Construction faults, age, gender, and relative medical health: Factors associated with complaints in complete denture patients

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Statement of problem. Many practitioners will experience a situation, whereby a patient with newly fabricated complete dentures continues to experience difficulty in adapting to them. This can lead to a protracted period of discouraging “adjustment appointments” that may not result in the eventual resolution of the problem. Therefore it is often concluded that there is some patient factor, either age, gender, medical, or psychologic status that is hindering the success of treatment.

Purpose. This study examined a group of 100 patients who experienced ongoing difficulties with their new complete dentures, to determine possible underlying causes.

Material and methods. A retrospective study was conducted with information derived from patient records. All patients were treated by the same prosthodontist after having been referred specifically for their denture problems. Information regarding patient age, gender, medical and psychological histories, and information pertaining to the dentures at the time of presentation was derived from patient records.

Results. Statistical analysis comparing age, gender, and medical and psychologic status with the number or type of patient complaint failed to show any significant relationships. Significant relationships were observed when denture design faults or the condition of a patient’s mucosa were compared with patient complaints.

Conclusions. This study suggests that in most instances, complete denture patients present with complaints only when there is a real design fault or a tissue problem. (J Prosthet Dent 1998;79:545-54.)

CLAUSINK IMPLICATIONS

Although many complete denture patients are elderly and may suffer from a variety of medical or mentally compromising conditions, these factors together with patient gender are not frequently related to ongoing denture difficulties. The clinician is advised to carefully determine the adequacy of the patient’s dentures before suspecting another patient-related cause.

A major challenge in dental practice continues to be the successful management of the complete denture patient who experiences ongoing difficulty with his or her dentures. Often there is not total agreement between the patient and the dentist as to the adequacy of their dentures. This differing perception of patient needs makes management more difficult. The fact that a denture of poor quality may be well tolerated in one person, while a well-made one may be a failure in another has been a frequent source of confusion and frustration. It is our opinion that this has led many dentists away from taking proper care in the construction and provision of good quality dentures in the belief that the patient will adapt to almost anything, irrespective of the quality.

Several authors cite the most frequent complaints with complete dentures are those pertaining to retention and stability, esthetics, comfort while eating, and the accumulation of food under the appliance. The factor that most often appears to have an impact on either the success or failure of complete dentures is esthetics. A patient may find it difficult to volunteer the fact that it is the appearance of their dentures that prevents them from wearing them. The way in which the patient believes he or she should look is not always in accordance with the clinician’s perception of a pleasing appearance.

Some patients find it difficult to adequately manage removable prostheses of any kind, especially complete dentures. Moreover, systemic medical conditions and local physical factors may make successful wearing of a removable prosthesis difficult. Medication required for systemic or local disease can adversely affect oral tissues and the quantity and quality of saliva produced. The psychologic status of a patient also appears to have great bearing on his or her ability to manage removable prostheses. It has been reported that with advancing age, both men and women experience diffi-
Attention has been focused on women who are experiencing menopausal changes. It is believed that they are prone to experience more difficulty because of the physical and emotional changes they undergo during and after this time.5,7,8,10,13

Attention has also been focused on patient's expectations of their dentures. Patients may have unrealistically high expectations of their dentures, often believing that the dentures will be comparable to their natural teeth.3,4,5,6,7,10,13 It has been stated that these high expectations of dentures are more prevalent in older age groups.5 Fiske et al.21 stated that there is also a social dimension to ongoing denture complaint in the elderly, as visits to the dentist for adjustments provide these elderly patients with something to do.

When assessing a patient who is experiencing difficulty with his or her dentures, the clinician must critically assess the factors that influence denture acceptance. These factors may provide an explanation as to why there is often a difference between the perceptions of the dentist and the patient of where the difficulty lies.

The purpose of this study was to examine 100 complete denture patients experiencing difficulties with their prosthesis and determine: (a) the most frequent complaints; (b) the age and gender distribution of these patients and how they may relate to complaints; (c) the number of patients afflicted with chronic and debilitating medical conditions and how this relates to complaints; and (d) the most frequently identified denture faults and how these may relate to patient complaints. The null hypotheses for this study were that there is no relationship between patients' age or gender and denture complaints; no relationship between medical conditions and denture complaints; and no relationship between denture faults and patient complaints.

METHODS

The charts of 100 patients were selected from a group of more than 500 patients who had been referred to the Repatriation General Hospital Greenslopes, Brisbane, because these patients were experiencing difficulty with their complete dentures. Each patient had been referred to the hospital dental clinic for specialist assessment and treatment of his or her complete dentures. The 100 charts selected were those of the first and last five complete denture patients seen each year for a period spanning 11 years and thus provided a retrospective record of events.

There were 65 men and 37 women in the sample. Their ages ranged from 43 to 90 years with a mean of 68.7 years. The patients were grouped into seven age divisions: less than 60 years, 60 to 64 years, 65 to 69 years, 70 to 74 years, 75 to 79 years, 80 to 89 years, and over 90 years (Figs. 1 and 2).

The patients were selected from a population that comprised eligible male and female service veterans, their spouses, and siblings. The same visiting prosthodontist examined and treated each of the study patients for the length of their treatment period. Notes on assessment and subsequent treatment were recorded methodically and systematically in their hospital files. Information regarding the patients' general medical condition, psychological health, or other ailments were also derived from the records in the patient's hospital files.

For purpose of comparison, patients whose medical records revealed that they experienced a chronic or debilitating condition were classified as having chronic illness. These conditions included respiratory disease, advanced coronary conditions, renal failure, endocrine disorders, partial or hemiparesis, or diagnosed emotional or psychologic disorders (anxiety or depression).

In a similar manner, patients whose records showed evidence that they experienced an illness or disease state of which a symptom is chronic pain resulting in prolonged or constant periods of discomfort were classified.
under the grouping of chronic pain. Most of these patients had degenerative or inflammatory bone and joint disorders. There was crossover between these groups such that many were classified under chronic illness and chronic pain.

At the time of examination, the patients' comments regarding the adequacy of their dentures were recorded. Five divisions were used to group the various complaints the patients presented with. Those patients who stated that they experienced pain and discomfort on inserting or removing the dentures or pain while at rest or in function were grouped under "Pain." Those patients who experienced difficulties incising and masticating their food or instability when in such function were grouped under "Eating." Complaints of loose dentures or dropping dentures or complaints attributable to insufficient retention were grouped under "Looseness." Finally, patients whose complaints related to food accumulation around or under the appliance and those whose complaints related to leaping, whistling, or distorted phonetics were grouped under "Food" and "Speech," respectively. Patients with multiple complaints were listed under more than one grouping.

The condition of the patient's denture-bearing tissues was assessed at the initial appointment. The examination screened for ulceration, presence of infection, or any other abnormalities such as hyperplasia or neoplasm. Accordingly, patients were grouped as ulceration or infection "Present" or "Not Present."

Finally, an examination of the dentures was conducted to determine the adequacy of the denture base and occlusal scheme design according to the principles of base design and complete denture occlusion established by Rahn and Heartwell. The most frequently observed inadequacies of the presenting dentures were then grouped under "Retention," "Jaw Relationships," and "Tooth Position."

Retention incorporated perceived errors in base design (underextension or overextension of denture bases in the maxilla and/or mandible), poor tissue contact (observed in mandibular bases only or both mandibular and maxillary bases), and inadequacies in the posterior palatal seal (either incorrect position anterior-posteriorly or inadequately formed).

The heading "Jaw Relationships" grouped together errors in anteroposterior relationships (anterior premature tooth contact and posterior premature tooth contact) and errors in occlusal vertical dimension (excessive or inadequate). Tooth position involved errors in arrangement and setting of either the anterior or posterior teeth. These were errors in the buccolingual and anteroposterior positioning of the teeth, and vertical errors in tooth position involving the occlusal plane height.

The information collected from patient files was summarized by recording with a "tick the box" method onto a standardized data sheet. The information was then converted to numerical codes, and descriptive statistics were obtained by processing this information on a Packard Bell 386SX IIE computer (Packard Bell Electronics Inc., Chatsworth, Calif.) with the Statistical Package for the Social Sciences (SPSS, Chicago, Ill.). The statistical tests used to investigate differences between groups were the chi-square test, t test, Fisher's exact test, and the test for linear correlation. These tests were performed by a statistician at the University of Queensland. The level of statistical significance chosen was \( \alpha = 0.05 \).

RESULTS

Common complaints

All patients seen at the dental clinic had at least one complaint; many patients had multiple complaints. It was observed that 75% of patients complained of problems relating to pain and discomfort; 61% stated that they had difficulty eating their food; 59% stated that their dentures were loose; and only 17% complained of food accumulating around or under their appliances. A total of 16% of the patients in the sample said they had difficulties with their speech while wearing their dentures (Table I). A chi-square test was applied to determine whether there was a relationship between the patient's gender and any particular complaint (Table II). No dependence was observed between patient's gender and the type of complaint (\( \chi^2 = 1.7, df = 4, p = 0.791 \)). The
average number of complaints per male and female patient were then measured with a t test. They were found to be not statistically different (t = 1.15, df = 98, p = 0.244).

The possibility of the presence of a relationship between patient's age and the type of complaint was tested by a chi-square test (Table II). No dependence was found to exist (χ² = 13.412, df = 24, p = 0.959). However, many of the cells in the contingency table (Table II) contained counts of less than 5, which can invalidate the test. A test of linear correlation was then applied to determine the existence of a relationship between patient's age and the number of complaints. No linear relationship was observed.

Chronic illness and chronic pain

Twenty-eight patients in the sample suffered from a condition that was categorized as a chronic illness, and many experienced more than one disease state or systemic disorder. This group also included patients with diagnosed emotional or psychologic disorders. A majority of these patients (40%) had advanced cardiac or circulatory disorders. Twenty-four sample patients suffered from conditions relating to chronic or prolonged episodes of pain, and these conditions related mainly to degenerative bone and joint disorders. Most patients suffering with a chronic illness also had chronic pain and were placed in both groupings.

Chi-square testing was conducted to determine whether there was a relationship between patients suffering with chronic illness and the type of complaint they presented with (Table III). No significant relationship was observed (χ² = 0.859, df = 4, p = 0.930). The average number of complaints per patient was 2.17 for those suffering a chronic illness, and 2.22 for those not suffering chronic illness. These were not statistically different when tested with the t test (t = 0.230, df = 98, p = 0.914). The average number of complaints from patients suffering with chronic pain was 2.25, and 2.20 for those without chronic pain. No significant relationship was observed when the t test was applied (t = 0.195, df = 98, p = 0.971). Finally, a chi-square test was carried out that failed to demonstrate a significant relationship between patients suffering from chronic pain and the type of complaint (χ² = 0.983, df = 4, p = 0.912).

Condition of the denture bearing tissues

Examination of the oral lining mucosa of the denture bearing tissues revealed that 31 patients in the sample exhibited ulcerative lesions in the mandible and 16 patients showed evidence of lesions in the maxilla. A generalized inflammatory appearance indicative of fungal infection was seen in the maxillary edentulous arches of five patients. Evidence of infection was not observed in the mandibular arches of any patients and no other lesions were diagnosed.

To determine whether there was a relationship between mucosal lesions and the type of denture complaint, a chi-square test was performed for each of the five complaint groupings against the presence of ulceration or infection in either of the mandible or maxilla (Table IV). A significant relationship (p < 0.01) was found when comparing the patient complaint of pain with the presence of ulceration or infection in either dental arch.

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### Table III. Summary table of results of the chisquare testing of the presence of chronic pain or chronic illness against patient complaints

<table>
<thead>
<tr>
<th>Complaint</th>
<th>Chronic illness</th>
<th>Chronic pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eatting</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Food</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Loose</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Pain</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Speech</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

* = Significant relationship (p < 0.05).
X = Not significant.

### Table IV. Summary table of results of the chi-square testing of the presence of ulceration and infection in the mucosal tissues against patient complaints

<table>
<thead>
<tr>
<th>Complaint</th>
<th>Ulceration or infection</th>
<th>Ulceration only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eatting</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Food</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Loose</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Pain</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Speech</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

* = Significant relationship (p < 0.05).
X = Not significant.
(χ² = 7.244, df = 1, p = 0.007). This result was confirmed by performing a Fisher's exact test (two-tailed), which also revealed a significant relationship (p = 0.009). The complaint of pain was then tested only against ulceration of either dental arch only using both chi-square (χ² = 6.787, df = 1, p = 0.009) and two-tailed Fisher's exact tests (p = 0.007). A significant relationship was thus observed at the p < 0.01 level.

The remaining four complaint groupings were tested against the presence of ulceration or infection in either arch with chi-square tests (Table IV). No significant relationships were observed. (Ulceration or infection vs: [a] Eating [χ² = 2.554, df = 1, p = 0.110]; [b] Food [χ² = 3.964, df = 1, p = 0.066]; [c] Loose [χ² = 0.028, df = 1, p = 0.868]; and [d] Speech [χ² = 0.608, df = 1, p = 0.436]).

Denture faults

All of the dentures assessed were determined to have some faults or errors (Table V). On initial examination, 88 patients had dentures that exhibited poor retention.

Of these patients, two had dentures whose bases were overextended; the remaining 86 had underextended denture bases (Figs. 3 through 5). Of these 88 patients, 86 showed poor tissue contact between denture base and the load bearing areas (areas of high and low pressure) (Figs. 6 and 7). Fifty patients showed this problem in the mandibular denture only, and 36 in both denture bases. The posterior palatal seal was determined to be inadequate in 34 of these patients.

Ninety-four patients had dentures that exhibited errors in jaw relationships. Anteroposterior relationship errors were slightly more prevalent with 72 patients who have dentures with either posterior premature tooth contacts (63) or anterior premature contacts (9) (Figs. 8 and 9). Incorrect occlusal vertical dimension was observed in 68 of the 94 patients. It was observed that the denture designs resulted in more patients being overlapped with 38 patients who have too small a VDO, whereas 30 patients had been provided with one too large (Figs. 10 and 11).

Errors in horizontal and vertical positioning of either
antior or posterior teeth were observed in the den-
tures of 63 patients (Fig. 12, A through C). A patient's
dentures frequently displayed two or all three of these
erors and were counted as “yes” for each category.

Contingency tables were prepared for Chi-square test-
ing to determine the presence of a relationship between
each of the three faults observed, and each of the five
groupings of patient complaints. Only two significant
relationships were observed (Table VI): (1) between
faults relating to retention and the patient complaint of
loose dentures \(\chi^2 = 10.102, df = 1, p = 0.002\), and (2)
between faults relating to jaw relationships and the pa-
tient complaint of difficulty eating \(\chi^2 = 10.072, df = 1,\)
\(p = 0.002\). Both relationships were confirmed with a
Fisher's exact test and determined to be significant
\(p < 0.01\). Contingency tables were also prepared to test
for relationships between observed denture faults and
age, and faults and gender; however, no significant rela-
tionships were observed (Table VI).

**DISCUSSION**

The patients in this study were drawn from a popula-
tion of people who were Australian service veterans
or spouses. This sample may not be representative of the
edentulous population on a whole. One notable dif-
fERENCE was the male to female ratio of 1.7:1, whereas other
studies have reported samples where the ratio was re-
versed with 1 male subject for every 1.6 to 4.0 female sub-
jects.\(^2,8,9,10,16,18\) Also, the mean patient age of this sample
was 68.7 years, which was higher than the mean ages
reported in other studies samples (53 to 65 years)\(^2,8,9,10,16,18\)
possibly due to the fact that many patients in this study
were World War II veterans. It is also possible that mil-
itary service-related conditions may be responsible for
the medically compromised state of these patients more
than might be seen in the general population.

Information was obtained retrospectively from patient
dates in a manner similar to DePsoila et al.\(^12\) The assess-
ment of each patient by the same prosthodontist en-
sured standardization and consistency of observations,
but may have introduced bias. However, in accordance
with studies by Smith and Hughes,\(^6\) Power and Cleaton-
Jones,\(^7\) and Cabot,\(^22\) observations by the prosthodontist
were accepted as the “Gold Standard” for assessment of
denture faults. The prosthodontist’s involvement in col-

**Table VI. Summary table of results of the chi-square testing of
the different denture faults against patient complaints**

<table>
<thead>
<tr>
<th>Complaint</th>
<th>Retention</th>
<th>Jaw relationships</th>
<th>Tooth position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eating</td>
<td>X</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>Food</td>
<td>X</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>Loose</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>Pain</td>
<td>X</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>Speech</td>
<td>X</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>Age</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Gender</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

✓ = Significant relationship \(p < 0.05\).
X = Not significant.
Fig. 10. A, Frontal and B, profile views of patient demonstrating overclosure and collapse of nasolabial features due to VDO that is reduced.

lection and interpretation of notations in the patient files ensured accuracy of data transcription.

The most common complaints of the complete denture patients in this sample were Pain and Generalized Discomfort (75%), Difficulty in Eating (61%), and Looseness of the dentures (59%). This result supports the findings of Kotin,14 (Pain 45%, Eating 40%, Looseness 80%) and Smith and Hughes,15 (77% Pain, 55% Looseness, 15% Eating). Interestingly, there were no complaints from the patients in this sample regarding the appearance of the dentures, which is in strong contrast to most other reports.1,14 This may be attributed to an observed "easy going" and appreciative attitude of many elderly service veterans in Australia toward the providers caring for them.

Statistical testing in this study failed to identify any relationship between patient age or gender and the number or type of complaints regarding their complete dentures. This conflicts with the accepted views that older patients are more likely to experience difficulties with their dentures and complain more frequently.6,11 Muller and Hasse-Sander4 reported that oral motor abilities and the capability of adaptation to new dentures are not clearly age related and concluded that aging is a biologic process and not simply chronologic, which leads to considerable individual variation in oral motor and adaptation abilities.

Edwards and Bouchier21 stated that the median age for onset of menopause occurs at 50.8 years. However, only one woman in this study was below this age (43 years), so it could be assumed that the remaining women in the sample were menopausal or postmenopausal. The failure to observe a significant relationship between gender and number or type of complaints would tend to challenge the reports of Powter and Cleason-Jones,18 Winkler,7 and Heartwell.5 However, the results of our study supports the findings of Langer et al.2 and Berg,10 who observed no significant patient age or gender relationships on denture acceptance.

The significant relationship between the condition of the mucosa of the denture bearing areas and the complaint of pain and discomfort was anticipated. It is assumed that denture patients who were medically comprised or being treated with medications that produce oral side effects with introral manifestations will experience more difficulties with their dentures. DePaola et
al.\textsuperscript{11} further reported that all common medical conditions except rheumatic heart disease and congestive heart failure produced complications in their study. The results of our study revealed no such relationships between the patient's medical condition and the type or number of denture complaints. Similarly, no significant relationship was observed between the number of patients experiencing chronic pain and the type or number of complaints.

Finally, the various faults in denture construction and the frequency of their occurrence were addressed. Although the literature contains references that describe how to identify construction faults and procedures for their rectification,\textsuperscript{26,27} there are few reports describing the commonly observed construction faults seen in existing complete dentures.

All patients in this study were referred from general practitioner dentists who were unable to identify problems with the existing dentures, or unable to rectify them sufficiently to overcome the patient's complaints.
This study found 88% of patients had dentures with poor retention. The denture bases were either underextended or overextended (86% and 2%, respectively), formed poor tissue contact (86%), or displayed an inadequate posterior palatal seal. Incorrect vertical or horizontal jaw relationships were observed in 94% of patients and errors in tooth positions were observed in 63% of denture patients. Not surprisingly, significant relationships were observed between the presence of denture construction faults relating to retention and patient complaints of loose dentures, as well as construction faults relating to jaw relationships and complaints of difficulty eating. These results are in accordance with those of Smith and Hughes, who observed universally present errors in denture base extension, and generally poor retention. Jeganathan and Payne reviewed the literature and noted that underextension of denture bases and vertical and horizontal jaw relationships were the most frequently observed faults. Cabot identified that senior dental undergraduate students and general practitioners experienced difficulty in recognizing errors in base extension and occlusal vertical dimension when compared with a control group of prosthodontists. The results of this study would tend to support these findings.

CONCLUSIONS

This study found that complete denture patients experiencing difficulties with their dentures most frequently complained of pain and discomfort, difficulty with eating, and looseness of their dentures. There were no significant relationships between the patient's age, gender, or general medical condition and the type or number of complaints. A significant relationship was observed between an unhealthy denture bearing mucosa and complaints relating to pain.

The most frequently observed faults in denture construction related to retention, and vertical and horizontal jaw relationships. There were significant relationships between inadequate retention and improper intermaxillary relationships and patient complaints of looseness and difficulty eating, respectively.

The results of this study suggest that the dissatisfied complete denture patient in most instances experiences difficulties with his or her dentures due to an identifiable cause. This study would suggest that the clinician
carefully evaluate the denture for faults in denture base extension and horizontal and vertical jaw relationships before concluding that the patient's complaint is related to age, gender, or general medical condition.

In this study, age and physical illness did not affect a person's ability to manage a well-made denture prosthesis. It has been our experience that advancing age and the presence of a debilitating illness can become too much for some people. Chronically ill and homebound patients often become depressed and may give up with their dentures. In these circumstances, it is the patient's mental and emotional status and not that he or she is old that is the factor. The development of an ability to recognize an emotionally compromised or depressed patient and manage them with concern and empathy are invaluable skills that need to be encouraged and developed in the practicing clinician.

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REFERENCES

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