

Quality of Life and Psychological Evaluation of Patients After Anaplastology

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ABSTRACT

Purpose: To date, there have been only a few studies published that have investigated parameters like patient satisfaction, quality of life, and social interaction in patients with facial prostheses. However, the psychosocial and how that translates to treatment outcomes may have significant value in future product and treatment strategy development.

Methods: A special comprehensive questionnaire was designed with 43 questions to evaluate the patients' quality of life based on rehabilitation with a facial prosthesis. Patient's psychological situation was assessed by using validated questionnaires and scales. Different patient groups were compared to each other regarding questionnaire scores and general data.

Results: A total of 76 patients with a prosthesis of the orbit, nose, ear, or a combination thereof were included. There was a highly significant difference in overall satisfaction with defect reconstruction through a prosthesis of the ear compared to the orbit and nose ($F(3) = 6.511, p = 0.001$). Patients with a congenital defect showed a significantly higher level of general satisfaction compared to patients with acquired defects ($F(2) = 5.795, p = 0.001$). Patients who returned to work were significantly more satisfied with their lives ($T(57) = 2.626, p = 0.011$). As an improvement of the state-of-art prosthesis, the majority of patients suggested better retention, more durable colors, make-up possibility, less noticeable margins, softer material, and a moving orbital prosthesis.

Conclusion: Our data show that a facial epithesis diminishes mental pain and increases the quality of life of patients with a facial defect. However, further studies are needed since the challenge of psychological and social detriment remains.

Introduction

Maxillofacial defects with the loss of structural and functional integrity have a major impact on patients' social behavior,

expression of emotions, and communication. When surgical intervention is not possible or desired, rehabilitation through facial prosthesis poses an alternative option. With the appropriate

indication, an epithesis is a feasible alternative to improve facial function and aesthetics from both a psychological and a social point of view [1-5]. Furthermore, in case of extensive or even recurrent tumor disease, a prosthesis makes it easier to monitor and access the region of interest [6,7]. Since the face has a unique role in communication and changes in facial features or functionality may have significant psychological and social impacts, the development of maxillofacial prosthetics has been an area of active research over the past few decades [4,8-10]. Myriad different prosthesis types and materials, with retention mechanisms like anatomical undercuts, skin adhesives, and endosseous implants, have led to better rehabilitation outcomes. The material and therefore also color and durability play an important role in the patient's satisfaction with the prosthesis [11-15]. However, the psychosocial impact of facial prostheses on patients and how that translates to treatment outcomes have so far been understudied, even though this may have significant value in future product and treatment strategy development. We performed a pilot study to evaluate the determinants of quality of life and satisfaction in patients with facial prosthetics. A comprehensive questionnaire was developed in conjunction with validated psychological questionnaires to achieve these objectives.

Material and Methods

The patients' participation in this study was approved by the institutional review board at Charité (board reference number: EA4/102/18). All methods/experiments were carried out in accordance with relevant guidelines and regulations (Declaration of Helsinki).

Patient Acquisition

A total of 200 patients who had received a facial prosthesis for at least 12 months were contacted by mail. Of these, 76 patients agreed to participate in this study by filling out the questionnaires. The cohort of patients was stratified according to epidemiology, demographics, location of defect, and origin of defect. Patient data were double-checked with medical charts (e.g., to confirm gender, age, type of prosthesis, habits like smoking, duration of time since cancer therapy, and prosthetic rehabilitation).

Questionnaires

A special comprehensive questionnaire was designed to evaluate the patients' quality of life based on rehabilitation with a facial prosthesis. The questionnaire contained 43 questions, including yes/no questions, scale questions, and multiple-choice questions. The scale varied from "very often/yes of course/very satisfied" with a score of 10 to "not at all/unsure/not satisfied at all" with a score of 1. The questionnaire was divided into four parts. The first part assessed the patient's demographics and defect location. The second part evaluated the patient's psychological,

social, and functional aspects regarding the use of a prosthesis. In the third part, the patient was asked to suggest the areas within the field of anaplastology that needed further research. In the fourth part, the patient's psychological situation was assessed by using the validated questionnaires and scales including the Beck Depression Inventory II [16], Brief Symptom Inventory [17], Resilience Scale [18], Short-Form Health Survey [19] and Short Warwick Edinburgh Mental Well-Being Scale [20]. In addition, 31 patients who indicated cancer treatment with surgery as the reason for their prosthesis were asked to complete the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-H&N35 (EORTC QLQ-H&N35) [21]. The questionnaire covers physical aspects as well as social components. There are 35 questions, 30 of which are answered with a 4-point Likert scale, and the remaining five are decision questions. A formula is used for the evaluation, resulting in 18 symptom scales. High values represent a large loss of function [21]. Furthermore, the patients were asked to give their thoughts about design and material requirements. All questionnaires were sent with an explanatory letter included that outlined the objectives and confidentiality of the study.

Statistics

The statistical analysis was performed with Microsoft Excel (Version 16.16.10) and IBM SPSS Statistics (Version 25). Different patient groups were compared to each other regarding questionnaire scores and general data. The t-test for two independent samples was chosen to analyze two groups. If more than two groups were present, ANOVA was used. In order to determine between which groups the difference was found, the Scheffé and Bonferroni post-hoc tests were applied. The significance level was set to 5% (≤ 0.05).

Results

General Data

A total of 76 patients with a prosthesis of the orbit, nose, ear, or a combination thereof were included. Forty-two of the patients were male (55.3%), and 34 were female (44.7%). The mean patient age was 59.28 years (SD ± 16.20), with the youngest patient being 22, and the most senior, 89 years of age. A prosthesis was manufactured for 57.9% of the patients due to cancer in the midfacial region, 30.3% were due to congenital malformation, and 10.5% were caused by accidents. The region of defect that had to be replaced was the ear in 42.1% (n= 32) of the cases, the eye in 40.8% (n= 31), and the nose in 10.5% (n= 8). The remaining five cases were combined defects. At the time of the questionnaire, these patients had had a facial prosthesis for a mean of 31.2 years (SD ± 24.46). Table 1 presents the main characteristics that were addressed: age, sex, nationality, residence, level of education, employment situation, relationship status, location and cause of the epithesis, as well as anchorage. All baseline characteristics are summarized in Table 1.

Table 1: Baseline characteristics of patients.

Age in years		Sex	
mean	59.28 ± 19.2	male	42 (55.3%)
minimum	22	female	34 (44.7%)
maximum	89		
Nationality		Residence in city	
German	69 (90.8%)	no	31 (40.8%)
foreign	5 (6.6%)	yes	45 (59.2%)
missing	2 (2.6%)		
Education A-level		University studies	
no	41 (53.9%)	no	44 (57.9%)
yes	33 (43.4%)	yes	31 (40.8%)
missing	2 (2.6%)		
Vocational training		Employment	
no	9 (11.8%)	no	46 (60.5%)
yes	61 (80.3%)	yes	27 (35.5%)
missing	6 (7.9%)	retiree	2 (2.6%)
		missing	1 (1.3%)
Relationship status		Children	
married	42 (55.3%)	no	24 (31.6%)
in a relationship	10 (13.2%)	yes	52 (68.4%)
single	14 (18.4%)		
divorced	5 (6.6%)		
widowed	3 (3.9%)		
missing	2 (2.6%)		
Region of defect		Cause of defect	
eye	31 (40.8%)	accident/trauma	8 (10.5%)
ear	32 (42.1%)	tumor	44 (57.9%)
nose	8 (10.5%)	congenital	23 (30.3%)
combination	4 (6.6%)	other	1 (1.3%)
other	1 (1.3%)		
Anchorage of prosthesis			
implants	65 (85.5%)		
bonding	5 (6.6%)		
Implants + bonding	3 (3.9%)		
other	3 (3.9%)		

General Satisfaction and Quality of Life

Looking at general patient satisfaction, there was a highly significant difference in overall satisfaction with defect reconstruction through a prosthesis of the ear compared to the orbit and nose ($F(3)=6.511$, $p=0.001$) (Figure 1). Furthermore, patients with a congenital defect showed a significantly higher level of satisfaction compared to patients with acquired defects ($F(2)=5.795$, $p=0.001$) (Figure 2). In particular, patients who had lost their nose did not feel comfortable going out in public ($F(3)=4.967$, $p=0.003$). This patient group also tended to have more problems engaging in an intimate relationship ($F(3) = 2.600$,

$p=0.059$). In comparison, in patients with a congenital defect, a prosthesis led to an improvement in sexual satisfaction ($F(2) = 2.956$, $p=0.059$). Analyzing demographics, patients from cities were more actively looking for interactive conversations with others ($T(73) = 2.756$, $p=0.007$) compared to patients from rural areas. Further, patients from cities were more likely to return to their employment compared to patients in rural areas ($T(58) = 2.499$, $p=0.015$). Patients who returned to work were significantly more satisfied with their lives ($T(57)=2.626$, $p=0.011$). This is true not only for work, but also for hobbies: patients that were able to pursue their hobbies again after prosthetic rehabilitation were significantly more satisfied ($T(71) = 2.330$, $p=0.023$).

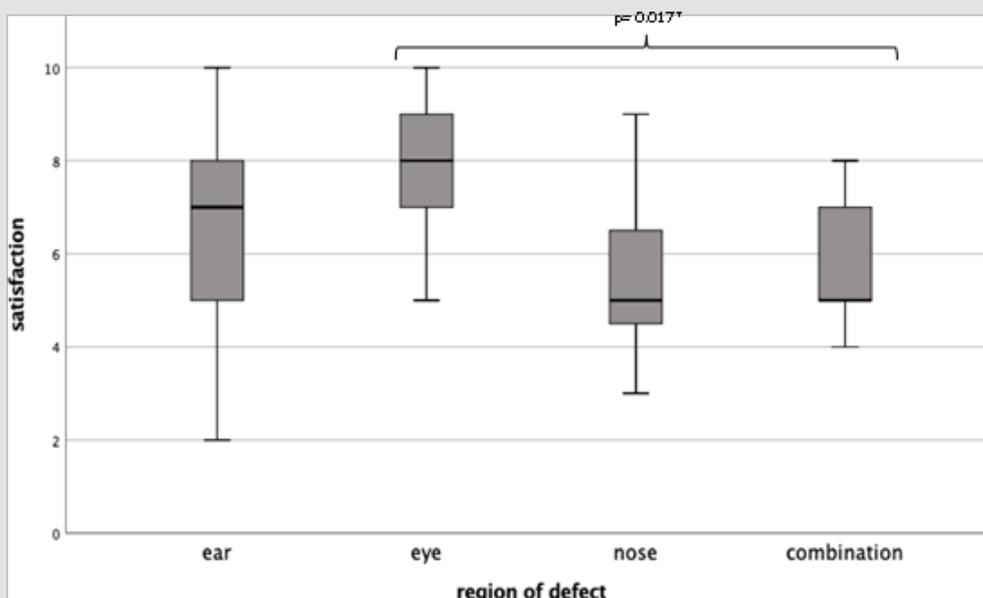


Figure 1: Correlation between location of defect and general satisfaction.

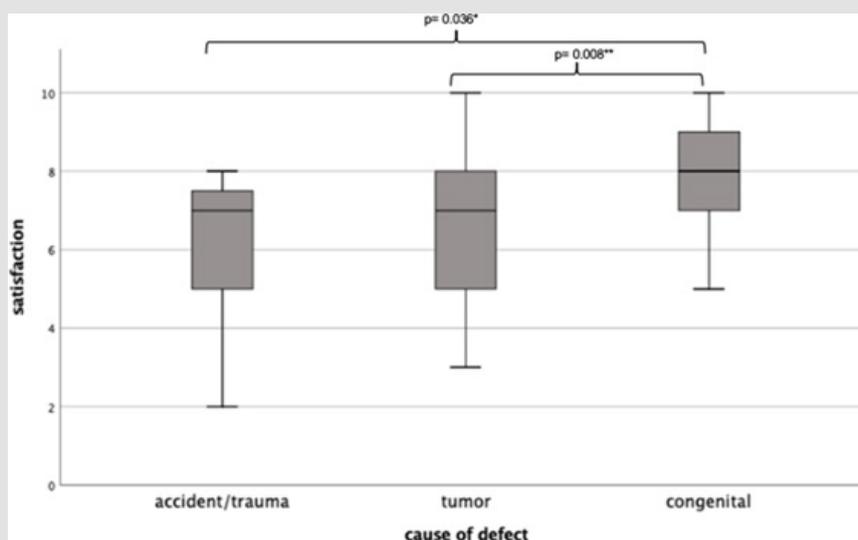


Figure 2: Correlation between cause of defect and general satisfaction.

Wishes and Suggestions

As an improvement of the state-of-art prosthesis, the majority of patients suggested better retention, more durable colors, less noticeable margins, softer material, and a moving orbital prosthesis. Thirty-four patients (46.6%) would further like to own a second epithesis. Addressed reasons were the change of their skin color in the summertime and wanting to have a different

epithesis for special occasions, e.g., some female patients wanted a second epithesis that could be covered with make-up. Table 2 gives an overview and rating of different wishes and suggestions made by patients, as assessed by the four open questions in part 4 of the questionnaire. The different answer options are listed with absolute numbers. Above that, for each question, it is indicated how many patients answered the question and how many missing answers there were.

Table 2: Wishes, expectations, and innovations from patients.

General expectations for future epitheses		Wishes for functionality	
Replies	6	Replies	6
Missing	3	Missing	1
	1		1

Missing	3	Missing	5
Total	7		7
	6	Total	6
Broader health insurance cover	2	Jewelry	1
Satisfied/no improvement	2	Microchip for retrieval	1
(Faster) production	5	Better cleanability	1
Adaptability of the epithesis	6	Stronger adhesion	1
Better hold/seat	8	Copy of the other eye	2
Stronger anchorage	1	Stronger epithesis-skin junction	3
	0		
Longer shelf life	1	Higher mobility	4
	0		
Better material	1	Better material	4
	4		
Naturalness/aesthetics	1	Satisfied/no improvement	5
	8		
		Adaptability/color	1
			8
Wishes for aesthetics		Further ideas/wishes/suggestions	
Replies	5	Answers	1
	3		6
Missing	2	Missing	5
	3		0
Total	7	Total	7
	6		6
Material	1	Individual case decisions	1
MRI capable	1	Shorter production time	1
Suitable for water	1	Longer shelf life	1
CAD/CAM/Laser	2	Better cleaning	1
Hearing aid	2	Sustainability	1
Breathable	3	Problem with fungal infestation	1
Satisfied/no improvement	3	Sleeping epithesis	1
Naturalness	4	Visual acuity	1
Color	5	Accommodation during production	1
Fastening/Adhesion	1		2
	0	Psychological support	
Mobility/Function	1		2
	1	Satisfied/no improvement	

Psychological Evaluation

In addition to our questionnaire, the psychological surveys revealed further findings. Addressing depressive symptoms with the BDI, 49 patients (72.1%) had no signs of depression. Five patients (7.4%) suffered from moderate depression, and the rest showed light signs of depression. Differentiating by the anatomical location of the epithesis, patients with a prominent location like a nasal epithesis showed the strongest signs of depressive symptoms ($F(3)=3.178, p=0.030$), with a mean BDI II score of $M=10.43$.

The evaluation of the SWEMWBS questionnaire showed a trend towards significance that men had higher mental well-being than women ($T(67) = 1.976, p=0.052$). Evaluating the Resilience Scale of this study group, 14 patients treated with epithesis (20.3%) showed low resilience, four patients (5.8%) showed moderate resilience, and 51 patients (73.9%) showed high resilience. There was no significant difference relating to types of prostheses, age, or gender. Further, patients without children had significantly lower resilience compared to patients with children ($T(67) = -2.743$,

$p=0.008$). The evaluation of the BSI shows that the people who lived in big cities felt psychologically more stressed based on the scales for compulsivity ($T(67)=2.670$, $p=0.010$), uncertainty about social contacts ($T(67)=2.480$, $p=0.016$), and paranoid thinking ($T(43.162)=2.791$, $p=0.008$) compared to those patients living in rural areas. The evaluation of the Short-Form Health Survey is based on the two sum scales of mental and physical health. There was a significant difference in the type of craniofacial prosthesis in relation to the physical sum scale ($F(3)=4.887$, $p=0.004$), showing that patients with ear prostheses had significantly better physical health compared to those with combination prostheses. Between the other groups, no significant difference was found.

Also, better-educated patients seemed to live a significantly healthier life ($T(59)=-2.962$, $p=0.004$; $T(59.727)=-2.962$, $p=0.011$) than patients with a lower level of education. Finally, the questionnaire EORTC QLQ-H&N35 for the 31 OMFS tumor patients was evaluated by calculating the symptom scale values in order to achieve comparability. The mean values of the symptom scales are shown in Table 3. Based on the symptom scale values, patients reported their biggest limitations as mouth opening (37.63 ± 41.94) and having the sensation of a dry mouth (32.26 ± 38.95).

Table 3: Symptoms via tumor questionnaire.

Symptoms	Mean value (SD)
Pain	12.63 (\pm 20.05)
Difficulty swallowing	19.35 (\pm 29.76)
Sensory problems	22.05 (\pm 32.03)
Speech problems	13.79 (\pm 23.26)
Trouble with social eating	29.03 (\pm 24.7)
Trouble with social contact	20.96 (\pm 24.97)
Less sexuality	19.19 (\pm 34.00)
Tooth problems	18.21 (\pm 30.89)
Reduced mouth opening	37.63 (\pm 41.94)
Dry mouth, coughing	32.26 (\pm 38.95)
Sticky saliva	22.58 (\pm 32.64)
Coughing	18.28 (\pm 28.33)
Felt ill	9.68 (\pm 24.63)
Needed painkillers	22.58 (\pm 42.50)
Needed nutritional supplements	19.35 (\pm 40.16)
Needed a feeding tube	9.68 (\pm 30.05)
Weight loss	16.10 (\pm 37.40)
Weight gain	9.68 (\pm 30.05)

Discussion

To date, there have been only a few studies published that have investigated parameters like patient satisfaction, quality of life, and social interaction in patients with facial prostheses [4,7,11,15]. Despite the high number of questionnaires sent out to the patients in our study, no remarks about the number of questions were received from any of the respondents, although only approximately

one-third of patients responded. As also shown by Atay et al. [9] patients with nasal and orbital prostheses showed significantly lower quality of life, probably due to the prostheses' prominence in their facial appearance. Patients with ear prostheses showed themselves to be socially more integrated than combination prosthesis wearers. These patients also showed the highest general satisfaction. Our results also showed that patients who were able to return to work and continue to practice their hobbies had fewer signs of depressive symptoms. These findings highlight that it is important for people as social beings to be in a social environment and to have contact with others, suggesting that social contacts are important for full rehabilitation and high quality of life [11]. This also indicates that epitheses have to be manufactured in a highly functional way. For example, perhaps a second special epithesis for a certain hobby has to be produced. Then, hobbies can be pursued, which in turn leads to a higher quality of life.

Further, the patient sex distribution (55.3% male and 44.7% female) demonstrated similar proportions as in previous studies. This study confirms the findings in the literature that women are more susceptible to depressive symptoms but contrarily are more likely to return to their employment [7-9]. On average, patients from big cities were generally more satisfied than those living in rural areas. Although this correlation is only a trend, it can nevertheless be seen as an indication. This may be explained by the anonymity and diversity of the big city, which may protect patients from unpleasant looks and the feeling of exclusion. In addition, people from cities were more active in looking for conversations with others and returned to their jobs more often. Here again, a parallel can be found to the relevance of social integration, already mentioned above. Based on our data, there is a higher need for social support to improve the psychosocial functioning of patients living in rural areas.

In our patient collective, the general satisfaction of tumor patients was significantly lower than that of patients with congenital defects. Moreover, the tumor patients had higher psychological stress than the other patient groups [22]. In general, the psychological burden is particularly high in patients with tumors in the head and neck region, with the reported incidence of depression and anxiety disorders is between 14% and 52% [23,24]. It is therefore of great importance to provide patients with psychological care in addition to epithetic rehabilitation therapy. Especially for tumor patients, there is the stress and anxiety of cancer therapy in addition to the new situation of the prosthesis. In the literature, it is described that the success of the therapy depends not only on the preservation of life but also significantly on the subsequent quality of life [22]. In this context, it is important to strive for close cooperation with psychologists in the future in order to increase the quality of life of epithesis wearers. In the fourth part of our questionnaire, patients' wish for psychological support was also expressed.

The psychological questionnaires should serve, in addition to our epithesis questionnaire, to assess both psychological symptoms and quality of life. This makes it possible to draw a comparison with the normal population and, if necessary, to identify signs of mental illness. In almost all psychological questionnaires, deviations from the normal population were found. The mean value of the BDI-II overall score was 5.81 (SD=7.21), lower than that of a sample of the normal population in Germany (M 7.69; SD=7.52). [25] However, both values can still be classified as «no depressive symptoms.» On the basis of these data, it can be concluded that wearing an epithesis does not provide increased evidence for the presence of depression. If we compare the BSI scale values of our patient collective with the values of the German normal population, a deviation is noticeable on some scales. The most significant deviation is to be found in the «somatization» scale, which includes mental stress. The mean value of our patient collective was 0.42 (SD=0.53), while that of the normal population in Germany is 0.27 (SD=0.32) [26,27]. This suggests that wearing an epithesis is a psychological stressor.

Our SF-12 results also deviate from the normal population's values. The mean value for the physical scale value is 46.70 (SD=11.48), and for the mental sum scale, 50.76 (SD=10.36). If we look at the standard values of the population, it is noticeable that only 30% of the normal population have a physical scale value below 48. Also, on the mental scale, only 40% have a value below 51. These results make it clear that the mental well-being of epithesis carriers is reduced compared to the normal population. The mean value of the RS-13 is slightly higher in our patients, at 75.48 (SD=13.061), than in the normal population, who have a mean value of 70 (SD=12) [28]. It has been proven that high resilience can protect against the occurrence of depression [29]. Thus, it can be suggested that the interviewed epithesis patients achieved low BDI values due to their high resilience values. This causality is important for the future understanding and treatment concept of the patients. Our study should be interpreted within the constraints of its limitations, which include the small number of patients. The rarity of these patients necessitated recruitment of a heterogeneous cohort with different follow-up periods after prosthetic rehabilitation. This may have allowed more time for some patients to develop coping strategies and therefore judge differently. Another point is that questionnaires were only sent to patients treated with a prosthesis. This means that there is no control group that did not receive any treatment for their defect or do not have a facial defect. A special questionnaire for this cohort will be designed for further investigations. Extended studies are needed to shed more light on this rare patient group.

Conclusion

In this study, we gained insights into the quality of life, satisfaction, needs, and psychological distress of patients with a facial epithesis by using a number of interdisciplinary

questionnaires. Our data show that a facial epithesis diminishes mental pain and increases the quality of life of patients with a facial defect. However, the challenge of psychological and social detriment remains. This shows the urgent need for further research, in the direction of both technological advancement and, in particular, the psychological care of those affected.

Conflicts of Interest and Source of Funding

The authors have no conflicts of interest or funding sources to report.

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Robert Gaudin and Jan Dirk Raguse contributed equally to the study.

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