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Original Study Article



Russian localization and validation of the BRACE QUESTIONNAIRE

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BACKGROUND: According to the literature, the Greek questionnaire on the study of the quality of life of children and adolescents undergoing brace treatment (BRACE questionnaire, abbreviated as BrQ) is informative and reliable, which is confirmed by its validation in different countries. This necessitates the creation of an adopted Russian version and its validation.

AIM: To perform Russian localization and validation of the Greek questionnaire on the study of the quality of life of children and adolescents undergoing brace treatment.

MATERIALS AND METHODS: Russian localization and validation of the Russian version of the questionnaire on braces (Ru-BrQ) was carried out in several stages: direct and reverse translations, examination of the questionnaire, formation of a preliminary version, pilot testing of 104 patients with idiopathic scoliosis on brace treatment, development of the final version, reliability study using the evaluation of Cronbach's alpha criterion and intraclass correlation coefficient (ICC), and provision of the final version.

RESULTS: According to the indicators of the overall Ru-BrQ score, 0% of patients scored at the "floor" and "ceiling" levels. The average quality of life scores according to Ru-BrQ and in the retest were 72 ± 9.2 and 72.4 ± 9.0 points, respectively. According to the ICC indicator, domains such as "general health," "self-esteem and aesthetics," "vitality," and "social functioning" showed excellent reliability (>0.9). "Physical functioning" and "school activity" demonstrated good reliability (0.75–0.9). "Emotional functioning" and "body pain" demonstrated moderate reliability (0.5–0.75). The Cronbach's alpha coefficient showed that except for the domains "emotional functioning" and "body pain," where good internal consistency was determined (≥ 0.8), all other domains confirmed excellent internal consistency (≥ 0.9). The Pearson correlation coefficient (index 0.67) revealed a noticeable correlation between Ru-BrQ and the Russian version of SRS-22.

CONCLUSIONS: The Russian version is a reliable questionnaire for the study of the quality of life of children and adolescents undergoing brace treatment, comparable with the original Greek version of BrQ, and can be recommended for use in practical and scientific activities to assess the effect of a torso brace on the quality of life in children and adolescents.

Keywords: questionnaire; brace; quality of life; children; adolescents.

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Оригинальное исследование

Лингвокультурная адаптация и валидация русскоязычной версии опросника BRACE QUESTIONNAIRE

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Обоснование. Согласно данным литературы греческий опросник по исследованию качества жизни детей и подростков, проходящих корсетное лечение (BRACE QUESTIONNAIRE, сокращенно BrQ), информативен и надежен, что подтверждено путем его валидации в разных странах. Это обуславливает необходимость создания адаптированной русскоязычной версии и ее валидации.

Цель — лингвокультурная адаптация и валидация русскоязычной версии греческого опросника по исследованию качества жизни детей и подростков, проходящих корсетное лечение.

Материалы и методы. Лингвокультурная адаптация и валидация русскоязычной версии опросника по корсетам (Ru-BrQ) проведена в несколько этапов: прямой и обратный переводы, экспертиза опросника, формирование предварительной версии, пилотное тестирование 104 пациентов с идиопатическим сколиозом, находящихся на этапе корсетного лечения, создание окончательной версии, исследование надежности с помощью оценки критерия альфа-Кронбаха и внутриклассового коэффициента корреляции (ICC), предоставление финальной версии.

Результаты. По опроснику Ru-BrQ 0 % пациентов набрали общее количество баллов на уровне «пола» и 0 % на уровне «потолка». В тесте среднее количество баллов составило $72 \pm 9,2$, в ретесте — $72,4 \pm 9,0$. По показателю ICC отличная надежность ($>0,9$) установлена для таких доменов, как «Общее состояние здоровья», «Самооценка и эстетика», «Жизнеспособность» и «Социальное функционирование». Хорошая надежность (0,75–0,9) определена в доменах «Физическое функционирование» и «Школьная активность». Домены «Эмоциональное функционирование» и «Телесная боль» продемонстрировали умеренную надежность (0,5–0,75). Согласно коэффициенту альфа-Кронбаха для доменов «Эмоциональное функционирование» и «Телесная боль» отмечена хорошая внутренняя согласованность ($\geq 0,8$), а для остальных доменов — отличная ($\geq 0,9$). Коэффициент корреляции Пирсона (показатель 0,67) свидетельствовал о заметной корреляционной связи между Ru-BrQ и русскоязычной версией SRS-22.

Заключение. Русскоязычная версия является надежным опросником по исследованию качества жизни детей и подростков, проходящих корсетное лечение, сравнимым с оригинальной греческой версией BrQ, и может быть рекомендована к использованию в практической и научной деятельности для оценки влияния корсета на туловище на качество жизни детей и подростков.

Ключевые слова: опросник; корсет; качество жизни; дети; подростки.

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BACKGROUND

Adolescent idiopathic scoliosis is a complex three-dimensional progressive deformity that requires long-term conservative or surgical treatment. In the treatment of scoliosis, the Society on Scoliosis Orthopedic and Rehabilitation Treatment identifies three most important aims until the end of the growth period, namely, improving body esthetics, improving the patient's quality of life, and preventing disability. However, to improve the quality of life in adulthood by long-term treatment of adolescents with a rigid orthosis on the body for several years, the subjective assessment of their quality of life during orthotics worsens [1–7]. In the analysis of 60 studies, Wang et al. [8] identified self-esteem, mental health, and vitality as the most frequently mentioned components that reduce the quality of life. To improve effectively the quality of life of individuals who wear body orthoses for a long time, factors that affect this indicator the most must be identified; therefore, the use of appropriate questionnaires is still relevant. In Russia, only three validated quality-of-life questionnaires are used, namely, the Short-Form-36 (SF-36) [9], Pediatric Quality of Life Inventory (PedsQL) [10], and Scoliosis Research Society 22-Item (SRS-22) [11]). Only PedsQL is adapted for pediatric patients; however, it is not focused on children with scoliosis; thus, SRS-22, a specialized scoliosis questionnaire, is more intended for self-assessment of the condition after surgical treatment of this pathology. In 2006, Greek experts developed the Brace Questionnaire (BrQ), a specialized questionnaire for assessing the quality of life for children and adolescents with scoliosis undergoing orthotic treatment [12]. To date, the questionnaire has been translated and validated in several languages, namely, Polish [13], Italian [14], French [15], Turkish [16], Korean [17], Persian [18], and Chinese [19, 20], which has proven its informativeness and reliability. The lack of a validated Russian version of the questionnaire makes it difficult to conduct comparative studies on the quality of life of children and adolescents undergoing orthotic treatment; thus, the high performance of the original version of the questionnaire determines its need for adaptation for practice in Russia.

The work aimed at the localization and validation of the Russian version of the Greek BrQ to evaluate the quality of life of children and adolescents undergoing orthotic treatment for scoliosis.

MATERIALS AND METHODS

The use of any international questionnaire in scientific and practical work must comply with the conditions for the adaptation procedure in accordance with international standards [21]. The developer (Theodoros B. Grivas, MD, Director of the Orthopedics and Traumatology Department

of Tsaneio General Hospital in Piraeus, Greece, member of the National Examination Board in the relevant specialty) of the questionnaire was informed and agreed to the Russian translation.

The localization of the questionnaire was performed in several stages, namely, translation from Greek into Russian by two independent Russian-speaking medical translators, reverse translation of the questionnaire by two independent Greek speakers with medical education, assessment by a panel of experts with the participation of translators, clinical specialists, and psychologists, and the creation of the pre-final version of the questionnaire.

The inclusion criteria for pilot testing were girls and boys aged 12–18 years with idiopathic scoliosis, Cobb angle of 25°–50°, and skeletal immaturity (Risser test 1–3), which used a brace made according to the Rigaud–Chenot system using the CAD/CAM complex Rodin4D for at least 3 months and at least 14 h a day. The study participants marked difficult questions. The survey was conducted by psychologists who, if necessary, further explained the wording of the questions to children and adolescents.

The BrQ contains 34-Likert scale items and covers eight domains for measuring the quality of life of patients with juvenile idiopathic scoliosis receiving orthotic treatment, including “general health perception” (questions 1 and 2), “physical functioning” (questions 3–9), “emotional functioning” (questions 10–14), “self-esteem and aesthetics” (questions 15 and 16), “vitality” (questions 17 and 18), “school activity” (questions 19–21), “bodily pain” (questions 22–27), and “social functioning” (questions 28–34). Estimating BrQ is simple. For questions 4, 5, 6, 12, and 14–17, “always” scored 5 points; “most of the time,” 4 points; “sometimes,” 3 points; “almost never,” 2 points; and “never,” 1 point. For questions 1, 2, 3, 7–11, 13, and 18–34, “always” scored 1 point; “most of the time,” 2 points; “sometimes,” 3 points; “almost never,” 4 points; and “never,” 5 points. Each score is then multiplied by 20, and the total score is divided by 34. Theoretically, the minimum and maximum scores are 20 and 100, respectively. Higher scores indicate a better quality of life. The subscale score can be calculated for each of the eight domains by dividing the total score for each dimension by the number of its constituent items. To avoid memory effects, all participants in the pilot study completed two Ru-BrQ tests at 7-day intervals (test–retest).

The scheme of testing and repeated testing enabled determining the intraclass correlation coefficient (ICC), which represents the questionnaire's reliability. The ICC index was evaluated according to the method proposed by T.K. Koo and M.Y. Li [22], where a score of <0.5 indicates low reliability; 0.5–0.75, moderate reliability; 0.75–0.9, good reliability; and >0.9, excellent reliability. The “floor” and “ceiling” effects for each question were determined.

The test–retest reliability and the final version of the questionnaire were assessed using Cronbach's alpha coefficient [23]. Excellent internal consistency was assumed if Cronbach's alpha was >0.9 , good if >0.8 , sufficient if >0.7 , doubtful if >0.6 , poor if >0.5 , and insufficient if ≤ 0.50 [24].

To assess parallel validity, the results of the Russian Ru-BrQ questionnaire were compared with that of the Russian SRS-22 version using the Pearson correlation coefficient.

Table 1. Percentage of respondents with the minimum/maximum score on a scale (1–5) for each item of the Ru-BrQ

Question number	Floor effect	Ceiling effect
1	0 (0%)	11 (10.58%)
2	3 (2.86%)	5 (4.81%)
3	4 (3.81%)	4 (3.85%)
4	6 (5.71%)	11 (10.58%)
5	4 (3.81%)	37 (35.58%)
6	1 (0.95%)	40 (38.46%)
7	0 (0%)	21 (20.19%)
8	0 (0%)	21 (20.19%)
9	1 (0.95%)	18 (17.31%)
10	2 (1.9%)	5 (4.81%)
11	0 (0%)	7 (6.73%)
12	4 (3.81%)	8 (7.69%)
13	11 (10.48%)	2 (1.92%)
14	1 (0.95%)	21 (20.19%)
15	5 (4.76%)	7 (6.73%)
16	4 (3.81%)	8 (7.69%)
17	4 (3.81%)	6 (5.77%)
18	0 (0%)	6 (5.77%)
19	0 (0%)	16 (15.38%)
20	0 (0%)	13 (12.5%)
21	0 (0%)	19 (18.27%)
22	0 (0%)	39 (37.5%)
23	1 (0.95%)	33 (31.73%)
24	1 (0.95%)	26 (25%)
25	1 (0.95%)	16 (15.38%)
26	0 (0%)	32 (30.77%)
27	3 (2.86%)	42 (40.38%)
28	0 (0%)	18 (17.31%)
29	14 (13.33%)	5 (4.81%)
30	2 (1.9%)	9 (8.65%)
31	0 (0%)	14 (13.46%)
32	5 (4.76%)	14 (13.46%)
33	0 (0%)	25 (24.04%)
34	18 (17.14%)	4 (3.85%)

The Pearson criterion was determined using the R.E. Chaddock scale [25], where a value of <0.3 meant weak correlation; 0.3–0.5, moderate correlation; 0.5–0.7, evident correlation; 0.7–0.9, high correlation; and >0.9 , very high correlation.

Based on the results of the pilot study, the final version of the Russian-language questionnaire BrQ (Ru-BrQ), presented in the appendix, was created. The meaning of the questions in the final Russian version is correct and matches those in the original Greek version.

RESULTS

Patients undergoing orthotic treatment at the Skolio-logik.ru Prosthetic and Orthopedic Center and the North-Western Scientific and Practical Center for Rehabilitation and Prosthetics Orthetika, who participated in the Ru-BrQ pilot study, came from various federal districts of Russia.

The average age of the participants at the time of questionnaire completion was 14.0 ± 1.7 years. They used a brace for 3–120 months. The mean brace-wearing time per day was 17.5 ± 3.2 h. The mean Cobb angle of the main scoliotic curve at the time of the survey was $34.1^\circ \pm 10.6^\circ$. The distribution of the types of scoliotic curves at the time of the survey according to the classification of M. Rigo et al. [26], which is used to make braces, is as follows: variant A with three curves, 23.1%; variant B with four curves, 46.1%; variant C with not three and not four curves, 23.1%; and variant E with isolated curve, 7.7%. The bone maturity indices according to Risser I, II, and III were 7.7%, 40.4%, and 51.9%, respectively.

In the initial test, the average score in assessing the quality of life according to the Ru-BrQ was 72 ± 9.2 , whereas in test 2, it was 72.4 ± 9.0 . The average durations of filling out the questionnaire in the test and retest were 4.5 ± 0.9 and 4.3 ± 0.7 min, respectively.

As regards the total Ru-BrQ scores, none of the patients scored at the “floor” and “ceiling” levels. No “floor” (most participants scored the lowest on the considered variable) or “ceiling” (most participants scored the highest on the considered variable) effects were observed for each Ru-BrQ question (Table 1).

However, attention should be paid to questions 5, 6, 22, 23, 26, and 27, which showed higher values, indicating more pronounced “ceiling” effects in “physical functioning” and “bodily pain.”

The ICC and Cronbach's alpha coefficient based on testing/retesting by the Ru-BrQ domains are presented in Table 2.

According to the obtained indicators of the ICC, the questionnaire reliability in all domains can be determined. Excellent reliability (>0.9) was shown by domains such as “general health perception,” “self-esteem and aesthetics,” “vitality,” and “social functioning.” Good reliability (0.75–0.9) was noted in “physical functioning” and “school activity.”

“Emotional functioning” and “bodily pain” showed moderate reliability (0.5–0.75).

According to Cronbach’s alpha coefficient for “emotional functioning” and “bodily pain,” good internal consistency (≥ 0.8) was noted, whereas in the remaining domains, the coefficients showed excellent (≥ 0.9).

In the parallel validity study of the Ru-BrQ and Russian version of the SRS-22, the Pearson correlation coefficient confirmed a significant correlation (indicator 0.67) despite the different structures of the questionnaires.

DISCUSSION

BrQ is the first multidimensional questionnaire specially developed in Greece and tested in many countries to assess the quality of life of patients with juvenile idiopathic scoliosis receiving orthotic treatment, which justifies the relevance of its use.

The Ru-BrQ was characterized by good reproducibility. In general, Russian children had no difficulty understanding most of the questions. The sentence “You wore special clothes” required additions and clarifications. The children did not understand the term “special clothes,” so they needed an explanation. Thus, the question in the Russian version was formulated as “Did you wear bulky clothes that hide the brace?”

However, in Russian children, attention was drawn to the answers to some questions regarding the “floor” and “ceiling” effects. For questions 5 and 6 (if the patient can put on and take off the brace without external assistance), 35.58% and 38.46% of the respondents answered “always,” corresponding to the maximum number of points. This is because children and adolescents with idiopathic scoliosis, who were undergoing orthotic treatment at the Prosthetic and Orthopedic Center Skoliologik.ru and the North-Western Scientific and Practical Center for Rehabilitation and Prosthetics Orhetika, where patients are trained on putting on and taking off the brace independently, were involved in the pilot survey. More frequent indicators of the “ceiling” were noted in “bodily pain.” Thus, to questions 22 (“You had to take medication for pain”) and 23 (“You had pain during the night”), almost a third of patients (37.5% and 31.73%, respectively) responded “never,” estimated at 5 points. Indicators close to these “ceiling” scores (30.77% and 40.38%) were obtained in questions 26 (“You had pain when climbing stairs”) and 27 (“You felt pins and needles in your arms or legs”). Thus, these questions showed lower sensitivity. For conclusions about the sensitivity of these questions, the Russian-speaking population should continue to be interviewed using Ru-BrQ.

The high Cronbach’s alpha coefficient of the Ru-BrQ (0.93) implies excellent internal consistency. The Cronbach’s alpha coefficient of the Ru-BrQ was compared with that of the original Greek version, as well as versions in Polish,

Table 2. Intraclass correlation coefficient and Cronbach’s alpha coefficient by domains of the Ru-BrQ ($n = 100$)

Ru-BrQ quality-of-life domain	ICC	Cronbach’s alpha
General health perception	0.93	0.96
Physical functioning	0.79	0.92
Emotional functioning	0.73	0.88
Self-esteem and aesthetics	0.96	0.99
Vitality	0.95	0.97
School activity	0.82	0.99
Bodily pain	0.53	0.82
Social functioning	0.97	0.99

French, Turkish, Korean, Persian, and Chinese languages (Table 3).

Table 3 once again confirms the excellent internal consistency of the Russian version. Thus, the original Greek version of the BrQ has a Cronbach’s alpha of 0.82. The 2021 Chinese version (0.83), French (0.85), and Korean (0.87) versions are close to this indicator of internal consistency. The highest coefficients were noted in the Persian, Russian (0.93), Polish (0.94), and Turkish (0.94) versions.

The average values of the sum of points in the Russian population (test, 72 ± 9.2 ; retest, 72.4 ± 9.0) are comparable with the data obtained by Polish (test, 77.1 ± 12.2 ; retest, 76.5 ± 12.1) [13], French (test, 76.0 ± 10.5 ; retest, 73.8 ± 11.1) [15], Turkish (test, 78.4 ± 14.8 ; retest, 77.3 ± 15.2) [16], and Chinese (test, 77.8 ± 9.8 ; retest 79.2 ± 10.5) [20] researchers.

The higher the Cronbach’s alpha coefficient of the questionnaire, the more single discipline it is. This fully applies to the localized and validated Ru-BrQ, which should be attributed to specific clinical questionnaires.

Table 3. Comparison of the Cronbach’s alpha coefficient of the Russian version with the original Greek version and versions in other languages

Questionnaire versions (year)	Cronbach’s alpha value
Russian (2023) Ru-BrQ	0.93
Original Greek (2006) G-BrQ	0.82
Polish (2012) Pol-BrQ	0.94
French (2017) F-BrQ	0.85
Turkish (2018) Tur-BrQ	0.94
Korean (2018) K-BrQ	0.87
Persian (2020) P-BrQ	0.93
Chinese (2021) C-BrQ	0.83
Chinese (2022) C-BrQ	0.89

CONCLUSION

The Ru-BrQ localized and validated in accordance with international standards can be recommended for studying the quality of life of patients aged 9–18 years

undergoing orthotic treatment. The results of testing to identify individual psychological differences can be used in scientific research and optimize conservative treatment.

APPENDIX

Russian version of the Brace Questionnaire (Ru-BrQ)

This questionnaire asks how you feel about your health while you are wearing a brace. This is not a test, and there are no right or wrong answers.

- **Please read every question carefully.**
- **Choose the best answer and mark with an x.**

Example	Never	Almost never	Sometimes	Most of the time	Always
During the last week, you were in a good mood for studying	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Please tell us a few things about yourself:

You are: a girl a boy Age: _____ years. You are wearing the brace since _____
 You are wearing the brace for _____ hours/day. Date _____

<i>During the past 3 months...</i>	Never	Almost never	Sometimes	Most of the time	Always
1. The brace made you feel ill	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. You were afraid that your back will get worse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>During the past 3 months while you were wearing the brace...</i>	Never	Almost never	Sometimes	Most of the time	Always
3. You felt tired when walking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. You were able to run	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. You managed to wear the brace without any help	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. You managed to take off the brace without any help	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. You could not eat well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. You could not sleep well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. You could not breathe well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>During the past 3 months...</i>	Never	Almost never	Sometimes	Most of the time	Always
10. The brace made you feel nervous	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. You felt worried because of the brace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. You felt happy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. You believed that your life would be better if you were not on brace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. You believed that brace treatment was beneficial	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>During the past 1 month...</i>	Never	Almost never	Sometimes	Most of the time	Always
15. You felt proud of yourself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. You were satisfied with your body	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>During the past 1 month...</i>	Never	Almost never	Sometimes	Most of the time	Always
17. You felt strong and full of energy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. You felt tired and exhausted because of the brace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>During the past 1 month, because of the brace</i>	Never	Almost never	Sometimes	Most of the time	Always
19. You had difficulties with your lessons	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. You were absent from school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. You found it hard to pay attention in the classroom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>During the past 1 month, while you were wearing the brace</i>	Never	Almost never	Sometimes	Most of the time	Always
22. You had to take medication for pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. You had pain during the night	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. You had pain when walking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. You had pain when sitting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. You had pain when climbing stairs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. You felt pins and needles in your arms or legs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>During the past 1 month, because of the brace</i>	Never	Almost never	Sometimes	Most of the time	Always
28. You could not go out with your friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Your friends felt compassion for you	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. You felt different from your peers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. You had problems with your family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. You believed that your relationship with your family or your friends would be better if you were not on brace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. You stayed at home because you were ashamed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. You wore special clothes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Thank you!

ADDITIONAL INFORMATION

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Ethical considerations. The publication of the article is authorized by the Ethics Committee of the Prosthetic and Orthopedic Center Skoliologik.ru based on the principles of the World Helsinki Medical Declaration (Minutes No. 4 dated March 30, 2023). The article presents the results of studies without patient identification, which do not contradict the ethical standards of the Declaration of Helsinki of the World Medical Association "Ethical Principles for Conducting Scientific Research Involving Humans" as amended in 2000 and the Rules of Clinical Practice in the Russian Federation, approved by the

Order of the Ministry of Health of Russia dated June 19, 2003 No. 266. The study participants and their legal representatives were informed about the aims, methods, expected benefits of the study, and the risks and inconveniences associated with participating in the study.

Author contributions. G.A. Lein created the study concept and design and edited the text. I.V. Pavlov performed analysis of the data obtained and wrote the text. M.O. Demchenko performed statistical processing of the research materials. A.V. Zaripova performed the localization of the questionnaire. O.V. Berezneva and T.Yu. Maklakova collected the research materials.

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