Acta Odontologica Scandinavica

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/iode20

Does orthognathic treatment improve patients' psychosocial well-being?

Outi Marja Elina Alanko, Anna-Liisa Svedström-Oristo, Auli Suominen, Tero Soukka, Timo Peltomäki & Martti T. Tuomisto

To cite this article: Outi Marja Elina Alanko, Anna-Liisa Svedström-Oristo, Auli Suominen, Tero Soukka, Timo Peltomäki & Martti T. Tuomisto (2021): Does orthognathic treatment improve patients' psychosocial well-being?, Acta Odontologica Scandinavica, DOI: 10.1080/00016357.2021.1977384

To link to this article: https://doi.org/10.1080/00016357.2021.1977384

Published online: 22 Sep 2021.

ACTA ODONTOLOGICA SCANDINAVICA
https://doi.org/10.1080/00016357.2021.1977384

Taylor & Francis
Taylor & Francis Group

Does orthognathic treatment improve patients' psychosocial well-being?

Outi Marja Elina Alanko[a,b], Anna-Liisa Svedström-Oristo[a,c], Auli Suominen[d], Tero Soukka[c], Timo Peltomäki[e,f,g,h] and Martti T. Tuomisto[b]

[a]Pediatric Dentistry and Orthodontics, University of Turku, Turku, Finland; [b]Faculty of Social Sciences (Psychology), Tampere University, Tampere, Finland; [c]Department of Oral Diseases, Turku University Hospital, Turku, Finland; [d]Community Dentistry, University of Turku, Turku, Finland; [e]Faculty of Medicine and Health Technology, Tampere University, Tampere, Finland; [f]Institute of Dentistry, Faculty of Health Sciences, University of Eastern Finland, Kuopio, Finland; [g]Department of Oral and Maxillofacial Diseases, Kuopio University Hospital, Kuopio, Finland; [h]Department of Ear and Oral Diseases, Tampere University Hospital, Tampere, Finland

ABSTRACT

Objective: To analyse changes in patients' psychosocial well-being from before treatment until post-surgical orthodontic treatment (including retention) is completed.

Materials and methods: Data was collected six times: before treatment (T0), 6–8 weeks after the placement of orthodontic appliances (T2), 3–4 weeks before surgery (T3), six weeks after surgery (T4), one year after surgery (T5) and after completing orthodontic treatment (T6; 20–57 months after surgery). At T0, 60 patients participated while at T6, data was available for 15 patients. All patients completed the Orthognathic Quality of Life Questionnaire (OQLQ), Rosenberg Self-Esteem Questionnaire (RSES), Acceptance and Action Questionnaire II (AAQ-II) and the Symptom Checklist 90 (SCL-90). All pairwise comparisons between variables were conducted with the Wilcoxon signed-rank test.

Results: OQLQ function, RSES, AAQ-II and SCL GSI worsened from T0 to T2. At T5, improvements compared to T0 were found in all aspects of OQLQ and SCL GSI. When comparing results at T6 to T0, improvements where only found in OQLQ sum, OQLQ facial aesthetics and OQLQ function.

Conclusions: Although well-being of orthognathic patients seems to improve during treatment, many improvements cannot be verified anymore at the completion of the retention period. Most stable changes are found in the oral function component and in the facial aesthetics component of the OQLQ.

ARTICLE HISTORY
Received 5 May 2021
Revised 13 August 2021
Accepted 30 August 2021

KEYWORDS
Orthognathic surgery; psychological flexibility; quality of life; treatment outcome

Introduction

Orthognathic treatment combines orthodontic and surgical treatment and aims at correcting severe dentofacial discrepancies that cannot be treated with conventional orthodontic treatment. Severe dentofacial discrepancies affect patients in many ways: Patients report various symptoms, such as headache, facial pain, temporomandibular joint problems and chewing difficulties [1,2] and prospective orthognathic patients have more symptoms in their head and neck region than young adults not in need of orthognathic treatment [3,4]. Before surgery, patients' quality of life is lower than controls' quality of life [5–10]. Patients' self-esteem seems lower than controls' [11,12], but on closer inspection, this may only be true for female patients [12] (see also Jung [6]).

Orthognathic treatment seems to improve the well-being of patients. Recent meta-analyses concluded that orthognathic treatment resulted in improvements in orthognathic quality of life that can be detected six months after surgery [10, 13]. Especially social aspects, facial appearance and oral function improved from before treatment to 6 months after surgery [10]. However, the length of the follow-up periods of individual studies varies considerably (see, e.g. Zamboni et al., for a review [14]) and often the last data collection point is 12 months after surgery at the latest. As orthognathic treatment is expensive and time-consuming, more information on long-term effects is needed on quality of life and other aspects of psychosocial well-being, such as self-esteem and psychological symptoms. The long-term effects of orthognathic treatment are especially intriguing. A recent article by Ashton-James and Chemke-Dreyfus [15] suggested that sustainable improvements in daily affect should not be expected following orthognathic treatment. People tend to adapt to changes in their life circumstances. However, a recent cross-sectional study by Paunonen et al. [16] suggests that at least the positive improvements in quality of life are maintained for a longer period. In their study, the orthognathic quality of life of patients treated 4–8 years previously was better than that of prospective patients. Information regarding long-term changes in self-esteem or psychiatric symptoms after orthognathic treatment is not available. However, a recent study found that 10–15 years after

CONTACT Anna-Liisa Svedström-Oristo anlisve@utu.fi Pediatric Dentistry and Orthodontics, University of Turku, Turku, Finland

surgery, most patients are still highly satisfied with treatment outcome [17].

In a previous study, patients' psychosocial well-being was followed from the initial stages of treatment planning to one year after surgery [18]. The results suggest that in general, psychosocial well-being decreases from pre-treatment to the application of orthodontic appliances and then increases until one year after surgery. One year after surgery, patients' psychosocial well-being was comparable to or even better than controls', although in another study we found prospective patients to have lower condition-specific quality of life and lower body image than controls, while self-esteem was equal to controls' [19]. The focus of the current study is to report changes in patients' psychosocial well-being until post-surgical orthodontic treatment (including retention) is completed, allowing for comparisons between one year after surgery and at the end of treatment. Furthermore, also patients who dropped out of the study are included in the analyses for as long as they participated. The focus of the current study is to compare the end results of orthodontic-surgical treatment to all patients who were eligible for the treatment. In sum, the main interest of this study was to find out does orthognathic treatment improve the psychosocial well-being of adults with severe dentofacial discrepancies.

Methods

Patients referred to two university hospitals for evaluation of orthognathic treatment need were recruited to the study. Patients with cleft lip or palate or syndromes affecting craniofacial anatomy and those whose Finnish-language skills did not allow them to complete the questionnaires were excluded from the study. Data were collected six times: before treatment (T0), 6–8 weeks after the placement of orthodontic appliances (T2), 3–4 weeks before surgery (T3), six weeks after surgery (T4), one year after surgery (T5) and after completing orthodontic treatment (T6; 20–57 months after surgery). All patients ($n = 60$) whose data were included in the analyses at T0, later on received an orthodontic-surgical treatment plan. Of them, 8 decided not to begin any treatment and thus did not participate in following data collection points, while altogether 7 patients were excluded from the analyses during the study because their treatment plan changed, and they did not undergo surgery. At the first data collection point, 60 prospective patients participated and at the last data collection point, the patient group consisted of 15 patients. Some patients participated at all data collection points, while for some, data was available for a limited number of time points. Reasons for patients' drop-outs from the study are listed in Table 1.

Data were collected with four questionnaires: Orthognathic Quality of Life Questionnaire (OQLQ) [20], Rosenberg Self-Esteem Questionnaire (RSES) [21], Acceptance and Action Questionnaire II (AAQ-II) [22] and The Symptom Checklist 90 (SCL-90) [23]. OQLQ consists of 22 items that form subscales on oral function, facial aesthetics, awareness of dentofacial aesthetics, and social aspects of dentofacial deformity. Items are assessed on a five-point scale (N/$A = 0$, "bothers me a little"=1 to "bothers me a lot"=4). Higher scores indicate lower orthognathic quality of life (sum score range 0–88). The reliabilities of the subscales range from 0.83 to 0.93 [24]. RSES is a ten-item questionnaire with a four-point Likert scale (strongly disagree – strongly agree), where higher scores indicate higher self-esteem (sum score range 0–30). The reliability of the RSES in a Finnish population has been found to be 0.86 [25]. AAQ-II is a seven-item questionnaire for assessing psychological flexibility (i.e. the ability to accept and experience current feelings and emotions) [26]. Items are answered on a seven-point scale (never true = 1 to always true = 7). Higher scores indicate greater psychological flexibility (sum score range 7–49). The mean α-coefficient of AAQ II has been 0.84 [22]. SCL-90 is a self-report questionnaire. The patients rated the occurrence of psychiatric symptoms on a five-point Likert scale (not at all = 0 to extremely = 4, sum score range 0–360). SCL-90 has 90 items that form the following scales: somatisation, obsessive-compulsivity, interpersonal sensitivity, depression, hostility, anxiety, phobic anxiety, paranoid ideation, psychoticism and global severity index (GSI). The reliability of these in the Finnish version ranges from 0.77 to 0.90 [27]. The Ethics Review Committees approved the study protocol of the Hospital District of Southwest Finland and the Joint Municipal Authority of the Pirkanmaa Hospital District. Informed consent was obtained from all patients and controls before the study. Participation in this study was voluntary.

Pairwise comparisons between time points were carried out using the Wilcoxon signed-rank test. All analyses were conducted using SPSS Statistical Package (IBM SPSS Statistics, V26.0, Armonk, NY). *P*-values $<.05$ were interpreted as statistically significant.

Results

Detailed descriptive data for the scores of all applied questionnaires at all time points are presented in Table 2. As a summary, OQLQ function, RSES, AAQ-II and SCL GSI all worsened from pre-treatment (T0) to placement of orthodontic appliances (T2). No difference was found for OQLQ facial aesthetics, social aspects of dentofacial deformity and awareness of dentofacial aesthetics. From pre-treatment (T0) to one year after surgery (T5), all aspects of OQLQ and SCL GSI improved, but no change was found in RSES or AAQ-II. From pre-treatment (T0) to the end of the treatment (T6), statistically significant long-term changes were found in OQLQ sum score ($p=.011$), facial aesthetics ($p=.020$) and oral function ($p=.001$). Other aspects of OQLQ, RSES, AAQ-II and SCL GSI remained unchanged. Comparisons between all the mean differences at T0, T2, T5 and T6 are shown in Table 3.

Discussion

The aim of this study was to find out does orthodontic-surgical treatment improve patient's psychosocial well-being, when comparing the long-term results of treatment to the psychosocial well-being of prospective patients. The results

Table 1. Attrition of the study sample from time point T0 to T6.

Time point	Sample size	Appointment	Reason for attrition	*n*
T0	60	Before treatment	–	–
T1		Orthodontic examination and treatment plan	–	–
–	–	–	Did not start treatment	8
			Treatment without surgery	3
			Moved away	2
			Did not want to participate in the study	7
T2	40	6–8 weeks after placement of orthodontic appliances	–	–
–	–	–	Treatment without surgery	4
			Mowed away	1
			Did not want to participate in the study	3
T3	32	3–4 weeks before surgery	–	–
–	–	–	Did not want to participate in the study	1
T4	31	6 weeks after surgery	–	–
–	–	–	Did not want to participate in the study	9
T5	22	1 year after surgery	–	–
–	–	–	Did not want to participate in the study	7
T6	15	After completing orthodontic treatment	–	–

Table 2. Sample size, means, and standard deviations at different data collection points.

Measure	Before treatment (T0)	6–8 weeks after placement of orthodontic appliances (T2)	3–4 weeks before surgery (T3)	6 weeks after surgery (T4)	1 year after surgery (T5)	After completing orthodontic treatment (T6)
OQLQ sum	*n* = 57	*n* = 37	*n* = 29	*n* = 23	*n* = 22	*n* = 13
	M 32.35	M 38.49	M 40.34	M 37.00	M 14.50	M 11.08
	SD 20.15	SD 22.16	SD 21.16	SD 21.00	SD 13.04	SD 11.00
OQLQ	*n* = 60	*n* = 38	*n* = 29	*n* = 23	*n* = 22	*n* = 13
social aspects	M 8.02	M 10.58	M 11.38	M 9.87	M 2.86	M 2.85
	SD 8.20	SD 10.03	SD 8.69	SD 8.59	SD 5.29	SD 3.98
OQLQ	*n* = 60	*n* = 37	*n* = 30	*n* = 23	*n* = 22	*n* = 14
facial aesthetics	M 9.12	M 10.16	M 10.70	M 8.96	M 4.23	M 4.57
	SD 5.82	SD 6.07	SD 6.02	SD 6.37	SD 4.39	SD 4.42
OQLQ oral function	*n* = 57	*n* = 38	*n* = 30	*n* = 23	*n* = 22	*n* = 14
	M 9.81	M 12.53	M 12.30	M 11.87	M 5.00	M 2.50
	SD 5.07	SD 4.91	SD 4.74	SD 5.61	SD 3.55	SD 2.65
OQLQ awareness of	*n* = 60	*n* = 38	*n* = 30	*n* = 23	*n* = 22	*n* = 14
dentofacial	M 5.33	M 5.61	M 5.77	M 6.30	M 2.41	M 2.43
aesthetics	SD 4.00	SD 4.24	SD 4.11	SD 4.60	SD 3.19	SD 2.28
RSES	*n* = 58	*n* = 37	*n* = 30	*n* = 23	*n* = 22	*n* = 13
	M 22.22	M 19.81	M 21.63	M 21.83	M 24.50	M 23.92
	SD 5.89	SD 7.26	SD 5.68	SD 6.68	SD 4.26	SD 4.42
AAQ-II	*n* = 59	*n* = 36	*n* = 30	*n* = 23	*n* = 22	*n* = 14
	M 41,.2	M 38.97	M 41.83	M 41.70	M 43.41	M 42.79
	SD 7.69	SD 8.88	SD 6.43	SD 7.44	SD 5.91	SD 3.17
SCL-90	*n* = 59	*n* = 38	*n* = 30	*n* = 23	*n* = 22	*n* = 14
GSI	M 48.19	M 59.95	M 48.20	M 38.70	M 34.96	M 32.29
	SD 42.33	52.61	SD 47.11	SD 35.98	SD 38.96	SD 23.96

OQLQ: Orthognathic Quality of Life Questionnaire; RSES: Rosenberg Self-Esteem Scale; AAQ-II: Acceptancance and Action Questionnaire; SCL-90 GSI: General Symptomatic Index of the Symptom Check List 90.

of this study indicate that placement of fixed orthodontic appliances has effects both on the functional and psychological aspects of well-being. Specifically, after beginning orthodontic treatment, patients experience a deterioration in their oral function, self-esteem, and psychological flexibility and an increase in psychological distress. However, these deteriorations do dissipate during treatment. Although improvements in self-esteem are cited as a motive to start treatment (see, e.g. Yu et al. [12]), in this study patients' self-esteem drops after placement of fixed orthodontic appliances, but then returns to the baseline level and does not improve; thus, treatment does not seem to fulfil patients' expectations in this respect. Psychological flexibility follows the same pattern (i.e. improves back to the baseline level, but not any higher).

Interestingly, general psychological distress differs somewhat from these trends and seems to be better one year after surgery than at baseline. However, these improvements are lost by the end of treatment (i.e. at least 20 months after surgery). Yet the mean score is lower at the end of treatment than at one year after surgery, though statistical significance is not reached. The only improvements maintained at the end of the treatment are found in general orthognathic quality of life, oral function and facial aesthetics, supporting recent findings by Torgersbråten et al. [28] who reported improvements in oral function, dental and facial appearance three years post-surgery. The results also support the results by Paunonen et al. [16], who found improvements in OQLQ in patients treated 4–8 years previously, as we did find changes both in functional and aesthetic issues. Thus, it seems that orthognathic treatment is beneficial to patients wishing for improvements in function and aesthetics, but not for those who hope to achieve improvement in their psychological well-being. As self-esteem did not change during

Table 3. Sample size, mean differences, SDs, and Wilcoxon signed ranks test values.

	T0–T2					T0–T5					T0–T6				
	n	M (SD)	Min	Max	*Z*, *p*	*n*	M (SD)	Min	Max	*Z*, *p*	*n*	M (SD)	Min	Max	*Z*, *p*
OQLQ Sum	36	6.14 (14.84)	−17.00	56.00	−1.89, .059	21	−16.52 (18.53)	−52.00	19.00	−3.17, .002	13	−21.15 (22.30)	−66.00	20.00	−2.55, .011
OQLQ social aspects	38	2.18 (7.72)	−14.00	31.00	−1.52, .129	22	−4.36 (8.07)	−27.00	13.00	−2.73, .006	13	−3.15 (8.40)	−25.00	8.00	−1.28, .202
OQLQ facial aesthetics	37	1.08 (4.23)	−6.00	13.00	−1.24, .216	22	−4.23 (5.29)	−15.00	4.00	−3.04, .002	14	−5.79 (7.21)	−16.00	6.00	−2.33, .020
OQLQ oral function	37	1.73 (3.80)	−5.00	12.00	−2.53, .011	21	−5.86 (5.64)	−17.00	4.00	−3.45, .001	14	−9.93 (4.92)	−18.00	.00	−3.18, .001
OQLQ awareness of dentofacial aesthetics	38	.55 (3.46)	−7.00	12.00	.73, .468	22	−2.36 (3.03)	−11.00	2.00	−3.03, .002	14	−2.50 (4.18)	−9.00	6.00	−1.92, .055
RSES	35	−2.09 (4.16)	−14.00	5.00	−2.71, .007	21	1.67 (4.73)	−8.00	16.00	−1.71, .086	13	−1.08 (4.42)	−9.00	6.00	−.67, .502
AAQ-II	36	−2.11 (5.56)	−17.00	14.00	−2.49, .013	22	2.05 (7.88)	−10.00	31.00	−.94, .348	14	−.21 (6.75)	−8.00	15.00	1.07, .285
SCL-90 GSI	38	.12 (.34)	−.67	1.32	−2.43, .015	22	−.21 (.44)	−1.29	.50	−2.21, .027	14	−.15 (.39)	−1.23	.25	−.97, .330

OQLQ: Orthognathic Quality of Life Questionnaire; RSES: Rosenberg Self-Esteem Scale; AAQ-II: Acceptance and Action Questionnaire; SCL-90 GSI: General Symptomatic Index of the Symptom Check List 90.

treatment, these results support at least partly the results by Ashton-James and Chemke-Dreyfus [15], who suggested that the results of orthognathic treatment are not stable as people adapt to the changes. Also, as noted in a previous review article [29], patients may feel that, e.g. their self-esteem has improved during treatment, although this change is not reflected on standardised questionnaires.

Thus, changes in the long-term results between studies may also reflect methodological issues. However, in line with earlier findings the results of the current study indicate positive effects of orthognathic treatment on patients' oral function and dental aesthetics. In the future, it would be of interest to compare results of standardised questionnaires with patients' self-evaluated changes in well-being.

The main limitation of this study is the small sample size at the later data collection points. However, this study adds to previous knowledge of the psychosocial well-being of orthognathic patients by following them during the whole treatment process.

Disclosure statement

No potential conflict of interest was reported by the authors.

References

[1] Pahkala H, Kellokoski JK. Surgical-orthodontic treatment and patients' functional and psychosocial well-being. Am J Orthod Dentofacial Orthop. 2007;132(2):158–164.

[2] Svedström-Oristo AL, Ekholm H, Tolvanen M, et al. Self-reported temporomandibular disorder symptoms and severity of malocclusion in prospective orthognathic-surgical patients. Acta Odontol Scand. 2016;74(6):466–470.

[3] Paunonen J, Helminen M, Sipilä K, et al. Temporomandibular disorders in class II malocclusion patients after surgical mandibular advancement treatment as compared to non-treated patients. J Oral Rehabil. 2019;46:605–610.

[4] Pietilä R, Tolvanen M, Peltomäki T, et al. Symptoms in the masticatory system and related quality of life in prospective orthognathic patients. Acta Odontol Scand. 2017;75:402–406.

[5] Frejman MW, Vargas IA, Rösing CK, et al. Dentofacial deformities are associated with lower degrees of self-esteem and higher impact on oral health-related quality of life: results from an observational study involving adults. J Oral Maxillofac Surg. 2013; 71(4):763–767.

[6] Jung MH. Quality of life and self-esteem of female orthognathic surgery patients. J Oral Maxillofac Surg. 2016; 74(6):e1–7.

[7] Kurabe K, Kojima T, Kato Y, et al. Impact of orthognathic surgery on oral health-related quality of life in patients with jaw deformities. Int J Oral Maxillofac Surg. 2016;45(12):1513–1519.

[8] Ribeiro-Neto CA, Ferreira G, Monnazi GCB, et al. Dentofacial deformities and the quality of life of patients with these conditions: a comparative study. Oral Surg Oral Med Oral Pathol Oral Radiol. 2018;126(6):457–462.

[9] Sun H, Shang H, He L, et al. Assessing the quality of life in patients with dentofacial deformities before and after surgery. J Oral Maxillofac Surg. 2018;76(10):2192–2201.

[10] Yi J, Lu W, Xiao J, et al. Effect of conventional combined orthodontic-surgical treatment on oral health-related quality of life: a systematic review and Meta-analysis. Am J Orthod Dentofacial Orthop. 2019;156(1):29–43.

[11] Agırnaslıgıl M, Gul Amuk N, Kılıc E, et al. The changes of self-esteem, sensitivity to criticism, and social appearance anxiety in orthognathic surgery patients: a controlled study. Am J Orthod Dentofacial Orthop. 2019;155(4):482–489.

[12] Yu D, Fang B, Wang F, et al. Implicit association test: a possible tool for screening patients for orthognathic surgery. Med Hypotheses. 2013;81(2):309–310.
[13] de Araujo CM, Schroder AGD, De Araujo BMM, et al. Impact of orthodontic-surgical treatment on quality of life: a Meta-analysis. Eur J Orthod. 2020;42(3):281–289.
[14] Zamboni R, de Moura FRR, Brew MC, et al. Impacts of orthognathic surgery on patient satisfaction, overall quality of life, and oral health-related quality of life: a systematic literature review. Int J Dent. 2019;2019:2864216 [21.3.2021].
[15] Ashton-James J, Chemke-Dreyfus A. Can orthognathic surgery be expected to improve patients' psychological well-being? The challenge of hedonic adaptation. Eur J Oral Sci. 2019;127(3): 189–195.
[16] Paunonen J, Svedström-Oristo AL, Helminen M, et al. Quality of life several years after orthodontic-surgical treatment with bilateral sagittal split osteotomy. Acta Odontol Scand. 2020;78(5): 358–361.
[17] Kämäräinen M, Savolainen J, Tynkkynen J, et al. Long-term patient satisfaction and the sense of coherence – a longitudinal study 10–15 years after orthognathic surgery. Acta Odontol Scand. 2021;79(5): 377–382.
[18] Alanko O, Tuomisto MT, Peltomäki T, et al. A longitudinal study of changes in psychosocial well-being during orthognathic treatment. Int J Oral Maxillofac Surg. 2017;46(11):1380–1386.
[19] Alanko O, Svedström-Oristo A-L, Peltomäki T, et al. Psychosocial well-being of prospective orthognathic-surgical patients. Acta Odontol Scand. 2014;72(8):887–897.
[20] Cunningham SJ, Garratt AM, Hunt NP. Development of a condition-specific quality of life measure for patients with dentofacial deformity: ii. validity and responsiveness testing . Community Dent Oral Epidemiol. 2002;30(2):81–90.
[21] Rosenberg M. Society and the adolescent self-image. Princeton, NJ: Princeton University Press; 1965.
[22] Bond FW, Hayes SC, Baer RA, et al. Preliminary psychometric properties of the acceptance and action Questionnaire-II: a revised measure of psychological inflexibility and experiential avoidance. Behav Ther. 2011;42(4):676–688.
[23] Derogatis LR, Lipman RS, Covi L. SCL-90: an outpatient psychiatric rating scale - preliminary report. Psychopharmacol Bull. 1973;9(1): 13–28.
[24] Cunningham SJ, Garratt AM, Hunt NP. Development of a condition-specific quality of life measure for patients with dentofacial deformity: i. reliability of the instrument. Community Dent Oral Epidemiol. 2000;28(3):195–201.
[25] Schmitt D, Allik J. Simultaneous administration of the Rosenberg self-esteem scale in 53 nations: exploring the universal and culture-specific features of global self-esteem. J Pers Soc Psychol. 2005;89(4):623–642.
[26] Hayes SC, Luoma JB, Bond FW, et al. Acceptance and commitment therapy: model, processes and outcomes. Behav Res Ther. 2006;44(1):1–25.
[27] Holi M. Assessment of psychiatric symptoms using the SCL-90 [dissertation]. Helsinki: Helsinki University; 2003.
[28] Torgersbråten N, Stenvik A, Espeland L. Patient satisfaction after orthognathic surgery: a 3 year follow-up of 60 high-angle class II individuals. Eur J Orthod. 2021;43(2):215–221.
[29] Alanko OME, Svedström-Oristo A-L, Tuomisto MT. Patients' perceptions of orthognathic treatment, well-being, and psychological or psychiatric status: a systematic review. Acta Odontol Scand. 2010;68(5):249–260.