KATARZYNA BOGUSIAK^{1, A–F}, TOMASZ KOWALCZYK^{1, B, F}, PIOTR ARKUSZEWSKI^{2, A, E, F}

Satisfaction with Life in Patients with Skeletal Class III Malocclusion After Orthognathic Surgery

Satysfakcja z życia pacjentów z wadami III klasy szkieletowej po zabiegach ortognatycznych

¹ Craniomaxillofacial and Oncological Surgery Ward, University Teaching Hospital no. 1 of Medical University of Łódź, Łódź, Poland

² Department of Craniomaxillofacial and Oncological Surgery, Medical University of Łódź, Łódź, Poland

A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation; D – writing the article; E – critical revision of the article; F – final approval of article

Abstract

Background. Good well-being is a noteworthy element of health and it also influences the overall evaluation concerning the quality of life assessed in relation to individually selected criteria.

Objectives. The aim of this study was to examine whether the subjective evaluation concerning the satisfaction with life after orthognathic treatment depends on the surgical method applied for treating skeletal class III malocclusion and subjective evaluation of the result obtained after surgery.

Material and Methods. Sixty-six patients treated in 2002–2013 for skeletal class III malocclusion were enrolled into the study (after bilateral sagittal split osteotomy, BSSO, extraoral vertical ramus osteotomy, EVRO, bimaxillary surgery). The questionnaire study was divided into two parts. The first one was a survey concerning patients' satisfaction with treatment results, their appearance and subjective evaluation concerning the function of the stomatognathic system following the surgery. The second was the Satisfaction with Life Scale (SWLS) questionnaire. Satisfaction with life index (SAT) was used to assess patients' answers and transformed into standardized STEN units.

Results. SAT ranged from 13 to 31 points, mean value: 23.9 ± 3.83 , after BSSO: 25.3 ± 2.73 , EVRO: 23.4 ± 4.26 , bimaxillary surgery: 20.9 ± 1.25 . 95% patients would undergo the surgery for the second time. More than half of them had high stens (57%). No statistically significant differences were observed between positive and negative responses to questions and high or low STEN evaluations ($p > 0.05$).

Conclusions. Satisfaction with life after orthognathic surgery is on average higher than the average satisfaction with life in reference to the adult population and depends on the type of conducted surgery. Patients who underwent sagittal split ramus osteotomy experienced a higher level of well-being than patients undergoing bimaxillary surgeries. The value of satisfaction with life after orthognathic surgery does not depend on the patient's subjective evaluation concerning therapeutic result (Dent. Med. Probl. 2016, 53, 2, 236–243).

Key words: mandibular prognathism, orthognathic surgery, satisfaction with life.

Słowa kluczowe: prognatyzm żuchwy, chirurgia ortognatyczna, satysfakcja z życia.

Good well-being is not only a noteworthy element of health, but it also influences the overall evaluation concerning the quality of life assessed in relation to individually selected criteria [1]. The term quality of life (QOL) is the main subject of multiple publications from various scientific branches, such as: sociology, psychology, philosophy, theology, political science, pedagogy, econo-

my and medicine. Each of these scientific domains attempts to determine factors influencing satisfaction with life and quality of life. Apart from a multitude of elements, the human face and the subjective perception of individual attractiveness, due to their influence on various aspects of individual, professional and social life, play a crucial role in the subjective evaluation of quality of life [2]. That

is why currently the increasingly common reason to undertake orthodontic treatment, as well as combined orthodontic-surgical therapy, lies in the desire to improve the appearance of one's face by improving occlusion conditions, obtaining an aesthetic smile and an attractive facial profile [3, 4]. The willingness to improve one's appearance may also result from the fact that people with maxillofacial defects are usually seen as less interesting and less valuable, and hence less socially desired. Prolonging the lower part of the face, protrusion of the mandible give one's face an aggressive appearance, which is particularly negatively perceived in case of women. It has been proven that a smaller labiomental angle and the nasion-pogonion angle is associated with lowered feeling of psychical discomfort caused by a negative assessment of the facial appearance in patients, who underwent mandibular setback surgery [5]. Among people with maxillofacial defects, mainly with skeletal class III malocclusion, negative emotions associated with the lack of acceptance for one's own appearance may lead not only to lowered satisfaction with life but also to worsened quality of life. These may as well have a negative effect on the psyche, personality and adaptation to function in a society [6, 7].

Change in the appearance of a patient's face resulting from orthodontic and orthognathic therapy may influence success in professional and personal life, and hence on the evaluation of the quality of life. Orthognathic procedures restore the proper functioning of the stomatognathic system through improved osseous-dental relations, improved articulation, chewing and biting of food, not to mention that due to changes in the soft tissue structure these procedures influence the aesthetics and attractiveness of a patient's face.

The aim of this study was to examine whether the subjective evaluation concerning the quality of life after orthognathic treatment depends on the surgical method applied for treating skeletal class III malocclusion and subjective evaluation of the result obtained after the surgery.

Material and Methods

Sixty-six patients from 90 treated between 2002 and 2013 for skeletal class III malocclusion, who underwent orthognathic surgeries (bilateral vertical ramus osteotomy from external approach, EVRO, bilateral sagittal split ramus osteotomy from internal approach with Obwegeser-Dal Pont's method, BSSO or bimaxillary surgery – Le Fort I osteotomy and BSSO) and who filled the questionnaires, were enrolled into the study. The questionnaire study was conducted at least

Table 1. The method of transformation of the general index of satisfaction with life (SAT) to standardized units of sten scale (STEN)

Value of SAT index	Standardized STEN unit
5–9	1
10–11	2
12–14	3
15–17	4
18–20	5
21–23	6
24–26	7
27–28	8
29–30	9
31–35	10

6 months after the surgical procedure. The study was divided into two parts. The first part included a survey, elaborated by the authors, covering 12 questions concerning patients' satisfaction with treatment results, their appearance and subjective evaluation concerning the functionality of the stomatognathic system following the surgery. (Annex 1) The second part of the study included a questionnaire elaborated by Diener et al. [8], which was adapted and translated into Polish by Z. Jurczyński – the Satisfaction with Life Scale (SWLS). The Satisfaction with Life Scale contains five statements. Each patient assessed to what extent each statement relates to his person and to his life. This measurement enables us to obtain the overall index of satisfaction with life (SAT). (Annex 2) The scope of results is within 5 to 35 points. The higher the result, the greater the feeling of satisfaction with life. Average values of the satisfaction with life index (SAT) were calculated for the overall group of patients, women and men, as well as in groups of patients divided according to the type of conducted surgical procedure. Additionally, the overall SAT index was transformed into standardized STEN units, based on Table 1. Results between 1 and 4 stens were seen as low results, the ones falling between 7 and 10 stens as high, whereas results equaling 5 and 6 stens were considered average.

Sixty-six patients filled out the questionnaire, 40 women and 26 men between 18 and 51 years old (average age 24.3 ± 6.4 years). Characteristics of patients enrolled into the study are shown in Table 2.

Statistical Analysis

The Chi-square test of independence was utilized to compare the frequency of particular re-

Table 2. Characteristics of patients included in the study

	Female			Male			Total		
	N	%	Age $\pm$ SD	N	%	Age $\pm$ SD	N	%	Age $\pm$ SD
EVRO	18	27.27	23.2 $\pm$ 5.53	13	19.70	25.8 $\pm$ 6.17	31	46.97	24.3 $\pm$ 5.95
BSSO	19	28.79	23.3 $\pm$ 4.96	9	13.64	26.7 $\pm$ 10.02	28	42.42	24.4 $\pm$ 7.18
Bimaxillary surgery	3	4.55	19.3 $\pm$ 1.70	4	6.06	26.8 $\pm$ 3.70	7	10.61	23.6 $\pm$ 4.75
Total	40	60.61	23.0 $\pm$ 5.17	26	39.40	26.3 $\pm$ 7.49	66	100	24.3 $\pm$ 6.40

N – number of patients, SD – standard deviation, EVRO – external vertical ramus osteotomy, BSSO – bilateral sagittal split osteotomy.

sponses in examined groups as well as to evaluate the dependence between features. The p value lower than .05 was assumed as the significance level.

Results

SAT values within the whole questioned group ranged from 13 to 31 points, with the average reaching 23.9 ± 3.83 . Women obtained a slightly higher average than men (24.3 ± 3.63 vs. 23.4 ± 4.14 respectively; $p > .05$). Overall, high results were reported in 57.6% cases, slightly more among women (60.0%) than men (53.8%), ($p > .05$) (Table 3).

What applied to the whole group of questioned patients was that the highest average SAT values were obtained in the case of sagittal osteotomy procedures, namely 25.3 ± 2.73 . A considerably lower result was observed in the case of vertical osteotomy: 23.4 ± 4.26 , while the lowest result was noted after the bimaxillary surgery: 20.9 ± 1.25 . The average SAT value for sagittal osteotomy was significantly higher when compared with the bimaxillary surgery ($z = 2.468$; $p < .05$). Differences between sagittal osteotomy and vertical osteotomy ($p > .05$), as well as between vertical osteotomy and bimaxillary surgery ($p > .05$) proved to be statistically insignificant. Statistically significant differences were observed in the percentage of high results (sten 7–10) reported after various procedures ($p < .05$). Sagittal osteotomy revealed the highest percentage of high results (71.3%), which was followed by vertical osteotomy (54.8%), while the smallest percentage was noted

in the bimaxillary surgery, where the percentage of high results amounted only to 14.3%. No statistically significant difference was observed among percentage of low results (sten 1–4) for particular procedures ($p > .05$), although the highest percentage of such results was observed after bimaxillary surgeries (14.3%), while after sagittal osteotomy results falling between 1 and 4 stens did not occur at all (Table 4).

Similar values of the overall satisfaction with life index following the orthognathic procedure as well as statistical dependences were observed in the female group. The highest SAT values were stated after sagittal osteotomy procedures, where the average reached 25.5 ± 2.55 . The average value following vertical osteotomy was much lower: 23.8 ± 3.67 , and the lowest one was reported after the bimaxillary surgery, as it only reached 19.0 ± 5.20 . A statistically significant difference was seen between average SAT values calculated for sagittal osteotomy and bimaxillary surgery ($z = 2.521$; $p < .05$). Whereas the difference between average values of this parameter in the group of patients undergoing sagittal and vertical osteotomy did not prove statistically significant ($p > .05$). A comparison of average SAT values among patients operated with vertical osteotomy method and those undergoing the bimaxillary surgery did not reveal significance dependences as well ($p > .05$). A statistically significant difference was not observed as well within the scope of low results (sten 1–4) and high results (sten 7–10) for particular procedures ($p > .05$). However, a comparison of pairs of high results in groups of pa-

Table 3. Test results of SAT and STEN in the group of respondents

	N	Mean value of SAT results	SD	STEN units	
				low values (sten 1–4)	high values (sten 7–10)
Total	66	23.9	3.83	6.1%	57.6%
Female	40	24.3	3.63	5.0%	60.0%
Male	26	23.4	4.14	7.7%	53.8%
Statistical analysis	$z = .768$; $p > .05$			$\chi^2 = .006$; $p > .05$	$\chi^2 = .244$; $p > .05$

N – number of patients, SD – standard deviation.

Table 4. Results of SAT and STEN for different methods of surgical treatment for the entire group of patients and for male and female patients

	N	Mean value of SAT results	SD	STEN units	
				low values (sten 1–4)	high values (sten 7–10)
Total	66	23.9	3.83	6.1	57.6
BSSO	28	25.3	2.73	–	71.4
EVRO	31	23.4	4.26	9.7	54.8
Bimaxillary surgery	7	20.9	1.25	14.3	14.3
Statistical analysis	$H = 6.255; p < .05$			$\chi^2 = 1.132; p > .05$	$\chi^2 = 7.655; p < .05$
Female					
Total	40	24.3	3.63	5.0	60.0
BSSO	19	25.5	2.55	–	68.4
EVRO	18	23.8	3.67	5.5	61.1
Bimaxillary surgery	3	19.0	5.20	33.3	–
Statistical analysis	$H = 6.780; p < .05$			$\chi^2 = 1.271; p > .05$	$\chi^2 = 2.633; p > .05$
Male					
Total	26	23.4	4.14	7.7	53.8
BSSO	9	24.8	3.19	–	77.8
EVRO	13	22.8	5.08	15.4	46.2
Bimaxillary surgery	4	22.3	1.89	–	25.0
Statistical analysis	$H = 1.812; p > .05$			$\chi^2 = 2.166; p > .05$	$\chi^2 = 3.072; p > .05$

N – number of patients, SD – standard deviation.

tients undergoing various orthognathic procedures revealed a significantly higher percentage of results within the scope of sten 7–10 after sagittal osteotomy when compared with bimaxillary surgery (68.4% vs. 0%; $p < .05$) (Table 4).

In the male group, the average SAT results and the frequency of both high and low results were similar to those observed for the female group, although no statistically significant dependences were observed. What concerns the male group, the highest SAT values were observed after sagittal osteotomy procedures, where the average reached 24.8 ± 3.19 . A smaller average was obtained in the case of vertical osteotomy: 22.8 ± 5.08 and the smallest one in case of the bimaxillary surgery: 22.3 ± 1.89 . What was also statistically insignificant was the difference concerning the percentage of high results (sten 7–10) in the case of various procedures ($p > .05$). However, within this group, similarly to the female group, sagittal osteotomy was characterized by the highest percentage of high results (77.4%), and was followed by vertical osteotomy (46.2%). The smallest percentage of high results was reported after the bimaxillary surgery (25.0%). Comparing high results in groups after various surgeries in pairs in the male group did not reveal significant differences ($p > .05$) (Table 4).

All questioned patients assessed that their image after the surgery was very good or good, and the number of high results (sten 7–10) reached 38

(57%). A positive influence on self-confidence was noted in 56 out of 66 questioned patients (84%), and high results (sten 7–10) were indicated by 32 people from this group (57%), which means more than every other questioned patient. Forty-one patients (62%) declared improved interpersonal contacts, but only half of them had high stens ($N = 21$; 51%). In the case of 57 people (86%) their friends were positive about their new look, and high 7–10 stens were recorded in more than half of these patients ($N = 31$; 54%). Thirty-six patients (54%) declared that they wanted their environment to see the change in their appearance, but high stens concerned only slightly more than half of this group ($N = 20$, 56%). Change in the professional status applied to only 5 people (7%) and they all evaluated their satisfaction with life as high. Only one person with high sten attributed the promotion at work to the performed procedure (1.5%). Fifty-three patients experienced an improvement in biting and chewing food (80%), yet only slightly more than half of them (28 people; 53%) had stens reaching 7–10. Similarly, improved articulation was reported by 38 questioned patients (58%), but only slightly more than half of them had sten between 7 and 10 (21 people, 55%). 31 out of 66 patients were operated by means of external access. 27 patients from this group said that the scar does not negatively influence their image (87%). It is worth mentioning that only 16 people, and this is more than

Fig. 1. Positive results of the survey and the frequency of high results (sten 7–10) of satisfaction with life scale

Table 5. Results of the survey elaborated by the authors

	Answers							
	a		b		c		d	
	N	%	N	%	N	%	N	%
Question 1	30	45.45	35	53.03	1	1.52	0	0.00
Question 2	13	19.70	42	63.64	7	10.61	4	6.06
Question 3	11	16.67	29	43.94	8	12.12	18	27.27
Question 4	37	56.06	19	28.79	0	0.00	10	15.15
Question 5	14	21.21	22	33.33	26	39.39	4	6.06
Question 6	5	7.58	5	7.58	56	84.85	0	0.00
Question 7	1	1.52	65	98.48	0	0.00	0	0.00
Question 8	42	63.64	10	15.15	6	9.09	8	12.12
Question 9	11	16.67	26	39.39	20	30.30	9	13.64
Question 10 ^a	0	0.00	4	10.00	36	90.00	0	0.00
Question 11	62	93.94	4	6.06	0	0.00	0	0.00
Question 12 ^b	10	14.08	2	2.82	54	76.06	5	7.04

Note: ^a Only patients after extraoral vertical ramus osteotomy (EVRO), ^b More there one answer is possible to this question, N – number of patients.

half of this group (59%), have high stens: 7–10. Sixty-three from among 66 patients (95%) would undergo the surgery for the second time. More than half of them have high stens (57%). No statistically significant differences were observed between positive or negative responses to questions and high or low STEN evaluations ($p > .05$). The ma-

jority of questioned patients gave positive answers to questions in the survey, but in most questions only half of surveyed people evaluated their satisfaction with life on the level of 7–10 stens (Fig. 1). The vast majority of patients (70.4%) made an individual decision to undergo the surgical procedure (Table 5).

Appendix 2

E. Diener, R.A. Emmons, R.J. Larson and S. Griffin
SWLS

Adapted by: Z. Juczyński

..... age gender M F date of the examination

Below you can find several statements that you can agree with or not. By using a scale from 1 to 7 please indicate – ***to what extent do you agree with each statement*** by entering a proper digit in the empty space provided. Please be honest when providing your answers.

Particular points of the scale indicate the following:

- 1 – **I disagree entirely**
- 2 – I do not agree
- 3 – I rather do not agree
- 4 – I neither agree nor disagree
- 5 – I rather agree
- 6 – I agree
- 7 – **I entirely agree**

-
- 1. ☐ In many aspects my life is nearly perfect
 - 2. ☐ My living conditions are perfect
 - 3. ☐ I am satisfied with my life
 - 4. ☐ As far as my life is concerned, I have achieved the most important aspects that I desired
 - 5. ☐ If I could relive my life, I wouldn't like to change almost anything

ue of satisfaction with life in the original American study by Diener et al. [8], conducted among students equaled 23.4 ± 6.53 , and in the group of elderly people values reached 24.4 ± 6.99 . In our study patients with skeletal class III malocclusion after orthognathic surgeries on average evaluated their satisfaction with life higher than people from the reference group representing adult population in Poland. Patients after sagittal split ramus osteotomy were the group of patients, which revealed the highest average value in the SWLS study. This value was higher than the average data observed by Diener et al. [8] in the study conducted on the American population. However, the lowest average value of subjectively experienced satisfaction with life was noted among patients after bimaxillary surgery. This value was only slightly higher than the average value of satisfaction with life observed in diabetic patients (20.9 ± 1.25 versus 20.3 ± 5.78).

Results obtained by the authors of this questionnaire study concerning therapeutic results are close to the data stated by other authors. The majority of patients with skeletal class III malocclusion after orthognathic surgeries are satisfied with

the outcome of the therapy [5, 7]. As far as the examined population is concerned, all patients evaluated the appearance of their face after the surgery as being very good or good. About 95% of people would probably once again decide to undergo the orthognathic procedure. Most patients also observed improvement in biting and chewing food, as well as improvement in articulation. Subjective feelings of improved articulation and food chewing were confirmed in subjective tests conducted by Lewandowski [13, 14]. When observing the group of his patients, he reported that lisping and hypernasal speech, which concerned about half of the examined group, vanished entirely or partially after the surgical procedure [13, 14]. Some authors suggest that in the case of most people with maxillofacial defects the negative evaluation of their appearance negatively influence their personal life, and in about 40% it negatively influences their relations with others [15]. What has been also observed is the fact that the main motivation to undergo combined orthodontic-orthognathic treatment in patients with morphological defects of the facial skeleton was associated with the desire to improve facial aesthetics [3, 4]. Flanary [16] diagnosed

about 1/3 of his patients with personality disorders. He also observed a positive influence of surgical procedure on the psychological profile of patients 2 years after the surgical procedure. Whereas Sergl et al. [6] proved in his study that patients felt aesthetically impaired, which was reflected in a social handicap. In our study, more than half of people wanted their environment to see a positive change in their appearance. In 84% of cases the change in the way they look positively influenced their self-esteem. About 60% of patients observed improvement in interpersonal relations after the surgery, as they found it easier to make friends.

The results demonstrate that subjective evaluation concerning satisfaction with life among patients with skeletal class III malocclusion, who underwent orthognathic surgeries is on average higher than the average satisfaction with life in reference adult population and depends on the type of conducted surgery. Patients who underwent sagittal split ramus osteotomy experienced a higher level of well-being than patients undergoing bimaxillary surgeries. The value of satisfaction with life after orthognathic surgery does not depend on the patient's subjective evaluation concerning the therapeutic result.

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Address for correspondence:

Katarzyna Bogusiak
 Craniomaxillofacial and Oncological Surgery Ward
 University Teaching Hospital no. 1 of Medical University of Lodz
 22 Kopcińskiego St.
 90-153 Łódź
 Poland
 E-mail: katarzyna.bogusiak@gmail.com

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