

## SUMMARY

**Introduction:** Currently, both scientific studies and clinical work have paid more and more attention to the need to supplement standard clinical examination and imaging tests in patients with Carpal Tunnel Syndrome (CTS) with Patient-Reported Outcome Measures (PROMs) applied to measure subjective assessment of the patient's health. One of the questionnaires most frequently used to assess the severity of symptoms and dysfunctions in CTS is the Boston Carpal Tunnel Questionnaire (BCTQ). The questionnaire is divided into the SSS (Symptom Severity Scale) including 11 items and the FSS (Functional Status Scale) with 8 items.

**Aim of the study:** The aim of the study was to adapt the Boston Carpal Tunnel Questionnaire (BCTQ) culturally and linguistically to Polish conditions and to assess its psychometric properties among patients undergoing extracorporeal shock wave therapy.

**Material and methods:** A total of 103 patients (78 women and 25 men) diagnosed with mild or moderate CTS were enrolled in the study. After excluding contraindications to therapy, each patient was tested three times. Test 1 was performed during the first physiotherapeutic appointment and included taking medical history, completing a personal questionnaire, completing BCTQ, QuickDASH, SF-36 v. 2,0 questionnaires, the VAS pain scale, Tinel-Hoffmann and Phalen functional tests were performed, and grip strength was measured using a hand dynamometer. During test 2 (test - retest) carried out at the interval of 2 - 7 days from test 1, BCTQ completed again. After completing the questionnaire, the patient underwent the first of a series of four shockwave treatments on CTS. Test 3 was the last examination and was carried out 3 months after the end of the shock wave treatment series and included the same assessment as in test 1.

**Results:** The Polish version of BCTQ questionnaire is characterized by high internal consistency (Cronbach's alpha coefficient for SSS was 0.861 and for FSS 0.924) and excellent repeatability (ICC 0.9406 for SSS and 0.9250 for FSS, with SEM 0.16 and 0.21 for SSS and FSS, respectively, and MDC 0.43 and 0.59 for SSS and FSS, respectively). High construction validity of the Polish version of BCTQ questionnaire was demonstrated, as seven out of nine a priori adopted hypotheses were confirmed i.e. 77.77%. Strong correlations were found between BCTQ and the general score of QuickDASH questionnaire ( $R = 0.70$  for SSS and QuickDASH and  $R = 0.80$  for FSS and QuickDASH), strong correlations between the VAS pain scale and SSS ( $R = 0.73$ ) and weak correlations between VAS and FSS ( $R = 0.47$ ). Grip strength tested with a dynamometer was not significantly correlated with SSS and FSS scales.

The correlations between the BCTQ scales and the quality of life assessed with the SF-36 scale were of average strength, with the strongest correlations relating to the "bodily pain" subscale in the physical domain of SF-36 and FSS ( $R = -0.56$ ) and SSS ( $R = -0.52$ ). The relationships between BCTQ and functional tests were statistically significant only for the Phalen test and the FSS scale ( $p = 0.0195^*$ ). The results of the factor analysis for the SSS scale showed some discrepancy between the answers to the questions. The assessments made in questions 1, 2, 6, 8, 9 and 10, concerning nocturnal symptoms not directly related to activities of daily living, and questions 3, 4, 5, 7 and 11, concerning daytime symptoms related to functionality, were correlated. The factor analysis performed for the FSS scale showed its one-dimensional structure.

The internal and external sensitivity of the questionnaire to clinical changes in the health condition of patients after the applied shock wave therapy was assessed. The mean decrease in the severity of symptoms on the SSS scale was 1.04 points, and the functional status assessed on the FSS scale improved by an average of 0.77 points. The ES value for the SSS scale was 1.62 and for FSS 0.99, SRM 1.35 for SSS and 1.01 for FSS, which proves a high sensitivity to changes in BCTQ. As a result of the therapy, a statistically significant improvement was achieved in the patients' condition as assessed with VAS, grip strength tested with a dynamometer and the QuickDASH questionnaire (improvement by an average of -3.1 points, 7.7 points and -23.2 points, respectively). Changes in the VAS and QuickDASH scores were significantly correlated with the BCTQ scales, respectively SSS and VAS ( $R = 0.70$ ), SSS and QuickDASH ( $R = 0.76$ ) and FSS and VAS ( $R = 0.46$ ) and FSS and QuickDASH ( $R = 0.77$ ). For SSS and grip force measured with a dynamometer, the correlation was weak ( $R = -0.36$ ), and for FSS no correlation with the grip strength measurement was found. The correlations between SF-36 and BCTQ were weak, these correlations were however of average power ( $R = -0.52$ ) only in the "bodily pain" subscale in the physical domain of SF-36 and SSS. The improvement in the Phalen test results was statistically significantly associated with the improvement in SSS ( $p = 0.0007^{***}$ ) and FSS ( $p = 0.0000^{***}$ ) results, and the improvement in the Tinel-Hoffmann test results was statistically significantly associated only with SSS ( $p = 0.0132^*$ ).

**Conclusions:** The Polish version of BCTQ is a repeatable tool for the subjective assessment of the health of patients with CTS, characterized by high internal consistency. The Polish version of BCTQ is highly specific in measuring the severity of symptoms and dysfunctions typical for the patients with CTS. The Polish version of BCTQ is a tool capable

of detecting changes that have occurred in the subjective assessment of the health condition of patients with CTS after applied physiotherapy.