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Quality of life in correlation with presurgical psychological assessment of surgically treated patients with class III skeletal deformities

Квалитет живота у корелацији са преоперативном психолошком проценом код хируршки лечених пацијената са деформитетима III скелетне класе

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SUMMARY

Introduction/Objective Quality of life before and after mono and bimaxillary surgery may vary from patient to patient depending on psychological assessment score. The aim of this study was to compare the quality of life before and six months after orthognathic surgery in correlation with a presurgical psychological assessment of patients with class III skeletal deformity. Assuming that patients with low psychological assessment results might have a lower quality of life after surgery despite successful treatment results.

Methods For this prospective study 30 patients (19 female, 11 male) were included. Psychological assessment was obtained before, and quality of life before and after surgery in skeletal deformity class III patients. Statistical analysis was done with a statistical package for social science – SPSS.

Results Overall quality of life after surgery significantly improved in all patients. Surgical correction of class III deformities provided a significant improvement independent of the type of surgery and the severity of the deformity, as well as gender and age. There were significant differences in post-surgical quality of life scores between patients with good and poor psychological assessment scores, related to social disability ($p < 0.05$).

Conclusion Patients with lower preoperative psychological scores experienced a lesser improvement in quality of life, particularly in the domain of social disability. This suggests that additional psychological treatment of these patients could further improve the beneficial effects of orthognathic surgery on postoperative quality of life.

Keywords: quality of life; mono-bimaxillar surgery; skeletal deformities

САЖЕТАК

Увод/Циљ Квалитет живота пре и после моно- и бимаксиларне хирургије може да варира од пацијента до пацијента у зависности од резултата психолошке процене. Циљ овог истраживања био је да се упореди квалитет живота пре и 6 месеци након хируршке интервенције, у корелацији са прехируршком психолошком проценом пацијената са деформитетима III класе. Под претпоставком да пацијенти са лошијим резултатима психолошке процене, могу имати нижи квалитет живота након операције, упркос успешним резултатима лечења.

Метод У сврху ове проспективне студије обрађено је 30 болесника (19 жена и 11 мушкараца). Психолошка процена извршена је пре, док је процена квалитета живота извршена пре и после хируршког захвата, урађена је статистичка анализа података у стандардизованом програму Статистички пакет за социолошке науке – SPSS.

Резултати Свекупан квалитет живота значајно се побољшао након операције код свих пацијената. Хируршка корекција деформитета III класе дала је значајно побољшање независно од врсте операције и тежине орофацијалног деформитета, као и од пола и старости. Постојале су значајне разлике у пост-хируршким оценама квалитета живота између пацијената који су имали позитивну и негативну психолошку процену, а тичу се социолошких потешкоћа ($p < 0,05$).

Закључак Пацијенти са негативнијом преоперативним психолошким проценом имали су мање побољшање у квалитету живота, посебно у домену социолошких потешкоћа. Може се истаћи да би психолошки третман тих пацијената, додатно могао побољшати добре ефекте ортогнатске хирургије на постоперативни квалитет живота.

Кључне речи: квалитет живота; моно-бимаксиларна хирургија; деформитети скелета

INTRODUCTION

The number of patients requiring correction of craniofacial disproportions, particularly class III deformities, has undoubtedly increased. Skeletal class III deformities can be a result of mandibular prognathism, maxillary deficiency, or both [1, 2, 3]. Orthognathic surgery aims to restore proper dental occlusion and facial harmony through modification of the position, shape, and size of the facial bones. Bone movement implies positional and tensional changes

in the attached soft tissues. These new soft tissue relationships introduce significant changes in the facial appearance. Skeletal class III deformities can be surgically corrected by using mandibular setback surgery or bimaxillary surgery (maxillary advancement and mandibular setback) [4–7].

At the first appointment, every patient was assessed to establish the motive for the treatment. Ideally, they should initially be evaluated by a psychologist, to determine whether their expectations are realistic and possible to achieve. In clinical practice, this is seldom possible, and clinicians have to do the initial evaluation including psychological assessment. However, a patient-centered approach to examining the outcomes of the treatment is as important as the initial assessment. It complements the study of morphological and physiological responses to the treatment, as the success of the treatment must also be defined in the context of the patient's perceptions, and beyond traditional health indicators, such as mortality and morbidity [8–11].

The World Health Organization (WHO) defined quality of life (QoL) as “an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns” (WHO study protocol, 1993), patients perception of the treatment success becomes the most important parameter.

Present research hypothesized that the patients with low psychological assessment results and risk of Body Dysmorphic Disorder (BDD) will have a lower quality of life despite successful morphological and physiological responses to the treatment.

The aim of this study was to compare the Quality of life before and 6 months after orthognathic surgery in correlation with a presurgical psychological assessment of patients with class III skeletal deformity. Assuming that patients with low psychological assessment results might have lower quality of life after surgery despite successful treatment results.

METHODS

The study was approved by the ethics committee of the School of Dental Medicine, University of Belgrade (No. 36/24)598

All patients were provided with written informed consent to participate, and they were instructed about the aims and protocol of the study as well.

Patients with skeletal Class III deformities were selected at the first visit at The Clinic for Maxillofacial Surgery, School of Dental Medicine, University of Belgrade. Exclusion criteria were the following: patients with complex craniofacial syndromes and patients with matured cleft lip and palate. The prospective study sample consisted of 30 consecutive patients (19 female and 11 male; mean age \pm standard deviation: 22.27 ± 3.39 years, range 18–29 years) (Table 1).

The psychological assessment included a questionnaire with a number of significant questions specific to orthognathic deformities, developed by Cunningham and Feinmann [12] in 1998 at University College London, Orthodontic Department and Academic Department of Psychiatry. The questionnaire “The initial assessment of patients requesting Orthognathic treatment” is presented in Table 2. The interview was performed, during the initial appointment by a surgeon in a private consultation. Based on psychological assessment patients were divided into 2 groups; Group 1- patients with low psychological assessment results (less than 50% positive responses) and, Group 2 – Patients with satisfactory psychological assessment results (more than 50% positive responses).

Afterwards, in preoperative quality of life assessment patients were given one of the most widely used questionnaires, disease-specific measurement of the Oral Health Impact Profile (OHIP14). It measures individuals’ perception of the social impact of their oral disorders and their well-being. The OHIP-14 questionnaire was developed as a shorter version of the OHIP-49, where the 49 questions might be too long or unnecessary for the purpose. Questions included in this questionnaire measure seven domains: functional limitation (OH-1, OH-2), physical pain (OH-3, OH-4), psychological discomfort (OH-5, OH-6, OH-10), physical disability (OH-7, OH-8, OH-14), psychological disability (OH-9), social disability (OH-11, OH-12) and handicap (OH-13) (Table 3).

Initial CBCT scans of each patient were done for treatment planning. 3D planning was done in InVivo 5.2 software (Anatomage, San Jose, CA, USA). Study models were mounted onto a semi-adjustable articulator (Artex® ct, Amann Girschbacher AG, Koblach, Austria) for manufacturing the interocclusal positioning splints.

Surgical correction of Class III deformities was performed by bilateral sagittal split osteotomy (BSSO) with mandibular setback in 14 patients and using bimaxillary surgery comprised of BSSO setback and Le Fort I osteotomy maxillary advancement in 16 patients (Table 1).

After surgical correction, patients were hospitalized for at least 5 days. Following the protocols: rigid fixation was applied for 2 weeks, and afterwards the patients wore light elastics for another 2 weeks. All patients underwent clinical assessment and postoperative CBCT radiological evaluation 6 months after the treatment to evaluate the success of the surgical procedure.

Afterwards, in the postoperative quality of life assessment, patients were again given Oral Health Impact Profile (OHIP 14) questionnaire for disease-specific measurements, now with three additional questions based on orthognathic surgery results. Rustemeyer et al [13] added questions highly specific to orthognathic surgery to OHIP-14 questionnaire (Table 3). Three additional questions (AD-1 to AD-3), regard chewing function, aesthetics and post-operative loss of sensitivity.

To summarize every patient was given OHIP-14 questionnaire pre and 6 months postoperatively, and AD-1 to AD-3 questions just postoperatively.

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS for Windows, version 18.0 Chicago, IL, USA). The Kolmogorov-Smirnov test was performed to determine if the samples were normally distributed. Differences between pre and postoperative data and correlations between variables were calculated by the Wilcoxon Signed Ranks test, and differences between groups were calculated by using the independent sample T-test. Differences were considered as significant $p < 0.05$.

RESULTS

All 30 patients involved in this study had successful surgical outcomes without complications. Surgical correction of class III deformities provided a significant improvement independent of the type of surgery and the severity of the orofacial deformity, as well as gender and age.

Psychological preoperative assessment and the quality of life showed no significant differences between the scores obtained by females and males, of different ages or comparing patients treated by mono or bimaxillary surgery.

Results of the psychological assessment showed that all patients had at least one negative response. Nevertheless, only 26.67% of patients had more than 50% of negative responses- Group 1, in the initial psychological assessment, which suggests risk of Body Dysmorphic

Disorder (BDD). However high percentage (73.33%) of patients had more than 50% of positive responses -Group 2.

Pre- and post-surgical quality of life scores, showed positive correlation ranks for items: OH-1 (Trouble pronouncing words), OH-3 (Painful aching), OH-4 (Uncomfortable with eating), OH-5 (Selfconsciousness), OH-6 (Feeling tense), OH-12 (Working difficulties), OH-13 (Less satisfying life), OH-14 (Totally unable to function). While items OH-2 (Problem with sense of taste), OH-7 (Unsatisfactory diet), OH-8 (Interrupted meals), OH-9 (Difficulty to relax), OH-10 (Feeling embarrassment) and OH11 (Being agitated around people) showed negative correlation ranks. Only item OH-1 (Trouble pronouncing words) showed statistically significant correlation before and after surgery (Figure 1, Table 4).

Comparison of postoperative quality of life between the groups 1 and 2 (psychological assessment) showed significant differences. The statistical differences were noted in items OH-2 (Problem with sense of taste), OH-10 (Feeling embarrassment), OH-11 (Agitated around people), OH-12 (Working difficulties), OH-13 (Less satisfying life). We have to emphasize that items concerning social disability OH-10, OH-12 and OH-13 showed significantly higher scores in patients with poor psychological assessment with $p=0,013^*$, $p=0,013^*$ and $p=0,015^*$ respectfully (Figure 2, Table 5). No significant differences were noticed between the two groups regarding additional questions specific to orthognathic surgery AD-1 to AD-3.

DISCUSSION

In accordance with the hypothesis this research aimed to evaluate the impact of psychological issues on postoperative quality of life, in patients who had successful surgical correction of class III deformities. Orthognathic surgery intends to improve the functional and aesthetic problems of class III deformities, as well as their psychological impact, with the help of tools such as OHIP-14. In general, the findings of this prospective study indicated that surgical procedures improved the quality of life in all of the patients, as was previously observed by other authors in similar researches [3, 5–11, 14, 15]. Tan SK. et al. found that psychological well-being and social function are improved after orthognathic surgery, independent of the skeletal pattern of deformity and gender [15]. Our findings suggest that general improvement in well-being is regardless of severity of deformity or gender as well.

Pre- and post-surgical quality of life assessment showed that only item OH-1 (Trouble pronouncing words) showed a statistically significant correlation before and after surgery

(Table 4). This implies that resolving phonetic problems made an important difference that improved QoL significantly.

In this study, results showed that 26.67% of patients had more than 50% of negative responses – group 1. in the initial psychological assessment, which suggests the risk of Body Dysmorphic Disorder (BDD) These are the patients who would be advised additional psychological support treatment. Nevertheless, a high percentage (73.33%) of patients had more than 50% of positive responses - group 2. which suggested that these patients wouldn't need to be referred to additional psychological support treatment. Although orthognathic surgery corrections improve the quality of life in patients with negative psychological scores, the improvements are lesser compared to the other group, especially in the domain of social disability.

Comparison of postoperative quality of life between the groups 1 and 2 showed significant differences in items OH-2 (problem with sense of taste), OH-10 (feeling embarrassment), OH-11 (agitated around people), OH-12 (working difficulties), OH-13 (less satisfying life). With the highlight of the social disability items OH-10, OH-12, OH-13, with $p=0,013^*$; $0,013^*$; $0,015^*$ respectfully, as the ones with strongest statistical differences. This implies that even though the surgical results were similar, patients with good psychological scores (group 2) felt less embarrassed, weren't so agitated around others, didn't have as many difficulties at work and overall had a much more satisfying life after surgery.

Consistent with our results, other authors have also found patients with negative psychological scores less improved after surgery [10, 11, 15]. This indicates that improvements in social QoL should be considered as an independent measure of success after orthognathic surgery, in addition to improvements in oral function and facial aesthetics [15–18].

This study has practical implications as results confirm that initial psychological assessment is related to Orthognathic patients QoL after surgery [13]. This is a multidimensional problem that cannot be assessed by a single score because each dimension is associated with a specific postoperative outcome [12]. However, some patients may experience good QoL despite a severe deformity, while others experience lower QoL with mild orofacial deformity [19]. In favor of our findings, a recent review by Cremona M et al. implied that psychological and social domains improved after orthognathic surgery, but quality of life can temporarily deteriorate during the pre-surgical phase, so they advise that a standardized assessment tool needs to be developed to assess the quality of life changes [2]. Nevertheless, sometimes the variables for the assessment of postoperative improvement in QoL do not give

an objective picture. Therefore, preoperative psychological assessment is of great importance, to estimate the psychological profile of concern - patients with low psychological scores, and refer them to further psychological support, so that the overall treatment would achieve better QoL.

CONCLUSION

Patients with lower preoperative psychological scores, experienced a lesser improvement in quality of life, particularly in the domain of social disability. Suggesting that psychological treatment of these patients, could further improve the beneficial effects of orthognathic surgery on postoperative quality of life.

Conflict of interest: None declared.

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Table 1. Distribution of patients according to sex and type of surgery

Sex	Group		Total
	Monomaxillary	Bimaxillary	
Male	7	4	11
Female	7	12	19
Total	14	16	30

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Table 2 The initial assessment of patients requesting orthognathic treatment

Question	Positive finding	Negative finding
The defect		
Is there an actual deformity?	Yes	No
Is the defect minor?	No	Yes
The request		
Is the request obscure?	No	Yes
Is the requested change surgically feasible?	Yes	No
Is there a history of dissatisfaction with previous surgery?	No	Yes
Has the patient been “surgeon shopping”?	No	Yes
The decision to seek help		
Was there long-term planning?	Yes	No
Is the patient in acute crisis?	No	Yes
Is there pressure from others?	No	Yes
Is there support from friends/family?	Yes	No
The expectations		
Are the expectations reasonable?	Yes	No
The psychodynamics		
Is there evidence of the complaint reflecting deeper conflicts? E.g., poor relationship with parent who has the same feature	No	Yes
Previous history		
Is there a history of past psychiatric disturbance?	No	Yes
Is there a history of severe maladjustment in life situations?	No	Yes

Table 3. Questionnaire consisting of OHIP-14 items (OH-1-OH-14) for pre- and post-surgical and additional items (AD-1-AD-3) for postsurgical assessment of quality of life

Item	How often do you have problems with your teeth, mouth or dentures (during the previous month*) Please answer using the following scores: 0 (never), 1 (seldom), 2 (occasionally), 3 (often), and 4 (very often)
OH-1	Did you have trouble pronouncing words because of problems with your teeth, mouth or dentures?
OH-2	Did you feel that your sense of taste has worsened because of problems with your teeth, mouth or dentures?
OH-3	Did you have painful aching in your mouth?
OH-4	Were you uncomfortable while eat because of problems with your teeth, mouth or dentures?
OH-5	Did you feel self-conscious because of problems with your teeth, mouth or dentures?
OH-6	Did you feel tense because of problems with your teeth, mouth or dentures?
OH-7	Was your diet unsatisfactory because of problems with your teeth, mouth or dentures?
OH-8	Did you have to interrupt meals because of problems with your teeth, mouth or dentures?
OH-9	Did you find it difficult to relax because of problems with your teeth, mouth or dentures?
OH-10	Were you embarrassed because of problems with your teeth, mouth or dentures?
OH-11	Were you agitated around other people because of problems with your teeth, mouth or dentures?
OH-12	Did you have difficulty doing your usual work because of problems with your teeth, mouth or dentures?
OH-13	Did you feel that life in general was less satisfying because of problems with your teeth, mouth or dentures?
OH-14	Were you totally unable to function because of problems with your teeth, mouth or dentures?
AD-1**	Did you feel discomfort while chewing?
AD-2**	Were you unsatisfied with your facial aesthetics?
AD-3**	Did you have a loss of sensitivity in your lips, tongue or other facial area?

*Time specification was only given in a post-surgical questionnaire;

**AD – alternative-question only administered in post-surgical questionnaires

Table 4. Pre- and post-surgical mean item scores and correlation of changes

Item	Short description	Pre-operative		Post-operative		WSR Z-value	WSR p-value
		mean ± SD	range	mean ± SD	range		
OH-1	Trouble pronouncing words	1.3 ± 1.23	0–4	0.86 ± 1.1	0–4	-1.99 ^a	0.046*
OH-2	Problem sensing taste	0.16 ± 0.38	0–1	0.43 ± 0.81	0–3	-1.9 ^b	0.057
OH-3	Painful aching	0.8 ± 0.92	0–3	0.7 ± 1.08	0–4	-0.61 ^a	0.54
OH-4	Uncomfortable to eat	1.5 ± 1.28	0–4	1.13 ± 1.33	0–4	-1.25 ^a	0.21
OH-5	Self-conscious	0.86 ± 1.1	0–4	0.76 ± 1.25	0–4	-0.35 ^a	0.72
OH-6	Feeling tense	0.7 ± 0.95	0–3	0.46 ± 0.86	0–3	-1.38 ^a	0.166
OH-7	Unsatisfactory diet	0.46 ± 0.73	0–3	0.33 ± 0.6	0–2	-1.07 ^b	0.28
OH-8	Interrupted meals	0.9 ± 0.92	0–3	0.63 ± 1.09	0–4	-1.33 ^b	0.18
OH-9	Difficulty to relax	0.66 ± 0.84	0–3	0.56 ± 0.89	0–3	-0.61 ^b	0.54
OH-10	Feeling embarrassment	0.9 ± 0.92	0–3	0.80 ± 1.21	0–4	-0.36 ^b	0.72
OH-11	Agitated around people	0.43 ± 0.62	0–2	0.5 ± 0.82	0–3	-0.57 ^b	0.56
OH-12	Working difficulties	0.7 ± 0.98	0–3	0.6 ± 1	0–3	-0.32 ^a	0.74
OH-13	Less satisfying life	0.13 ± 0.43	0–2	0.16 ± 0.46	0–2	-0.26 ^a	0.79
OH-14	Totally unable to function	0.66 ± 0.92	0–3	0.56 ± s0.49	0–2	-0.61 ^a	0.54

WSR – Wilcoxon signed ranks test; SD – standard deviation;

^abased on positive ranks;

^bbased on negative ranks;

*statistically significant at $p < 0.05$

Table 5. Differences in post-surgical scores of quality of life between patients with and without low score in initial psychological assessment

Item	Description	Group 1 Mean \pm SD	Group 2 Mean \pm SD	p-value
OH-1	Trouble pronouncing words	1.05 \pm 1.23	0.5 \pm 0.7	0.13
OH-2	Problem sensing taste	0.6 \pm 0.94	0.1 \pm 0.31	0.041*
OH-3	Painful aching	0.4 \pm 0.69	0.85 \pm 1.22	0.21
OH-4	Uncomfortable to eat	1.2 \pm 1.43	1 \pm 1.15	0.68
OH-5	Self conscious	1 \pm 1.45	0.3 \pm 0.48	0.062
OH-6	Feeling tense	0.6 \pm 0.99	0.2 \pm 0.42	0.13
OH-7	Unsatisfactory diet	0.2 \pm 0.42	0.4 \pm 0.68	0.4
OH-8	Interrupted meals	0.2 \pm 0.43	0.6 \pm 0.98	0.13
OH-9	Difficulty to relax	0.9 \pm 1.25	0.1 \pm 0.31	0.33
OH-10	Feeling embarrassment	0.75 \pm 1.01	0.2 \pm 0.42	0.013*
OH-11	Agitated around people	1.1 \pm 1.37	0.2 \pm 0.42	0.047*
OH-12	Working difficulties	0.7 \pm 0.92	0.1 \pm 0.31	0.013*
OH-13	Less satisfying life	0.75 \pm 1.11	0.3 \pm 0.67	0.015*
OH-14	Totally unable to function	0.25 \pm 0.55	0 \pm 0	0.056
AD-1	Discomfort while chewing	1.2 \pm 1.11	1 \pm 1.22	0.685
AD-2	Dissatisfying aesthetics	0.9 \pm 1.01	0.1 \pm 0.42	0.33
AD-3	Hypoesthesia	0.4 \pm 0.69	0.85 \pm 0.48	0.21

Group 1 – with low score in the initial psychological assessment; Group 2 – with satisfactory score in the initial psychological assessment; SD – standard deviation;

*statistically significant at $p < 0.05$

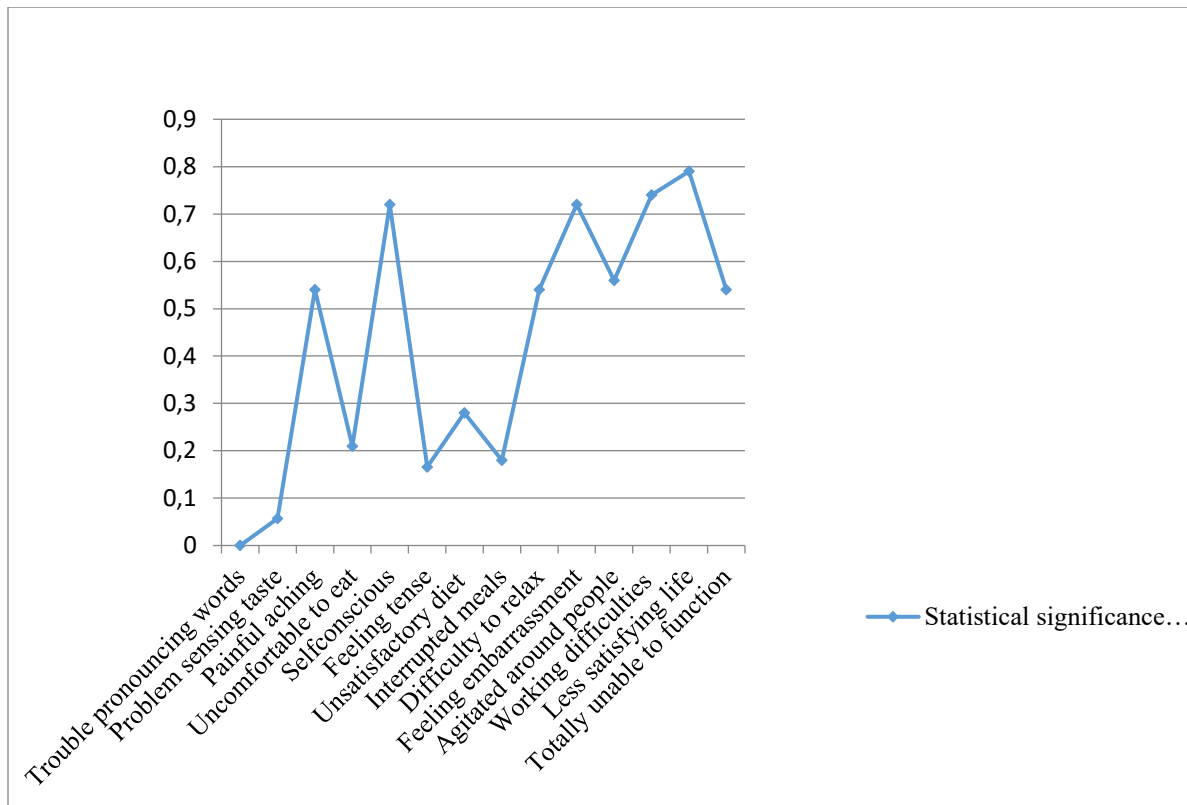


Figure 1. Pre- and postsurgical mean item scores and correlation of changes

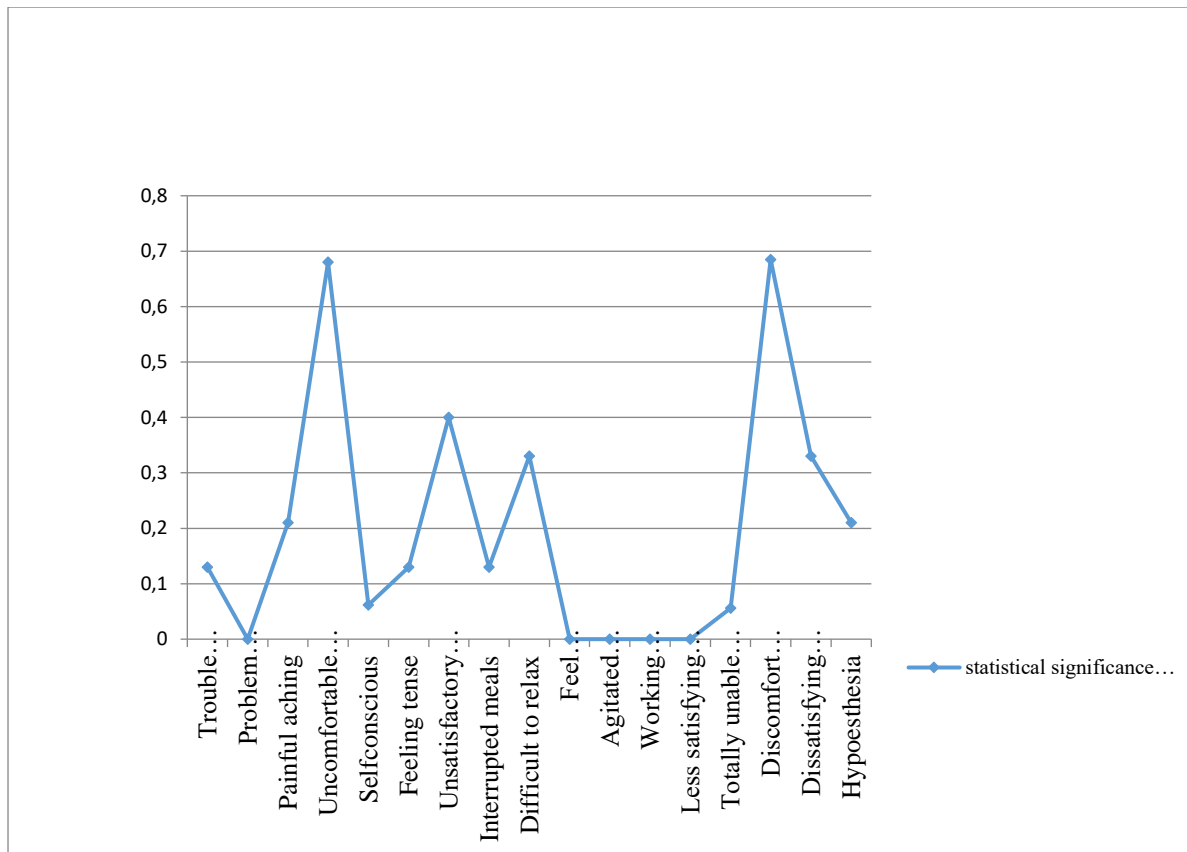


Figure 2. Differences in post-surgical scores of quality of life between patients with and without low score in the initial psychological assessment