7), tend to be avoided by the edentulous (26) and even complete denture wearers, due to reduced chewing efficiency caused by the lack of stability and retention of the dentures and pain while eating (36).

Common treatments for oral cancer include surgery, radiotherapy and/ or chemotherapy. Both the disease and treatment in the elderly may induce anatomical changes in the oral cavity, compromising functions such as chewing, swallowing and speaking which ultimately influences the quality of life of the elderly with oral cancer (3).

Periodontal disease and diabetes in the elderly

Diabetes mellitus is associated with advancing age. There is a bidirectional relationship between periodontal disease and diabetes mellitus (4). In the face of persistent hyperglycaemia, glucose concentration in the saliva and gingival crevicular fluid increases. This provides enriched substrate for bacterial proliferation. Species that favour anaerobic environment outgrow other resident bacteria (37). Additionally, persistent hyperglycaemia causes increased advanced glycation end-products (AGE). This impairs neutrophilic chemotaxis (38). This causes unchecked bacterial growth. Clinically, patients may experience halitosis and fetid taste. Collagen in periodontal tissue is also altered by

AGE. Advanced glycation end-products contribute to oxidant stress and promote the elaboration of proinflammatory cytokines; TNF- α , IL-6 and IL-1 β . These events increase collagen breakdown. Matrix metalloproteases are implicated here (38). The local inflammatory reaction increases osteoclastic activity in alveolar bone leading to bone resorption (39).

The loss of periodontal support structures causes loosening of teeth and the potential for tooth loss. Periodontal disease has the potential to worsen glycaemic control. TNF- α and IL-6 produced in the face of periodontitis increases insulin resistance. They interrupt the intracellular transduction process that occurs with the binding of insulin to its receptor (40, 41). Periodontitis is associated with an increased hepatic production of TNF- α as an acute phase reactant (42). The treatment of periodontitis reduces these events. This was shown in the Pima Indians where the treatment of their periodontal disease resulted in significant improvement in glycaemic profile (43). As outlined above, the pro-inflammatory states of both uncontrolled diabetes and periodontal disease form a vicious cycle.

Xerostomia is also of concern in the diabetic elderly. Uncontrolled diabetes is associated with autonomic neuropathy which decreases salivary flow rates. This, coupled with the increased likelihood of polypharmacy in elderly patients with diabetes, increases complaints of dry mouth (44).

DISCUSSION

The elderly tend to have poor oral health conditions (3), caused by the physiological ageing process and lifestyle factors over the years. This is an indication that the need for oral healthcare persists unmet in this group. Healthcare workers need to be more attentive to this population and take into consideration how their oral health affects their quality of life, general health and well-being (7).

Risk factors for general health, such as smoking, alcohol consumption and dietary habits also impact on oral health. The association seen between these risk factors and increased risk of oral diseases is an indication that a multidisciplinary and integrated approach is required to promote both general and oral health (2, 7).

A significant challenge in supplying restorative and preventive treatment for the elderly, is the underappreciation of the necessity of regular oral care of the elderly. Dental care for the elderly is often emergency treatment which results in tooth extraction and not retaining the teeth. Preventive strategies will work

best when the diseases are detected at the earliest stages, for which regular contact with the patient is required (16).

In developing countries other barriers to oral care in the elderly, include lack of sufficient dental personnel, coupled with low priority given to the oral health of the elderly by health authorities at a national level (2).

General health in the elderly should be assessed during treatment planning for dental treatment. The elderly frequently present with systemic diseases and multi-medication therapies which could lead to xerostomia and changes in smell and taste (2).

Whilst clinical aspects are fundamental for treatment planning for the elderly, self perception of oral health should not be overlooked by healthcare workers and must be taken into consideration during treatment planning (3).

CONCLUSION

Poor oral health in the elderly adversely impacts general health and quality of life. An integrated and multidisciplinary approach is important for preventing oral diseases and improving and maintaining oral health in the elderly.

AUTHOR CONTRIBUTIONS

All the authors, MA Brown, B Thomas and K Blake played a role in the conception and design, the research in databases to obtain the articles, the drafting and critical revision for important intellectual content and the final revision and approval of the version for publication.

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