QUALITY OF LIFE IN PATIENTS WITH OBTURATOR PROSTHESES

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Background: Oral cancer has a profound impact on the quality of life for patients and their families. Functionally, the mouth is an important organ for speech, swallowing, chewing, taste and salivation. These functions become compromised due to surgical ablation of the tumour. Obturator prosthesis is a common prosthdontic rehabilitative option for maxillectomy patients. The purpose of this study was to investigate how patients with maxillofacial defects evaluate their quality of life after maxillectomy and prosthodontic therapy with obturator prostheses. **Methods:** Thirty patients were included in the study (11 female, 19 male). The patients were interviewed by using a standardised questionnaire developed by University of Washington (UW-QOL). The detailed questionnaire was adjusted for obturator patients and internalised most parts of obturator functioning scale (OFS). **Results:** Quality of life after prosthodontic therapy with obturator prostheses was 54±22.9% on average. Functioning of the obturator prosthesis, impairment of ingestion, speech and appearance, the extent of therapy, and the existence of pain had significant impact on the quality of life (p<0.005). **Conclusion:** Orofacial rehabilitation of patients with maxillofacial defects using obturator prostheses is an appropriate treatment modality. To improve the situation of patients prior to and after maxillectomy sufficient information about the treatment, adequate psychological care and speech therapy should be provided.

Keywords: quality of life, maxillectomy, obturator prosthesis, oral cancer, prosthodontic therapy

INTRODUCTION

The WHO defines quality of life as 'the individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.[1,2] Quality of life is an important consideration in philosophy, medicine, religion and also in economics and politics. Usually the 'quality of life' is used to describe factors that influence the living conditions of a society or of the society's individuals Quality of life also includes physical health, personal circumstances (wealth, living conditions), social relationships, functional activities and pursuits, as well as wider societal and economic influence.[3]

In the literature, end points such as recurrence rates and survival have been used to evaluate the outcome of therapeutic interventions in head and neck cancer while patient's satisfaction or quality of life is not usually considered. Recently, the recognition of the multidimensional impact of maxillofacial tumours on a patient's life has led to an increased interest in the quality of life of these patients.[4] Significant studies investigating the quality of life of patients with maxillofacial defects after prosthodontic therapy with obturator prostheses remain rare. Until now, little data has been published dealing with the comparison between prosthetic obturation and (free flap) reconstruction.[5,6]

Microvascular free tissue transfer techniques have become established in recent years, but the optimal reconstruction of maxillectomy defects remains controversial. The decision whether to reconstruct or to obturate depends on patient characteristics such as age, medical history, and defect size and on the surgeon's technical expertise.[7–9] Surgical flap reconstruction provides definitive correction of the abnormal oronasal communication, and, in general is associated with increased procedure time and the possibility of donor morbidity at the flap harvest site.[6] Moreover dental rehabilitation is sometimes not accomplished in surgical reconstruction In contrast; fabrication of obturator prostheses shortens the procedure time and offers the possibility of immediate and adequate dental rehabilitation. The surgical site can be easily examined after removing the obturator prosthesis, and tumor recurrence may be detected in time.[10–12] Obturation may therefore still be the privileged treatment modality after maxillectomy and explain why studies comparing both patient groups (obturator vs. free flaps) are rare.

The most important aspects of treatment after resection of the maxilla are to reconstruct the maxillary defects and restore oronasal functions and facial contours. In general, obturator prostheses comply with these requirements but patients' difficulties in handling the obturator prosthesis or impaired obturator functioning may lead to deficits in speech, mastication, swallowing or facial disfigurement, and as a consequence, patient dissatisfaction.[4,10,13] Although free flap transfer aims to deal with these problems that are often associated with obturator prostheses (e.g., hypernasal speech, foods and liquids escaping through the nasal cavity) no statistically significant differences between prosthetic obturation and free flap could be detected.[5,6]

MATERIAL AND METHODS

Thirty patients who received maxillary resection and prosthodontic therapy with obturator prostheses were included in the cross-sectional study. All patients were

provided written informed consent prior to their participation in the study. All obturator prostheses were fabricated in the authors' department.

Eligible patients were interviewed by a single trained interviewer. The study sample consisted of 30 patients; 19 males and 11 females.

The questions asked were based on a questionnaire developed by University of Washington (UW-QOL). The detailed questionnaire was adjusted for obturator patients and internalised most parts of Obturator Functioning Scale (OFS). The University of Washington Quality of Life questionnaire was first described by Hussan and Weymuller. The current version is version 4. it consist of 15 question: 12 disease specific items such as pain, appearance, activity, recreation, swallowing, chewing, speech, shoulder problem, taste, saliva, mood, and anxiety plus three general items measuring global HRQOL, and a free text section allowing patients to address issues not contained within the questionnaire. Each patient is secured 0 (worst) to 100 (best) using a Likert type scale giving a maximum summary score of 1200. The three global questions are scored individually.

The data were processed with SPSS® 15.0 for windows statistical software (SPSS Inc., Chicago, IL, USA). For all statistical analyses probability levels of $p<0.05$ were considered statistically significant.

RESULTS

The sociodemographic and medical characteristics of the 30 patients interviewed are given in Table-1. There were 19 (63.3%) male and 11 (36.6%) female patients with a mean age of 57.6±10.7 years old (range 34–82 years). They predominantly had no primary/secondary school education (55%, 17/30). Most participants (70%, 21/30) were retired before they underwent maxillary resection, lost their job as a consequence of the disease and 30% (9/30) remained in employment. The most frequent histological diagnoses were squamous cell carcinoma (52%, 16/30), adenocarcinoma (16.6%, 5/30) and adenoid cystic carcinoma (10%, 3/30).

The global quality of life after prosthodontic therapy with obturator prosthesis was found to be 54±22.9% on average. Lowest ratings (47%) were observed in patients aged 50–59 years (n=13), compared with patients in all other age groups (Table-2). Female patients evaluated their quality of life slightly better than male patients (female 55%, male 54%). Quality of life of obturator patients was not significantly related to age (p=0.828), and gender (p=0.092) or size of tumour (p=0.123) in contrast to existence of pain (p=0.002). The extent of therapy also correlated positively with the quality of life. A significantly better average rating was found when patients had received surgery only compared with patients whose treatment had consisted of surgery plus radiation and chemotherapy (p=0.042). The classification[6] of maxillary defects (p=0.793) had a significant influence on the patients' evaluation of their quality of life.

Functional impairment as a result of maxillary resection generally impinged on the patient's life and the grade of impairment correlated negatively with the quality of life. The grade of impairment of speech (p=0.005), ingestion (p=0.001), xerostomia (p=0.030), or appearance (p=0.001) had a significant impact on the quality of life after prosthodontic therapy with obturator prostheses (Table-3).

Appearance in public after tumour therapy was reduced in 52% (16/30) of patients and remained unchanged in 48% (15/30) of patients. Although quality of life was lower in patients who reduced their appearance in public the difference between both groups was statistically not significant (p=0.092). The main reasons for reduced appearance in public were problems with ingestion 75% (12/16), speech 44% (7/16), or impairment of appearance 38% (6/16).

Table-1: Sociodemographic and medical characteristics of patients (n=30).

Patient characteristics (n=30)	**n (%)**
Gender	
Male	19 (63.3%)
Female	11 (36.6%)
Age in years	
Mean	57.6±10.7
Range	34–82
30–39	2 (6.6%)
40–49	9 (29.0%)
50–59	13 (41.9%)
60–69	3 (9.7%)
70–79	2 (6.6%)
80–89	1 (3.2%)
Marital status	
Single	3 (9.7%)
Married	22 (70.9%)
Divorced	1 (3.3%)
Widowed	4 (12.9%)
Educational status	
Not educated	17 (55%)
Basic primary school (can read and write)	10 (33%)
Secondary school level I certificate	3 (10.0%)
Employment status	
Retired	21 (70%)
Not retired	9 (30%)
Tumour type	
Squamous cell carcinoma	16 (51.6%)
Adenocarcinoma	5 (16.6%)
Adenoid cystic carcinoma	3 (9.7%)
Mucoepidermoid carcinoma	1 (3.2%)
Ameloblastoma	1 (3.2%)
Other	4 (12.9%)
Therapy	
Surgery	20 (66.6%)
Surgery + radiation therapy	7 (22.6%)
Surgery + radiation + chemotherapy	3 (9.7%)

Table-2: Medical characteristics of patients and their influence on the quality of life (*n*=30)

Item scales	n (%)	Quality of life Mean±SD (Min, Max)	*p*
All patients	30 (100)	54.4±19.9% (10, 100)	
Gender			
Male	19 (45.2)	53.6±21.2% (20, 100)	0.092
Female	11 (54.8)	55.0±21.2% (10, 100)	
Age			
30–39	2 (6.6)	95.0%	0.828
40–49	9 (29)	60.0±23.0% (40, 90)	
50–59	13 (41.9)	65.0±11.1% (70, 90)	
60–69	3 (9.7)	56.2±27.3% (10, 100)	
70–79	2 (6.6)	60.6±15.7% (50, 100)	
80–89	1 (3.2)	60.0±17.3% (50, 80)	
Educational status			
Not educated	17 (55)	30.0±28.3% (10, 50)	0.013
Basic primary school	10 (33)	59.1±19.6% (20, 100)	
Secondary school level-I certificate	3 (10)	62.2±20.3% (40, 95)	
Existence of pain			
Yes	17 (56.6)	52.0±20.5% (10, 80)	0.002
No	13 (43.3)	65.9±17.9% (40, 100)	
Therapy			
Surgery	20 (64.5)	60.8±18.9% (40,100)	0.042
Surgery + radiation therapy	7 (22.6)	50.0±20.8% (40,100)	
Surgery + radiation + chemo therapy	3 (12.9)	30.0±31.6% (10, 80)	
Defect class[6]			
I	3 (9.7)	56.7±11.5% (50, 70)	0.793
IIa	11 (38.7)	63.3±28.4% (10, 95)	
IIb	9 (29)	62.8±21.5% (40, 100)	
IIc	1 (3.2)	50%	
IIIa	2 (6.5)	70±28.8% (50, 90)	
IIIb	3 (9.7)	80±20% (60, 80)	
IIIc	–		
IVa	–		
IVb	1 (3.2)	70%	
IVc	–		

Table-3: Reported difficulties with obturator functioning and their influence on the quality of life (*n*=30)

Item scales	*n* (%)	Quality of life Mean±SD (Min, Max)	*p*
Impairment of speech			
Not at all	9 (32.25)	67.0% (±20.1, 20, 100)	
Little	9 (29.0)	53.1% (±15.2, 40, 90)	0.005
Moderate	7 (22.6)	45,7% (±13.7, 40, 75)	
Severe	4 (12.9)	40.0% (±23.1, 40, 75)	
Very much	1 (3.2)	20.0%	
Impairment of ingestion			
Not at all	8 (29.0)	66.1%, (±21.8, 50, 100)	
Little	6 (19.4)	65.0%, (±12.2, 60, 95)	0.001
Moderate	10 (32.25)	53.3%, (±16.8, 40, 90)	
Severe	3 (9.7)	50.0%, (±20.0, 40, 80)	
Very much	3 (9.7)	21.5%, (±15.0, 10, 40)	
Impairment of appearance			
Not at all	8 (29.0)	71.7%, (±19.8, 50, 100)	
Little	6 (19.4)	47.5% (±26.0, 20, 90)	0.001
Moderate	9 (29.0)	58.3% (±11.5, 50, 80)	
Severe	2 (6.5)	40.0% (±14.1, 40, 60)	
Very much	5 (16.1)	30.0% (±18.7, 10, 60)	
Xerostomia			
Not at all	15 (51.6)	62.8%, (±21.3, 20,100)	
Little	7 (22.6)	54.3%, (±21.3, 40, 95)	0.030
Moderate	2 (6.5)	40.0% (±0, 50, 50)	
Severe	1 (3.2)	30.0%	
Very much	5 (16.1)	38.0% (±25.9, 10, 80)	
Avoidance of family or social events			
Not at all	15 (48.4)	63.3% (±22.3, 20, 100)	0.092
Sometimes	11 (35.5)	47.7% (±22.7, 10, 90)	
Difficulties with the use of the obturator			
Not at all	5 (16.1)	76.0% (±8.2, 75, 95)	
Little	11 (38.7)	659.2% (±24.3, 20, 100)	0.002
Moderate	11 35.5)	42.3% (±18.1, 10, 80)	
Severe	2 (6.5)	40.0% (±0, 40, 40)	
Very much	1 (3.2)	40.0%	

Table-4: Influence of defect class on obturator function

Defect class	Obturator function				
	Excellent	Good	Moderate	Poor	Not at all
I			3		
IIA	3	5	3		
IIB	1	5	1	2	
IIC			1		
IIIA	1		1		
IIIB		1	1		1
IVB		1			
Total:	5	12	10	2	1

Functioning of the obturator prosthesis had significant impact on the quality of life (p=0.002). In general a higher average rating was found when patients were satisfied with the functioning of their obturator prosthesis. Only one patient evaluated the quality of his life very high although functioning of the obturator prosthesis was rated very low.

DISCUSSION

Quality of life has become the focus of attention during recent years in oncology patient's psychological well-being and the patients' vitality are increasingly contributing to the evaluation of therapeutical success. The present study investigated the quality of life of patients with maxillofacial defects after prosthodontic therapy with obturator prostheses. Despite intensive research regarding the quality of life after cancer therapy, few publications focus on maxillectomy patients using obturator prosthesis.

Limitations of the present study include the small sample size. As maxillary cancer is a rare tumour with increased mortality, small sample sizes are

typically found in studies of maxillectomy patients. Rogers *et al,*[6] interviewed 10 patients, Hertrampf *et al,*[18] 17 patients, IRISH *et al*,[4] 42 patients and Kornblith *et al*,[13] 47 patients.

Several study groups used the European Organization for Research and Treatment of Cancer (EORTC) Quality of Life Questionnaire Core 30 (QLQ-C30) to assess the health related quality of life in various groups of cancer patients.[15–18] When investigating the quality of life of patients with maxillofacial defects after prosthodontic therapy with obturator prostheses a selection bias to those patients with free tissue reconstruction must be respected. Patients who had not received an obturator prosthesis might have allowed the authors to determine the impact of an obturator prosthesis on patients' quality of life more distinctly. Most patients who undergo maxillary resection at the authors' hospital receive obturator prostheses, eliminating the possibility of obtaining an adequate comparison group of patients. Kornblith *et al*. had the same problem and used norms of the Mental Health Inventory (MHI) to evaluate the adjustment of their data in relation to the community at large.[13]

Global quality of life after prosthodontic therapy with obturator prostheses was found to be 54±22.9% on average. Reference data for the German population detected 66% for men and 63% for women, respectively.[18] These results are not directly comparable as different tests were used to assess the quality of life, but the data are supported by the results of Hertrampf *et al*,[18] who found a 61% quality of life. Irish *et al*,[4] found that maxillectomy patients with obturator prostheses adjusted well to their functional disability and enjoyed their quality of life equivalent or even better than other chronic disease populations. Kornblith *et al*,[13] investigated the psychosocial adoption of maxillectomy patients and reported that patients adjusted favourably after maxillectomy and rehabilitation with obturator prostheses. Considering the severity of the disease, most patients considered that being alive outweighed the disadvantages of obturator therapy. This may also explain the results that no correlation was detected between defect classification and quality of life or obturator functioning. In contrast, all patients' ratings with defect class I were well below the ratings of patients with defect class IIIb or IVb.

Brown *et al*.[5] investigated quality of life outcomes of 16 patients with class 1 and 2a defects compared with 14 patients with class 2b plus defects. In the class 1 and 2a group, 8 patients underwent reconstruction and 8 were obturated, and in the class 2b plus group 11 patients underwent reconstructed and only 3 were obturated. A significantly lower cumulative score between class 1 and 2a defects compared with class 2b plus was observed. Although speech and chewing scored lower (but not significantly), averages for the larger defects, such as disfigurement, swallowing, and shoulder function showed surprisingly similar results. No significant differences were found between the method of rehabilitation in each group. The authors concluded that the method of rehabilitation requires more complex treatments that influence the quality of life, as the ablative defect becomes more extensive.

The findings of the present investigation demonstrate that quality of life is significantly influenced by the extent of the therapy. HAHN and Kruskemper[19] analysed 1411 DOESAK questionnaires from patients with oral cancer in a retrospective multicentre study. Although impairment of the irradiated patients was higher compared with patients who only received surgery, a significant impact on the quality of life was not detected. No significant correlation between the subjective feeling of the patients and the dose of radiotherapy was proven. It is assumed that maxillectomy patients who receive additional radiation and chemotherapy because of the size of the tumour are at a higher risk of relapse and therefore tend to have more fear of the future or to be depressed. This might be responsible for the negative impact on the quality of life.

Good obturator function has been reported to account for improved quality of life.[4,6,13,18] The results of the present investigation support this observation, but loving families, socioeconomic advantages, and valued activities and interests also contributing to the quality of life were not explored in depth in this investigation.[4] The results of the present study confirm that problems typically associated with obturator prostheses are impairment of speech (hypernasal speech), chewing, swallowing, leakage and pain. Pain is also found to be a problem in maxillectomy patients, reducing the quality of life. Hertrampf *et al*,[13] and Rogers *et al*,[6] detected significantly more patients with maxillofacial defects after prosthodontic therapy with obturator prostheses suffering from pain compared with the control group. In the present study, significantly reduced quality of life was found in the group of patients with pain compared with those without pain although only 25% of the patients with pain used analgesics regularly.

Most maxillectomy patients with obturator prostheses avoided appearing in public and invitations for meals, mainly due to difficulties with speech intelligibility, leaking fluids from the mouth or the nose, or particles adhering to the obturator prosthesis. Social activity is highly dependent on the good function of the obturator prosthesis. According to Irish *et al*,[4] and Kornblith *et al*,[13] patients with increasing difficulties with obturator function reported increased disease

impact, depression, loss of behaviour or emotional control, and decreased positive effect.

Although reconstruction of maxillary defects seems an adequate solution for the problems often associated with obturator prostheses, statistically significant advantages could not be verified. Rogers *et al*,[6] and Brown *et al*,[5] who evaluated the quality of life of patients after maxillectomy treated with obturator prostheses or (free flap) reconstruction demonstrated no significant differences between the both groups.

CONCLUSION

Reconstruction of maxillary defects by obturator prostheses remains an adequate therapy for the rehabilitation of patients after maxillectomy. The hypothesis that the patient's quality of life after obturation is acceptable compared with the quality of life of the normal population was verified by the results of the present study. The importance of good functioning of the obturator prosthesis for quality of life was underlined by the findings of the present study and confirmed the results of similar studies. To overcome deficits regarding obturator prosthesis function, information and psychosocial support prior to and after surgery, repeatedly stepwise elucidation of the therapy, sufficient instruction about obturator use, routine psychological and logopedic care should be offered to maxillectomy patients.

Future research on alternative reconstruction methods, such as the application of stem cells may help to overcome the problems typically associated with obturator prostheses or free flap reconstruction and will help to improve patients quality of life after maxillectomy in the future.[20]

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