QUALITY OF LIFE AND STOMATOGNATHIC DYSFUNCTION ANALYSIS IN PATIENTS WITH CRANIOFACIAL ANOMALIES PRIOR TO ORTHOGNATHIC INTERVENTION

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Abstract. *Individuals with dentofacial deformities experience not only changes in appearance but also disturbances in the functions of the stomatognathic system, including mastication, swallowing, speech, and breathing. These functional impairments may significantly affect psychological well-being and reduce patients' quality of life.*
Keywords: *quality of life, dentofacial deformities, stomatognathic system, orthognathic surgery.*

АНАЛИЗ КАЧЕСТВА ЖИЗНИ И ДИСФУНКЦИИ СТОМАТОГНАТИЧЕСКОЙ СИСТЕМЫ У ПАЦИЕНТОВ С КРАНИОФАЦИАЛЬНЫМИ АНОМАЛИЯМИ ДО ПРОВЕДЕНИЯ ОРТОГНАТИЧЕСКОГО ВМЕШАТЕЛЬСТВА

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Аннотация. *У лиц с зубочелюстными (дентофациальными) деформациями отмечаются не только изменения внешнего облика, но и функциональные нарушения стоматогнатической системы, включая расстройства жевания, глотания, речи и дыхания. Данные функциональные нарушения могут существенно влиять на психологическое состояние пациентов и приводить к снижению качества их жизни.*
Ключевые слова: *качество жизни, зубочелюстные деформации, стоматогнатическая система, ортогнатическая хирургия.*

ORTOGNATIK ARALASHUVDAN OLDIN KRANIOFASIAL ANOMALIYALARI BO'LGAN BEMORLARDA HAYOT SIFATI VA STOMATOGNATIK TIZIM DISFUNKSIYASINI TAHLIL QILISH

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Annotatsiya. *Dentofatsial deformatsiyalarga ega bo'lgan shaxslarda nafaqat tashqi ko'rinish o'zgaradi, balki stomatognatik tizim funksiyalarida ham buzilishlar kuzatiladi. Jumladan, chaynash, yutish, nutq va nafas olish jarayonlari izdan chiqishi mumkin. Ushbu funksional buzilishlar bemorlarning psixologik holatiga sezilarli darajada ta'sir ko'rsatib, ularning hayot sifatini pasaytiradi.*
Kalit so'zlar: *hayot sifati, dentofatsial deformatsiyalar, stomatognatik tizim, ortognatik jarrohlik.*

Objective. The aim of this study was to assess the quality of life and analyze the reported dysfunctions of the stomatognathic system in orthognathic patients before surgical intervention.

Materials and Methods. The study group (SG) consisted of 63 patients with dentofacial deformities scheduled for orthognathic surgery. The control group (CG) included 70 patients with malocclusion undergoing orthodontic treatment who did not meet criteria for surgical intervention. Quality of life was evaluated in all participants using the Orthognathic Quality of Life Questionnaire (OQLQ) and self-assessment of stomatognathic system dysfunctions (SS).

Results. Significant differences were observed between the groups across all quality-of-life parameters in orthodontic and orthognathic patients. SG patients more frequently reported difficulties in the evaluated stomatognathic functions compared with CG patients. No statistically significant differences were identified between SG patients with Class II and Class III malocclusions regarding OQLQ scores or the frequency of SS dysfunctions. Concerning sex differences, women reported lower overall quality of life and lower scores in social domains related to facial deformity and facial aesthetics compared with men. No significant correlations were found between age and quality-of-life scores in orthognathic patients.

Conclusions. Orthognathic patients demonstrate lower quality of life and a higher frequency of stomatognathic dysfunctions compared with patients with malocclusions not requiring surgical treatment. The type of skeletal deformity does not significantly affect quality of life or the prevalence of stomatognathic dysfunctions. Unlike age, sex is a sig-

nificant factor influencing quality of life prior to orthognathic surgery.

Introduction.

In everyday clinical practice, in addition to assessing a patient's biological condition, particular attention is given to emotional status, well-being, and daily functioning. The interrelationship between these aspects and somatic complaints makes the assessment of quality of life a crucial component of therapeutic management. This is especially relevant for patients with craniofacial deformities [1–3].

Oral Health–Related Quality of Life (OHQoL) reflects the extent to which the condition of the teeth, gingiva, and peri-oral tissues affects an individual's daily functioning [4–6]. A healthy oral cavity enables adequate nutrition, breathing, speech, and social interaction without pain, discomfort, or embarrassment, contributing positively to overall well-being [7]. Malocclusions of Class II and Class III can significantly reduce quality of life, both functionally and aesthetically.



Table 1. **Craniofacial Deformitie**

Materials and Methods.

The study group (SG) included 63 randomly selected patients (46 women and 27 men) with Class II malocclusion (retrogenia, n = 34) and Class III malocclusion (progenia, n = 39), who provided informed consent to participate before undergoing orthognathic surgery. The mean age of participants was 28.56 years. All patients were admitted to the Department of Maxillofacial Surgery of University Clinical Hospital No. 1 in Szczecin (Poland) and examined one day prior to the scheduled surgery.

Inclusion criteria

- Age 18–40 years
- Indications for orthognathic treatment (skeletal Class II or III)
- Potential for one- or two-jaw surgery
- Written informed consent

Exclusion criteria

- Candidates for SARPE only or genioplasty only
- History of syndactyly, cleft lip/palate, or post-traumatic maxillofacial surgery
- History of psychiatric disorders
- Patients undergoing repeat stomatognathic system surgeries

The control group (CG) consisted of 70 patients (36 women and 24 men) undergoing orthodontic treatment without indication for surgical intervention. The mean age was 25.28 years.

Inclusion criteria: current orthodontic treatment, no indication for orthognathic surgery, no prior orthodontic treatment, consent to participate.

Exclusion criteria: age < 18 years, psychiatric/autoimmune diseases, pregnancy, use of medications (analgesics, muscle relaxants, etc.).

The required sample size was 128 subjects at medium effect size (0.50 < Cohen's d < 0.80), α = 5%, and power = 80%. Calculations were performed using G*Power 3.1.

Assessment Tools

All participants were evaluated for quality of life and stomatognathic system dysfunctions (SSD) using:

1. The Orthognathic Quality of Life Questionnaire (OQLQ)

Developed by Cunningham et al. [25]. It consists of 22 items evaluating the impact of dentofacial deformity in four domains:

- **Facial aesthetics** (items 1, 7, 10, 11, 14; 0–20 points)
- **Oral function** (items 2–6; 0–20 points)
- **Awareness of facial deformity** (items 8, 9, 12, 13; 0–16 points)
- **Social aspects of deformity** (items 15–22; 0–32 points)

Each item uses a 5-point Likert scale (0—does not apply/does not bother; 4—severe discomfort).Total score ranges from 0 to 88, with higher scores indicating poorer quality of life.

2. A specially designed questionnaire

Including

- demographic data (sex, age)
- functional disturbances of the stomatognathic system: difficulties with chewing, swallowing, different food consistencies, speech, smiling, and maintaining a neutral facial expression.

Self-assessment was completed under confidential conditions: SG patients completed forms in the hospital ward; CG patients in a quiet, separate room in the orthodontic clinic.

Statistical Analysis

Statistical analysis was performed using **IBM SPSS Statistics 30**. Normality was assessed with descriptive statistics and the **Shapiro–Wilk test**.

- Independent samples **t-tests** were used for continuous variables (equal sample sizes)
- **Mann–Whitney U test** for unequal sample sizes
- **Chi-square tests** for categorical variables
- **Pearson correlation** for relationships between continuous variables

Significance level: **α = 0.05**

Results.

Demographic Characteristics

Table

Demographic characteristics of the study and control groups

Dependent variable	Study group (n = 73)	Control group (n = 60)
	M	Me
Age	28.56	28

Sex distribution (%)

Sex	Study group	Control group
Male	63%	60%
Female	37%	40%

Note: n — number; M — mean; Me — median; SD — standard deviation; Min/Max — minimum and maximum values; % — percentage.

Table 2.

Basic Descriptive Statistics and Shapiro–Wilk Test Results (N = 133)
Study group (n = 73)

Variable	M	Me	SD	Skewness	Kurtosis	Min	Max	W	p
Total OQLQ score	40.47	37.00	16.38	0.53	–0.33	12.00	83.00	0.97	0.050
Social aspects of facial deformity	11.75	11.00	8.19	0.74	–0.20	0.00	32.00	0.94	0.001

Facial aesthetics	13.42	14.00	4.59	–0.47	–0.71	3.00	20.00	0.95	0.004
Oral function	8.38	8.00	5.01	0.46	–0.34	0.00	20.00	0.96	0.038
Facial deformity awareness	7.08	6.00	4.34	0.29	–0.66	0.00	16.00	0.96	0.022
Number of stomatognathic dysfunctions	2.90	3.00	1.67	0.30	–0.63	0.00	6.00	0.93	<0.001

Control group (n = 60)

Variable	M	Me	SD	Skewness	Kurtosis	Min	Max	W	p
Total QoL score	11.63	11.00	3.22	0.62	–0.19	5.00	20.00	0.94	0.005
Social aspects of facial deformity	2.08	2.00	1.23	0.47	0.91	0.00	6.00	0.92	<0.001
Facial aesthetics	3.60	3.00	1.68	0.80	0.63	1.00	8.00	0.91	<0.001
Oral function	4.08	4.00	1.09	0.63	–0.59	3.00	7.00	0.84	<0.001
Facial deformity awareness	1.93	1.00	2.20	1.40	1.44	0.00	9.00	0.81	<0.001
Number of SS disorders	0.62	0.00	0.83	1.39	1.56	0.00	3.00	0.72	<0.001

Interpretation of Results (Translated)

The distribution of continuous variables was analyzed at this stage.Basic descriptive statistics were calculated, and the Shapiro–Wilk test was performed to assess normality.

The results demonstrated that the Shapiro–Wilk test was statistically significant for all variables in both groups, indicating substantial deviation from a normal distribution (Table 2). However, the absolute value of skewness did not exceed 2, indicating only minimal asymmetry [26]. Therefore, parametric tests were applied, provided that other statistical assumptions were met.

Comparison of Quality-of-Life Scores Between Study and Control Groups

To determine whether preoperative orthognathic patients differed from orthodontic (non-surgical) patients, an **independent samples t-test** was applied for:

- total quality-of-life scores
- facial aesthetics
- oral function
- facial deformity awareness
- social aspects of deformity

Table 3.

Comparison of Quality-of-Life Parameters Between Groups (N = 133)

Variable	Study group (n=73) M ± SD	Control group (n=60) M ± SD	t	df	p	95% CI (LL–UL)	Cohen's d
Total OQLQ score	40.47 ± 16.38	11.63 ± 3.22	14.70	78.70	<0.001	24.93 – 32.74	2.34
Social aspects	11.75 ± 8.19	2.08 ± 1.23	9.96	75.91	<0.001	7.74 – 11.60	1.58
Facial aesthetics	13.42 ± 4.59	3.60 ± 1.68	16.95	94.30	<0.001	8.67 – 10.98	2.74
Oral function	8.38 ± 5.01	4.08 ± 1.09	7.13	80.27	<0.001	3.10 – 5.50	1.14
Facial deformity awareness	7.08 ± 4.34	1.93 ± 2.20	8.85	110.87	<0.001	4.00 – 6.30	1.45

All differences were **statistically significant with very large effect sizes** (Cohen's d ≥ 0.80).

Comparison of Frequency of Stomatognathic Dysfunction

Chi-square tests were applied to compare functional disturbances between groups.

Table 4.

Frequency of Stomatognathic Dysfunction in Study vs. Control Group (N = 133)

Activity affected	Study group (n=73) Yes (%)	Control group (n=60) Yes (%)	$\chi^2(1)$	p	φ
Chewing	58.9%	5.0%	42.30	<0.001	0.56
Drinking	8.2%	0%	5.16	0.032	0.20
Eating solid foods	57.5%	33.3%	7.75	0.009	0.24

Eating soft foods	4.1%	3.3%	0.06	1.000	0.02
Smiling	61.6%	5.0%	45.81	<0.001	0.59
Swallowing	4.1%	0%	2.52	0.252	0.14
Speaking	32.9%	6.7%	13.61	<0.001	0.32
Neutral facial expression	63.0%	8.3%	41.65	<0.001	0.56

Strongest effects (φ ≥ 0.50) were observed for:
- Chewing
- Smiling
- Maintaining a neutral facial expression

Comparison Between Retrognathic and Prognathic Patients

Table 6.

Comparison of Retrognathic and Prognathic Patients by Quality-of-Life Parameters (N = 73)

Variable	Retrognathia (n = 34) M ± SD	Prognathia (n = 39) M ± SD	t	df	p	95% CI (LL–UL)	Cohen's d
Total OQLQ score	40.53 ± 17.24	40.41 ± 15.81	0.03	71	0.976	−7.60 to 7.84	<0.01
Social aspects	11.76 ± 8.38	11.74 ± 8.12	0.01	71	0.991	−3.84 to 3.88	<0.01
Facial aesthetics	13.29 ± 4.69	13.54 ± 4.56	−0.23	71	0.822	−2.41 to 1.92	0.05
Oral function	9.00 ± 5.37	7.85 ± 4.68	0.98	71	0.330	−1.19 to 3.50	0.23
Facial deformity awareness	6.91 ± 4.72	7.23 ± 4.03	−0.31	71	0.756	−2.36 to 1.72	0.07

Interpretation: There were **no statistically significant differences** between Class II and Class III patients in any OQLQ parameter.

Table 7.

Frequency of Stomatognathic Dysfunction in Retrognathic vs. Prognathic Patients (N = 73)

Activity affected	Retrognathia Yes (%)	Prognathia Yes (%)	χ^2 (1)	p	φ
Chewing	64.7%	53.8%	0.89	0.475	0.11
Drinking	8.8%	7.7%	0.03	1.000	0.02
Eating solid foods	58.8%	56.4%	0.04	1.000	0.02
Eating soft foods	5.9%	2.6%	0.51	0.595	0.08
Smiling	67.6%	56.4%	0.97	0.347	0.12
Swallowing	2.9%	5.1%	0.22	1.000	0.05
Speaking	44.1%	23.1%	3.64	0.081	0.22
Neutral facial expression	52.9%	71.8%	2.77	0.144	0.19

Interpretation: No statistically significant differences were found between the groups.

Comparison of Total Number of Dysfunction Symptoms

Table 8.

Number of Stomatognathic Dysfunction Symptoms (N = 73)

Variable	Retrognathia (n = 34) M ± SD	Prognathia (n = 39) M ± SD	t	df	p	95% CI (LL–UL)	Cohen's d
Number of SS dysfunctions	3.06 ± 1.84	2.77 ± 1.51	0.74	71	0.463	−0.49 to 1.07	0.17

3.3. Relationship Between Sex, Age, and Quality-of-Life Assessment

Sex Differences (Mann–Whitney U Test)

Because a significant sex distribution imbalance was noted ($\chi^2(1)=4.95$; p=0.026), a non-parametric test was used.

Table 9.

Comparison of Women and Men in the Study Group (N = 73)

Variable	Women (n=46) Mean rank	Women M ± SD	Men (n=27) Mean rank	Men M ± SD	Z	p	η^2
Total OQLQ score	40.89	43.74 ± 17.46	30.37	34.89 ± 12.81	–2.05	0.041	0.06
Social aspects	41.12	13.28 ± 8.58	29.98	9.15 ± 6.87	–2.17	0.030	0.07
Facial aesthetics	40.78	14.26 ± 4.37	30.56	12.00 ± 4.68	–2.00	0.046	0.06
Oral function	39.45	9.00 ± 5.52	32.83	7.33 ± 3.86	–1.29	0.198	0.02
Facial deformity awareness	38.00	7.37 ± 4.63	35.30	6.59 ± 3.83	–0.53	0.598	<0.01

Interpretation: Women demonstrated **significantly lower quality of life** in:

- total OQLQ score
- social aspects
- facial aesthetics

Effect sizes were **moderate (η^2 = 0.06–0.07).**

Correlation Between Age and Quality-of-Life Parameters

Table 10.

Pearson Correlations Between Age and QoL (N = 73)

Variable	Pearson r	p
Total OQLQ score	0.01	0.932
Social aspects	–0.06	0.601
Facial aesthetics	0.10	0.391
Oral function	–0.05	0.656
Facial deformity awareness	0.10	0.377

Interpretation: There were no statistically significant correlations between age and any quality-of-life domains.

Discussion.

This study examined two key aspects related to orthognathic patients. The first aspect concerned quality of life, which was evaluated using the standardized Orthognathic Quality of Life Questionnaire (OQLQ)—a validated instrument designed to assess the impact of dentofacial deformities on patients' daily functioning [27]. The second aspect involved the self-assessment of stomatognathic system dysfunctions (SSDs) in these patients. Previous studies have included healthy individuals as control groups; however, we were unable to identify research in which the control group consisted of orthodontic patients without indications for surgical intervention [28]. In our opinion, comparing these groups across the four essential OQLQ domains—facial aesthetics, oral function, awareness of dentofacial deformity, and social aspects—provides valuable insights. The study results may contribute to a deeper understanding of the somatic and psychological impact of skeletal facial deformities for specialists in maxillofacial surgery and orthodontics.

The data obtained revealed statistically significant differences between groups across all OQLQ measures. Before surgery, orthognathic patients demonstrated substantially lower overall and domain-specific quality of life compared with orthodontic patients not requiring surgical treatment. Notably, all observed effects were strong (Cohen's d ≥ 0.80). These findings indicate that individuals with dentofacial deformities experience much greater dissatisfaction with their health status than patients with nonsurgical malocclusions. Hence, orthognathic surgery is essential not only for esthetic improvement but also for maintaining health and, in some cases, preserving life. Similar conclusions were reported in studies using healthy subjects as control groups.

The next stage of our research will involve assessing the postoperative quality of life of orthognathic patients to determine how surgical treatment influences daily activity and overall well-being.

Another important part of this study involved evaluating stomatognathic system dysfunctions re-

ported by patients before surgery and comparing them with the experiences of orthodontic patients without surgical indications. The findings demonstrated that orthognathic patients reported significantly more SSDs. They more frequently experienced difficulties with chewing, drinking, consuming solid foods, smiling, speaking, and maintaining a neutral facial expression compared with orthodontic patients. The effects were strong for chewing, smiling, and maintaining a neutral expression ($\varphi \geq 0.50$), moderate for speech ($0.30 \leq \varphi < 0.50$), and weak for drinking and consuming solid foods ($\varphi < 0.30$). Hnitecka et al. similarly reported that more than 39% of orthognathic patients experienced discomfort while chewing and swallowing, emphasizing the importance of thorough preoperative evaluation of stomatognathic function to identify functional impairments.

Additionally, this study compared retrognathic (Class II) and prognathic (Class III) patients in terms of overall and domain-specific quality of life, as well as the number and frequency of SSDs. The results revealed no significant differences between these groups. However, Sen et al. reported higher OQLQ scores in Class III patients in the domains of oral function, deformity awareness, and social disability. Clinical experience also suggests that Class III patients are more likely to express concern about their facial profile compared with retrognathic patients.

Scientific evidence indicates that women undergo orthognathic surgery more frequently than men. In the present study, the relationship between sex, age, and quality-of-life assessment in orthognathic patients was examined. The results demonstrated that women had significantly lower overall QoL scores and worse outcomes in social aspects and facial aesthetics compared with men ($0.06 \leq \eta^2 < 0.14$). Similar findings were reported by Stagles et al., who observed lower preoperative QoL in women. Sen et al. also noted that women in surgical groups had higher scores in esthetic awareness and social disability domains. Our results are consistent with the findings of Bortoluzzi et al., who showed that women had poorer QoL than men across all OQLQ parameters, especially in facial aesthetics, oral function, and deformity awareness.

This study found no significant associations between age and any QoL parameters in orthognathic patients. In contrast, Bortoluzzi et al. reported that the negative impact of dentofacial deformities on QoL increased with age, particularly within the domains of facial aesthetics and oral function.

One of the key determinants of human behavior and functioning is individual personality. According to the literature, psychological characteristics play an important role in the diagnosis and management of orthognathic patients. Research indicates that patients who undergo orthognathic surgery may display heightened anxiety, increased concern about body image and health, reduced self-confidence, inhibition, and difficulties in interpersonal interactions. At the same time, these individuals may show extraverted tendencies, focus on the present moment, and actively plan their lives. Assessing the emotional state of patients before and after surgery is essential, as postoperative satisfaction and successful rehabilitation strongly depend on psychological well-being.

Based on the study's hypothesis and the analysis of the results, it can be cautiously concluded that patients with malocclusions requiring surgical intervention—due to the severity of the deformity—exhibit worse quality of life compared with patients receiving conventional orthodontic treatment. These patients also demonstrate a higher frequency of stomatognathic system dysfunctions.

This study had several limitations.First, the orthognathic group was assessed one day prior to surgery, a period when perceived stress may be particularly high, potentially affecting QoL responses. Second, self-assessment introduces a degree of subjective bias.Long-term, longitudinal, and multicenter studies in the Polish population are needed. Future research should evaluate postoperative QoL among orthognathic patients during the recovery period and at 1, 3, 6, and 12 months after surgery.

Conclusions.

Patients undergoing orthognathic treatment demonstrate lower quality of life and a higher frequency of stomatognathic system dysfunctions compared with patients with malocclusions who do not require surgical intervention.The type of skeletal deformity in surgical patients does not significantly influence either quality-of-life outcomes or the frequency of stomatognathic dysfunctions. In contrast to age, sex is a significant factor affecting preoperative quality of life in orthognathic patients.

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