COMPLETE DENTURE CONSTRUCTION IN PRIVATE GENERAL DENTAL PRACTICE IN KLANG VALLEY, MALAYSIA

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Abstract

This study investigated the procedures and materials that general dental practitioners used in managing complete denture patients. A postal questionnaire consisting of questions relating to the clinical and laboratory aspects of complete denture construction was sent to private general dental practitioners in the Klang Valley, Malaysia. An arbitrary frequency system was adopted whereby the use of certain clinical or laboratory procedure/material was defined as being used generally (90% or more use), frequently (approximately 50% use) or occasionally (10% or less use). Of the 266 questionnaires mailed, 80 were returned (30% response rate). Most of the respondents (70%) qualified in 1980 to 2000. While 26% indicated that they devoted 50% of their practice time to complete denture patients, 56% of the respondents occasionally provided complete dentures (less than 10% of their practice time). The majority of practitioners (67%) took 3 or 4 clinical appointments to complete a set of dentures, while 34% took 5 visits. The practitioners also differed in the materials and methods used in almost all the stages of complete denture construction compared to what was taught to them in the dental school curriculum. In conclusion, the findings from this study showed that the respondents did not perform most of the techniques or use the materials that had been taught in dental schools, which had been deemed to be clinically essential for complete denture prosthetics, in their routine dental practices.

Key words: complete denture, denture material, technique

INTRODUCTION

The 2000 year Malaysian population census showed that there were 6.2%, i.e. 1.452 million people aged 60 or over. However, demographic ageing is occurring and by the year 2020, it is projected that 9.5% of the country’s population will be aged 60 years and over.¹ As in all developing countries worldwide, Malaysia is experiencing improved health, longer life expectancy, and low mortality as well as declining fertility rates. The combination of all these factors has brought about a declining proportion of younger people, while the proportion of the elderly is on the rise. Malaysia classifies the elderly as being the age of 60 years and over in accordance with the recommendation adopted by the United Nations World Assembly on Ageing held in Vienna in 1982. It is anticipated that with the increasing population of the elderly in Malaysia and the improving economy and dental awareness, the transition to edentulousness will be occurring later in life. This suggests that as in all developed countries, access to removable complete denture treatment and the quality of prostheses received will remain vital concerns for dentistry in the future, especially for geriatric patients who may require special treatment considerations.²

Complete denture treatment in undergraduate dental schools universally involves standard procedures and entails many visits. Although some of these procedures may be empirically derived, they are generally considered to be clinically essential.³ Patients who attended a dental school
clinic have been shown to be more appreciative of their dentures, as they felt that in a dental school setting they would get the best dental care, although the quality of the dentures may only play a moderate role in the patients’ satisfaction with their prostheses.\(^4\)

As the trend in society progresses towards affluence, more patients are anticipated to obtain their prostheses through the private sector.\(^5\) The purpose of this article is therefore to determine how closely practitioners in private dental practices in the Klang Valley, Malaysia adhered to the principles of complete denture prosthodontics as taught to them in the undergraduate dental curriculum.

**MATERIALS AND METHODS**

A postal questionnaire relating to the professional qualification of the practitioners and the clinical and laboratory aspects of complete denture construction practiced by them was sent to 266 general dental practices in the Klang Valley in 2001. A self-addressed stamped return envelope was included. The study did not attempt to trace an individual reply to a specific practice, and therefore no reminders or follow-up letters were sent to the practitioners. It is recognized that most practitioners employ a number of different techniques to acquire a particular objective in their treatment and consequently, respondents were presented with a list of materials and methods that are generally used in practice and the practitioners were asked to number each material or method of preference and usage. In order to define the frequency of use of a particular method or material, an arbitrary frequency system was adopted whereby the usage was defined as being generally used (90% or more use), frequently used (approximately 50% use) or occasionally used (10% or less use).\(^6\)

**RESULTS**

The response rate was 30% (80 respondent’s submitted completed questionnaires). Hence 80 are defined as 100% baseline. The spread of year of graduation of the respondents is shown in Table 1. About 60% of the practices provided complete dentures on an occasional basis, while about 20% provided complete dentures regularly (Fig.1). Half of the respondents took 4 clinical appointments to complete a set of dentures (Fig. 2). The majority of respondents (approximately 60%) took between 10-15 minutes to see a patient during the first clinical visit, where first impressions and general examinations were made. Generally there were no radiographs taken at this visit (Fig. 3, 4).

There were only 73% of the respondents who routinely used special trays for making final impressions. Out of this, only 50% reported that they always border mold the trays (Fig. 5, 6). When registering jaw relationships, 75% of the respondents used wax as the trial denture base plates, and 20% used cold cure acrylic resin. Wax was also preferred by 75% of the respondents as the material to record the jaw relationships (Fig. 7, 8). Although in general, all the respondents either thought balanced occlusion is essential or desirable in complete dentures, 50% of them used hinge articulators to set up the artificial teeth for the complete dentures (Fig. 9, 10). Seventy five percent of the respondents did not remount the dentures on articulators to grind in the occlusion at the denture delivery stage. Although most of them did some occlusal adjustments intra-orally, 25% of the respondents did not do any occlusal adjustments during the denture insertion stage (Fig. 11, 12). Post-insertion instructions were generally given verbally, and 75% of the respondents said that they recalled their patients within a day or up to a week after denture delivery (Fig. 13, 14).

**Table 1.** The year of qualification of the respondents as dentists.

<table>
<thead>
<tr>
<th>Year of graduation</th>
<th>No. (%) of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1955-1960</td>
<td>1 (1.3)</td>
</tr>
<tr>
<td>1961-1970</td>
<td>5 (6.3)</td>
</tr>
<tr>
<td>1971-1980</td>
<td>23 (29.1)</td>
</tr>
<tr>
<td>1981-1990</td>
<td>20 (25.2)</td>
</tr>
<tr>
<td>1991-2000</td>
<td>28 (35.3)</td>
</tr>
</tbody>
</table>

\(^*3\) respondents did not indicate their year of qualifying

![Figure 1. Frequency of providing complete dentures.](image-url)
Figure 2. Number of clinical appointments needed to complete treatment.

Figure 3. Time taken (min) for examination and primary impressions.

Figure 4. Take radiograph (panoramic) at first visit.

Figure 5. Use of special trays.

Figure 6. Border mold secondary impressions.

Figure 7. Materials for occlusion rims.

Figure 8. Material to record jaw relationship.

Figure 9. Articulator used for tooth set-up.

Figure 10. Opinion on balanced occlusion.

Figure 11. Intra-oral occlusal adjustment.
DISCUSSION

In 1978 Silversin et al. reported the results of a survey that assessed differences between the way dentists and senior undergraduate dental students in the United Kingdom treated patients with complete dentures. They showed that students and practitioners differed from the number of procedures/visits needed to complete the dentures, and in the time taken for each visit. This scenario was also seen in the United States, where private dental practitioners were also not using the traditional prosthodontic materials and techniques that were taught in dental schools.

The respondents from the present study had been qualified as dental surgeons between one and twenty years at the time they responded to this survey. (Fig. 1). None of them had any postgraduate qualification in prosthodontics, as this survey was only limited to private general dental practices. It was seen that less than 25% of the practices provided complete dentures on a regular basis (Fig. 1). A survey of dentists in British Columbia conducted by Margolese et al. showed that 63% of the respondents did not feel comfortable providing removable denture services, and they felt that their dental school training had not prepared them adequately for the clinical practice of removable prosthodontics. The reasons cited were inadequate training, patient attitudes and expectations, patient conflicts, more interest in other forms of treatment which are preventive oriented, small patient demand, poor financial return and inadequate laboratory quality, among others. The meagre and diminishing reward offered for complete denture treatment also influences the techniques and materials used by practitioners when treating complete denture patients.

Fifty percent of the respondents in this study completed their treatments in four appointments (Fig. 2). Most complete denture techniques require five to six appointments. In the first appointment, the patient is examined and preliminary impressions are made. Diagnostic casts are poured from the preliminary impressions. In the second appointment, final impressions are made from which the accurate master casts are poured. In the third appointment, jaw relationship registrations are made for transferring from the patient to the articulator positions and information that is necessary to fabricate the dentures. In the fourth appointment, the trial denture is evaluated in the patient's mouth and on the articulator for aesthetics and occlusion. In the fifth appointment, the finished dentures are inserted into the patient's mouth. At this time, the dentures are adjusted for fit and occlusion and the patient is instructed in his/her use and maintenance. One or more subsequent appointments may then be given for adjustment and evaluation of the dentures once the dentures have been worn for some time. Some authors have combined the first three stages of complete denture construction, thus reducing the number of visits the patient has to make. However, a long clinical session is needed and the "tray cum record block" could be easily be distorted if not carefully handled. In the present study 3% of respondents took 3 visits for completing one set of complete dentures. General practitioners should aware of potential problems associated with alternative or short-cut techniques in constructing complete dentures.

More than half of the respondents in this study took less than 15 minutes for the first clinical visit and generally panoramic radiographs are not taken (Fig. 3, 4). The success in complete denture therapy begins with a detailed examination of the patient at the first appointment. It is necessary that a history is recorded and the patient's concerns and the expectations of treatment are noted in a relaxed, and not in a hurried manner. Previous and current dentures, if present, should be inspected to correlate any faults to the patient's complaints. A
diagnosis is established and a suitable treatment plan should then be discussed with the patient. In order to ensure a complete examination of the patient’s mouth and dental supporting tissues, the clinical examination in the undergraduate curriculum is routinely supplemented with panoramic radiographs, as they are considered an important component of the prosthodontic diagnosis and treatment planning to confirm or assist in diagnosing retained roots, rough alveolar ridges and painful areas to pressure.

Although 75% of the respondents in this study used special trays to make the final impressions, only 50% of them border moulded the trays (Fig. 5, 6). In order to produce accurate final impressions upon which the dentures are fabricated, special trays are custom-made on the cast produced from the preliminary impressions. This tray is adjusted to the patient's mouth and the borders are molded with stick compound or high viscosity silicone to define the soft tissue border and other landmarks, such as muscle attachment, frenum, and posterior palatal seal area. The molded tray is then used to carry the final impression material in the mouth to record the surface details of the denture supporting areas. These impressions should then be beaded and boxed before they are casted.

When registering jaw relationships, 73% of the respondents used wax as the base plate material, while 13% used autopolymerising acrylic resin bases. Eighty percent of the respondents used wax as the material of choice for recording jaw relationships, 14% used bite registration paste and the remaining 5% used zinc-oxide eugenol (ZOE) paste (Fig. 7, 8). In recording jaw relationships, accurate and stable bases are absolutely necessary. In the undergraduate curriculum, the use of cold cure acrylic resin bases is advocated as they fulfil the above requirements. In this study the majority of the respondents use wax as the baseplate material and wax was also the first choice material for registering the jaw relationship. Wax is unsuitable as a baseplate material because of its limitation in hardness and the tendency to distort when used in the mouth. Wax was also the first choice material used by general practitioners in the United Kingdom. Other bite registration materials (e.g. bite registration paste and ZOE paste) would be more appropriate, as their initial low viscosity ensures minimal occlusal pressures when the occlusal rims are brought into contact in the retruded contact position at the appropriate vertical dimension.

Ideally, the working casts should then be mounted in the articulator at the correct relationship to the hinge axis, using a facebow record. A split cast mounting technique should be used so that the dentures and their casts can be removed for processing and returned to the articulator for correction of the processing errors. The articulator most commonly used by the respondents in this study was either the plane-line (simple) hinge articulator or the average value articulator. Fifty percent of all respondents considered balanced eccentric occlusion to be essential and 49% thought it was desirable (Fig. 9, 10). However, in this study, most of the dentures are mounted on average value or hinge articulators, where the patient’s hinge axis has no relationship to the axis of the articulators. Many prefer to use the average value articulators, where the use of a face-bow record is not necessary. Mohamed et al. found that 64% of practicing dentists in his study used a hinge or simple articulator, 26% used a semi-adjustable, and 10% used a fully adjustable articulator. On the other hand, Schweitzer found that he had equal amounts of success using different articulators. It is difficult to obtain balanced articulation using hinge articulators and cusped teeth, since no lateral movement or adjustments are possible. Provided records have been taken correctly, dentures can be satisfactorily constructed on a free-plane articulator which will occlude in the retruded contact position (RCP). However, most recent dental school graduates and many dentists who have been in practice for several years were taught to use semi-adjustable articulators. Gross and Grazier surveyed the department of prosthodontics and occlusion of 59 North American dental schools and reported that 92% of the 53 responding schools used the semi-adjustable articulator for training students.

At the denture delivery stage, 75% of the dentures are not remounted on articulators. 50% of the dentists generally made the necessary occlusal adjustments in the mouth (Fig. 11, 12). Prosthodontists recommend a remount procedure for identification and correction of occlusal errors in complete dentures rather than the more common practice of placing articulating paper intra-orally, followed by 'spot-grinding' at the chair-side. However, there is no evidence to support this recommendation, and there is no evidence that articulating paper used intra-orally is inaccurate compared with a remount procedure. Occlusal adjustments may be done at the chair-side, provided that there are no major occlusal adjustments required, as there is no intermediate stage which can give rise to errors. However, due to the displaceability of the underlying tissues and relative instability of the dentures, it can be
difficult to assess if the requirement for occlusal contacts are satisfied because the soft tissues will be distorted and obscured the errors and the articulating paper will not mark efficiently. It is also impossible to see the occlusal contacts lingually.

The majority of respondents (76%) instruct and educate the patients on the use and care of the complete dentures verbally, 18% used both printed and oral instructions, 51% of the respondents scheduled a first post insertion appointment within one week, 14% within 48 hours and 9% within 24 hours. The remainder 26% did not recall their patients (Fig. 13, 14). It is necessary to recall patients after delivery of dentures as the agreement between patients' appreciation of fit and clinical assessment of quality of new complete dentures may differ.18

Patient satisfaction is an important parameter related to the outcome of prosthetic rehabilitation. There is no practical method in the clinic whereby patient satisfaction by physical examination or observation can be validly and reliably measured, as a patient's judgement is usually based on his/her own subjective perceptions. There is poor correlation between the quality of dentures and patient satisfaction, and in the hands of an experienced clinician, there is no evidence that a more complex fabrication technique results in a better clinical outcome.19 Psychosocial factors have been seen to be more important than prosthodontic factors for a successful treatment outcome.20

We concluded that the findings from this survey showed that general practitioners differed from undergraduate dental students in the way they manage complete denture patients. These differences occur in the materials and methods used in almost all stages of complete denture construction. It may be necessary to emphasize strongly the basic prosthodontic principles in the teaching curriculum.

References