GERIATRIC PERIODONTOLOGY: AN OVERVIEW

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ABSTRACT

Old age is a natural phenomenon. Life expectancy has increased rapidly. The systemic health of aged individuals is greatly affected by the oral health and also there exists a link between elderly population and periodontal health status. It is therefore necessary to assess the periodontal as well as medical status in geriatrics before planning any treatment. Thus, preventive, and treatment services will ensure healthy aging which will ultimately improve the quality of life. This paper discusses various problems in depth and information regarding changes in periodontal oral health and strategies for providing appropriate oral healthcare in geriatrics.

KEYWORDS: Geriatric individuals, Oral health, Periodontal complications, Treatment approach.

INTRODUCTION

Geriatric dentistry is the dental care of older adults involving diagnosis, prevention, management and treatment of problems associated with age related diseases.[1] In the elderly population, general health problems has been considered a risk factor due to poor oral health. Periodontal disease is a set of inflammatory conditions affecting the tissues surrounding the teeth.[2] The probability of retention of teeth in elder individuals may result in a risk for periodontal disease, thus, the prevalence of periodontal disease may be associated with aging.[3] This association was addressed by Beck in 1996 at world workshop on periodontitis.[4]

As increasing age is said to be related to the severity of periodontitis, leading to the gingival recession with exposure of tooth root surfaces which leads to the formation of caries which goes along with the development of periodontitis. This ultimately results in tooth loss. However regular dental visits may lead to tooth retention in the elderly individuals[5] with a better quality of life.[6] Thus, this paper aims to assess and review the patterns and prevalence of periodontal disease of geriatrics and their treatment needs.

THE AGING PERIODONTIUM

The periodontium is mainly consists of gingival, periodontal ligament, cementum and alveolar bone. The natural aging process can be related to the moderate to severe loss of periodontal bone support. It has been shown that aging results in histopathological and clinical alterations in the oral tissues.[7]

Age Related Changes In Gingiva

Reduction in stippling of the attached gingiva with age has been reported. There are changes in the structural organization of the connective tissue and epithelium. As age advances, there is thinning of epithelium and reduction in the keratinization of the gingival epithelium.[8] The epithelial density has also been shown to be increased with age.[9] Increasing age is related with increase in the height of the epithelial ridges[10] and flattening of retepegs[11]. Fibroblasts are the primary cells in the gingival connective tissue. High rate of intracellular collagen phagocytosis has been demonstrated in fibroblasts from older individuals as compared to younger individuals. There is a decline in the production of both young cells and fibers in the gingiva as the cellular turnover rate does slow down for all regions of oral cavity. This also results in variation between the synthesis and degradation of collagen, affecting the extracellular matrix homeostasis.[12] The quality of collagen has been shown to decrease with advancing age.[13] Johnson BD (1986) reported 5 times decreased collagen production with increasing donor age.[14]

Age Related Changes In Periodontal Ligament (PDL)

The fiber content of PDL is reduced with increasing age, and the structure of PDL also becomes more irregular.[15-17] Similarly, the amount of organic matrix decreases with advancing age, whereas the amount of elastic fibers increases. There has been a conflict regarding the changes in the width of PDL with aging. Some authors report an increase in width of PDL with increasing age[18,19] whereas, some authors report decrease in width of PDL.[20,21] This has been best explained as the occlusal load on the teeth. Wherein, tooth loss with the increasing age results into increase in occlusal forces of remaining teeth, which leads to increase in width of PDL space of remaining teeth. Thus, decrease in occlusal function in geriatrics may result in decreased PDL width if no teeth are lost.[22]

Cellularity of PDL is also affected by aging. Along with it, degenerating hyaline changes are observed with advancing age. A decrease in the acid mucopolysaccharide content of PDL with increasing age has been demonstrated by biochemical analysis.[23] There is also reduction in the mobility and chemotactic ability of PDL cells. Groessner-Schreider B (1992), observed reduced osteoclast chemotaxis and decreased rate of osteoclast differentiation in samples derived from older individuals as compared to younger.[24] However, it is best explained by the occlusal load on the teeth. Calcified bodies can also be observed in PDL along with altered aggregation in epithelial rests.

Age Related Changes In Cementum

Cementum is a specialized calcified substance covering the root of a tooth.[25] The formation of cementum on the root surface occurs throughout the life.[26,27] The thickness of cementum also increases by deposition of new layer of it on the outer surface of dentin. The life cycle of the cementocytes is normally characterized by aging and cell death. This may be because of decrease in the accessibility of nutritive substances along with the poor elimination of waste products of cementocytes. Cementum becomes acellular with advancing age. Along with this, areas of cementum resorption followed by new cementum apposition can be observed which may lead to irregular surface of cementum.[26-32]

Age Related Changes In Alveolar Bone

Alveolar bone is that part of the maxilla and mandible that supports the teeth and contains the alveoli of the teeth. With advancing age, there is a reduction in the rate of bone formation resulting in decreased bone mass.[33] The bone metabolism is under the control of various mechanisms that includes hormonal controls like parathyroid hormone, estrogen, calcitonin and non-hormonal controls like vitamin D metabolites, calcium and phosphate concentrations in plasma, growth factors and cytokines.[34] This also affects the cellular density of bone remodeling. Severson et al (1978) demonstrated a decrease in the cells of osteogenic layer of bone with advancing age.[30]

Decrease in synthesis and secretion of essential bone matrix proteins or reduction in osteoblast proliferating precursors may leads to reduce bone formation.[33,35] The extracellular matrix surrounding osteoblasts plays an important role in bone metabolism.[35] Thus, possible dysfunction of extracellular matrix which is essential for bone metabolism may be associated with the aging process.[35]

Selkoe DJ(1990) stated that the oxygen-free radical is a major contributor to the aging process.[36] Abiko Y (1998) postulated that the bone nodule formation by osteoblasts is decreased by oxygen radical treated fibronectin (FN) when compared to intact FN concluding that FN plays an crucial role in osteoblast activity and that FN damaged by oxygen radicals during the aging process may be related to less bone formation.[35]

Age Related Changes In Physiological Or Pathological Apical Migration Of Junctional Epithelium

The junctional epithelium lies immediately apical to sulcular epithelium which lines the gingival sulcus. With increasing age, a gradual physiological recession of gingiva occurs in association with apical migration of the epithelium. This is a result of occlusal migration of the teeth recouping for occlusal wear.[37,38] In contrast to this, results from other studies[39-41] suggest that there is no apical migration of junctional epithelium if periodontium remains healthy. This depends on two factors-

(i) The position of mucogingival junction does not change with advancing age.[42]
(ii) The width of gingiva increases with advancing age in absence of any pathological gingival recession.[43,44]

So as the gingival width increases with age, the position of junctional epithelium remains at CEJ and there is no apical migration of junctional epithelium with advancing age.

Effect Of Advancing Age On Inflammatory Response

Inflammation is a biologic response of the body tissues to harmful stimuli and a protective response which involves immune cells, blood vessels and molecular mediators.[45] The inflammatory response has been shown to be altered in advanced age. Immunosenescence is a decrease in immune response associated with the natural process of aging.[46] Inflamm-aging is a term used to describe the inflammatory response in old age humans.[47] An altered cytokine production and an immunological alteration in leukocytes has been associated with advancing age.[48] In geriatrics, periodontitis is said as one of the contributing factors for heightened chronic inflammatory response.

Aging And Wound Healing

The wound healing is delayed in elderly individuals.[49] This is due to an altered inflammatory response that includes delayed T-cell infiltration into wound area with alterations in chemokine production and reduced macrophage phagocytic capacity.[50] Some other factors are increased platelet aggregation, increased secretion of inflammatory mediators, decreased secretion of growth factors, impaired macrophage function, delayed re-

epithelialization, delayed angiogenesis, delayed collagen deposition and reduced collagen turnover.[49] Due to all these alterations, a reduced wound strength is observed in elderly individuals.

APPROACH TO TREATMENT

It is utmost important that the outcome and prognosis of therapy should be carefully analysed before the treatment of geriatric patients. The need for further treatment will be determined by the re-evaluation performed after cause-related periodontal therapy. Regardless of the age, preservation of a functional dentition by preventing the progression of periodontal diseases is the main objective of periodontal therapy.

Kerry et al (1995) described three therapeutic objectives of supportive periodontal treatment:[51]

(i) To prevent the progression and recurrence of periodontal disease among patients who have previously been treated for periodontitis;
(ii) To reduce the incidence of tooth loss;
(iii) To increase the probability of recognizing and treating other diseases or conditions found within the oral cavity.

Wennstrom JL (2000) described decision tree for periodontal treatment of geriatric patients- (Figure 1)

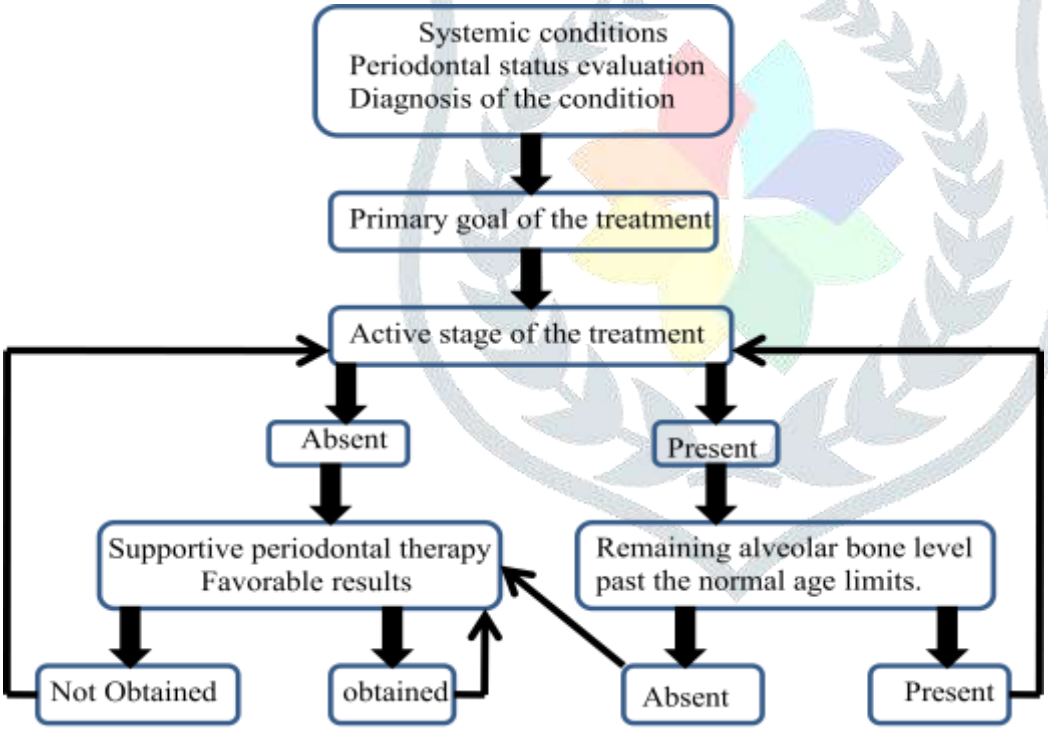

Figure:1 Decision making tree of periodontal treatment for geriatric patients [52]

EFFECTIVITY OF PERIODONTAL THERAPY IN GERIATRIC PATIENTS

Age is not an important criterion for the determination of success rate of periodontal treatment.[53-55] The post treatment self care by the patient and strict adherence to the maintenance protocol is highly dependent on the results of periodontal therapy. Despite of age changes in the periodontal tissues and retarded wound healing, surgical elimination of pathologically deepened pockets has a favorable prognosis in geriatrics. Hence, it is

important to know the extent of maintenance of oral hygiene in order to circumvent the recurrence of periodontal breakdown.[56,57]

Hence, a good periodontal health can be ensured in geriatric patients, if the patient is maintaining a good oral hygiene and is adhering to the maintenance care program.

CONCLUSION

The elderly population is increasing day by day due to improvement in quality of life. Oral health is one of the major issues concerning with increasing age. There are reasonable proofs suspecting that increasing age could be a potential risk factor for periodontal disease. Treatment of periodontal tissues is an integral part of it. The therapeutic choices should be made on the basis of consideration of age, dental and medical status and long term maintenance of elderly individual. Therefore managing the periodontal problems becomes important. We have precisely discussed the periodontal problems faced by geriatric individuals and treatment modalities till date which may help efficiently to treat and maintain the periodontal status.

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