

Effect of edentulism on general health and quality of life

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ABSTRACT

The theoretical link between food choice and masticatory efficiency has long been established in literature. The recent evidences have confirmed this association, indicating a progressive alteration in food choice with decreasing number of teeth with the greatest effect being among those who are edentulous. The elderly population have a typical set of mind regarding the oral health. The data on oral health of elderly depict a worrying situation, with an increased prevalence of caries and periodontal disease. When it is not treated, the final stage of caries and periodontal disease is the loss of tooth and leads to complete edentulism, which is frequent nowadays, but represents a failure of overall dental care system. Furthermore, it is essential to know if the dental problem, general health, and dental treatment have a correlation, which may subsequently have an impact on the overall quality of life of the elderly. The effect of edentulism on daily functions of the oral cavity and interactions in social situations has significant plausibility and has been described using various dimensions before. However, evidence of general health associated with complete loss of teeth is limited. To highlight the importance of oral health to general well-being and its interrelated dependencies, this paper summarizes the source of literature relevant to the inappropriate intake of food and its correlation with general health and systemic diseases. It identifies areas where altered food choice leads to consequences such as reduced masticatory efficiency and behavior pattern due to tooth loss, suggestive of change in the quality of life.

KEY WORDS: Edentulism, Elderly, General health, Oral health, Quality of life

INTRODUCTION

Oral health is important to such an extent that it can hinder a person's ability to work and concentrate on their daily routine. Although not life-threatening, the complete loss of all teeth or edentulism has a significant impact on an individual, especially in the aged, oral problems are more chronic and severe as they have been always neglecting it over the other health problems. Researches like Dolan defined oral health broadly as "a comfortable and functional dentition which allows individuals to continue in their desired social role."^[1]

The World Health Organization defined health as a multidimensional construct: "A state of complete physical, psychological, and social well-being and not merely the absence of disease or infirmity." This interpretation has led to the development of

instruments such as the health-related quality of life (HRQOL) measure, which refers to the impact of health on the individual's ability to function and their perceived well-being in physical, mental, and social domains. In dentistry, major efforts have been made to develop instruments for the measurement of oral HRQOL (OHRQOL), considering the effect of oral health on different aspects of life, including self-esteem, social interaction, and school or work performance, among others.

Oral diseases affect all the human beings irrespective of location, country, nationality, race, or color. The consequences of tooth loss have been described in several dimensions. Edentulism has been shown to affect an individual's quality of life, which then has an impact on psychological well-being; eventually, it is important to know measures to improve quality of life and bring solace and comfort in their lives. Quality of life of individual to a large extent affects families, communities, or even nation. It is a subjective blend of biological and psychological experiences influenced by personal and sociocultural environments. Evans

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reported most elderly people hold a negative attitude toward oral healthcare and these contribute to worsen their oral health.^[2]

The aim of this review is to highlight the importance of edentulism from a public health perspective as well as its impact on the general and systemic health and quality of life of the patient, as a whole. Particular emphasis is also given to the psychological aspects, OHRQOL, oral function, nutrition, morbidity, and mortality.

REVIEW OF LITERATURE

Chewing of food is essential in the initiation of digestion of food. It is responsible for comminuting food so that a bolus can be formed and thereafter swallowed. The presence or absence of teeth will influence the ease of chewing. According to various authors, aging alone has little effect on chewing efficiency, although the literature suggests some reduction in oral motor function as people get older, probably relating to altered muscle bulk.^[3,4] It has been also found that complete denture wearers show a significantly lower chewing efficiency in comparison to persons with a natural dentition.^[5] They have smaller chewing cycles and decreased bite force and muscle activity when compared to dentate patients.^[6-8]

This process of breaking up food and converting it into a bolus to be swallowed is according to few authors, associated with the release of tasteants from the food, enhancing our enjoyment of the things we eat.^[9] Studies have proven that chewing movements are generated by a central pattern generator in the brain stem. The rhythmic muscular activity patterns are constantly modified by sensory input of the oral-facial structures.^[8] It was shown in animal experiments that, after the extraction of all teeth, there is a loss of afferent nerve fibers in the mandibular canal.^[10] Therefore, sensory input is considerably reduced.^[8]

As masticatory efficiency declines, people report increasing difficulty chewing foods and choosing not to eat foods that are difficult to chew. This avoidance is of particular importance for those foods that could be regarded as more difficult to chew, such as raw carrot, nuts, fibrous vegetables, and some fruits. Individuals with a compromised dentition will need a more radical change in food selection, preparation, or both.^[9] In the 1950s, Farrell showed that chewing ability has no influence on digestion of food consumed in a modern diet. He found that the quality of digestion was independent of the extent by which the food had been chewed but was dependent on the food type.^[9-12] People with fewer teeth become handicapped by their dentition and as a consequence may suffer impaired intakes of some key nutrients. One area of particular concern is the level of non-starch polysaccharide

(dietary fiber) intake, which is markedly reduced in older people compared with dietary reference values.^[9,13]

The effect of masticatory efficiency on food selection is likely to be compounded by food preparation. A person with reduced chewing efficiency may overprepare (e.g., removing the skin from fruits and vegetables) or overcook fresh foods in an effort to make consumption practical. A broad range of nutrients are affected by these practices, including foodstuffs that are thought to be important for cancer prevention (e.g., non-starch polysaccharides or dietary fiber) and cellular defense and combating the effects of aging (e.g., the antioxidant micronutrient Vitamins C and E).^[9] Patients who are edentulous tend to favor softer and more processed foods, which are typically higher in cholesterol and fat content.^[14] It may also be lacking in vitamins and minerals. Therefore, being edentulous may predispose one to comorbidities, owing to difficulty in obtaining sufficient nutrition and thereby affecting general health status of an individual.^[15]

In addition to declines in nutrient intake, increases in intakes of saturated fats, cholesterol, and calories are reported in older people as the number of teeth decline.^[9,14]

A number of papers recently have related oral health to systemic health, most notably to atherosclerotic disease and pneumonia in debilitated subjects.^[9] The prime focus for these papers is the role of periodontal pathogens and their associated circulating inflammatory markers in the initiation and progression of the formation of atherosclerotic plaques and hence disease.^[9,16-19] A significant body of evidence also associates dietary imbalance with a variety of systemic illnesses. Reduction in dietary fiber and in fruits and vegetables consumption is associated with an increased risk of cardiovascular disease.^[9,20-23] The mechanisms for this interaction have not been clarified fully but probably relate both to the lipid-lowering capabilities of soluble fiber.^[9,24] It also includes the antioxidant effect from fruits and vegetables. Strong associations have been found between increased fruit and vegetable intake and reduced risk of esophageal, gastric, and colorectal cancer.^[25,26]

There is evidence of the relationship between deficient oral health and various health conditions and quality of life. For example, in a study conducted in Brazil, edentulism was associated with high blood pressure compared to individuals who had more than 10 teeth.^[27] In Japan, Aida *et al.* observed that mortality from cardiovascular disease and respiratory disease was higher among those who had more missing teeth.^[28] Recently, in Mexico, Medina *et al.* found that angina pectoris was associated with edentulism.

This insufficient nutrition leads to malnourishment in edentulous individuals.^[29]

Another important aspect worth highlighting would be about the quality of life of an individual with edentulous condition. Quality of life in the elderly is a very sensitive issue. A study investigated the masticatory performance with OHRQOL in independently living elderly Japanese subjects.^[30] It suggests that the masticatory performance has a direct influence on the quality of life.^[30,31] OHRQOL is measured by various scales, but GOHAI (geriatric oral health assessment index) is one of the most commonly used scales in the assessment of oral-related quality of life in geriatric population.^[31] GOHAI that consisted of 12 items was developed by Atchison and Dolan, the aim of which was in measuring the problems that are related to psychological, physical, and physiological aspects.^[32] It measures the reported functional oral problems of the patient in a simple to administer manner. GOHAI gives a greater weightage to the functional limitations, pain, and discomfort that are more immediate. It was already showed that the subjects who are young would have much better GOHAI scores than the subjects elder to them. Respondents who were better educated had higher GOHAI which clearly indicates a relatively better socioeconomic status and awareness. It was already stated that the females had better GOHAI scores than male which shows that they have better acceptance to the prescribed treatment. The elderly who were married showed very high impact on the QOL, and this is because the married subjects showed higher GOHAI scores than the widow or widowers and the singles.^[31] A study by Jenson in 2008 states that HRQOL is associated with some (perceived need for dental treatment, poor self-rated health, worse mental health, fewer teeth, and relatively poor cognitive status) but not all (e.g., activities of daily living [ADL] and instrumental ADL dependence) measures of oral health, health, and disability status and not with life satisfaction, living alone, or low income.^[33] On the contrary, as per Mack *et al.*, prosthetic status has a significant effect on the physical index of general HRQOL. The reduced dentition without replacement of missing teeth by removable or fixed prosthodontics reduces the physical index of quality of life to the same extent as cancer or renal diseases.^[34]

Studies show that edentulous individuals have significantly lower levels of satisfaction with life. In light of this, a term subjective well-being (SWB) has been frequently used. It is defined as “a person’s cognitive and affective evaluations of his or her life” is one measure of the quality of life of an individual and societies.^[35] Diener in 2000 described it as a subjective definition of quality of life.^[36] This is consistent with other studies which showed that lower levels of SWB, lower morale and self-esteem, less satisfaction with

life, and impaired communication were associated with edentulism.^[33,37-39] Brennan *et al.* noted that edentulism has an effect on an individual’s quality of life which then has an impact on their psychological well-being and therefore on their SWB.^[40] This effect of tooth loss on quality of life may occur as a direct result of altered function resulting from the tooth loss or as a result of changes in perceptions and values that occur with increasing age.^[41] Many authors observed that having good social support was associated with better self-rated oral health and more teeth.^[42]

DISCUSSION

Although it is not life threatening, the complete loss of teeth or edentulism has a very significant effect on an individual. It has been observed to result in functional, psychological, and social limitations and affects the quality of life and general health of an individual. It also affects the ability of the individual to speak clearly and participate fully in activities due to feelings of insecurity and inferiority; this leads to considerable psychosocial problems.

With edentulism, facial esthetics is also compromised. Apart from the obvious lack of teeth on opening the mouth, there is also facial sagging as a result of the loss of the facial support provided by the presence of teeth, giving the individual an aged look. All of which can affect the way an individual feel about his/her life and may also act together to compromise his/her quality of life.

In general, there are two ways to measure the health status of a population. One is a subjective approach by asking the individual and then uses the self-reported health status to summarize symptoms, disease, injuries, or disability. The other is by normative method using skilled health personnel and a clinical examination.^[43] Self-reported health is one of the most frequently used measures of health perceptions evaluated in social epidemiology.^[44,45] It is a relatively stable measure over time and shows high test–retest reliability.^[45,46] It has also been demonstrated that self-rated health is a powerful predictor of both morbidity and mortality.^[46,47] The association between edentulism and self-reported poor health status (bad/very bad) in the Mexican adult population was stronger in the younger segment of the population studied.^[48]

Inability to chew food is a major concern in edentulous individuals. This issue is of prime importance as the consequent digestion may be hampered by improper chewing of food. Another aspect related to chewing is the sensation of taste. Studies say that tastetants are released by efficient chewing of food. Furthermore, edentulous individuals find it difficult to have raw and fibrous type of diet and often tend to switch over to a softer alternative. This is frequently accompanied by

overcooking of food. Consequently, a choice of food tends to alter, and consumption of food containing fat and cholesterol increases profoundly.^[9]

Oral health status is generally poor due to several causative and controversial risk factors and is usually characterized by increasing tooth loss, periodontal disease, and bad oral hygiene.^[49] Various factors such as emotional issues, weak financial conditions, lack of family cooperation and awareness, and multiple medications can worsen the oral health.^[2]

The aim should be to preserve the natural teeth wherever possible, since this can help to enhance general health of the individual and create a positive body image and self-worth, and positively influence quality of life.

CONCLUSION

Edentulism subsequently leads to the alteration in the diet consumption. The massive change in the diet pattern alters and affects the systemic health of edentulous individuals. Not only are the key nutrients lacking in such individuals but also it causes increased propensity to cardiovascular diseases and such comorbid conditions. All of these reasons may end up eventually leading to malnourishment. The lack of sufficient nutrition markedly affects the general health of the patient. Summation of these also affects the quality of life of the individual to a great extent.

Edentulism is declining due to the new treatment modalities which in recent days are very promising. The dental treatment protocols are shifting from removable to a more fixed option for rehabilitation of missing teeth. In light of such a change, there is a lot of scope in the future to prevent the effect of edentulism, on the oral health as well as general health, and well-being of any individual. Thereby, quality of life and the psychosocial aspects are also hoped to improve effectively.

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