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Geriatric Oral Health – Appreciating and Addressing It with a Team Approach

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1. Introduction

It is universally accepted that the body undergoes physiological change and development throughout life. The period of growth peaks at approximately 21 years of age before it begins to decline slowly until the person dies. The geriatric age lies somewhere towards the end of this continuum and is generally acknowledged to be around 65 years and older.

Ageing is part of the cycle of life. In the past, many communities did not have the privilege of experiencing this part of the cycle due to the ravages of war, infectious diseases, poor sanitation and malnutrition. This has, however, changed and it is projected that by 2040, about 14% of the global population, or almost 1.3 billion people, will be aged 65 years or older. ¹ Such a demographic change poses pressing concerns for the healthcare fraternity as an increasingly geriatric population brings with it a host of health issues including chronic diseases such as diabetes, hypertension and stroke. Declining oral health also tends to be common among the elderly and this is an issue which warrants close attention. One of the enlightenments of the 21st century has been the recognition of oral health as an essential and integral part of systemic health. For example, the close association between periodontal disease and diabetes is well documented. ^{2,3,4} Increasingly, evidence of a close association between periodontal disease and cardiovascular disease ^{5,6} is also emerging.

While the link between oral and systemic health is complex, it is easier to understand how poor oral health substantially influences one's overall quality of life as the ability to enjoy food and speak properly as well as social confidence can be grossly affected ^{7,8} by oral diseases. A British national nutrition survey showed that the intake of most nutrients, such as non-starch polysaccharides, protein, calcium, non-haem iron, niacin, and vitamin C, was lower in edentate than dentate subjects. The survey also revealed that subjects with 21 or more teeth consumed more of most nutrients, especially the non-starch polysaccharides. ⁷

Indeed, oral health is an integral and important part of one's overall health but it is often neglected due to prevailing misconceptions which include a general apathy towards oral health since many conditions affecting the oral cavity are non-life threatening. Therefore, while people are willing to attend annual health checks for their blood pressure, blood sugar, height and weight; the same interest for dental check-ups is generally lacking.

2. Common oral diseases affecting the elderly

2.1 Dental caries and periodontal disease

Dental caries (tooth decay) and periodontal disease (gum disease) are the two most common dental conditions which affect the general adult population and their prevalence tends to increase with increasing age.^{7,8}

Dental plaque is a key contributing factor in the aetiology of dental caries and periodontal disease. This composite of saliva, partially digested food and bacteria sticks to the tooth surfaces. Acidic by-products of bacteria metabolism causes erosion of the tooth structure giving rise to dental caries. The elderly with lower masticatory ability tend to consume carbohydrate-rich foods and this exacerbates a vicious cycle for dental caries as such foods are excellent bacterial substrates in the oral cavity. In general, oral health has generally improved over the years and the prevalence of edentulism has decreased.⁹ With more teeth in the mouth over a longer period of time, it is unsurprising that the incidence of dental caries is higher among the elderly. Gingival recession (Figure 1), common with increasing age, also puts teeth at increased risk for root caries.



Fig. 1. Gingival recession (circled) increases the risk of root caries

In the initial stage, dental caries usually presents with little or no signs and symptoms. Often noticed as an initial white patch on the tooth surface, it can easily go undetected especially by the lay person. Left unmanaged, the caries progress further giving rise to a cavitation in the tooth. At this stage, sensitivity and pain manifest to suggest the onset of dental caries (Figure 2).

The teeth are supported in their positions in the mouth by the periodontium which comprises the alveolar bone, periodontal ligament, gingiva (gums) and cementum. The bacterial by-products of dental plaque cause gingival inflammation and sets the stage for periodontal disease to set in. Prolonged accumulation of dental plaque around and in the gingival tissues initiates a host-mediated destruction of soft tissue caused by hyperactive leukocytes, cytokines, eicosanoids and bacterial by-products. This leads to an irreversible resorption of the surrounding bone supporting the teeth resulting in drifting, mobility and

eventually loss of teeth. 25 Common signs and symptoms of periodontal disease include redness and swelling of the gingival tissue, bleeding even on gentle brushing, longer looking teeth, mobility of teeth, malodour and pain.



Fig. 2. Carious teeth

Certain medical conditions such as diabetes mellitus, hyposalivation as well as medications like anti-hypertensives can also predispose individuals to dental caries and periodontal disease.

2.2 Retained roots

Retained roots and carious teeth broken beyond repair, are commonly found among the institutionalised elderly. Various studies on oral health status and treatment needs in nursing homes show that 20% to 36% of the residents require at least one dental extraction. 10,11 The risks of infection arising from these retained and carious teeth is a cause of concern among the elderly especially those who are immunocompromised.

2.3 Prevention of dental caries and periodontal disease

The prevention of dental caries and periodontal disease can be easily instituted at home with regular toothbrushing using fluoridated toothpastes and dental flossing. Dietary control to limit the intake of sugars, which are excellent substrates for the bacteria in the mouth, is also crucial for the prevention of dental caries. In high-risk individuals, the use of fluoride varnishes or mouthrinses, saliva substitutes or sugar substitutes may be necessary to complement the home care as additional caries prevention measures. Regular dental visits are highly recommended, even for the elderly, as this will facilitate the early detection and management of dental conditions which may otherwise be left to deteriorate and cause great pain and suffering.

2.4 Mucosal lesions

The main causes of mucosal lesions in the oral cavity are trauma from dentures and food, *Candidal* infections, mucosal changes due to nutritional deficiencies and neoplastic changes. One of the biggest culprits of mucosal lesions is poorly fitting dentures. Denture wearers have a higher likelihood of succumbing to denture stomatitis, *Candidal* infection and ulcers.

With increasing age, the oral mucosa tends to lose its elasticity, have diminished blood supply and exhibit atrophy of epithelial cells. These changes can be exacerbated by conditions, such as xerostomia and iron or vitamin deficiency, commonly associated with the elderly. This makes the oral mucosa more friable and susceptible to inflammation and ulcers. 12,13

Denture wearers are generally advised to remove their dentures before sleeping, brush off all food debris from the denture surfaces and soak the dentures in a denture cleanser or diluted Milton's solution. Soaking the dentures in antiseptic solutions reduces the bacterial and fungal load in the porous acrylic resin denture base. Furthermore, the oral mucosa needs to be exposed to the protective antibodies and enzymes in saliva to minimise denture stomatitis.

2.5 Xerostomia

Xerostomia, otherwise known as dry mouth, is relatively common among the elderly and results from reduced salivary flow. This reduction in saliva is often a result of diseases such as Sjogrens' Syndrome, sarcoidosis, primary biliary cirrhosis and cystic fibrosis. It may also be the result of polypharmacy and radiotherapy. Many drugs including anticoagulants, antihypertensives, antihistamines, antipsychotics, antidepressants and anticholinergics can also result in reduced salivary flow as a side effect. 26

Saliva serves many important functions. It helps in speaking, chewing and swallowing. It offers protection against dental caries with its capacity to buffer the drop in pH associated with the onset of dental caries. Xerostomic individuals are, therefore, at increased risk of developing dental caries. Saliva helps to hydrate the oral mucosa and a reduced salivary flow can cause a burning sensation or soreness of the mucosa. Saliva also plays a pivotal role in complete denture retention and xerostomia poses a challenge for fully edentulous elderly patients.

2.6 Bisphosphonates

The use of bisphosphonates in the treatment of osteoporosis, Paget's disease of the bone, multiple myeloma and breast cancer is common. One possible side effect of this is osteonecrosis of the jaw bone following dental surgery or infection, which can be challenging to manage. To prevent such complications, it is advisable for all potential foci of dental infection to be removed before starting bisphosphonate therapy. 26 27

3. Management of oral diseases

Tooth loss is mainly caused by dental caries 14,15 and periodontal disease. However, trauma and other iatrogenic causes may also contribute towards tooth loss. Due to current advancements in dental restorative procedures, more people are retaining their teeth for longer than before. Among those who still have teeth, many of the remaining teeth are heavily restored with fixed prostheses and even implant retained ones. Re-restoration of complex restorations in an ageing dentition is therefore a growing and emerging challenge of this century.

Dental prostheses (Figure 3) to replace missing teeth have been used for centuries. Missing teeth should only be replaced if necessary to fulfil the needs of aesthetics, function or comfort. Prostheses must be recognised as aids that require maintenance and care for its continued function.



Fig. 3. Crowns used to replace extensively carious teeth

Complete dentures have been used for over a hundred years. The ubiquitous acrylic resin dentures (Figure 4), which came into use in the early 1950s, are now commonly used all over the world. They are generally affordable, well-tolerated by patients and simple to fabricate.



Fig. 4. Acrylic upper complete denture

Studies have shown that worn and broken dentures cause more oral lesions than having no teeth or dentures! In fact, prolonged chronic irritation can often lead to pre-cancerous lesions. This underscores the need for regular dental check-ups even with a dental prosthesis in the mouth. Complete dentures rely on suction for retention and they need to be professionally cleaned and maintained, with the borders checked and adjusted for over-extension and occlusion modified to accommodate uneven wear of the tooth surfaces. It is also recommended to have new ones made every 3 to 5 years.

One of the main problems with dentures is the retention of the mandibular denture as the bony ridges which support the prostheses in the lower jaw tend to be highly resorbed with increasing age. Osseointegrated dental implants, first introduced in the late 1950s in an experimental way, are now readily available at most dental practices and their costs are no longer overly prohibitive. The implant retained lower complete denture (Figure 5) is fast becoming the prosthesis of choice and almost synonymous with the expected standard of



Fig. 5. Implant-retained mandibular complete denture



Fig. 6. Implant retained maxillary partial denture

care for edentulous persons in many developed countries. However, not everyone, is suitable for dental implants and the contra-indications for such a treatment option include smokers, patients with diabetes and those on oral bisphosphonates.

Fixed partial dentures or bridges are commonly prescribed for those with one or two teeth missing. These are more challenging to maintain than the removable ones and cleaning around them needs to be more meticulous. Such prostheses often fail when the supporting neighbouring teeth become mobile, carious or fracture with time.

4. Embracing a team approach to oral health

General medical practitioners provide comprehensive and holistic health care for individuals in the community, including the elderly. As more people visit their general medical practitioners each year than any other health care professional, they are well poised to promote health, anticipate health needs and offer opportunistic prevention by proactively targeting high-risk elderly individuals who may not be fully aware of their conditions and the need for follow-up care and management. In fact, this close contact with the medical practitioners is even more so for the elderly as many of them have chronic conditions which require regular follow-ups with their doctors.

Oral health is part and parcel of an individual's general health and wellbeing. An alliance can be forged with the general medical practitioner to empower them to identify early signs of oral diseases and alert their elderly patients to seek further follow-up with their dental practitioners.¹⁹ For example, when a doctor performs a routine tonsil examination, a quick glance at the rest of the mouth for signs of oral disease can help the patient a long way. Early referral to a dental surgeon or an oral health therapist (e.g. dental hygienist; dental therapist) can enhance the patient's overall quality of life.

In line with this, oral health has been included as one of 6 functional domains of functional independence for the elderly in Singapore.²³ To facilitate an assessment of oral health, the Oral Health Assessment Tool (OHAT) has been incorporated within a set of Functional Screening Guidelines for Older Adults in the Community in Singapore.²⁴ The OHAT was modified from the Kayser-Jones Brief Oral Health Status Examination (BOHSE) and validated for use in nursing homes in Australia.¹⁸ With this tool, non-dental healthcare professionals such as doctors and nurses can recognise and identify less than optimum states of oral health so that patients can be referred for necessary follow-up with the dental surgeon.

Apart from the doctor, other members of the healthcare team including allied health professionals such as nurses can be rallied to identify common oral conditions and alert the elderly or their caregivers to seek dental treatment and management. For example, occupational therapists can also be involved to reach out to the cognitively impaired residents helping them to carry out activities of daily life including tooth and denture brushing.¹⁶ In Singapore, a pilot project was conducted for nursing staff from the intensive care and geriatric wards in a hospital. With this project, the nursing staff were trained in the fundamentals of oral hygiene education²² to empower them to address the oral hygiene of the patients as part of the overall in-patient care. The staff responded favourably to the training and were positive about what they could do for their patients with the newly acquired knowledge and skills. Volunteer dentists in Singapore have been working closely with nursing home administrators and clinical staff to run regular dental clinics in their

premises. Many of these homes are staffed by non-dental professionals who display a commendable interest in oral health and proactively look into the oral health needs of the residents. 20,21

It must be emphasised that the primary role of the non-dental healthcare partners is to recognise and identify less than optimal states of oral health and refer the patient to a dental surgeon or oral health therapist for further management. They should not be expected to dispense oral hygiene instructions but if they do, that will be a real bonus for the patient!

This team approach to oral healthcare is not a new idea and has been proposed by many researchers and public health dentists and also practised in some countries.^{16,17} The dental fraternity needs to step out of its comfort zone and embolden itself to engage their medical colleagues from the general medical practices, hospitals and even nursing homes to establish a collaborative relationship which will benefit the health and wellbeing of the elderly population in the long-term.

5. Conclusion

Oral health is a fundamental and pivotal aspect of health for the elderly as it can significantly influence their overall quality of life. It is therefore crucial to embrace the new paradigm to include oral health care as part of one's overall health and holistic wellbeing. Traditionally, oral health has been viewed as the sole responsibility of the dental fraternity. However, with increasing awareness of a team approach to healthcare, the dental fraternity needs to work collaboratively with their counterparts from the medical fraternity to forge alliances with them and empower them to identify and detect early signs of oral conditions among the elderly for early dental referrals and management. This will allow the elderly easy access to oral health advice from multiple touchpoints.

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Geriatric dentistry, or gerodontics, is the branch of dental care dealing with older adults involving the diagnosis, prevention, and treatment of problems associated with normal aging and age-related diseases as part of an interdisciplinary team with other healthcare professionals. Prosthodontics is the dental specialty pertaining to the diagnosis, treatment planning, rehabilitation, and maintenance of the oral function, comfort, appearance, and health of patients with clinical conditions associated with missing or deficient teeth and/or oral and maxillofacial tissues using biocompatible materials. Periodontology, or Periodontics, is the specialty of oral healthcare that concerns supporting structures of teeth, diseases, and conditions that affect them. The supporting tissues are known as the periodontium, which includes the gingiva (gums), alveolar bone, cementum, and the periodontal ligament. Oral biology deals with the microbiota and their interaction within the oral region. Research in oral health and systemic conditions concerns the effect of various systemic conditions on the oral cavity and conversely helps to diagnose various systemic conditions.

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