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ORIGINAL REPORT

DETERMINANTS OF CHANGE IN PERCEIVED DISABILITY OF PATIENTS WITH NON-SPECIFIC CHRONIC LOW BACK PAIN

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Objective: **Change in psychophysical capacity, calculated as the ratio between physical capacity and perceived effort, may be a determinant of change in perceived disability. The aim of this study was to identify determinants for change in perceived disability, as measured with the Roland Morris Disability Questionnaire (RMDQ), in patients with non-specific chronic low back pain after rehabilitation.**
Methods: **Data were gathered for 84 outpatients. Psychophysical capacity (psychophysical static leg lift, psychophysical static trunk lift, and psychophysical dynamic lifting capacity), physical lifting capacity, perceived lifting effort, aerobic capacity and RMDQ were assessed. Associations between change in RMDQ and potential determinants were calculated. Variables associated with change in RMDQ were entered in a multivariate linear regression analysis (backward).**
Results: **Change in psychophysical static trunk lift (r=–0.51), psychophysical dynamic lifting capacity (r=–0.53) and psychophysical static leg lift capacity (r=–0.23) were significantly associated with change in RMDQ. The RMDQ score at baseline (β=–0.438), change in psychophysical dynamic lifting capacity (β=–0.109), psychophysical static trunk lift capacity (β=–0.038), psychophysical static leg lift capacity (β=–0.012) and static leg lift capacity (β=0.007) all contributed significantly to the regression model (r^2=52%).**
Conclusion: **Improvements in psychophysical lifting capacity are determinants for a reduction in perceived disability.**

Key words: lifting capacity; Roland Morris Disability Questionnaire; chronic low back pain; psychophysical capacity.

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INTRODUCTION

Disability due to chronic low back pain (CLBP) is a major problem in western society. Rehabilitation programmes have been developed and applied in order to reduce the burden on patients and society (1–5). Multi-modal rehabilitation programmes for patients with CLBP, aimed at functional restoration, reduce pain, improve function and improve return to work status more effectively than do exercises alone, advice, or a waiting list (6, 7). However, it is not known which factors contribute to these improvements.

Patients with CLBP have been found to be deconditioned (8) and, as a result of this finding, rehabilitation programmes have been developed aimed at re-conditioning and increasing the aerobic capacity of patients with CLBP (9–11). Beneficial effects of these rehabilitation programmes have been attributed to an increase in aerobic capacity. In fact, these rehabilitation programmes and their rationale are based on the biomedical model for CLBP. However, during the last decade it has become apparent that a cognitive, psychosocial model for low back pain might be more appropriate (12, 13). Moreover, it has been found that the level of aerobic capacity in patients with CLBP is not associated with the duration and severity of perceived disability, as assessed with the Roland Morris Disability Questionnaire (RMDQ) (8, 14). In addition, despite the significant increase in physical and aerobic capacity in patients with non-specific CLBP the perceived disability in 59% of the patients increased and in 17% did not change, after a physical rehabilitation programme (15). Based on these results it is questionable whether changes in aerobic capacity and muscle strength can explain the beneficial effects of rehabilitation in patients with CLBP.

For successful treatment of CLBP, a reduction in subjective feelings of disability and an appropriate perceived effort to undertake physical activities is most important (16). Perception has been suggested to be an important factor in evaluating physical effort tasks (17, 18). Additionally, if the perceived effort (Borg score (17)) is high, the risk for non-specific CLBP is substantially higher than if the perceived effort is low (18). To assess change in perceived effort in patients with non-specific CLBP, a new measure was introduced: psychophysical lifting capacity, which is calculated as the ratio between physical capacity expressed in Newton (N) and perceived effort expressed as Borg score (B) (19, 20). This ratio takes into account both physical capacity and perceived effort. An

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important difference between the psychophysical approach and the physical approach is the acceptable maximal effort (AME) (21). In the psychophysical approach the patient is in control and determines his or her own termination point based on acceptability (21). In addition, the tests not only use a psychophysical approach to determine capacity, but also psychophysical outcome measures. We introduced this ratio formula because perceived physical effort is associated with the physical capacity available to perform the activity, and this, perhaps, contributes to assessing the change in perception of physical effort performed. The advantage of this method is the opportunity to measure the change in the interaction between the 2 variables, because both perceived effort and physical effort may increase during the performance of a lift. Ideally it should involve greater physical effort and less perceived effort to increase the psychophysical capacity. Moreover, change in psychophysical capacity may be more closely associated with change in perceived disability, because the RMDQ is also a ratio outcome of the patient perceived disability on account of LBP and the activities asked in the questionnaire.

Different measures of psychophysical lifting capacity were significantly lower in patients with non-specific CLBP than in healthy subjects (20). In addition, change in psychophysical static trunk lift was significantly related to change in perceived disability assessed with the RMDQ ($r=-0.74$) (19). On the basis of these results, we hypothesize that improvements in psychophysical capacity may be determinants for reduction in perceived disability, as measured with the RMDQ in patients with non-specific CLBP, after rehabilitation.

The aim of this study was to identify determinants for change in perceived disability as measured with the RMDQ.

METHODS

Data for 84 outpatients diagnosed with non-specific CLBP were included in this retrospective cohort study. The mean (standard deviation; SD) age of the patients was 39 years (SD 10) and 41% (SD 48.8) patients were women. The mean (SD) height was 1.77 m (SD 0.09), weight 82.1 kg (SD 15.7) and lean body mass 55.9 kg (SD 12.1). The mean (SD) duration of complaints was 63.1 months (SD 67.1), and mean duration of sporting activity per week was 1.6 h (SD 0.7) prior to rehabilitation. The data were collected at the University Medical Centre Groningen, the Netherlands, as part of the routine assessment of patients prior to and after the rehabilitation programme. The collection of data in the present study was approved by the medical ethics committee of the University Medical Centre of Groningen.

Prior to the rehabilitation programme patients were assessed by a rehabilitation physician. The patients who participated in the rehabilitation programme were between 18 and 65 years of age and had had low back pain for at least 3 months. The rehabilitation physician used general admittance criteria: (*i*) CLBP (i.e. pain lasting for more than 3 months, LBP without an obvious cause); and (*ii*) patients were content with the diagnostic process and motivated to undertake the rehabilitation programme. Exclusion criteria were: (*i*) specific low back pathology, co-morbidity, pregnancy and psychopathology; (*ii*) a medical condition that could interfere with physical performance tests, such as major surgery within the previous year, existing infectious disease, cancer, neuralgic or cardiovascular disease; (*iii*) patients who were in a financially profitable situation caused by the illness; and (*iv*) patients who were in a conflict situation with an employer or insurance company. Patients were assessed twice by a physical therapist: (*i*) before starting the rehabilitation programme, at intake (T1); and (*ii*) after completion of the programme, at the evaluation (T2). The rehabilitation programme was a cognitive somatic back school programme aimed at improving the patients' ability to solve the problem at hand (a physically demanding task) on the basis of the patient's skill, physical capacity and knowledge of how to react appropriately to physical symptoms. The cognitive somatic rehabilitation programme consisted of: (*i*) education according to the bio-mechanical principles of correct posture, lifting and other activities and education concerning self-treatment of the lower back (22); (*ii*) education to gain insight into perception of physical symptoms that occur during exposure to physical activities and to learn to react appropriately to these physical symptoms; (*iii*) education concerning overload mechanisms by explaining the influence of bio-mechanical and psychosocial factors. The duration and frequency of the programme was adjusted to the patient's needs (19). The mean duration (SD) was 4.1 (SD 1.6) months, with a mean frequency of 13.1 (SD 6.5) visits of 1 h duration.

Assessments

Aerobic capacity. A lean body mass (LBM)-based sub-maximal bicycle test was performed in order to estimate aerobic capacity; VO_2 max in ml/min kg LBM (8, 19, 20). The LBM-based sub-maximal bicycle test was chosen because cycling is a common activity in the Netherlands and the test is reliable and valid (23). LBM was measured according to the Durnin and Womersly protocol using a skin-fold calliper (Servier Nederland BV, Leiden, The Netherlands) (19, 23, 24). The subjects performed the test on a calibrated Cycle ergo meter (Excalibur Sport, Lode BV, Groningen, The Netherlands). Heart rate was recorded using a monitor connected to electrodes on the patient's chest (Polar Favour, Kempele, Finland). The subjects started cycling under a predetermined workload of 0.5 W/kg LBM at a constant rate of 60 rpm. After 2 min cycling the workload was increased to 1.5 W/kg LBM. If the heart rate (HR) remained below 120 beats/min the workload was increased by 0.5 W/kg LBM every 2 min. Once HR exceeded 120 beats/min, the patient cycled 6 min under a fixed workload to reach a steady state phase, meaning that HR did not vary more than ± 5 beats/min during the final 2 min of exercise. The mean heart rate during the final 2 min of exercise was calculated. The VO_2 max was estimated using the Binkhorst calculation, based on the linear association between HR and increase in oxygen uptake, for men and women (19, 20, 23, 25).

$$VO_2 \text{ max (men)} = \frac{174.2 * \text{load Watts} + 4020}{103.2 * \text{heart rate} - 6299}$$

$$VO_2 \text{ max (women)} = \frac{163.8 * \text{load Watts} + 3780}{104.4 * \text{heart rate} - 7514}$$

The calculated VO_2 max was corrected for age using the age correction factor according to Åstrand & Rodahl (26). The test was terminated if the subject did not attain a heart rate of at least 120 beats/min, if the HR exceeded the predetermined maximum (220–age * 0.85), if the systolic/diastolic blood pressure reached a level of 220/115 mmHg, or if the subject showed signs of serious cardiovascular or pulmonary difficulties. After 6 min cycling under a fixed workload, the load decreased over 1 min to 0.25 W/kg LBM and the subject cycled for 1 min under this workload of 0.25 W/kg LBM. This LBM-based submaximal bicycle test is not a psychophysical approach, because the resistance is based on the LBM of the patient.

Psychophysical static lifting capacity tests. The psychophysical static lift capacity test was performed by pulling up a horizontal bar connected to a pillar, which is adjustable in height (19). The vertical force was measured with a force transducer (EBN 8500–1250, Depx type brosia; GmbH & Co, Tettnang, Germany, range 0–2500 N; linearity 0.02%) and an amplifier, (Elan-Schaltelemente MBP 6218; Kurt Maecker GmbH, Neuss 1, Germany, range 500 µm/m to 5000 µm/m) and was registered on a plotter (PM 8043 Eindhoven, The Netherlands, range 2 mV/cm to 1 V/cm). Two static lifting tests, the leg lift and trunk lift, described by Chaffin et al., were performed (27). During the trunk lift the horizontal distance between the patient (ankle joint) and the horizontal bar was 375 mm. The horizontal distance for the leg lift was 0 mm. The vertical distance during the leg lift and trunk lift was 500 mm. In the psychophysical approach the patient is in control and determines which termination is acceptable. The patient was instructed to stop the test when they believed that the AME was reached, and a Borg score (range 0.5–10) was recorded directly after reaching the AME, the end point of the static lifting tests (17, 19–21, 28, 29). The Borg score was modified by changing the 0 score in 0.5, which corresponds to not at all, 1 = very light, 2 = light, 3 = moderate, 4 = slightly heavy, 5 = heavy, 6 = less than 7, 7 = very heavy, 8 = less than 9, 9 = less than 10, 10 = very extremely heavy (almost maximum). The psychophysical static lifting capacity was calculated as the ratio of physical lifting capacity and the Borg score, using the formula "AME / perceived effort", expressed in Newton/Borg (N/B) (19, 20). The rehabilitation professional can determine whether the perceived effort score of the patient agrees with the AME. Thus, a high psychophysical capacity reflects low to normal perception relative to the actual AME; and a low psychophysical capacity reflects a high perceived effort relative to the actual AME. The test is a reliable measure in patients with non-specific CLBP (20).

Psychophysical dynamic lifting capacity test. To measure the psychophysical dynamic lifting capacity, the standardized Progressive Isoinertial Lifting Evaluation (PILE) protocol, described by Mayer et al., was used (30, 31).

During a period of 20 s the patient had to lift a box with weights, 4 times from the ground on to a table. The weight of the box was increased stepwise after each session, during a 20 second rest, in intervals of 2.25 kg for women and 4.5 kg for men, respectively. Heart rate was measured (Sport tester PE-3000; Polar Electro, Kempele, Finland) (19, 20). The observer stopped the test when the patient had reached the heart rate safety limit (220 – age × 85%) (19, 20, 32). The patient was instructed to stop the psychophysical lifting capacity test when the AME was reached (19, 20, 21). Perceived lifting effort was recorded directly after reaching the AME, the cardiac safety limit (formula 220 – age × 85%) or the ceiling of the test of 402 N (32, 33). The psychophysical dynamic lifting capacity was calculated as the ratio of physical lifting capacity and Borg score, expressed in Newton/Borg (N/B) (19, 20). The test is a reliable measurement in patients with non-specific CLBP (20).

Perceived disability. Perceived disability was assessed by means of the Roland Morris Disability Questionnaire (RMDQ) (34, 35). The RMDQ is frequently used in studies of CLBP and is reliable, valid, and sensitive in persons with CLBP (34–36). It provides an assessment of a patient's specific perceived disability, with scores expressed on a scale from 0 (no perceived disability) to 24 (maximal perceived disability) (36).

Data analyses

Descriptive statistics were calculated for the scores of the 2 test-sessions. The Kolomogorov-Smirnov test revealed no significant differences from the normal distribution. Changes in scores between T1 and T2 were analysed using *t*-tests for dependent samples. Effect sizes (ES) were calculated as $mean_{change}/SD_{T1}$ (37, 38). Pearson's correlation between change in RMDQ score and the measurement results of T1 (aerobic capacity, physical lifting capacity, Borg scores, and psychophysical lifting capacity) and the change in scores of these measurements were calculated.

In a multivariate linear regression analysis (backward), variables changed significantly with the change in RMDQ scores and the initial RMDQ score were entered as potential predictors for the change in RMDQ (outcome) . Data analyses were performed using the Statistical Package for the Social Sciences (SPSS 14.0). $a \leq 0.05$ was considered significant.

RESULTS

The patients' aerobic capacity, physical lifting capacity, perceived lifting effort, psychophysical lifting capacity, and RMDQ scores improved significantly ($p < 0.001$) after completion of the rehabilitation programme (Table I). The ES for RMDQ scores was 1.35 and the mean of reduction was 5.4 points. The ES for the aerobic capacity, physical static leg lift capacity, static trunk lift capacity and dynamic lifting capacity (PILE) ranged between 0.22 and 0.43 (Table I). The ES for the psychophysical static leg lift capacity, psychophysical static trunk lift capacity, and psychophysical dynamic lifting capacity (PILE) ranged between 0.36 and 0.62 (Table I).

Psychophysical static leg lift capacity increased in 71% of the patients, psychophysical static trunk lift capacity in 81% of the patients and psychophysical dynamic lifting capacity in 78% of the patients. The majority of patients increased in psychophysical lifting capacity by an increase in physical lifting capacity without a change in perceived physical effort, or by an increase in physical lifting capacity with a decrease in perceived physical effort.

The correlations between changes in RMDQ and changes in psychophysical lifting capacity were all significant (Table II), with the strongest correlation being with the change in psychophysical dynamic lifting capacity ($r = –0.528$). Of the T1 scores, only the T1 RMDQ score and the T1 physical static leg lift capacity correlated significantly with the changes in RMDQ. The change in

Table I. *Outcome variables before (T1) and after (T2) treatment, change between T1 and T2 (Δ), and effect size (ES) (*n = *84)*

Variables	T1 Mean (SD)	T2 Mean (SD)	Δ Mean (SD)	ES
Calculated maximum VO_2 (ml/kg LBM * min^{-1})	45.7 (9.6)	49.9 (11.2)	4.1 (6.4)**	0.43
Static leg lift (N)	556.3 (238.8)	609.8 (247.7)	53.5 (142.8)**	0.22
Static trunk lift (N)	322.4 (120.1)	352.4 (127.1)	29.9 (83.8)*	0.24
Dynamic PILE (N)	190.6 (94.3)	231.2 (101.8)	40.6 (73.9)**	0.43
Borg score leg lift	4.2 (1.4)	3.6 (1.3)	–0.5 (1.6)*	0.36
Borg score trunk lift	4.6 (1.5)	3.9 (1.4)	–0.7 (1.4)**	0.47
Borg score PILE	5.5 (1.5)	4.8 (1.1)	–0.7 (1.2)**	0.47
Psychophysical static leg lift (N/B)	153.4 (101.4)	189.7 (105.2)	36.3 (78.1)**	0.36
Psychophysical static trunk lift (N/B)	82.0 (55.5)	103.8 (60.2)	21.7 (42.5)**	0.39
Psychophysical dynamic PILE (N/B)	37.1 (20.9)	50.1 (24.1)	12.9 (16.1)**	0.62
RMDQ	11.5 (4.0)	6.1 (4.9)	–5.4 (4.7)**	1.35

Results of paired sample *t*-test: *$p < 0.01$, **$p < 0.001$.

T1: measurement before treatment; T2: measurement after treatment; Δ: change between T2 and T1 (T2 – T1); ES: effect size; SD: standard deviation; LBM: lean body mass; N/B: Newton/Borg score; PILE: progressive isoinertial lifting evaluation; RMDQ: Roland Morris Disability Questionnaire.

Table II. *Pearson's correlation coefficients between change in Roland Morris Disability Questionnaire scores and patient characteristics, T1 scores of RMDQ, LBM-based sub-maximal bicycle test and psychophysical capacity, physical capacity tests, Borg scores and change values of these variables*

	Δ RMDQ
Age	0.190
Gender	0.214
Duration complaints (months)	0.034
Total number of therapy	0.004
Duration therapy (months)	0.014
T1 RMDQ	–0.367**
T1 calculated max VO_2 ml/kg LBM * min^{-1}	0.213
T1 static leg lift (Newton)	–0.231*
T1 static trunk lift (Newton)	–0.182
T1 dynamic PILE (Newton)	0.029
T1 Borg score static leg lift	–0.094
T1 Borg score static trunk lift	0.007
T1 Borg score dynamic PILE	–0.041
T1 Psychophysical static leg lift (N/B)	–0.103
T1 Psychophysical static trunk lift (N/B)	–0.057
T1 Psychophysical dynamic PILE (N/B)	–0.080
Δ calculated max VO^2 ml/kg LBM * min^{-1}	0.017
Δ static leg lift (Newton)	–0.013
Δ static trunk lift (Newton)	–0.273*
Δ dynamic PILE (Newton)	–0.422**
Δ Borg score static leg lift	0.287**
Δ Borg score static trunk lift	0.437**
Δ Borg score dynamic PILE	0.162
Δ Psychophysical static leg lift (N/B)	–0.238*
Δ Psychophysical static trunk lift (N/B)	–0.509**
Δ Psychophysical dynamic PILE (N/B)	–0.528**

*$p<0.05$, **$p<0.01$.
Δ: T2 – T1; RMDQ: Roland Morris Disability Questionnaire; LBM: lean body mass; N/B: Newton/Borg score; PILE: progressive isoinertial lifting evaluation.

Table III. *Results of stepwise regression analysis (backward) with change in Roland Morris Disability Questionnaire scores as outcome variable*

Predictors	Beta	95% CI	Explained variance (r^2)
T1 RMDQ	–0.438	–0.632 to –0.243	
Δ Psychophysical dynamic PILE (N/B)	–0.109	–0.159 to –0.058	
Δ Psychophysical static trunk lift (N/B)	–0.038	–0.058 to –0.018	
Δ Psychophysical static leg lift (N/B)	–0.012	–0.023 to –0.001	
Δ Static leg lift (Newton)	0.007	0.001 to 0.013	
Constant	1.938	–0.510 to 4.387	
			52%

95% CI: 95% confidence interval; RMDQ: Roland Morris Disability Questionnaire; Δ: T2 – T1; PILE: progressive isoinertial lifting evaluation; N/B: Newton/ Borg score.

the physical static leg lift was not significantly correlated with the changes in RMDQ. The changes in physical static trunk lift and dynamic lifting capacity (PILE) were both significantly correlated with the changes in RMDQ. The changes in Borg score (perceived effort) of the dynamic lifting (PILE) was not significantly correlated with the changes in RMDQ.

Table III summarizes the results of the regression analysis. The following predictors contributed significantly to the regression equation; RMDQ score at baseline, change in psychophysical dynamic lifting capacity, change in psychophysical static trunk lift capacity, change in psychophysical static leg lift capacity, and change in static leg lift capacity (r^2 of the model 52%).

DISCUSSION

The results of this study support the hypothesis that improvements in perceived disability of patients with non-specific CLBP after a cognitive somatic rehabilitation are related to improvements in psychophysical capacity. The regression equation explained 52% of variance in change in perceived disability (RMDQ) after rehabilitation, and showed that an improvement in psychophysical lifting capacity is the next strongest predictor after the initial RMDQ score. Thus, a high initial perceived disability (RMDQ) in patients with non-specific CLBP partly explains the change in RMDQ. However, rehabilitation professionals can influence only psychophysical capacity and not the initial score of the RMDQ. On the other hand, the increase in aerobic capacity and static leg lift capacity were not significantly correlated with the decreased RMDQ. The decreased perceived effort for the static leg lift capacity was significantly correlated with the decreased RMDQ. The converse was true for the dynamic lifting capacity (PILE). However, only the improvements in all psychophysical lifting capacities were significantly correlated and contributed positively to the explained variance in change in perceived disability (RMDQ). Clinically, these findings indicate that rehabilitation programmes should focus on improving psychophysical capacity, rather than solely on physical capacity or aerobic capacity to reduce perceived disability (RMDQ). Interaction effects of the static leg and trunk lift capacity, dynamic lift capacity, the Borg score and the other independent variables were explored, but did not contribute significantly to the regression equation. Other interaction effects that were not explored might partly explain the change in RMDQ. However, in a previous quasi-experimental pilot study we also found that, in a small study population, improvement in psychophysical static trunk lift had a significant association with decrease in perceived disability, and the coefficient of determination was moderate (19). In addition, physical trunk lift capacity was not associated with a decrease in perceived disability (19). The results are similar, corroborating and strengthening the present findings. In the earlier study we also found that change in social function and change in emotional disability were not associated with change in RMDQ (19). Thus there is little evidence for a potential bias caused by the subjects reporting in a negative or positive manner or both.

The explanation, that an improvement in psychophysical capacity is a strong predictor of change in RMDQ, is that psychophysical capacity and RMDQ both measure a part of perception of activity that loads the lower back. Psychophysical capacity is a ratio between exposure and perception of that exposure that loads the lower back, and the RMDQ is an instrument that measures disability due to low back pain.

Furthermore, the majority of the patients' psychophysical capacity increased. Divide In two sentences:

This means that the perceived effort is decreased with a larger effect size relative to the increased physical lifting capacity with a smaller effect size. The result of this effect is an increased psychophysical capacity.

The relative reduction in the perceived effort reflects a more appropriate perception of the increased physical lifting capacity based on a psychophysical approach that contributes to reduced perceived disability as measured with the RMDQ.

The increased physical lifting capacity and aerobic capacity in our study cannot be attributed to physiological training principles due to the rehabilitation programme, because the average frequency of rehabilitation sessions was less than once per week. The increased physical lifting capacity and aerobic capacity of patients is probably due to the fact that patients perform more activities at home and at work as a result of the rehabilitation programme, which induces physiological training effects in lifting and endurance. Support for this statement is provided by the fact that the actual physical activity in daily living (PAL) in patients with non-specific CLBP is less than their habitual PAL, which results in deconditioning (39). The theory behind our cognitive somatic rehabilitation is that reconditioning is attributable to functioning included PAL. In a previous study we found that cognitive somatic rehabilitation improves functioning, as assessed with the RAND-36 (19).

In contrast to what was expected, change in physical static leg lift capacity contributed negatively to the reduction in perceived disability. Thus, an increase in physical static leg lift capacity resulted in a poorer perceived disability. This effect of the physical static leg lift capacity cannot be explained adequately. However, this effect was very small and contributed very little to the explained variance (0.02%).

The change in perceived disability correlated more strongly with the change in psychophysical static trunk lift and psychophysical dynamic lifting than with change in psychophysical static leg lift, probably because the RMDQ assesses perceived disability of the lower back and not perceived disability of the legs.

The effect size of the RMDQ scores was 1.35, indicating a considerable clinically relevant reduction in perceived disability (40). In addition, 49% of the patients exceeded the limits of agreement of ± 5.4 for RMDQ scores (36). This considerable reduction in perceived disability provides evidence that a successful treatment was achieved in non-specific CLBP. The mean improvement, of 5.4 points, is substantially higher compared with mean improvements achieved after active physical treatment (2.2), cognitive behavioural treatment (2.6), and a combination treatment consisting of physical and cognitive behavioural treatment (2.2) (5).

The results of the current study can be generalized to the population of patients with CLBP. The characteristics of the patients regarding duration of complaints and perceived disability score in the current study are similar to those found in other studies on CLBP. The mean duration of complaints was 63 months in the current study, while in other studies the mean duration was 62 months (8), 57 months (5), 68 months (5), 56 months (5) and 57 months (41). The mean RMDQ score at baseline in the current study was 11.5, while in other studies the mean baseline score was 10.2 (14), 14.2 (8), 14.1 (5), 13.7 (5), 13.5 (5), 12.5 (19), 11.8 (41) and 12.6 (42).

In conclusion, improvements in 3 psychophysical lifting capacity tests were found to be determinants for a reduction in perceived disability (RMDQ) in patients with non-specific CLBP.

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