



**REVIEW ARTICLE**

**Psychological Satisfaction Of Completely Edentulous Patients Treated With Complete Dentures  
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**ABSTRACT**

**Loss of natural tooth/ or teeth has functional and psychosocial consequences on the patients personality. These consequences can be rectified with complete replacement dentures for such patients. However, the psychological satisfaction or outcome of complete denture therapy is variable, and relies on patient factors, as well as the skill of the clinician and laboratory technician making the dentures. This article reviews recent literature on the psychological satisfaction or outcomes of edentulousness and complete denture therapy.**

**Introduction**

Adult dental health surveys conducted in industrialized countries like United Kingdom (U.K.) and United States (U.S.) revealed the positive attitudes of elderly individuals towards the preservation of their natural teeth.<sup>1,2</sup> Kelly and colleagues<sup>2</sup> estimated that the prevalence of edentulousness in U.K. will continue to decline and reach a floor level of 6% of the population by 2038. Though the prevalence of edentulousness has declined, but many elderly individuals are becoming edentulous in the foreseeable future. Dental profession must

consider the significant trend of people toward total tooth loss occurring in future life rather than peeping into the loss that had occurred in the past. This consideration might pose a major challenge keeping in mind about the diminished capacity of elderly to adapt to the limitations raised during complete denture wearing. This article reviews recent literature on the psychological satisfaction or outcomes of completely edentulous patients after rehabilitation with complete denture therapy.

**MENTAL ATTITUDE OR PSYCHOLOGICAL STATUS OF OLDER ADULTS TOWARDS EDENTULOUSNESS**

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Adult individuals have developed greater expectations about their dental and oral health than in the past. The mental attitude of aged people towards tooth loss is changing and they more prefer the retention of their existing dentition. The national survey carried in adult individuals of United Kingdom in 1998 have reported that these adults are more concerned about the prospect of losing their teeth and find the prospect of total tooth loss upsetting.<sup>2</sup> Several authors<sup>3-6</sup> conducted the cross-sectional surveys to find out the discrepancy between need for Prosthodontic treatment and complaints in an elderly edentulous population. The results of these surveys depicted that the adults who had been edentulous for less than 10 years were more likely to have a denture-related complaint for which they would seek advice or treatment. These studies concluded that elderly experienced denture wearers are more likely to accept limitations of denture wearing than their younger counterparts. It also suggested that older adults with a long history of denture wearing accept edentulousness as part of the aging process. Surveys carried in various parts of England, showed that with time many edentulous adults learn to cope with the limitations of complete dentures and adjust their expectations of oral function accordingly.<sup>3, 4, 7</sup> These studies indicated a clear

discrepancy between normative need and perceived need for complete denture therapies among institutionalized elderly individuals.

Current trends in adult dental and oral health might influence the mental attitude of elderly population towards edentulousness and satisfaction with complete dentures. The prevalence of adults retaining their natural teeth into old age has been increased and hence, the transition to the edentulous state will occur later in life. Some authors<sup>8-10</sup> have found an ultimate diminution in the ability of adults learning the complex series of reflexes required to control complete dentures with advancement in age. They concluded that the denture-related complaints increase in the elderly population.

#### **MORPHOLOGICAL OR ANATOMICAL CHANGES FOLLOWING TOOTH LOSS**

Teeth perform several functions including chewing of food, facilitation of speech, and enhancing facial expression. These functions are greatly affected with the loss of a tooth. Various intraoral and extra oral changes take place following extraction of natural teeth, differing among partially dentulous and complete edentulous individuals. Most of the changes in alveolar bone occur in the first year following extractions. Tallgren<sup>11</sup> observed a continuing reduction of the residual alveolar ridges in complete denture wearers in his

mixed-longitudinal study covering 25 years. He demonstrated that the bone loss in edentulous individuals was 4 times greater in the mandible than in the maxilla. Bergman and Carlsson<sup>12</sup> carried a clinical long-term study of complete denture wearers and confirmed that bone loss is an ongoing process following tooth loss. Van Waas and colleagues<sup>13</sup> compared the mandibular bone loss in patients treated with immediate overdentures or with immediate complete dentures after 2 years of tooth removal. This randomized clinical trial was conducted on 74 patients and significant differences in bone loss were noted between the two groups. The authors suggested that the roots retained to support a denture helped reduce bone loss in all regions of the mandible. However, Carlsson<sup>14</sup> could not understand the reasons for inter-patient variation in bone loss. Devlin and Ferguson<sup>15</sup> reviewed the correlation of alveolar ridge resorption and mandibular atrophy and brought some evidences from currently available studies. They summarized that the post-extraction alveolar bone loss is influenced by a combination of both local and systemic factors. However, the exact pathogenesis of alveolar bone loss is still unknown and unclear. Prediction of the rate of alveolar bone loss depending on an individual-based variation is unreliable. Bone loss results into decreased denture-bearing area. The

decreased mandibular alveolar bone height leads to problems in denture stability.

In anterior maxilla, mostly alveolar bone is replaced by fibrous tissue that results into displacement of maxillary denture during function. With the advancement in bone loss, structures such as the mylohyoid ridge and genial tubercles often turn prominent. Mucous membrane covering these structures is very thin and friable, which makes it incapable of withstanding functional stresses resulting from dentures. Pain and discomfort arising from these areas warrants surgical reduction of bony prominences and the application of resilient denture-liners. Budtz-Jorgensen<sup>16</sup> reported certain oral mucosal lesions associated with the wearing of removable dentures. Oral pathologic conditions such as denture-induced hyperplasia and denture-induced stomatitis are linked with problems with denture stability.

Facial appearance is drastically altered following post-extraction of total teeth. The natural teeth along with the surrounding alveolar bone provide proper support to the circumoral musculature. Several authors<sup>17-19</sup> performed longitudinal cephalometric and clinical studies to determine the morphologic and positional changes of the mandible after extraction and wearing of dentures. According

to these studies, loss of teeth gives rise to a “dished-in” appearance. Occlusal face height, which is determined by teeth, also changes. The overall effect is that the chin approximates towards the nose, leading to an appearance of decreased facial height or loss of “vertical dimension.” The principle findings of these studies were that loss of facial height and consequent mandibular prognathism were caused by progressive and continuous mandibular bone loss. These positional changes were not rectified by a relining of the mandibular denture. Tallgren<sup>18</sup> conducted a 7-year longitudinal study to determine the positional changes caused by complete denture wearing. He compared lateral cephalograms of edentulous patients with a group of patients who were edentulous in the maxilla and partially dentate in the mandible. In this follow-up study, the loss of facial height was markedly greater in the edentulous group, indicating the benefit of retaining some natural teeth in the mandible. The loss of alveolar bone height and width also results in marked changes in soft-tissue profile, particularly in the first year after tooth extraction. Tallgren and colleagues<sup>20</sup> used profile cephalometric radiographs to monitor soft-tissue changes in lip profile in subjects receiving complete immediate dentures. During a 2-year follow-up period, continuing residual ridge reduction led to pronounced protrusion of

the mandibular lip and chin. Loss of occlusal vertical dimension is also associated with poor maintenance of complete replacement dentures.

#### **MASTICATORY PERFORMANCE OR MASTICATORY ABILITY**

In complete denture wearers, the ability to chew food can be assessed using objective tests of masticatory performance or subjective assessment of masticatory ability. Masticatory performance tests utilize various test foods that are given to patients for chewing and the resultant food particle size is analyzed using fractional sieving laboratory technique. The amount of chewing strokes required comminuting food to a certain particle size and bite force is analyzed in this technique. While measurement of masticatory performance is useful, demonstrating a decreased masticatory performance may not in itself be clinically meaningful. For instance, a subject may not be able to chew a certain test food as quickly as a control subject, but is nonetheless able to chew the food. Masticatory ability, which gives an indication of subjects’ own perspective on their perceived ability to chew foods, may be more relevant. One problem with using this technique is that the subjects’ responses may be influenced by food preference rather than any physical barrier to chewing food. Slagter and colleagues<sup>21</sup> suggested measuring both

masticatory ability and performance to determine the ability of edentulous individuals to comminute tough foods. The performance of edentulous individuals wearing complete dentures is significantly less than dentate individuals. Wayler and Chauncey<sup>22</sup> investigated the impact of complete dentures and impaired natural dentition on masticatory performance and food choice in healthy aging men. They observed that complete denture wearers experienced more difficulty in chewing hard foods than dentate subjects. Similar findings were reported by certain authors who found that masticatory performance of edentulous individuals was one-sixth of that achieved by dentate individuals.<sup>23, 24</sup> However, other authors reported that this decreased masticatory performance could be related to age as well as dental status.<sup>25, 26</sup> Nevertheless, the finding that masticatory performance is related to number of teeth seems to be consistent, and confirmed by other workers using different methodology. Several authors<sup>27-29</sup> assessed bite forces achieved by complete denture wearers and compared it with dentate individuals. They found that the bite force of complete denture wearers is around 20% of that achieved by dentate controls. This reason may explain why edentulous patients report difficulty in chewing tough foods.<sup>22</sup>

Masticatory ability has been assessed by structured questionnaires in a number of investigations. Agerberg and Carlsson<sup>30</sup> used a questionnaire to determine perceived chewing ability of 1,106 dentate and edentulous individuals. Edentulous subjects tended to rate their chewing ability lower than dentate individuals. However, only 8% of the edentulous individuals rated their chewing efficiency as poor. A noteworthy finding was that individuals who were edentulous in one jaw only considered their chewing efficiency to be reduced to the same extent as individuals who were edentulous in both jaws. Other studies have measured both masticatory performance and masticatory ability. In studies that evaluated the effects of new, optimal dentures, masticatory performance and ability were not significantly improved.<sup>21, 25, 31, 32</sup> The results of these studies revealed a moderate correlation between objective and subjective assessments. Boretti and colleagues<sup>33</sup> reviewed masticatory ability and efficiency in complete denture wearers and suggested that the patient-assessed measures of chewing function tend to be more positive than objective measures of chewing function. This finding has implications for planning treatment, and indicates a need for a standardized index of chewing efficiency.

### **DENTAL STATUS AND DIETARY SELECTION**

The relationship between dental status and dietary intake of food items among older adult populations was surveyed.<sup>34-36</sup> These surveys showed that the loss of natural teeth is related to diminish nutritional intake, especially in older adults. The adults wearing partial or complete dentures have poor-quality diets. The reasons for this could be difficulty in chewing hard foods such as raw vegetables and fruit and a decreased sense of taste. Mostly, oral tissues become more friable in poorly nourished individuals, such that the oral mucosa is unable to withstand trauma from dentures. In such situations, softer, more highly flavored foods may be substituted by elderly. However, these foods frequently have a lower nutritional value. Evidence is emerging that improving the quality of complete replacement dentures does not radically alter dietary selection in edentulous patients.<sup>37, 38</sup>

Steele and colleagues<sup>36</sup> carried a National Diet and Nutrition Survey amongst people aged 65-years and over in London and reported that dentate individuals had higher daily intake of protein, fiber, calcium, iron and vitamin C than their edentulous counterparts. The sampling strategy employed meant that the results could be considered nationally representative. Participants included both independently living and institutionalized groups of dentate and edentulous adults. The findings, derived from

an analysis of food diaries, were confirmed by hematologic and biochemical analysis of nutritional status. These results have implications for general health in adults, as poor diet may lead to deficiency of nutrients and illnesses such as osteoporosis, atherosclerosis and bowel disease. However, the evidence to suggest that nutritional state relates to dental status alone is sparse; other strong influences on dietary selection and nutritional state include age, socio-economic status and general health.

Numerous reports have assessed whether dietary intake is related to denture quality<sup>39</sup> or improves after provision of either complete replacement dentures or implant prostheses for edentulous patients.<sup>40, 41</sup> These studies used self-complete food diaries to assess dietary intake, and consistently observed that edentulous patients had low fiber and high fat intake before and after treatment. Given this consistent trend, dental status can only be a co-factor with other factors such as socio-economic status. Nonetheless, poor nutritional status is apparent in elderly edentulous adults, particularly those living in institutions.<sup>36</sup> Shinkai and colleagues<sup>38</sup> recommend that these patients receive dietary counseling as part of their Prosthodontic rehabilitation.

#### **PSYCHOLOGICAL CONSEQUENCES OF EDENTULOUSNESS**

The World Health Organization has provided an international classification of impairments, disabilities and handicaps.<sup>42</sup> WHO described impairment as the loss of an anatomic body part; disability as being prevented from partaking in everyday activities such as chewing and speaking; handicap as minimized contact with other people in society. For some, the loss of all natural teeth leads to impairment, disability and handicap. The loss of natural teeth and associated alveolar bone leads to impairment. If dentures are unstable or unretentive, they may prevent proper chewing or speaking, thus causing disability. This state may also arise if the denture causes pain or a denture-associated pathology such as denture-induced hyperplasia. Impairment and disability are well recognized, and most denture techniques are directed at overcoming these problems. The broader issue of handicap associated with edentulousness has not received as much attention in the literature, perhaps because of the difficulties in assessing this state. This domain of health is difficult to measure and requires expertise beyond the dental disciplines.<sup>43</sup> Furthermore; tooth loss is a commonplace, nonfatal condition, which does not usually elicit sympathy from others.

Several authors<sup>44, 45</sup> used psychological assessment measures to assess patient acceptance of complete dentures, but no

convincing association was described. Many adults develop the skills required to overcome limitations of dentures and learn to accept these limitations with time. However, some patients do not cope well with the loss of natural teeth, and are classed as “maladaptive.” Friedman and colleagues<sup>46, 47</sup> have discussed the influences of fear, anxiety, and depression on the patient’s adaptive responses to complete dentures. Accordingly, the three classes of maladaptive responses to complete dentures are as follows:

Class 1: patients who can adapt physically but not emotionally;

Class 2: patients who cannot adapt physically or emotionally;

Class 3: patients who cannot and do not wear dentures, who are chronically depressed, and who isolate themselves from society.

Using a qualitative approach, the authors also describe 3 influences they believe have an impact on the maladaptive response. Parental influence may affect how individuals perceive themselves and their teeth. Teeth may also have a symbolic significance; loss of teeth may reflect impending loss of virility, loss of facial attractiveness and body degeneration.

Current life circumstances may strongly influence the adaptive response to tooth loss. The strong extraneous influences may

compromise the individual's ability to accept complete loss of natural teeth. Fiske and colleagues<sup>48</sup> employed a qualitative approach assessing the emotional effects of tooth loss in edentulous people. Using an unstructured interview technique, 50 edentulous individuals were invited to discuss their feelings about tooth loss, from the time of being rendered edentulous. The study sample was recruited from patients attending for conventional Prosthodontic treatment at an undergraduate student clinic. There was no suggestion in the paper that any of the study subjects demonstrated maladaptive tendencies. Common themes that emerged from these interviews were feelings of bereavement, lowered self-confidence, altered self-image, dislike of appearance, inability to discuss this taboo subject, concern about dignity, behaving in a way that keeps tooth loss secret, altered behavior in socializing and forming close relationships, and premature aging. The study concluded that tooth loss may profoundly affect the psychosocial well-being of patients, even those who are apparently coping well with dentures. MacEntee and colleagues<sup>49</sup> also reported the similar findings in their study. Studies advocate the use of qualitative methodology to fully explore the significance of the mouth in old age.<sup>48;</sup> <sup>49</sup>Van Waas<sup>50</sup> studied the influence of clinical variables on

patients' satisfaction with complete dentures. He concluded that denture quality had little influence on patient acceptance. However, Fenlon and colleagues<sup>51</sup> suggested a strong relationship between quality of the dentures and patient acceptance. Fenlon and colleagues<sup>51</sup> argued that previous studies used inappropriate statistical tests of association between denture quality and patient satisfaction. There is some evidence that patients with emotional problems tend to be dissatisfied with dentures.<sup>52-54</sup> Silverman and colleagues<sup>55</sup> employed a focused interview technique to assess the impact of self-image on denture acceptance. They concluded that patients with high morale and self-image were more likely to accept complete dentures. Vervoorn and colleagues<sup>56</sup> reported that overall denture satisfaction was not associated with personality traits. However, individual variables such as comfort of the mandibular denture were associated with the personality trait "introversion-extroversion" and neuroticism. These associations, though statistically significant, were not strong. Other studies have not found this relationship.<sup>57</sup> Personality trait may affect denture acceptance, but individual variation exists. Fiske and colleagues<sup>48</sup> suggest that even when there is an association between personality and dissatisfaction with complete dentures, it should not be assumed that the relationship is

unidirectional. Rather, it could well be that tooth loss and consequent denture wearing have caused the personality or psychological problems. These authors exhort against dismissing patient dissatisfaction with complete dentures as a deficiency in personality.

### **CONCLUSION**

Clinical practice in the rehabilitation of edentulous patients is informed to a major extent by anecdotal evidence and limited scientific research evidence. Scientific research into the potential satisfaction or outcomes of total tooth loss and complete denture therapy has been restricted by lack of randomized clinical trials, questionable use of statistical tests and failure to include comparable control groups. The current evidence base needs to be supplemented with stronger evidence from a more rigorous study design, which will lead to a better understanding of the outcomes of tooth loss and complete denture therapy.

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