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Periodontal Disease in the Older Patient

Abstract: Population projections predict an increasing number of dentate older people who will require assessment and treatment of periodontal disease. Studies show that healthy, older patients show no increased risk of periodontal disease progression compared to younger individuals, while periodontal treatment can be equally successful in the older age group. However, co-morbidity can impact negatively on both the periodontal tissues and the dentition. These effects range from a reduced ability to maintain adequate plaque control, to the use of drug and other therapies directly affecting the periodontal tissues and salivary flow.

Clinical Relevance: An individualized treatment plan is required for older patients, taking account of all factors impacting on the periodontal tissues.

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Improvements in healthcare and the standard of living continue to result in an increase in the expected lifespan. At the same time people are retaining more teeth into later life. Predictions for future levels of total tooth loss indicate that the percentage of people in the older age group without natural teeth will reduce significantly, with a trend towards retaining a functional dentition into later life (Figure 1). This increasing incidence of tooth retention will impact on all areas of dentistry, including periodontal management.

Incidence of periodontal disease in the older patient

Data reported in the 1998 Adult Dental Health Survey¹ show increasing levels of attachment loss with age (Figure 2). In the 65+ age group, 85% of subjects exhibited attachment loss (ALOSS) of ≥ 4 mm, with 35% of dentate subjects exhibiting ALOSS ≥ 6 mm. Data on probing pocket depths (ppd) showed a lower prevalence of periodontal pockets of

equivalent magnitude in this age group (67% exhibiting ppd ≥ 4 mm; 31% with ppd ≥ 6 mm), reflecting the level of recession seen in older subjects. Similar studies in the US, Canada and Australia have reported similar prevalence data of between 15–30% of older subjects having ALOSS or ppd ≥ 6 mm.^{2–4} Past interpretation of these data concluded that age was a risk factor for periodontal disease. The current view is that the greater level of periodontal destruction

seen in older populations reflects the accumulation of disease over a lifetime and not an age-specific condition.

Progression of periodontal disease in the older patient

Few studies have specifically investigated the incidence of attachment loss in older populations. The Piedmont 65+ study, a cohort study of adults aged

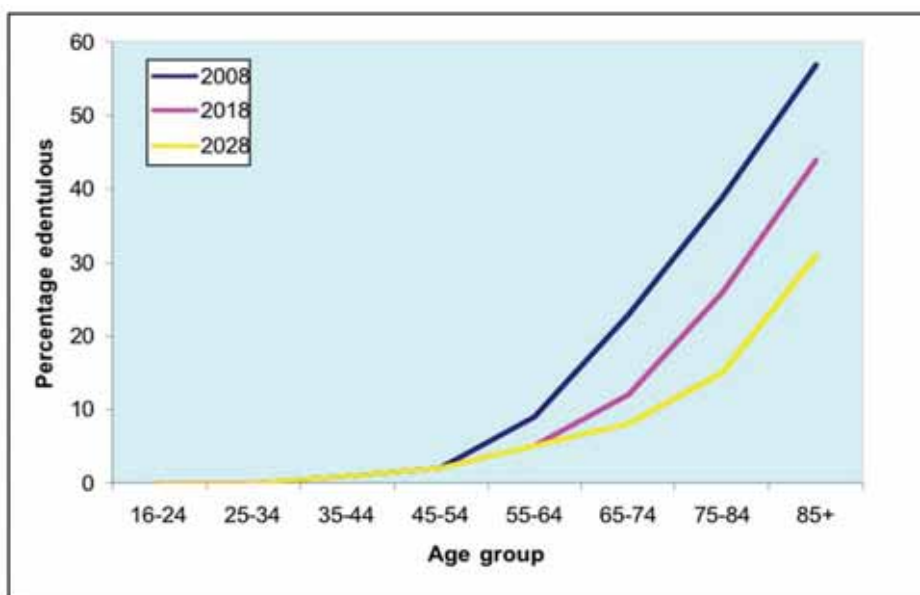


Figure 1. Predictions for future levels of tooth loss. (Data taken from Adult Dental Health Survey, 1998.¹)

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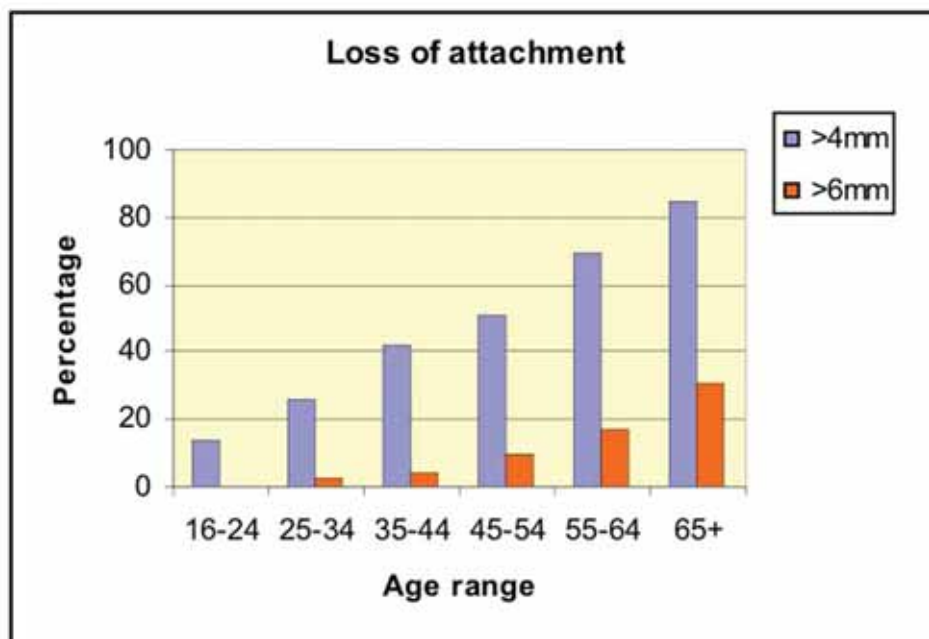


Figure 2. Proportion of dentate adults with loss of attachment of >4 mm by age. (Data taken from Adult Dental Health Survey, 1998.)

65 years or more carried out in North Carolina in the mid 1990s, provided substantial information on the natural history of ALOSS in this age group. Reports generated from data in this study indicated that 37% of White subjects showed sites with progressive ALOSS of ≥ 3 mm over the 3-year study period, with a higher incidence in Black subjects.⁵ Similar data were reported in Australia, where 43% of a mainly White cohort of 60+ year-old subjects exhibited ALOSS of ≥ 3 mm over a 5-year period.⁶ Interestingly, in both studies the majority of sites showing ALOSS did not show previous disease, ie were new sites, emphasizing the need for monitoring all sites and not just those with existing disease. The bulk of this additional ALOSS was recorded as an increase in gingival recession. In the Piedmont 65+ study, the presence of *Porphyromonas gingivalis* was the strongest predictor of progressive disease.⁷ Smoking, depression, lower levels of education, not having a dental check-up and location of sites adjacent to coronal caries/restorations were also found to be risk factors for progression. Interestingly, Beck *et al*⁸ reported that smoking was a risk factor for progression of ALOSS at existing but not new sites. A higher incidence (75%) of attachment loss of ≥ 3 mm over a 2-year

period was reported in an older Japanese population, where again smoking was the greatest risk factor for further loss.⁸ Similarly in Iowa, US, over 80% of older patients showed ALOSS of ≥ 2 mm over an 8–10 year period, indicating that periodontal treatment continues to be important for the older patient.⁹

Bacteriology

Studies comparing expression levels of specific periodontal pathogens in young and older patients have shown differences between the two groups. The prevalence of *Aggregibacter actinomycetemcomitans*, an organism thought to play a significant role in localized aggressive periodontitis, appears to reduce with age.¹⁰ In contrast, the importance of *P gingivalis* seems to increase with increasing age. As outlined above, the presence of significant levels of *P gingivalis* in periodontal pockets was linked to increased risk of disease progression at these sites.

Immune response in the older patient

The reduced response to

vaccination seen in older patients is supposedly due to an age-related reduction in immune competence, or immunosenescence. Such changes do not occur in all older subjects, as has been shown in studies on centenarians. Nevertheless, any reduction in the host defence mechanism may increase the risk of progression of bacterial-driven conditions such as periodontitis. Studies on inflammatory cell function in healthy, older patients with periodontitis have shown no significant difference in chemotactic or phagocytic ability of polymorphs compared to age-matched subjects without periodontal disease, or indeed with young healthy adults.^{11,12} Older periodontitis patients, just as with young patients, show high levels of serum antibody to *P gingivalis*, indicating a normal response to this periodontal pathogen.¹³ As such there is no evidence that a reduced immune system makes older patients more prone to progression of periodontal disease than younger patients.

Systemic health and periodontal disease

Polypharmacy

As the population ages, the use of medication will show a parallel increase, as older individuals develop chronic conditions. Some of these medications can impact on the oral cavity, either directly or indirectly, and may increase the risk of dental disease, including periodontitis. Over 400 types of medication, including antihypertensives and antidepressants, can cause xerostomia, leading to increased accumulation of plaque on tooth surfaces. This has implications for both periodontal disease and root caries, particularly in the older patient population where gingival recession is more prevalent. Mood altering medications can also reduce self-motivation to perform oral hygiene measures adequately, with patients often more difficult to motivate. Such patients will need regular review appointments to review and support plaque control measures. Similarly cancers, including head and neck cancer, are more prevalent in an older population. Radiotherapy in the oral region can have significant effects on salivary flow, resulting in profound xerostomia and its associated

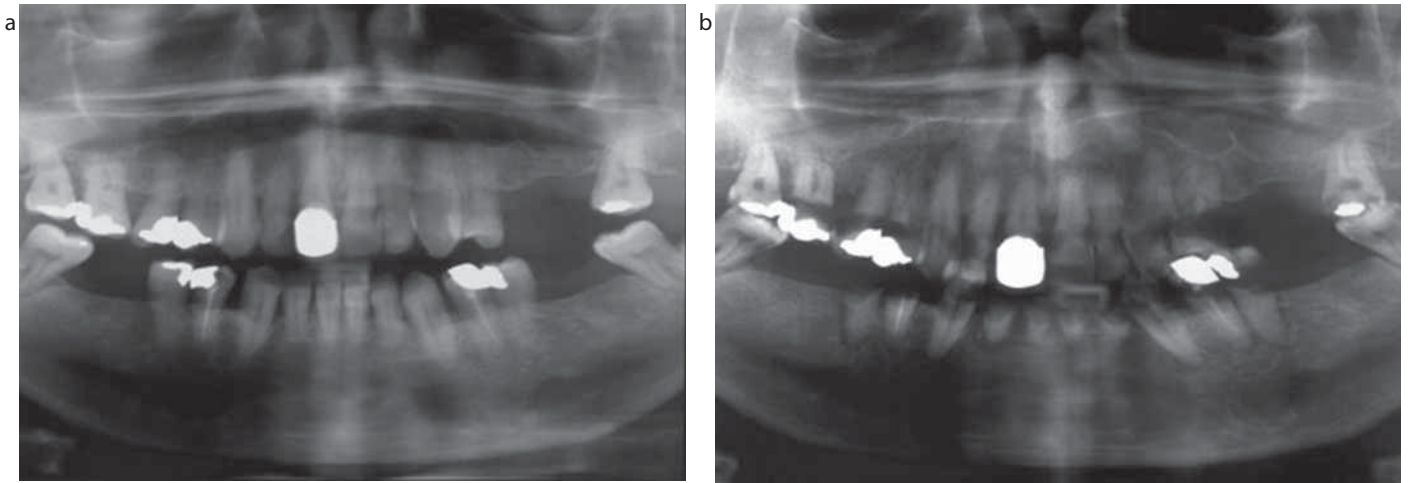


Figure 3. (a, b) Effects of radiotherapy and subsequent profound xerostomia on the dentition. (Courtesy of Dr A Burnett.)

problems (Figure 3). This group of patients requires individualized preventive programmes and support to maintain a functioning dentition.

Drugs can also have a direct effect on the periodontal tissues, both soft connective tissues and bone. Of the drugs known to cause gingival overgrowth, the calcium channel antagonists, including nifedipine and amlodopine, are the most likely to be found in older patients in the treatment of hypertension. These drugs cause gingival overgrowth in approximately 20% of patients, with resultant difficulties in plaque control, an overlying inflammatory response, and aesthetic problems (Figure 4). While a change in medication can reduce the level of overgrowth, gingival recontouring is often required to improve gingival health.

Desquamative gingivitis, a condition which usually presents as painful erosions or ulceration on the attached gingiva, may also be related to drug therapy (Figure 5). Desquamative gingivitis is primarily seen in older, female patients. In a recent review of cases, Leao *et al*¹³ found lichen planus to be the most common cause of desquamative gingivitis in a study population, with mucous membrane pemphigoid the next most common. While the condition is not related to dental plaque, discomfort occurring during toothbrushing often leads to an aggravation of the disease due to plaque accumulation and subsequent inflammation. It is important that a correct



Figure 4. Gingival overgrowth with associated plaque-induced inflammation in a patient taking nifedipine.

diagnosis of the cause of the condition, often quite difficult, is made using clinical, histological and immunological findings. While treatment is aimed at the underlying cause, good oral hygiene is central to a successful outcome. Topical steroids can be used to reduce discomfort in the gums and allow adequate plaque control measures.

The impact of bisphosphonate therapy on dental treatment, specifically the risk of osteonecrosis following extraction in patients on bisphosphonates, is very topical in the dental literature at present (Figure 6). Bisphosphonates are primarily used in the treatment of osteoporosis and metastatic bone cancer and, as such, are prescribed mainly in the older population. Bisphosphonates reduce bone loss by inhibiting osteoclastic activity. As such, some initial studies have been reported on the use of bisphosphonates as an adjunctive therapy in the treatment of periodontal disease, with varying



Figure 5. Desquamative gingivitis associated with lichen planus.



Figure 6. Osteonecrosis associated with bisphosphonate therapy. (Courtesy of Dr D Hussey.)

results.¹⁴⁻¹⁶ It is important for patients on bisphosphonate therapy to have regular recalls to prevent disease, including periodontitis, thus negating the need for extraction and possible sequelae. No associated problems with routine periodontal therapy in these patients have been reported, but periodontal surgery should be avoided in this group.



Figure 7. Maintenance of a functional dentition in an elderly patient over a 10-year period.



Figure 8. (a,b) Masking gingival recession using a gingival veneer.

Periodontal treatment in the older patient

Plaque control is central to the treatment of inflammatory periodontal disease. While self-performed plaque control is not in itself directly related to age, in the older patient, it is much more common to encounter physical, psychological and medical conditions which impede the patient's ability to perform adequate home care and impact on the periodontal condition. As outlined above, xerostomia resulting from drug therapy, salivary disease or following head and neck radiotherapy can have a significant deleterious effect on dental disease – each of these potential causes are more prevalent in an older population. Conditions resulting in a reduction of manual dexterity

and co-ordination will also impact on plaque control. For all such patients, home care regimes must be individualized, and include a role for carers where necessary.

The goal for treatment should be to preserve a functional, comfortable and aesthetically acceptable dentition. The basic treatment plan, encompassing non-surgical periodontal therapy, supported by self-performed oral hygiene, is no different from that for a younger patient, and can be equally successful (Figure 7) – studies have shown that age is not a significant factor in determining outcome following treatment.¹⁷ Similarly age is not a contraindication to periodontal surgery, healing in older patients being no different compared to younger individuals.¹⁷ The factors influencing the decision to undertake surgical intervention, including levels of plaque control and smoking, are the same in all age groups. However, given the increased risk of root caries seen in older adults, flap surgery with preservation of the gingival tissues would be preferred to resective gingival surgery with greater post-operative root exposure. Supportive maintenance, on a 3–6 month basis, is the same as for younger patients, but must be individualized for a given patient.

Gingival recession, dentine sensitivity and root caries

As outlined above, studies have shown that the progression of attachment loss in older patients is mainly seen clinically as increasing gingival recession rather than deepening of periodontal pockets. The exposure of root surfaces in this age group can have a significant impact on the patient, increasing the risk of both dentine sensitivity and the development of root caries, and affecting aesthetics.

Dentine sensitivity, in response to thermal, tactile or osmotic stimuli, is thought to be caused by fluid movement within dentinal tubules, leading to excitation of pulpal nerve fibres. Numerous agents, incorporated into toothpastes, mouthrinses or gels/varnishes, have been suggested as treatments for this condition, aimed at either occluding the dentinal tubules or reducing excitability of nerve endings. Similarly, bonding agents can be applied to exposed root surfaces to occlude patent tubules and reduce sensitivity. In

addition to such agents, toothbrushing technique and dietary intake, particularly of acidic foods, should also be monitored, as both can play a significant role in the development of sensitivity.

Root caries is a significant problem in the older population. Increased root exposure, xerostomia and reduced levels of plaque control are all significant risk factors for root caries. In a study determining the effects of antihypertensive therapy on the oral cavity, those patients on the therapy had xerostomia and 60% more root caries than controls.¹⁸ Meticulous plaque control, reduction in the intake of fermentable carbohydrates and application of topical fluorides can reverse root caries lesions. The presence of exposed root surfaces, particularly in the older patient, should alert the clinician to these risks and prompt appropriate preventive measures.

Gingival recession can also lead to aesthetic problems, particularly in the anterior maxillary segment. While a range of surgical treatments for gingival recession are available, these are primarily used for localized defects with normal interdental papillary height.¹⁹ In situations where there is generalized recession, with loss of papillary height, surgery cannot fully cover exposed root surfaces. In such cases, gingival veneers, as recently described by Hickey and Jauhar²⁰ in this journal, can be used to mask the loss of soft tissue (Figure 8).

Periodontitis and systemic conditions

Over the past 20 years an ever increasing number of studies have investigated a possible role for periodontal disease as a risk factor for systemic conditions. Most studies have focused on the atherosclerotic conditions, cardiovascular disease and stroke. More recently studies have also investigated a possible link with adverse pregnancy outcome, diabetes and respiratory disease. While the proposed links between periodontitis and these systemic conditions has recently been reviewed in this journal,²¹ and as such will not be fully reported here, it is worthwhile re-iterating the potential link with respiratory disease, a link very relevant to an older patient population, particularly those in nursing homes. A

small number of cross-sectional studies have investigated a possible association between poor oral health and chronic obstructive pulmonary disease (COPD). Results indicated that patients with poor oral hygiene levels had an increased risk of developing COPD.²² Two systematic reviews concluded that there was evidence of an association between oral health and both pneumonia and COPD, with the evidence for the link to pneumonia being stronger.²³⁻²⁴ Studies have also investigated the effect of improved oral hygiene on pulmonary function. These studies were carried out both in ICU wards and in nursing homes, while the level of oral care varied from the use of chlorhexidine gels to non-surgical mechanical therapy by a hygienist. Again, the results indicated that improving oral hygiene significantly reduced the occurrence of respiratory disease in both settings.

Conclusion

Improvements in dental care and an ageing population will result in significant numbers of older, dentate patients requiring periodontal assessment and treatment. At present, data would indicate that healthy older patients are not more likely to develop progressive attachment loss in their later life, while treatment outcome is as successful as in a younger population. However, in this older population, co-morbidity and the use of medicines is more prevalent and can have a significant impact on a patient's periodontal health and response to treatment. Older patients will require individualized treatment plans both to prevent and treat progressive disease.

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