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A comparison of psychosocial functioning as well as the quality of life between young adult patients after orthognathic surgeries and healthy youth

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Abstract. – OBJECTIVE: The aim of this study was to compare psychosocial functioning as well as the quality of life of young adults after orthognathic procedures and healthy individuals.

MATERIALS AND METHODS: The study included 124 respondents aged between 16 and 25 years, 65 of whom had undergone orthognathic surgeries, and 59 healthy individuals. The study was carried out using a diagnostic poll method with both standardized tools and the author's own questionnaires: Authors own questionnaire, 'How do you cope?' Questionnaire, Emotional Intelligence INTE Questionnaire, The List of Personal Values (LOPV), The Satisfaction with Life Scale (SWLS), and The Short Form Health Survey (SF-36 v2).

RESULTS: Patients after orthognathic procedures more frequently actively dealt with problems and sought social support rather than concentrating on emotions in terms of dispositional ways of coping with difficult situations. A statistically significant difference was established in the concentration on emotions subscale (CoE) for which lower average value was observed in the study group. Study and control groups differed in terms of the ability to recognise, understand, and control their own and other's emotions.

CONCLUSIONS: Respondents from both groups similarly perceived personal values pointing to love and friendship, health, intelligence as well as happiness as the most important ones. Both patients after orthognathic procedures and healthy ones assessed their life satisfaction on an average level. A link between the choice of the strategy of coping with difficult situations and the fact of having undergone an orthognathic procedure exists. Patients after surgical procedures, in comparison with healthy individuals, less frequently opted for the concentration on emotions (CoE) strategy.

Key Words:
Quality of life, Orthognatic surgery, Young adult.

Introduction

Physical appearance influences every sphere of human's life beginning with education, through dealing with the law and ending with social interactions. Skeletal disfunction has a negative influence on personal and social condition of some patients thus individuals with dentofacial deformities are offered orthognathic surgeries to improve their quality of life[1,2].

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The face is the most visible organ of human body which takes part in the majority of vital functions. Craniofacial deformities disharmonize the functional balance of its structures. Respiratory disfunctions cause hypoxia resulting in child's impaired development, both intellectual and physical. Problems with functioning of the temporomandibular joint, chewing, and swallowing cause digestive problems in the first stage of this process[3]. One's own image is one of the elements of personality – it serves an integrational and personality stabilising function. It grants stability and persistence of behaviours and actions[4]. Its disorder leads to a withdrawal from social life, as well as the sense of isolation and solitude. Impaired speech and facial deformities distort the image of oneself and impede fulfilment of social roles by the child. The optimal age of patients qualified to the procedures ranges between 16 and 30 years. It is also the period in which one person's identity develops, and individual hierarchy of values is established[5].

Individual's appearance is an essential feature of interpersonal relationships. A beautiful face influences creation of positive interpersonal relationships, whereas unattractive one may cause society's prejudice[6]. Treating attractive individuals in a more favourable way is not determined by either age or sex. Such people find partners and friends, get help from random people, and assert their rights in conflicts and disputes more easily. They are assigned positive traits, such as reliability, righteousness, wisdom, ambition, and sexual attractiveness[7-9]. Not only do the aesthetics of facial features influence personal and social life in psychologic aspect but also create one's own self-image as less or more attractive[10].

Orthognathic surgery is defined as surgical repositioning of jaw and/or mandible and/or their parts, with or without orthodontic repositioning of teeth. It is carried out to improve functioning, aesthetics and the quality of life related to health[11]. Majority of orthognathic procedures is carried out not only to improve the functionality but also to reconstruct the correct facial structures. It is associated with an increased self-esteem, attractiveness, and confidence, as well as the ability to fulfil social roles and improved self-image.

The aim of this study was a comparison of psychosocial functioning and the quality of life between healthy young adults and ones after orthognathic surgeries.

Materials and Methods

The study included 124 respondents, aged between 16 and 25 years, including 65 patients after orthognathic procedures carried out in the Department of Head and Neck Surgery with Maxillofacial Surgery Subdivision in Voivodship Specialistic Children's Hospital in Olsztyn and 59 healthy individuals. The study was carried out in accordance with the Declaration of Helsinki after receiving an approval of the director of the hospital and each person taking part in the study. A positive opinion of the Bioethical Commission of Pomeranian Medical University in Szczecin for conducting the study was obtained (approval number: KB-0012/255/06/18). Participation in the study was voluntary and anonymous. Participants from both groups were informed about the aim of the study and the ability to resign or withdrawal their consent at any stage of the study.

The inclusion criteria in the study group (operated on) were as follows: patient's age between 16 and 25 years, having undergone a bimaxillary orthognathic procedure in the Department of Head and Neck Surgery with Maxillofacial Surgery Subdivision in Voivodship Specialistic Children's Hospital in Olsztyn at least half a year before the survey, verbal agreement for the participation in the study, and delivery of the complete set of questionnaire forms. The exclusion criteria were the inability to meet inclusion criteria, lack of verbal agreement for the participation in the study, incomplete set of questionnaire forms.

These studies are part of a larger project. The study was carried out in two stages: through a direct delivery of questionnaire forms during a follow-up appointment in the Centre of Craniofacial Deformities and Maxillofacial Surgery for Kids in Voivodship Specialistic Children's Hospital in Olsztyn and during a hospitalization in the Head and Neck Surgery Department, minimum half a year after the orthognathic procedure. The sets of questionnaires were delivered with a return envelope minimum half a year after undergoing an orthognathic procedure.

Respondents in the control group were healthy and their inclusion criteria were as follows: respondent's age between 16 and 25 years, lack of chronic disease, verbal agreement for participation in the study as well as delivering a complete set of questionnaires. The exclusion criteria were not fulfilling the inclusion criteria, lack of verbal agreement for the participation in the study, incomplete set of questionnaires.

The study was carried out using diagnostic poll method *via* standardised research tools and author's own questionnaire.

Author's own questionnaire consisted of two versions: the first version was addressed to patients after orthognathic procedures and contained questions on sociodemographic and medical data (medical history regarding psychological support, supply of equipment that improves patient's functioning, coexisting diseases, care in specialistic outpatient clinics, number of hospital stays, duration of the treatment) The second version was addressed to the healthy population aged between 16 and 25 years. It enquired upon sociodemographic data.

The 'How do you cope?' Questionnaire by Zygfryd Juczyński and Nina Ogińska-Bulik (2004) is used to assess stress and coping with stressful situations. It consists of two parts. The first, intended to assess dispositional ways of coping with problems, and the second, measuring situational ways of dealing with difficult situations. The second part also requires stating the intensity of certain ways of acting. The answers are given on a five-point scale which measured three strategies: active coping, concentrating on emotions and seeking social support. The result ranged between 0 and 4 points[12].

Emotional Intelligence Questionnaire (INTE), Used in the Studies on Emotional Intelligence, by Stchutte et al[13]

The questionnaire consists of 33 first-person statements. On a scale from 1 to 5, respondents assess to what degree do the given statements refer to them. Abilities and skills regard 24 statements. The interpretation of the results was carried out using the standard tens norms for the given test: results from 1 to 3 are considered low, 4 to 7 as average, and 8-10 as high[13].

The List of Personal Values (LOPV) by Juczyński[14]

The tool enables an assessment of the importance assigned to health in the context of other significant values and personal goods. It consists of two parts. The first one describes nine symbols of happiness. The second consists of ten personal values among which health was listed. A respondent chooses five most important to him or her values and assigns them numbers from 5 as the most important to 1 as the least important. The points are assigned by respondents to five chosen symbols of happiness and personal values and are considered as 'weight' enabling an interpretation in relation to the representative samples of kids and youth[14].

The Satisfaction with Life Scale (SWLS), by Diener E., Emmons R.A., Larson R.J, Griffin S. (1985)[15]

The Polish adaptation of which was prepared by Juczyński[14], is a tool used for subjective assessment of satisfaction from one's own life. The diagnosis of life satisfaction is the balance of comparison of one's own situation to the standards set by him or her. Respondents assess on a 7-point Linkert scale to what extent they agree with each of the five statements regarding their life until now. After summing up the results range between 5 and 35 points. The higher the score, the greater the life satisfaction. Interpretation of results is carried out by comparing standard tens norms for the test: results between 1 and 4 are considered low, 5 to 6 as average, and 7 to 10 as high[15].

The Short Form Health Survey (SF-36 v2) consists of 11 questions regarding health and wellbeing which allow an assessment of the quality of life in 11 domains: physical functioning (PF), role limitations due to physical problems (RP), bodily pain (BP), general health perception (GH), vitality (VT), social functioning (SF), mental health (MH), role limitation due to emotional problems (RE), health transition (HT), physical component summary (PCS), and mental component summary (MCS). The quality of life in each domain is as a number between 0 and 100. The higher the number, the better the quality of life[16].

Statistical Analysis

For metrical (quantitative) variables central tendency (mean) and dispersion (standard deviation) were estimated. According to the characteristics of chosen standardised psychometric tools, parametric approach was used which assumed that dependant variables in the population have a distribution corresponding with the normal distribution. Comparison of obtained results for two independent groups were analysed with the Student's *t*-test. All the calculations were carried out using statistics package STATISTICA version 13.3 (TIBCO Software Inc.). All null analyses tests were carried out with the level of statistical significance established as 0.05 a priori.

Characteristics of Study (Post-Operative) and Control (Healthy) Groups

The study was conducted on 65 patients from the study group and 59 patients from the control group, majority of which were women (74.8%), aged between 19 and 20 years (50.8%), living in cities with population between 10 and 100 thousand (44.1%). Both groups declared similar involvement of both parents – patients after orthognathic surgeries – 81.5%; control group 74.6%. 78% of respondents had siblings in the control group and 81.5% in the control group. Living conditions were assessed as good in 47.5% and very good in 49.2% in the control group, whereas 63.1% of study group declared their conditions as very good and 35.4% as good. The most numerous in both groups, in control group – 49.0% and in the study group – 51.7%, were the respondents who studied at the university.

Individuals from the study group after orthognathic procedures shared additional information. Majority of respondents (72.3%) did not benefit from social support by professionals, such as psychologists. An unprofessional support provided by informal groups such as Facebook, Twitter, Internet forums, was used by 21.5% of respondents. 4.6% of individuals used psychologists consults and 1.5% worked with school counsellor. As far as using equipment which improves functioning of a patient is concerned, 64.6% of individuals used braces, 35.4% of respondents used glasses and 1.5% hearing aid. Concomitant diseases were not observed in 72.3% patients and 7.7% had no such information. 20% of respondents did suffer from concomitant diseases. 84.6% of respondents used the help of an outpatient orthodontic clinic, 35.4% of an ophthalmic outpatient clinic. 6.2% of patients underwent orthopaedic and laryngological consults. Majority of respondents (36.9%) declared that it was their second stay at the hospital and for 27.7% of kids third.

Results

The carried-out analysis indicated that as far as coping strategies with difficult situations were concerned, according to the 'How do you cope?' Questionnaire, patients after orthognathic procedures more frequently actively coped (M=1.96±1) and sought social support (M=1.66±0.88) rather than concentrating on emotions (M=1.08±0.91) within dispositional ways of coping with difficult situations. More significantly stands out the strategy of active coping (M=2.85±0.8) over seeking social support (M=2.19±0.81) in terms of situational ways of coping with stressful situations. Groups did not differ in terms of developing skills within active coping strategies (ACS) and seeking social support (SSS). However, a statistically significant difference was established in the concentration on emotions (CoE) subscale for which a lower average value was observed in the control group than in the study group (M: 1.08 *vs.* 1.62; $p = 0.006$; d = 0.51; 95% CI [0.15-0.86]); (Table I).

The obtained data with the INTE Questionnaire indicated that results of persons after orthognathic surgery ranged between 5 and 6 standard ten and between 4 and 5 STEN scores in the control group. Level of emotional intelligence remained on an average level. The groups differed in terms of the ability to recognise, understand, and control one's own and other's emotions. An average summed-up score was higher in a statistically significant way in the control group (M: 123.94 *vs.* 118.31; $p = 0.031$; d = 0.39; 95% CI [0.04-

Table I. Comparison of coping strategies according to HDYC Questionnaire between operated-on and healthy patients.

Name of the strategy	Control group		Study group		$t_{(df = 122)}$	p^*
	M	SD	M	SD		
Dispositional ways of coping with difficult situations						
Active coping strategy (ACS)	2.12	1	1.96	1	0.863	0.39
Concentrating on emotions (CoE)	1.62	1.22	1.08	0.91	2.801	**0.006**
Seeking Social Support (SSS)	1.88	0.96	1.66	0.88	1.325	0.188
Situational ways of coping with difficult situations						
Active coping strategy (ACS)	2.89	1.6	2.85	0.8	0.159	0.874
Concentrating on emotions (CoE)	2.31	0.95	2.28	0.75	0.15	0.881
Seeking social support (SSS)	2.27	0.94	2.19	0.81	0.518	0.606

t-student test, M – median, SD – standard deviation, *p*-level of statistical significance.

0.75]). Average score reflecting the first factor, the ability to use emotions to support acting and thinking, was not statistically relevant (p=0.058) and equalled to 61.49±8.07, while in the control group result was 58.9±6.91; as well as for the second factor - the ability to recognise emotions, was also not statistically significant (p=0.101) and amounted to 43.57±6.52, while in the control group the score was 41.66± 6.3 (Table II).

As far as goods and personal values according to the LOPV were concerned, 'Good health' was the highest rated in the study group for which the mean was higher than in the control group (M: 4.0 *vs.* 3.36*;* p = 0.015; d = 0.37; 95% CI [0.01-0.72]). In the control group the highest rated value was 'Successful family life' (M: 3.46). In the study group this value was on an average level of M: 3.34. This difference was not statistically relevant. In the study group, higher position in the hierarchy of values, comparing to the control group, was 'Being needed by other people' (M: 1,60 *vs.* 1,12) as well as 'Success at school, work' (M: 1.09 *vs.* 1.02) and 'Adventurous life, travels' (M: 1.09 *vs.* 0.86). Those differences were not statistically significant. In the control group, higher results were achieved in the hierarchy of values by 'Good material standing' (M: 1.44 *vs* 0.98) and 'Vast circle of friends' (M: 1.29 *vs.* 1.08). However, those variables were not statistically significant. As far as personal goods were concerned, both in the study and control groups 'Love, friendship' (M: 3.80 *vs.* 3.88), 'Good health, mental and physical fitness' (M: 3.38 *vs.* 2.81), 'Intelligence, wit' (M: 2.02 *vs.* 2.02), 'Happiness, contentment' (M: 1.55 *vs.* 1.71) were rated the highest. Differences in this case were also statistically not relevant. Personal good which was notably low rated in the study group comparing to the control group was 'Sense of humour', wit' (M: 1.29). The link was statistically significant (t = 3.528*;* p = 0.001; d = 0.62; 95% CI [0.26-0.98]) (Table III).

The results obtained in the study group with the Satisfaction with Life Scale (SWLS) were around the 6 STEN which stood for an average contentment from the quality of one's own life. No statistically significant relationships in terms of sense of satisfaction from their quality of life between the groups (p=0.105). In the study groups the result was 22.43±5.19, whereas in the control group -20.8±5.94.

A statistically significant difference in an average quality of life according to the Short Form Health Survey (SF-36 v2) between a study and control groups were established in some domains. Average value for physical functioning (PF) in the study group was significantly higher than in the control group (M: 97.15 *vs* 91.86; p = 0.014; d = 0.43; 95% CI [0.07-0.79]). In the health transition (HT) domain average score in the study group was significantly higher than in the control group (M: 69.23 *vs.* 54.24; p = 0.001; d = 0.59; 95% CI [0.23-0.95]). Similarly, in terms of physical component summary (PCS) average value was significantly higher than in the control group (M: 86.95 *vs.* 81.56; p = 0.019; d = 0.43; 95% CI [0.07-0.77]); (Table IV).

Discussion

In the orthognathic surgery, functionality, or aesthetic surgical component management, changed to a more holistic approach in relation to the patient. Patients with deformities with jaw and mandible not only suffer from headaches, deformities and functional impairment of teeth, issues with speech, as well as with mandibular joints but also worry for their appearance. The process might result in adverse psychological reactions of patients[17]. The topic of the study of Sousa et al[18] is the lack of acceptance of one's own body. It describes various mental disorders – de-

Table II. Comparison of the emotional intelligence levels according to INTE Questionnaire (ability to recognise, understand, and control other's and one's own emotions) between groups of healthy patients and ones after surgery.

Inte-Factorial scores	Control group		Study group		$t_{(df = 122)}$	p*
	M	SD	M	SD		
Sum	118.31	12.72	123.94	15.63	-2.187	**0.03**1
I factor – ability to use emotions to support acting and thinking	58.9	6.91	61.49	8.07	-1.912	0.058
II factor – ability to recognise emotions	41.66	6.3	43.57	6.52	-1.653	0.101

t-student test, M – median, SD – standard deviation, p -level of statistical significance.

Table III. Comparison of health and happiness in the context of other values and goods according to the LOPV between patients after surgery and healthy ones.

	Control group		Study group			
	M	SD	M	SD	$t_{(df = 122)}$	p^*
Symbols of happiness						
Good health	3.36	1.64	4	1.27	-2.456	**0.015**
Succesful family life	3.46	1.82	3.34	1.64	0.383	0.702
Carrying out facourite work, job	2.25	1.46	1.82	1.62	1.58	0.117
Being needed by other people	1.12	1.51	1.6	1.83	-1.59	0.114
Success at school, work	1.02	1.38	1.09	1.28	-0.315	0.754
Adventurous life, travels	0.86	1.46	1.09	1.26	-0.935	0.352
Vast circle of friends	1.29	1.66	1.08	1.36	0.777	0.439
Good material standing	1.44	1.48	0.98	1.55	1.676	0.096
Fame, popularity	0.2	0.92	0	0	1.775	0.078
Personal Values Category						
Love, friendship	3.88	1.59	3.8	1.55	0.288	0.774
Good health, physical and mental fitness	2.81	1.91	3.38	1.63	-1.7	0.081
Intelligence, cleverness	2.02	1.56	2.02	1.67	0.005	0.996
Happiness, contentment	1.71	1.63	1.55	1.64	0.537	0.592
Kindness, delicacy	0.75	1.37	1.11	1.38	-1.461	0.146
Knowledge, wisdom	1.25	1.61	1.06	1.52	0.685	0.495
Courage, decisiveness	0.8	1.23	0.81	1.32	-0.069	0.945
Sense of humour, wit	1.29	1.49	0.52	0.89	3.528	**0.001**
Wealth, fortune	0.12	0.56	0.45	1.2	-1.916	0.058
Good appearance, presentation	0.37	1.02	0.38	0.95	-0.067	0.947

t-student test, M – median, SD – standard deviation, *p*-level of statistical significance.

pression, lowered self-esteem, anxiety in orthognathic patients. Authors concluded that help of specialists in terms of mental health is vital both for the process of achieving postoperative satisfaction, as well as in an improvement of patient's quality of life[18,19]. However, in practice, patients rarely are psycho-educated and do not consult psychiatrists and psychologists[20]. Author's own studies indicated that 4.6% of patients received professional social support by psychologists and 1.5% by school counsellors. Unprofessional support by informal groups, such as Facebook, Twitter, Internet forums was estimated in 21.5% of surveyed. However, 72.3% of individuals did not

Table IV. Comparison of the quality of life according to the SF-36 between the group of healthy individuals and the group of patients after surgery.

Domain	Control group		Study group			
	M	SD	M	SD	$t_{(df = 122)}$	p^*
Physical functioning (PF)	91.86	16.19	97.15	5.45	-2.485	**0.014**
Role limitation due to physical problems (RP)	79.66	20.22	86.73	20.71	-1.920	0.057
Bodily pain (BP)	70.68	24.27	78.31	24.08	-1.755	0.082
General health (GH)	50.85	18.16	54.52	13.79	-1.276	0.204
Vitality (VT)	52.29	16.98	55.00	15.10	-0.941	0.348
Social functioning (SF)	74.15	27.35	76.15	25.07	-0.425	0.672
Role limitation due to emotional problems (RE)	75.56	28.74	79.49	27.25	-0.780	0.437
Mental health (MH)	59.12	16.61	62.22	14.46	-1.110	0.269
Health transition (HT)	54.24	25.91	69.23	24.91	-3.284	**0.001**
Physical component summary (PCS)	81.56	14.19	86.95	10.88	-2.384	**0.019**
Mental component summary(MCS)	61.90	17.47	64.90	15.09	-1.024	0.308

t-student test, M – median, SD – standard deviation, *p*-level of statistical significance.

use any form of social support, either professional or unprofessional. Indicative of the seriousness of the problem are the studies on patients who underwent a correction of gnathic deformities. During interviews two patients with gnathic deformities admitted to suicidal attempts caused by the lack of acceptance of their facial appearance. Psychiatric consults confirmed that facial deformities were unequivocally the underlying cause of suicidal attempt[20,21].

Patients after orthognathic procedures more frequently actively dealt with issues and sought social support rather than concentrating on emotions in terms of dispositional ways of coping with difficult situations. Also, active coping dominated over concentrating on emotions and seeking social support within situational ways of coping with stressful situations. The article of Pincus et al[22] presented results on strategies of coping with difficult situations in children aged between 11 and 14 years in two situations – medical (such as receiving an injection) and school-related. In situations linked to medical interventions, children used above all the strategy of concentrating on emotions[21]. Results obtained by the author were also not consistent with studies of Grzankowska and Ślesińska-Sowińska[23] on youth with a neoplastic disease in remission. It was established that youth with neoplastic diseases uses all the available strategies of coping in the 'How do you cope?' Questionnaire (active coping, concentrating on emotions, seeking social support) significantly more often than healthy youth when dealing with stress[23].

The obtained data based on the examination of emotional intelligence in authors own studies indicated 5-6 STENS in respondents after orthognathic procedures. In the categories of results interpretation, level of emotional intelligence was on an average level. Similar results were achieved by Basińska and Woźniewicz[24] in their exploration of patients suffering from psoriasis. Level of emotional intelligence was estimated as average (4 sten)[24]. It is a good predictor for individuals after orthognathic procedures since low level of emotional intelligence might lead to difficulties with establishing and maintaining relationships with others. In such case, individuals may not be able to join the social network, even when it is available. Such results were achieved in the study on 230 women from psychiatric wards (in the first stage) suffering from depression and on 202 women in outpatient clinics (in the second stage of the study)[25].

Human's identity, with his or her symbols of happiness and individual hierarchy of values, develops throughout the whole life. However, the adolescence stage is the key period. During this time, changes occur not only in physical but also in mental and social spheres, enabling taking on new roles and tasks. This is also the time of developing health identity[26-30].

By analysing the spot in which health is placed among personal goods and life values of respondents, authors own studies indicated that 'Good health' was placed the highest among the symbols of happiness in patients after orthognathic procedures. Different results were achieved in the study on youth suffering from neoplastic diseases (malignant bone tumours – 50 respondents) and healthy ones (40 individuals) aged between 18 and 20 years. For cancer patients a symbol with greater value than health was 'Good family life' and 'favourite work, job'. In case of healthy youth in that study, notably the most important symbol was 'Good health, physical and mental fitness' as well as 'Love and friendship'[31]. Comparable results were achieved by Głowacka-Rębała[32]. She examined children with correct body mass (32.28%), with excessive weight (33.81%) and overweight ones (33.81%). 'Good health' was on the second place in overweight and obese youth after 'Good family life'[32].

Life satisfaction is the main goal in the development of a person. It is a significant indicator of subjective well-being and psychosocial adaptation of one's functioning[33]. Surveyed showed an average life satisfaction. Achieved results were compatible with results of other authors. Bogusiak et al[34] studied patients after orthognathic procedures. Respondents in that study assessed their life satisfaction on an average level[34].

Individuals with craniofacial deformities might be stigmatised and discriminated just like patients with visible skin conditions, such as acne, psoriasis, and syphilis. Suldo et al[35] indicated that patients with acne estimated their life satisfaction as average. It is a confirmation of author's own studies. Only in case of psoriatic skin lesions in easily coverable places, surveyed expressed their life satisfaction as high[35]. Interesting conclusions were drawn based on the acceptance of plastic surgeries in women living in Thailand. For this group, the motivation to be physically attractive stems from interpersonal relations such as social pressure or the need to meet idealised beauty standards. Given standards enhance the idea that 'being beautiful is a success'. It was established

that relationship between high level of satisfaction from one's own life correlated with lower acceptance of plastic surgery[36].

To perceive the holistic image of quality of life of patients after orthognathic procedures and assess the influence of the therapy and surgical intervention on general perception of patients' health, the SF-36 questionnaire was chosen in author's own study. In Lee et al article[37] *Orthognathic Quality of Life* Questionnaire (OQLQ) was preferred to establish changes in the quality of life in patients with facial deformities and without them. However, the tool narrows down perception of patient's quality of life only to the oral cavity[37]. The study was carried out minimum 6 months after the orthognathic procedure. The suggestion of 6-month long postoperative period was caused by the fact that oedema reduces which allows a better visualization of facial aesthetics. In the given time, a change in the functioning of oral cavity is achieved. Patients return to full social functioning[38].

Patients after orthognathic procedures assessed unfavourably their functioning in mental sphere. They were satisfied with their recovery and the perception of their own health. An average sense of energy, tiredness and exhaustion was shown. Studies of Brucoli et al[39] showed an improvement in the quality of life in vitality and mental health domains after 6-month long postoperative phase. In the study analysing lives of 57 patients treated in New Zealand[39], notable and permanent changes in looks caused a significant and permanent improvement in mental wellbeing. With the same tool, Eslamipour et al[40] analysed Iranian patients after orthognathic procedures. A significant improvement was identified in emotional, mental, and social spheres of quality of life[40]. Assumingly, that may be caused by different cultural conditions and their implications.

Social Functioning (SF) in author's own studies was highly evaluated by patients after orthognathic procedures. Achieved results corresponded with results of many authors. The study of Hnitecka et al[41] established that change in craniofacial appearance for the patients after orthognathic procedures is an elimination of their biggest complex. Thus, an improvement in interpersonal relations occurs[41]. Additionally, Rustemeyer et al[42] in their survey, which was carried out before and after orthognathic surgeries, achieved similar results. However, the researchers used different standardised tool. In case of this study, the Orthognathic Quality of Life Questionnaire (OHIP-14) was used. It was noticed that subjective assessment of facial aesthetics may cause a more favourable social situation while skeletal deformities have a negative influence on patient's social life[42]. Similar results were achieved by Alves Silva et al[43] who surveyed Brazilian orthognathic patients. Social functioning in 60% of respondents did not change, 20% noticed a slim improvement, and 20% of surveyed stated a great progress in their social lives[43]. Regardless of cultural differences, patients surveyed in Saudi Arabia noticed a significant improvement in social components, followed by an improvement in facial aesthetics and functioning of the oral cavity[44].

Comparable results were achieved in Brucoli et al[39]. Patients were divided into two groups: 25 patients underwent a traditional 3-stage orthognathic treatment (preoperative orthodontics, surgery, and postoperative orthodontics), while 8 were subjected only to the surgical procedure. The studies showed an improvement in the quality of life in patients after orthognathic procedure as well as a progress in psychosocial factors. Comparison of the SF-36 results in patients after orthognathic procedures in relation to the implications before the surgery, showed a significant improvement in parameters such as bodily pain and social functioning.

Patients with deformities of mandible and maxilla not only suffer from headaches, deformities and disturbances in teeth functioning, problems with speech and maxillary joints but also were worried about the appearance of their face. The process might result in adverse psychological reactions of the patients. Thus, it is vital to continue research in this field[16]. Summing up the implications of the study, it is worth noting a few factors that complicate the analysis of the obtained results. The most important shortcoming of the study was the number of surveyed respondents. Bimaxillary orthognathic surgeries are still a niche and new field in surgery. The next restriction is the complicated way of returning the questionnaires. Some sets were sent *via* post after previous oral consent *via* the phone. Unfortunately, some of those were not returned or entirely completed, considering the number of patients it is a major issue. The next determinant complicating the research was the fact that very few studies were carried out in Poland in different centres. Implications from such studies would help in the analysis of results on the Polish population which might be relevant considering the relevance of cultural and economic conditions. Available foreign studies do not present the issue of quality of life in a holistic way, concentrating

only on the quality of life related to the oral cavity. Aspects presented and discussed in authors own studies grant a perspective for the implementations of changes in care over patients. First of all, it is important to provide detailed information on postoperative benefits and complications[44]. The acceptance of the treatment plan by the patient after thorough informing on conditioning for each type of treatment becomes necessary[45]. It is also important to establish estimated timeframe. Then, patients might be able to assess whether perceived psychosocial benefits are reasonable considering the pain, difficulties and time spent on such process[45,46].

Conclusions

Understanding of personal happiness differs between individuals after orthognathic procedures and healthy ones. Patients who have undergone a surgery, value health and need to be useful to others the most, followed by success at school, whereas healthy individuals valued good family life, good material standing and contact with friends.

Respondents in both groups very similarly perceived personal values, indicating love and friendship, health, intelligence, and happiness as the most important.

Both the people after orthognathic surgeries and the healthy ones assessed their quality of life on an average level.

A significant relationship between the choice of a coping strategy with difficult situations and the fact of having undergone an orthognathic surgery exist. Patients after procedures, in comparison with healthy individuals, less frequently chose the strategy of concentrating on emotions (CoE), both within the situational and the dispositional ways of coping with stressful situations.

Conflict of Interest

The Authors declare that they have no conflict of interests.

Ethics Approval and Consent to Participate

The study was carried out in accordance with the Declaration of Helsinki, and the protocol was approved by the Bioethical Commission of Pomeranian Medical University in Szczecin (approval number KB-0012/255/06/18). All subjects were informed about the study, and all provided informed consent.

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Authors' Contribution

Material preparation, data collection and analysis were performed by. Study concept and design analysis and interpretation of data M.B.R., KR., G.W. M.S., E.G., obtained funding M.B.R., E.G., L.Z. study supervision E.G.. The first draft of the manuscript was written by K.R., K. D. and G.W. and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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