Maximal Effort During Functional Capacity Evaluations: An Examination of Psychological Factors

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Background and Purpose: Patients with low back pain are often administered a Functional Capacity Evaluation (FCE) to determine levels of physical functioning at the conclusion of their rehabilitation program. The purpose of this study was to examine the relationship between psychological factors (ie, self-reported disability, anxiety, depression, self-efficacy) and maximal effort exerted during the FCE.

Subjects and Methods: Sixty-four patients with low back pain were administered the Oswestry Low Back Disability Questionnaire, Beck Depression Inventory, State-Trait Anxiety Inventory, and the FCE Self-Efficacy Scales before administration of the FCE.

Results: Compared with patients who gave maximal effort during the FCE, patients who did not exert maximal effort reported significantly more anxiety and self-reported disability, and reported lower expectations for both their FCE performance and for returning to work. There was also a trend for these patients to report more depressive symptomatology.

Conclusion and Discussion: Results provide evidence for the relationship between self-reported disability, depression, anxiety, self-efficacy, and patients' performance on the FCE. Suggestions for addressing the psychological factors in a comprehensive pain treatment program are provided.

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Patients with low back pain often go through a course of physical therapy as part of their rehabilitation program. At the conclusion of physical therapy, a Functional Capacity Evaluation (FCE) is often administered. The FCE is a comprehensive, objective test of a person's ability to perform work-related tasks. FCE results are used by physicians and physical therapists to determine patients' current physical capabilities and to establish guidelines for physical restrictions and suitability for return to work. Thus, the FCE is important in determining if, and when, patients may return to their previous levels of employment. To obtain a valid assessment of patients' abilities to perform work-related tasks, it is essential that they give acceptable maximal effort during the test. Although FCE performance is related to physical pathology, it may also be related to psychological factors.

For example, depression is a factor that may affect a patient's performance on the FCE. The prevalence of depression among pain patients is high. In general, depressed individuals may have difficulty maintaining their usual levels of social activity, show reduced interest in participating in hobbies, games, sports, or social activities, and may exhibit psychomotor retardation. Thus, being depressed may affect one's ability to give maximal effort during the FCE.

Along with depression, chronic pain is likely to result in anxiety. Anxiety is defined as the individual's appraisal of a perceived threat. Both personality and laboratory studies provide support for the hypothesis that the more anxious a person, the more intensely he or she perceives a painful stimulus. Thus, high levels of anxiety may affect performance on the FCE.

Physical therapists often acknowledge the importance of a patient's verbal description of his or her disability, yet these subjective aspects are rarely quantified. As Delitto noted, patients' complaints of pain, disability, and difficulty are often relegated to anecdotes documented during the evaluation. Evaluation of subjective disability may be useful in predicting a patient's ability to perform certain physical tasks. For example, Triano and Schultz found that subjective disability scores related significantly to such objective measures as absence of relaxation in back muscles during flexion, mean trunk strength, and trunk mobility. It may be useful to examine patients' subjective reports of disability as they relate to performance on the FCE.

Another cognitive variable is self-efficacy, which reflects the patient's confidence that he or she can perform specific behaviors. Efficacy expectations influence the degree of effort a patient can expend. For example, Kores and colleagues found that chronic pain patients with high self-efficacy scores after treatment demonstrated better overall functioning and greater reductions in chronic illness behavior at the follow-up evaluation. Thus, there is some support for a possible relationship between self-efficacy and the degree of effort a patient expends during the FCE.

The FCE is often used for vocational planning and/or medico-legal case settlement; thus it is essential that the results be a valid assessment of patients' maximum functional abilities. Not all patients exert maximal effort during the evaluation, however, and thus the evaluator risks making false decisions about patients' work-related abilities. Incorrect decisions regarding patients' physical abilities can affect work recommendations, impairment ratings, or medico-legal settlements (ie, workers' compensation or personal injury claims). Because of the importance of making correct decisions, we sought to determine if there is a relationship between psychological factors and FCE performance. Compared with patients who give maximal effort, it was predicted that patients who do not exert maximal effort would be more depressed, anxious, and perceive themselves as more disabled and less confident about their FCE performance and their ability to return to work.

METHOD

Subjects: Subjects were 64 consecutive patients with low back pain (44 men, 20 women) who were referred for a Functional Capacity Evaluation.
Evaluation at our Sports and Spine Center, an outpatient multi-disciplinary physical therapy clinic. The mean age of the subjects was 39.1 years (range, 21 to 62 years). Mean time since original injury was 18.9 months (range, 2 to 44 months). Patients had completed their physical therapy programs; therapy had lasted an average of 6.4 months (range, 1 to 37 months). Patients were out of work a mean of 14.9 months (range, 0 to 42 months). The majority (77%) were receiving Workers’ Compensation. Forty-one percent had undergone at least one surgical procedure. Patients averaged 12.6 years of education (range, 9 to 22 years), and 67% were married. Before their injury, fewer than 8% earned less than $10,000 per year, 35% earned between $10,000 to $19,999; 37% earned between $20,000 to $29,999, and 20% earned $30,000 to $39,999. Their previous occupations were clerical (2%), managerial (2%), professional (5%), construction (19%), maintenance (11%), technical (22%), and service (39%).

Procedure
Patients were recruited by a member of the research team and given a description of the study. If a subject was interested (only 27 patients were not), informed consent was obtained. Prior to the FCE, each patient completed 5 questionnaires presented in the following order: Demographic Information Questionnaire, Beck Depression Inventory, Oswestry Low Back Pain Disability Inventory, FCE Self-Efficacy scales, and the State-Trait Anxiety Inventory. After completing the questionnaires, each patient was administered the FCE by a registered physical therapist trained to conduct the evaluation. All therapists used the same testing format, although as is characteristic of the field in general,21 inter-rater and test-retest reliability were not determined.

Measures
Beck Depression Inventory (BDI). The BDI22 is a 21-item self-report inventory assessing a variety of dimensions of depressive symptomatology, including sleep disturbance, sexual functioning, weight change, and anhedonia. Patients indicate the extent of their depressive symptomatology using a 0 to 3 Likert scale, resulting in total scores ranging from 0 (no depressive symptoms) to 63 (extremely depressed). A score of 10 signifies at least mild depression.2223 Reliability and validity data on the BDI are extensive.24

Oswestry Low Back Pain Disability Questionnaire.25 The Oswestry measures patients’ subjective need for and effect of pain medication, and assesses different aspects of disability affecting various functions of daily life (personal hygiene, walking, lifting, standing, sitting, sleeping, sex life, social life, and traveling). All ten areas are believed to tap into the most relevant problems suffered by patients with low back syndromes. Each area contains six statements. Each statement describes a greater degree of difficulty in that area than the preceding statement. The patient marks the one statement in each area that describes his or her perceived limitation most accurately. Each area is scored on a 0 to 5 scale, with 5 representing the greatest disability. The scores for all areas are added together, giving a possible subjective disability score of 50. The maximum of 50 points would be obtained by patients who are either bed-bound or exaggerating their symptoms, whereas a patient with no perceived disabilities would score 0 points. Two-day test-retest reliability was .99 (25), and evidence of good internal consistency and concurrent validity exists.26

FCE—Self-Efficacy Scales. Patients’ confidence that they could perform the FCE was measured using 4 questionnaire items developed for this study (eg, “I feel I am ready to do my best on the FCE.” “I believe I will do well on the FCE.”). A single face-valid item was employed to determine patients’ readiness to return to work (”I am ready to return to work.”). Subjects indicated agreement or disagreement with these items by circling the appropriate number on a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). Scores on the FCE Self-Efficacy Scale can range from 4 to 24. For the return-to-work item, scores can range from 1 to 6. Internal reliability of the four-item scale was .82 (Cronbach’s alpha). No evidence of the scale’s validity exists.

State-Trait Anxiety Inventory (STAI). STAI27 is divided into state anxiety (A-State) and trait anxiety (A-Trait). Only A-State scale scores were analyzed. State anxiety is measured by 20 short descriptive statements that the individual answers in reference to how he or she feels at the moment. The answers are recorded by indicating the intensity of the feeling on a 1 to 4 scale (1 = not at all, 2 = somewhat, 3 = moderately so, 4 = very much so). Scores can range from 20 to 80. Although STAI-State has low test-retest reliability (.54), it has good internal consistency, content, concurrent, and construct validity.27

Functional Capacity Evaluation (FCE). The FCE is a set of evaluation procedures used to determine a person’s ability to perform physical tasks. Physical therapists at our center use a protocol that includes 3 standard tests recommended by Blankestijn2 to determine whether a patient is exerting maximal effort during the evaluation: Waddell’s signs,28 Grip Strength,29 and Coefficient of Variation.30 Waddell’s signs are ratings done by the physical therapist based on nonorganic signs, including tenderness, simulation, distraction, and overreaction. A finding of 3 or more positive signs during an evaluation is clinically significant. Grip Strength was measured three times (beginning, middle, and end of FCE test) in 5 test positions using a hand dynamometer. With maximal effort, scores form a bell-shaped curve, whereas non–bell-shaped curves indicate submaximal effort. Possible range of scores was 0 to 6, with scores of 3 or more considered submaximal. Coefficient of Variation (CV) evaluates static strength (push, pull, arm pull, and leg pull), and is calculated using the following formula: $CV = \frac{\text{Standard Deviation \times 100}}{\text{Mean}}$. A positive score was given for each CV over 15% resulting in scores ranging from 0 to 6, with CV scores of 3 or more considered submaximal. In this study, subjects were classified as giving submaximal effort if they displayed 3 or more Waddell’s signs, if they had 3 or more incorrect Grip curves, or if they had had 3 or more CV values > 15%. Using this formula, 21 of the 64 patients (33%) met the criteria for submaximal performance. Of the 21, 15 had submaximal effort on 1 test, 4 on 2 tests, and 2 on all 3 tests.

RESULTS
Before analysis, data were examined for accuracy of data entry, missing values, outliers, and fit between distributions and the assumptions of multivariate analysis. Table 1 lists the demographic characteristics of the 2 patient groups. Comparisons between groups showed no significant differences in gender, age, income, occupation, duration of illness or physical therapy, how long patients had been out of work, or whether they were receiving Workers’ Compensation. The 2 groups differed only on the number of previous surgeries, $F(1,60) = 4.26, p < .05$, with the submaximal effort group having had more surgeries compared with the maximal effort group. A multivariate analysis of variance (MANOVA) was performed to assess the differences between the 2 groups on BDI, Oswestry, FCE-Self-Efficacy, Return to Work, and STAI scores. The MANOVA was significant, Wilk’s Lambda $= .742, F(5,58) = 4.02, p < .01$, with the univariate tests for Oswestry, $F(1,62)$...
F(1.62) = 7.26, p < .01, all being significant. The univariate test for BDI approached significance, F(1.62) = 3.33, p = .07.

and STAI scores, and lower FCE Self-Efficacy and Return to Work recommendations. They also reported lower exert maximal effort on at least one of the three FCE subtests and patients' performances on the FCE. Compared with patients a small sample, the results provide evidence for the relationship between subjective disability, depression, anxiety, self-efficacy, and patients' performances on the FCE. Compared with patients who gave maximal effort during the FCE, patients who did not exert maximal effort on at least one of the three FCE subtests reported more depressive symptomatology, anxiety, and perceived themselves as more disabled. They also reported lower expectations for performing well on the FCE and rated themselves as less ready to return to work. Patients who perceive themselves as more depressed, anxious, disabled, or lower in self-efficacy are at risk for not giving maximal effort during the FCE. Thus, the evaluation process could be affected as it relates to work recommendations, impairment ratings, or medicolegal settlements.

Some limitations of this study need to be noted, with concomitant suggestions for future research. Given the design, it is not possible to determine a cause and effect relation between psychological factors and submaximal effort. Whether psychological factors influence physical performance, physical performance influences psychological factors, or both are affected by a third factor (eg, extent of injury) are questions that need further exploration. Also, because all data were collected from patients at a single outpatient physical therapy clinic, the results are relevant only for that population. In addition, the use of the 3 tests to identify submaximal effort (ie, Waddell’s Grip Strength, Coefficient of Variation) is unique to this study and warrants replication. Finally, future studies with larger samples may explore the sensitivity and specificity of the psychological tests for predicting submaximal effort.

The most obvious implication of our findings is that professionals who assess patients with low back pain need to consider how psychological factors can affect a patient’s performance during the FCE. It is not uncommon for patients to be administered an FCE at the request of physicians and/or at the conclusion of a physical therapy program. Just because patients have completed their physical therapy or they are requested to take the FCE does not mean that they are ready to take the FCE. We recommend that before patients are scheduled to take the FCE, psychological tests and the Oswestry questionnaire be administered to determine readiness for the FCE. If patients show elevations on these scales, then psychological counseling should be prescribed prior to the FCE. Counseling to address depression, anxiety, self-efficacy, and perceived disability is important with chronic pain patients and has been shown to be effective in dealing with these psychological issues. Facilitating psychological in addition to physical readiness may result in a better estimate of the patient’s maximum functional abilities.

Acknowledgments: Special thanks to Sue Jardon, Peggy Pease, and Mary Wast, Physical Therapists, for their assistance during data collection. Constructive comments from Alan Jette on an earlier version of this article were greatly appreciated.

Table 1: Demographic Characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Maximal Performance</th>
<th>Submaximal Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>28 (60)</td>
<td>16 (76)</td>
</tr>
<tr>
<td>Women</td>
<td>15 (30)</td>
<td>5 (24)</td>
</tr>
<tr>
<td>Age (n = 64)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>39.33 (8.54)</td>
<td>36.62 (9.93)</td>
</tr>
<tr>
<td>$0-9,999</td>
<td>3 (6.8)</td>
<td>1 (5.9)</td>
</tr>
<tr>
<td>$10-19,999</td>
<td>14 (41.2)</td>
<td>4 (23.5)</td>
</tr>
<tr>
<td>$20-29,999</td>
<td>10 (29.4)</td>
<td>9 (52.9)</td>
</tr>
<tr>
<td>Occupation n (%) (n = 62)</td>
<td></td>
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</tr>
<tr>
<td>Clerical</td>
<td>0 (0.0)</td>
<td>1 (5.0)</td>
</tr>
<tr>
<td>Managerial</td>
<td>1 (2.4)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Professional</td>
<td>2 (4.0)</td>
<td>1 (5.0)</td>
</tr>
<tr>
<td>Construction</td>
<td>7 (16.7)</td>
<td>5 (25.0)</td>
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<tr>
<td>Maintenance</td>
<td>6 (14.3)</td>
<td>1 (5.0)</td>
</tr>
<tr>
<td>Technical</td>
<td>9 (21.4)</td>
<td>6 (25.0)</td>
</tr>
<tr>
<td>Service</td>
<td>17 (40.5)</td>
<td>7 (35.0)</td>
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<tr>
<td>Duration of illness (n = 48)</td>
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<tr>
<td>Mean (SD)</td>
<td>17.42 (16.57)</td>
<td>22.27 (13.11)</td>
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<td>Duration of physical therapy (n = 57)</td>
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<tr>
<td>Mean (SD)</td>
<td>6.59 (7.07)</td>
<td>5.94 (6.58)</td>
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<tr>
<td>How long out of work (n = 62)</td>
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<tr>
<td>Mean (SD)</td>
<td>13.67 (15.38)</td>
<td>17.55 (11.60)</td>
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<td>Receiving workers' compensation (n = 64)</td>
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<tr>
<td>Yes n (%)</td>
<td>35 (81.4)</td>
<td>14 (66.7)</td>
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<tr>
<td>Number of surgeries (n = 62)</td>
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<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>1.24 (1.25)*</td>
<td>2.15 (2.11)*</td>
</tr>
</tbody>
</table>

* p < .05

References


