COMPARISONS OF MAGNET RETAINED SECTIONAL OBTURATOR AND SINGLE PIECE OBTURATOR

Aida Ali*, Zakiah Isa**

*Terendak Armed Forces Hospital, Melaka, Malaysia
Department of Prosthetic Dentistry,
**Faculty of Dentistry, University of Malaya
50603 Kuala Lumpur, Malaysia
e-mail: zakiah@um.edu.my

Abstract

Oronasal separation and the rehabilitation of oral functions are the main objectives of providing obturators for patients with maxillary defects. This study compared patient satisfaction with a single-piece and a magnet-retained sectional obturator. Seven patients with maxillary defects were treated with both types of prosthesis. A satisfaction survey was completed after each type of obturator had been worn for at least two months without any complaints. Patient satisfaction regarding their masticatory and speech abilities, aesthetics, prosthesis retention and ease of handling, and the patients' overall satisfaction with the obturators were measured on a visual analogue scale (VAS) and a 4-scale category (FSC) questionnaire. Statistical analysis of data was conducted using the non-parametric Wilcoxon Signed Ranks test. The results show that the only significant difference in patient satisfaction was the patients’ perception that the sectional obturator provided better aesthetics (p<0.05). It can be concluded that the patients had no preference for a particular type of prosthesis, and that they were satisfied as long as the obturators were comfortable, restored their oral functions and improved their quality of life.

Key words: magnetic retention, obturator, sectional denture, patient satisfaction

INTRODUCTION

Maxillofacial defects vary in size and may include portions of the hard palate, soft palate, maxillary sinus, alveolar ridge and floor of the nasal cavity. At present there is no widely accepted classification for maxillary defects, although the Aramany classification is a useful communication tool for surgeons and prosthodontists. Patients with maxillary defects experience psychosocial problems as a result of oral function impairment and associated with facial deformity. Most often, prosthetic rehabilitation is chosen rather than surgical repair to restore the patient’s physical handicap and emotional well-being.

There have been various designs of the maxillary obturator, either a one piece design or a sectional design. Retention of the one piece obturator is obtained by engaging the obturator into the undercuts within the cavity, and by using direct retainers or clasps from a denture framework. With this approach, undesired undercuts are commonly eliminated in order to ensure one path of insertion, and retention of the prosthesis could be compromised. The lack of adequate retention occurs most commonly when very few teeth remain, or in edentulous patients. To overcome the problem of retaining a one-piece obturator, the sectional design prosthesis is advocated for maximum retention. Different paths of insertion are used to insert various parts of the denture, and more undercuts could be engaged. Once the sections are in position, they are locked in place by precision attachments or magnets.

Besides the dentist’s evaluation, the success of the obturator prosthesis should also be evaluated in terms of patient satisfaction. It has been shown that a well functioning obturator significantly contributed to the improvement of the quality of life of maxillectomy patients.

The objective of this study was to evaluate the type of obturator design satisfied the maxillary defect patient by using a visual analogue scale (VAS) and a four scale category (FSC) questionnaires.
MATERIALS AND METHODS

Seven acquired maxillary defect patients were selected from the Oral and Maxillofacial Department and Prosthetic Dentistry Department, Faculty of Dentistry, University of Malaya.

The inclusion criteria were as follows:
1. Patients with acquired maxillary defect. Patients may be partially or completely edentulous.
2. A patient was already wearing a one-piece obturator and satisfied with the prosthesis. If the patient was not satisfied, adjustments were made or a new obturator was provided to the patient. For a patient who had recently undergone a surgical hemimaxillectomy, he or she was provided with a one-piece obturator and was allowed a period of adaptation until the patient was satisfied with the obturator.
3. Patients had given their written consent to participate in the study.

In the first appointment, all patients underwent a clinical examination of the oral cavity, together with the patient’s existing obturator to assess the extension, fit and occlusion of the prosthesis. If the one-piece obturator was satisfactory, the patient was asked to complete the first VAS (VAS1) and four category scale (FSC1) questionnaires.

If a patient had an unsatisfactory obturator, adjustments were made until the patient was satisfied. If the patient was still not satisfied, a new one-piece obturator was provided. For the post-surgery hemimaxillectomy patient, a one-piece obturator was made. Review appointments were arranged weekly until the patient had adapted well to the prosthesis. At the final review visit, the patient was asked to complete the VAS1 and FSC1 questionnaires.

The patient was then told that he/she would be provided with a second set of prosthesis as a spare. A replica technique using a silicone putty impression was used to provide a copy of the occlusal and polished surface of the prosthesis that the patient was currently wearing. The second prosthesis made was a sectional design obturator retained by Magfit EX 600 magnets (Aichi Steel Corp., Japan). The prosthesis design followed the design reported by Kanazawa et Al. After a period of adjustments and when satisfied, the patient was asked to complete a second set of questionnaires, VAS2 and FSC2. Any comments that the patient made about the two obturator designs were also noted. The patient was then asked which obturator he/she preferred. All patients had worn each type of obturator satisfactorily for at least two months before patient satisfaction was assessed. Both prostheses for each patient were designed and fabricated by the same prosthodontist (AA).

The VAS and FSC questionnaires were constructed in English, and then translated to Bahasa Melayu. These were a modification of the questionnaires used by Feine et al. Six questions were selected and modified exclusively for maxillary defect patients. The subjects were asked to rate their level of satisfaction of six variables: masticatory ability, speech ability, aesthetics, retention of prosthesis, ease of handling of prosthesis and overall satisfaction. The anchor words used to describe their satisfaction were: “very satisfied”, “satisfied”, “less satisfied” and “not satisfied at all”. The satisfaction survey was conducted in an interview manner by one prosthodontist (AA) in Bahasa Melayu.

For the FSC questionnaire, the subjects rated their level of satisfaction on a 4-point scale: 1 = not satisfied at all, 2 = less satisfied, 3 = satisfied, and 4 = very satisfied. For the VAS questionnaire, after receiving an explanation of the method, the patient was required to mark a spot on the 100 mm line between two extremities of satisfaction to indicate their satisfaction with the current prosthesis. The score was recorded as the distance in mm from the left, such that a high score indicated a high level of satisfaction. For the purpose of grouping the responses, the 100 mm line was divided into 4 divisions: 0-25 mm = not satisfied at all, 26-50 mm = less satisfied, 51-75 mm = satisfied, and 76-100 mm = very satisfied. This division was done after the patients had completed the questionnaires.

Comparisons of the VAS and FSC scores for all six patients were pooled and analysed with non-parametric Wilcoxon Signed Ranks test. A non-parametric correlation statistical test (Spearman’s test) was used to find out if there was any correlation between each of the variables assessed and overall patient satisfaction with the prosthesis. In both tests, a significance of $\alpha = 0.05$ was chosen.

RESULTS

The only significant difference between the two treatment methods was that patients were satisfied with the aesthetics provided by the sectional denture over the one piece denture ($p < 0.05$) (Figure 1).
DISCUSSION

The results indicate that the sectional design obturator did not appear to be particularly superior to the one-piece obturator, except in the aesthetic quality of the prostheses (Figure 1). The patients in the study were satisfied as long as they were comfortable with the dentures and could use their prostheses satisfactorily.

Patient satisfaction is an important parameter related to the outcome of prosthetic rehabilitation. There is no practical method in the clinic to validly and reliably measure patient satisfaction by physical examination or observation, as a patient’s judgement is usually based on his/her own subjective perceptions. This limitation, and the sense that the patient knows best, even though the patient’s evaluation of his/her prosthesis may not correlate well with the dentist’s assessment, have lead to clinicians searching for assessment methods that could be used objectively. The VAS and the FSC questionnaires allow for a numerical value of the patient’s judgement. The wide variation among patients, however, remains a limitation when using the VAS and FSC questionnaires as a research tool to evaluate patient satisfaction, and this may explain why the results for the VAS scores do not correlate well with the results of the FCS scores (Figures 1 and 2).

The VAS scores show that only speech ability had any correlation with overall obturator satisfaction (Table 1). Five patients reported overall satisfaction with the sectional obturators (data not shown) However, at the end of the study, only three out of these five patients chose the sectional obturator as the preferred obturator. On the other hand, one patient, despite reporting decreased satisfaction with the sectional obturator, had in the end chosen the sectional obturator as the preferred obturator. The choice of preferred obturator was based on the patient’s own specific reasons, which may not seem plausible to others. This was the case with the subjects in the study. There were subjects who reported improvements in most of the functional variables tested with the sectional obturator, yet chose to continue using the one-piece obturator out of familiarity and comfort. Due to time constraints and the limited availability of patients, the subjects in the study were of different age groups, had different types of maxillary defects and different denture experiences. Although each patient served as his/her own control, this was a limitation of the study. Familiarity and comfort with the one-piece

**Table 1.** Correlation between variables assessed and overall satisfaction with the prosthesis.

<table>
<thead>
<tr>
<th>Variables assessed against</th>
<th>Overall satisfaction of prosthesis</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masticatory ability</td>
<td></td>
<td>0.89</td>
</tr>
<tr>
<td>Speech ability</td>
<td></td>
<td>0.003*</td>
</tr>
<tr>
<td>Aesthetics</td>
<td></td>
<td>0.94</td>
</tr>
<tr>
<td>Retention</td>
<td></td>
<td>0.76</td>
</tr>
<tr>
<td>Ease of handling</td>
<td></td>
<td>0.38</td>
</tr>
</tbody>
</table>

* denotes the significance level (p<0.05) of the correlation between overall obturator satisfaction and speech ability.
denture that they had been wearing for some time before the study and ease of handling of the one-piece obturator may have influenced the decision for the preferred obturator.

Magnetic retention provides a solution for a number of problems related to the use of precision attachments such as the requirement of precision fit and parallelism of related components of a sectional obturator. The magnet retention system consists of two parts: a keeper, incorporated in the obturator section of the prosthesis, and a powerful permanent magnet enclosed in the denture part of the prosthesis. This system results in a rigid attachment of the denture parts together and aids in the retention of the entire prosthesis in the mouth. Five patients reported that the sectional obturator was more difficult to handle and only two thought that they could handle the sectional obturator as easily as they did the one-piece obturator. Patients who chose the sectional obturators were the younger patients who did so for reasons of improved aesthetics and retention.

Within the limitations of this study, it may be concluded that except for better aesthetics, the single piece obturator could be as effective as the sectional obturator retained by magnets, as long as the treatment achieved the goals of improvement of function and quality of life of the patients.

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References