

## ORAL HEALTH RELATED QUALITY OF LIFE IN HEMIMAXILLECTOMY PATIENTS REHABILITATED WITH OBTURATOR PROSTHESIS FABRICATED USING DIFFERENT MATERIALS

Mostafa I Fayad\*, Ihab M Atito\*\* and Mahmoud Ammar\*

### **ABSTRACT**

**Objective:** This study was conducted to evaluate oral health-related quality of life with different obturator materials in hemimaxillectomy patients.

**Patients and Methods:** Fourteen hemimaxillectomy patients were received a conventional obturator with combined metallic and heat cured acrylic resin. (Vertex™ Regular, Vertex-Dental B.V. Netherlands (Group I). Then the Patients received obturator constructed from a thermoplastic denture base . (Vertex™ Thermo Sens, Vertex-Dental B.V. Netherlands) (Group II). Oral health-related quality of life was measured after six months of obturator use using Functional Obturator Scale scores. Statistics were done using paired t-test to compare the oral health impact profile scale for edentulous patients in both groups.

**Results:** The mean total Functional Obturator Scale score [FOS] for group I and group II were 34.55 and 30.48 respectively. There was a a statistical significant different between both groups in relation to the mean total Functional Obturator Scale Score ( $P<.05$ ).

**Conclusions:** It was concluded that after six months of obturator use in hemimaxillectomy patients, using a thermoplastic obturator resulted in a better oral health related quality of life than a conventional one. Therefore, it should be considered a treatment plan option to improve oral health-related quality of life.

**KEYWORDS:** Oral health impact profile; acrylic obturator, denture base materials, thermoplastic denture base, quality of life.

\*Assistant Professor of Removable Prosthodontics, Faculty of Dental Medicine, Al- Azhar University, Cairo, Egypt.

\*\*Lecturer of Removable Prosthodontics, Faculty of Dental Medicine, Al- Azhar University, Cairo, Egypt.

\*Assistant Professor of Removable Prosthodontics, Faculty of Dental Medicine, Al- Azhar University, Assut, Egypt.

## INTRODUCTION

Oral cancer is one of the most prevalence types of cancer in the world. The mortality rate for oral cancer is higher than the mortality rates for breast cancer and skin melanoma <sup>(1)</sup>.

Tumor removal from the oral cavity results in a surgical defect which creates many problems for the patient affecting normal chewing, swallowing, phonetics and esthetics <sup>(2,3)</sup>.

The maxillary defects can be repaired surgically or by prosthetic obturation to improve patient's life<sup>(4)</sup>. A prosthesis used to close a defect or opening in a dentulous or edentulous mouth is called an obturator. It is used to restore masticatory function and improve speech and esthetics for maxillary defect patients<sup>(5)</sup>.

Obturator are still considered to be a useful treatment modality for closing these defects due to its rapid accomplishment, low cost, and avoiding a second surgery<sup>(6-8)</sup>.

The most commonly found difficulty in the patients using obturators was difficulty in chewing foods (92%) followed by dry mouth (66%), leakage while swallowing(64%), numb upper lip(54%), avoidance of family and social events (48%), dissatisfaction with looks (46%), funny looking upper lip(46%), difficulty in inserting the obturator (32%), difficulty in talking in public (30%), noticeable clasps on front teeth (24%), difficulty in pronouncing words (24%), voice different from before surgery(20%), speech difficult to understand (20%), nasal speech (18%) and difficulty in talking on phone (4%) <sup>(9)</sup>.

Obturator functioning can be evaluated both objectively and subjectively. Objective assessment may performed by the operator and requires the use of advanced scientific equipment. Subjective assessment means the evaluation of the prosthesis from the patient's point of view <sup>(3,10,11)</sup>.

Besides conventional retained obturator prosthesis, thermoplastic denture base was used recently in obturator construction for enhancing retention of the prosthesis <sup>(12)</sup>.

Thermoplastic denture bases are an excellent alternative to traditional hard-fitted denture base <sup>(13)</sup>. Thermoplastic resins can be broadly classified as thermoplastic acetal, thermoplastic polycarbonates, thermoplastic acrylic and thermoplastic nylon <sup>(14,15)</sup>.

*Thermoplastic polyamidic* resins (nylon) are versatile materials, suitable for a wide range of applications. They can be easily modified to increase stiffness and wear resistance. The material flexibility varies from one material to another, so we can choose from low flexible to super flexible polyamide. The material can be semi-translucent and provides excellent esthetics. The material is highly indicated for patients allergic to methyl metacrylate, being monomer-free, lightweight and impervious to oral fluids. Some may also be combined with a metal framework <sup>(16,17)</sup>.

The disadvantage of these resins include gradual fading of denture base color, shift of prosthetic teeth during processing may be noticed, air entrapment within the denture base , poor bonding quality between the denture base material and acrylic resin teeth and technique sensitivity <sup>(18)</sup>.

Oral epidemiology has used measures, which evaluate the extent to which oral conditions abnormally affect the normal social role functioning and lead to major changes in behavior, such measures are known as oral health-related quality of life measures (OHRQoL)<sup>(7,19)</sup>.

The health-related quality of life (HRQOL) in patients with head and neck cancer play a vital role in the decision-making process, developing treatment protocols and method of providing supportive care<sup>(20)</sup>.

The World Health Organization (WHO) defines health as "a state of complete physical, mental and

social well-being, not merely the absence of disease or infirmity<sup>(21)</sup>.

Quality of health is defined as a subjective, phenomenological, multidimensional construct based on individual's internal frame of reference<sup>(22)</sup>.

Individuals who may require a maxillectomy as line of treatment for oral tumors often ask about the quality of life (QoL) they should expect following surgery. A well-designed obturator can have a positive effect on an individual's QoL<sup>(3)</sup>.

Rehabilitation of hemimaxillectomy patients tends to improve oral health-related quality of life [OHRQoL] but some individuals may still have some problems due to obturator misfits or because of individual lack of acceptance of their obturator<sup>(23)</sup>.

Functioning of the obturator can be subjectively determined by using the Obturator Functioning Scale (OFS) which is the most frequently used tool to assess the health-related quality of life (HRQOL)<sup>(2, 19, 24)</sup>.

The Obturator Functioning Scale (OFS) was established at Memorial Sloan Kettering Cancer Center (New York, NY, USA) as a means of assessing self-reported functioning of an obturator. It was created by Kornblith et al.<sup>(25)</sup> to assess eating ability, speech, and cosmetic satisfaction.

This scale consists of 15 questions to assess the patient's capability to eat and speak with obturator prosthesis and their satisfaction with the restoration of lip position and its aesthetic effects. All items were rated on a 5-point Likert scale.<sup>(25)</sup>

## PATIENTS AND METHODS

This cross-sectional study was conducted at outpatient clinic, Removable Prosthodontic Department, Faculty of Dental Medicine, Al-Azhar University. The inclusion criteria were selecting hemimaxillectomy patient (Figure 1) had been rehabilitated with conventional definitive obturator

design with a combination acrylic and metallic denture base material, wearing of the definitive obturator for at least six months. Patients were excluded if they had physical and/or psychological disorders that precluded clinical examination and the completion of questionnaires, patients refused to share in the study, patients never used or lost the obturator.

An informed consent form was obtained from each participant, after clarifying the objective of the study, its methodology, and the participants' rights.

Power size calculation revealed a sample size of  $N = 12$  for the power of more than 80% to detect a correlation at a significance level of  $\alpha = 0.05$  ( $p < 0.05$ ).<sup>(26)</sup>

Regarding the sample, the study group comprised of randomly selected fourteen hemimaxillectomy patients reported to the Prosthodontic Clinic. (nine males and five females) whose average age was 30-50 years (mean age 41 years).

To assess health related quality of life Obturator Functioning Scale was used. Obturator functioning was assessed using 15 questions on a five point Likert Scale. Points 1 and 2 stood for 'not at all difficult' and 'a little difficult' on the scale. Points 3, 4 and 5 stood for 'somewhat difficult,' 'very much difficult' and 'extremely difficult. Each patient is scored 0 (worst) to 75 (best) using a Likert type scale<sup>(25)</sup>.

The Obturator Functioning Scale was translated into Arabic by two accredited translators, and then back-translated into English by two different accredited translators. Both the English and the Arabic versions were applied alternately to 10 bilingual volunteers. Each volunteer was interviewed by one trained and experienced interviewer, and the interviewer recorded any difficulty that volunteers had encountered. To develop the final version of Arabic Obturator Functioning Scale, a discussion session with the interviewer was arranged, to clarify

the volunteers' comments to make the questionnaire more understandable. Selected patients were interviewed by a single trained interviewer.

**Measurement of health-related quality of life using the Obturator Functioning Scale**

- a) Phase I: Selected patients with hemimaxillectomy who had been rehabilitated with conventional obturator design (a combination acrylic and metallic denture base material) and wearing of the definitive obturator for at least six months were invited to complete Obturator Functioning Scale questioner to assess the functioning of the obturator. [Group 1]
- b) Phase II: a new obturator [from a thermoplastic denture base. (Vertex™ ThermoSens, Vertex-

Dental B.V. Netherlands)] was constructed for each patient. After wearing the new obturator for at least six months, patients were asked to complete the Obturator Functioning Scale questionnaire. [Group II]

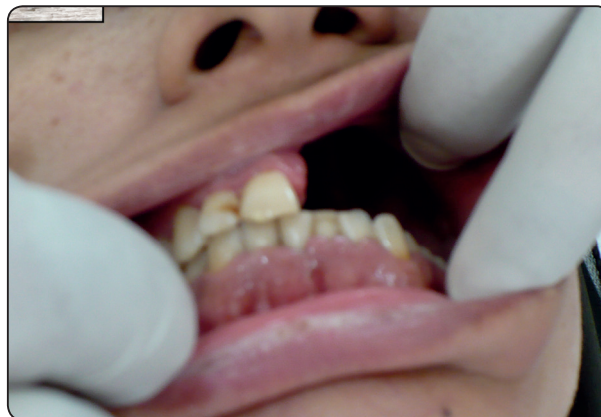


Fig. (1): Hemimaxillectomy patient.

TABLE (1): Functional Obturator Scale.

| Functional Obturator Scale |                       |  | Not at all difficult<br><i>1</i> | 'A little difficult'<br><i>2</i> | 'Somewhat difficult',<br><i>3</i> | 'Very much difficult'<br><i>4</i> | 'Extremely difficult'.<br><i>5</i> |
|----------------------------|-----------------------|--|----------------------------------|----------------------------------|-----------------------------------|-----------------------------------|------------------------------------|
| <i>1</i>                   | Chewing Limitation    | Difficulty in chewing foods              |                                  |                                  |                                   |                                   |                                    |
| <i>2</i>                   |                       | Leakage when swallowing foods            |                                  |                                  |                                   |                                   |                                    |
| <i>3</i>                   |                       | Mouth feels dry                          |                                  |                                  |                                   |                                   |                                    |
| <i>4</i>                   | Speech Limitation     | Voice different from before surgery      |                                  |                                  |                                   |                                   |                                    |
| <i>5</i>                   |                       | Difficulty talking in public             |                                  |                                  |                                   |                                   |                                    |
| <i>6</i>                   |                       | Speech is nasal                          |                                  |                                  |                                   |                                   |                                    |
| <i>7</i>                   |                       | Difficulty pronouncing words             |                                  |                                  |                                   |                                   |                                    |
| <i>8</i>                   |                       | Speech is difficult to understand        |                                  |                                  |                                   |                                   |                                    |
| <i>9</i>                   |                       | Difficulty talking on the phone          |                                  |                                  |                                   |                                   |                                    |
| <i>10</i>                  | Esthetic Limitation   | Dissatisfaction with looks               |                                  |                                  |                                   |                                   |                                    |
| <i>11</i>                  |                       | Clasp on front teeth noticeable          |                                  |                                  |                                   |                                   |                                    |
| <i>12</i>                  |                       | Upper lip looks funny                    |                                  |                                  |                                   |                                   |                                    |
| <i>13</i>                  | Social Disability     | Avoidance of family or social events     |                                  |                                  |                                   |                                   |                                    |
| <i>14</i>                  | Functional Limitation | Difficulty to insert or remove obturator |                                  |                                  |                                   |                                   |                                    |
| <i>15</i>                  |                       | Any area feels numb                      |                                  |                                  |                                   |                                   |                                    |

Data were collected and statistically analyzed with the Statistical Package for the Social Sciences software (SPSS version 20.0, IBM, Chicago, IL, USA). For all tests a p-value < 0.05 was considered as statistically significant.

**RESULTS**

OHRQoL was compared in maxillectomy patients rehabilitated with conventional obturator and with flexible obturator using Functional Obturator Scale. Fourteen hemimaxillectomy patients were selected. (9 males and 5 females) whose age were 30-50 years (mean age 41 years). Table (2) and table (3) compared the mean Functional Obturator Scale

scores for subscales and total scores between both groups. The results of the study revealed that, there were a statistically significant differences between both groups in psychological discomfort and handicap subscale (P<.05). On other hand there were no statistical significant differences between both groups in relation to functional limitation, physical pain, physical disability, psychological disability and social disability subscales (P > .05).

The mean total Functional Obturator Scale score for group I and group II were 36.57 and 33.10 respectively. There was a a statistical significant different between both groups in relation to The mean total Functional Obturator Scale score (P<.05).

TABLE (2): Comparison of mean Functional Obturator Scale score between both groups.

| Grouping              |          | Mean  | Std. Deviation | Std. Error Mean | Sig.(2-tailed) |
|-----------------------|----------|-------|----------------|-----------------|----------------|
| Chewing Limitation    | Group I  | 6.80  | .41            | .13             | 0.53           |
|                       | Group II | 6.63  | .73            | .23             |                |
| Speech Limitation     | Group I  | 12.18 | .19            | .06             | 0.04           |
|                       | Group II | 10.81 | .66            | .21             |                |
| Esthetic Limitation   | Group I  | 6.35  | .65            | .21             | 0.01           |
|                       | Group II | 5.42  | .80            | .25             |                |
| Social disability     | Group I  | 5.31  | .87            | .27             | 0.13           |
|                       | Group II | 4.80  | .56            | .18             |                |
| Functional limitation | Group I  | 3.91  | .52            | .16             | 0.02           |
|                       | Group II | 2.82  | .37            | .12             |                |

TABLE (3): Comparison between mean total Functional Obturator Scale scores between both groups.

|             |          | Mean  | Std. Deviation | Std. Error Mean | Sig.(2-tailed) |
|-------------|----------|-------|----------------|-----------------|----------------|
| Total Score | Group I  | 34.55 | .81            | .26             | 0.03           |
|             | Group II | 30.48 | 1.72           | .54             |                |

## DISCUSSION

An assessment of oral health-related quality of life in completely edentulous patients was done using Functional Obturator Scale.

The Functional Obturator Scale was selected to measure the OHQRol as it showed satisfactory reliability, validity and agreement with reported complaints in many languages<sup>(27-30)</sup>. The Functional Obturator Scale appears to be a reliable and valid instrument to measure oral health-related quality of life. This makes the instrument a good tool for comparison of this important variable between different countries and cultures<sup>(28,29)</sup>.

The Arabic version of the OFS seems to be a valid instrument and can be used efficiently in Arabic-speaking patients<sup>(29)</sup>.

The results of the present study showed that, the mean Functional Obturator Scale subscales scores for chewing limitation were 6.80 and 6.63 for group I and Group II respectively. The mean scores for speech limitation were 12.18 for group I and 10.81 for group II. There was no statistical significant different between both groups in relation to chewing Limitation, this can be explained by an adequate adaptation of the prostheses for both groups. Thus, it can be stated that oral rehabilitation with conventional and flexible obturator provided satisfactory chewing function, at least from the subjective perception.

With regard to social disability and functional limitation subscale, the results of the present study revealed that there were a statistical significant differences between both groups. This is an important finding as a certain level of social disability may be acceptable to one patient and intolerable to another.

The mean total Obturator Scale Scores were 34.55 for group I and 30.48 for group II. These results may be explained as the main complaints of patients were obturator instability and soreness, so the treatment with flexible obturator resulted in a positive impact on quality of life.

These results were in agreement with Ali et al<sup>(31)</sup> that mentioned that the rehabilitation of patients with maxillary defects using obturator prosthesis is an appropriate, not invasive treatment option so the good obturators contribute to improve quality of life. Tannamala et al<sup>(18)</sup> used flexible resins in the rehabilitation of maxillectomy patient and found that "A flexible and aesthetic retention of anterior teeth was gained by using thermoplastic resin in the rehabilitation of maxillectomy patient".

The findings from this study support the idea that patients wearing obturator from a thermoplastic denture base are more likely to feel positive impacts on their quality of life. The published literatures regarding the disadvantages and limitations of the thermoplastic resin over conventional acrylic denture base resins are limited and require further research for clarification<sup>(12)</sup>.

## CONCLUSION

Within the limitations of the present study, there was statistically significant difference in mean total Obturator Scale scores between conventional obturator and thermoplastic obturator leading to improvement in positive impact on quality of life.

## CONFLICTS OF INTERESTS

The authors declare that they have no conflict of interests.

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