

Restorative Dentistry in Geriatric Patients: A Literature Review

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Received: December 26, 2019; **Published:** January 07, 2020

Abstract

With the recent advances in medicine, the expectations of living longer have been elevated in accordance with the high quality of care, especially in developed countries. For theta, we performed an extensive literature search of the Medline, Cochrane, and EMBASE databases on 15 November 2019 using the medical subject headings (MeSH) terms “Geriatric Dentistry” [Mesh], “Dental Atraumatic Restorative Treatment” [Mesh] and “Dental Restoration Repair” [Mesh]. Papers discussing restorative dentistry in geriatric patients were screened for relevant information. There were no limits on the date, language or publication type. Poor dental health can be used to forecast a functional deterioration in the efficiency of everyday living activities and daily living instrumental activities. Several challenges are associated with dental care in geriatric populations such as xerostomia, age-related changes, and the associated comorbidity. Dental implantation has been used to replace damaged or lost teeth; however, conservative treatment can be adopted when surgery is contraindicated in some individuals.

Keywords: Restorative Dentistry; Geriatric Patients

Introduction

In the United States, the number of older adults is expected to rise by more than 90% by 2050 [1]. When life expectancy rises, such changing demographics will have a profound impact on society and the health care system, where older adults have more chronic diseases [2,3]. Chronic non-communicable diseases are prevalent in older adults, the most common ones are Alzheimer’s, stroke, multiple impair-

ments. Chronic illness and aging-related impairment are attributed to poor oral health [4]. It has been indicated that bad dental health can be used to forecast a functional deterioration in the efficiency of everyday living activities and daily living instrumental activities [4]. In recent reports, it has also been proposed that oral diseases reduce the quality of life and wellness, reinforcing the need for oral health in this section of the population [5,6].

Tooth decay appears to be a significant oral health concern for older adults [7,8]. Currently, dental caries is by far the most common medical disorder impacting 2 - 4/2.4 billion individuals worldwide [9]. Three age trends are correlated with dental caries: 6, 25 and 70 years of age [9]. Increasing the number of older adults residing in long-term care (LTC) homes is more than double that of those staying in the community. Worldwide patterns towards decreased tooth loss and growing lifespan have been well-recognized in dental research, a phenomenon called “demographic transition” [8,9]. Consequently, dental caries treatment will continue to advance so that patients may maintain the long-term function of their normal dentitions. The outcome of insufficient caries dental treatment may include severe incidents of discomfort, swelling, infection, and loss of the tooth [8]. Untreated oral illness, culminating in tooth loss, has various consequences, including reduced chewing capacity and food consumption, speech problems, diminished quality of life, avoidance of socialization, and symptoms of other chronic medical co-morbidities [6,8,10]. In addition, the link between impaired dentition and systemic disorders, such as diabetes, has been identified [10].

Worldwide, improvements have been reported in the pattern of tooth loss [11]. Previously, it was not unusual for one to lose all their teeth at a particular point in their lifetime. Currently, gradual tooth loss over a lifespan is declining due to improved prevention, developments in cosmetic dentistry, biomaterials, and improvements in the patients’ perceived value of natural dentition [11]. The theory of oral health-related quality of life (OHRQoL) indicates that the cumulative burden of chronic oral diseases does not automatically affect older people [11]. However, it has been indicated that OHRQoL is poorer in denture wearers with high number of missing or decayed teeth, dry mouth patients and those with feeding problems [11]. In this study, we aim to review the challenges in restorative dentistry amongst the geriatric population.

Methods

We performed an extensive literature search of the Medline, Cochrane, and EMBASE databases on 15 November 2019 using the medical subject headings (MeSH) terms “Geriatric Dentistry” [Mesh], “Dental Atraumatic Restorative Treatment” [Mesh] and “Dental Restoration Repair” [Mesh]. Papers discussing restorative dentistry in geriatric patients were screened for relevant information. There were no limits on the date, language or publication type.

Age-related changes

Root caries

A mixture of inadequately washed tooth surfaces in an oral environment with decreased salivary secretion and lack of periodontal adherence leads to root caries [11]. For the reasons described above, the inability of older people to maintain a clean oral environment can contribute to the emergence and rapid development of this disease [11]. Root caries are associated with a bacterial profile that has been shown to include *Streptococcus mutans*, *Lactobacilli* and *Actinomyces* as well as *Atopobium*, *Olsenella*, *Pseudoramibacter*, *Propionibacterium* and *Selenomonas* as root caries etiological agents [11,12]. When patients with a dry mouth sips accidental drinks or suck confectionery, the risk of dental caries is increased [11,13].

For the control of root caries in elderly, different treatment, modalities have been suggested. Prevention or decrease of caries can be supported by topical fluoride or remineralizing products [11,14]. Fluoride chewing gum has been shown to produce a higher degree of remineralization and acid tolerance than placebo gum [11,15]. In the prevention of root caries in elderly people, the application of silver fluoride solution, sodium fluoride varnish or chlorhexidine varnish to carious lesions was more effective in reducing emerging root caries compared to oral hygiene alone [11,16].

Noncarious tooth tissue loss

The cumulative effects of denture wear, bad oral habits, and disease; would all cause damage to tooth tissue and the supporting structures [17,18]. Consequently, a significant reduction in the odontoblasts density will be implied [17,18]. Moreover, the capacity of the pulp to regenerate in response to injury will be also reduced with age [17,18]. Furthermore, an overjet reduction may occur as a result of posterior teeth proximal wear, while the increased overjet is noticed in the food table along with "sluiceways" loss [17-19].

As a result, adjuvant changes may arise with increasing the dentin thickness and reduction of the pulp, which in turn compensate for the improper pulp response by the deeper placement of the preparation [17,18]. Another compensatory mechanism would be "attrition"; acting as a stabilizing factor between excessive leverage from occlusal forces imposed on the teeth and loss of bony support [17,18].

Dry mouth

The prevalence of xerostomia, the subjective feeling of the dry mouth ranged from 8% to 42% [11]. The decreased function of salivary glands, an objective drop in saliva volume, ranged from 12% to 47% [13]. There are several causes of xerostomia, most of them are associated with older ages; including autoimmune conditions, dehydration and irradiation [11,13]. Moreover, it is typically associated with drug use in older ages such as antidepressants, antihypertensive pharmaceutical goods, anticholinergic drugs and anti-asthmatic agents [17].

Medical conditions and associated challenges

After the age of 60, nearly half of the patients are medically compromised and on a treatment plan of some disease [17]. The most common conditions included hypertension, heart diseases, diabetes, arthritis, neurological conditions, and cognitive problems [17]. In dental practice, emergency situations can be triggered by the aforementioned condition if the appropriate precautions have not been taken [17]. Diabetes, in specific, is an important risk factor for periodontal diseases; especially with bad glycemic control [20].

The restorative dilemma in geriatric patients

Dentures

With the recent advances in medicine, the expectations of living longer have been elevated in accordance with the high quality of care, especially in developed countries. Therefore, the high prevalence of the elderly increases the need for well-developed strategies to maintain the normal physiological function of the human body and to allow more survival rates [21,22]. Since normal teeth and gums are associated with normal masticatory process therefore dental care in geriatric populations is substantial for their daily living [23]. The presence of geriatric homes and specialized geriatric hospitals in developed countries comprises a major component in geriatric dental care. In a cross-sectional study in Switzerland, individuals of more than 80 years old have more lost, decayed and filled teeth compared to those with 65 - 79 years old. Regarding type of treatment given to dentate patients, elderly of more than 80 years old required more new dentures and applications; however elderly below 80 years old required more operative therapy and periodontal therapy [24]. In an Indian cross-sectional study of elderly living in geriatric homes, in the upper arch, nearly half of the sample required full prosthesis and most of them were males. Moreover, a quarter of patients needed multiunit prosthesis and the other quarter of patients required no dental treatment. However, in the lower arch, the percentage of the need for full prosthesis was lesser than that of the upper arch, furthermore, the same percentage of the upper arch was adopted for those who required no application of dental treatment [25]. Bessertmann, *et al.* study, which recruited Danish individuals revealed that 62% of the sample required new dentures, meanwhile 38% allocated to necessary dento-alveolar surgery [26]. In a cross-sectional study of elderly subjects of more than 65 years old in England, 30% required relining denture and 25% needed full maxillary and/or mandibular dentures. However, 32% subjects of the sample needed no denture treatment, which indicates the high quality of dental care in developed countries [27]. Oral hygiene is essential for geriatrics to maintain normal structured teeth and for prevention of tooth decay and periodontitis [28]. It has been noted that subjects who regularly perform dental brushing have significantly decreased the biofilm surface and subsequently the risk of oral infections [28].

Implant prosthodontics

The altered immune response in elderly populations and the associated comorbidity such as diabetes, hypertension, malignancy, and osteoporosis have a greater influence on teeth function and survival and indicate the need for dental implantation to remove lost or non-functional teeth for maintaining normal masticatory functions [29]. Knowledge of dental implantation was recognized in 70% of elderly patients, meanwhile, the most geriatric attitudes towards implantation were expensive, not necessary, too old for surgery and the fear for ongoing operations [30]. Appropriate diagnosis constitutes the first step in dental implantation and assessment of patient's general condition specifically oral health with obtaining the history of smoking, existing comorbidity and bruxism is also essential to determine adequate dental implantation [31]. Moreover, the clinician must choose the appropriate implant type (fixed, removable or a combination) that fits the patient's condition [32]. Full dental implantation is obligatory for edentulous patients, however partial dental implantation may be needed in dentulous patients [33]. Individuals allocated to implants surgery have significant improvement in maximum voluntary bite force, body mass index, denture stability, and masseter muscle sickness compared to those allocated to conservative relines [34]. Implant survival shows high variability between several studies. Hoeksema, *et al.* demonstrated that the survival of dental implants after 10 years of follow up was higher in younger group (97%) rather than in elderly group (93%). The difference can be related to the type of implants and the comorbid conditions that commonly affect elder populations [35]. On contrary, Nael, *et al.* indicated that the survival year of dental implants in patients with mean age of 63.7 years was 100% following ten years of follow up period [36].

Conservative restorative dentistry

Despite that surgical implantation is considered one of the best treatment strategy for the elderly population, surgical management of most cases may be contraindicated and therefore, the role of conservative treatment replaces the surgical option. Oral hygiene is an essential element in conservative treatment. Gaszynska, *et al.* revealed that patients with bad oral hygiene were significantly associated with the need for prosthetic treatment, tooth removal and a visit to dentist within 12 months [37]. Furthermore, patients who can perform self-oral hygiene had better oral hygiene compared to those who need assistance [38]. Moreover, application of dental treatment in handicapped or those with debilitating disease is essential to maintain normal tooth function and for prevention of oral diseases which may result in tooth damage [39].

Conclusion

Dental care constitutes a major issue among geriatric populations. Dental implantation and conservative management comprise major components in preserving high quality dental care in elderly individuals.

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Volume 19 Issue 2 February 2020

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