ORIGINAL ARTICLE

Value of Functional Capacity Evaluation Information in a Clinical Setting for Predicting Return to Work

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ABSTRACT. Streibelt M, Blume C, Thren K, Reneman MF, Mueller-Fahrnow W. Value of functional capacity evaluation information in a clinical setting for predicting return to work. Arch Phys Med Rehabil 2009;90:429-34.

Objective: To evaluate the quality of Functional Capacity Evaluation (FCE) information in predicting return to work (RTW).

Design: Prospective cohort study.

Setting: Inpatient rehabilitation clinic.

Participants: Patients (N=220) with chronic musculoskeletal disorders (MSD) conducting a medical rehabilitation.

Interventions: Not applicable.

Main Outcome Measures: Patients filled in questionnaires at admission and 1-year follow-up. An FCE was performed on admission. RTW was defined as a combination of employment at 1-year follow-up with a maximum of 6 weeks sick leave because of MSD in the postrehabilitation year. As predictive FCE information, the physical capacity (Dictionary of Occupational Titles categories 1–5), the number of test results not meeting work demands (0–25), and the tester's recommendation of work ability in the actual job (≥6h/d) were analyzed. Logistic regression models (crude and adjusted for the concurrent predictors employment, preadmission sick leave, and patient's prognosis of RTW) were created to predict RTW.

Results: Complete data were obtained for 145 patients. The sample showed a non-RTW at 1-year follow-up for 37.9%. All FCE information showed significant relations to RTW (r=.28–.43; P<.05). In the crude as well as in the adjusted regression models, all FCE information predicted RTW, but the models' quality was low. The integration of FCE information led to an increase of 5%. The predictive efficiency was poor. The adjusted model for failed tests showed a substantial improvement compared with the reference model (concurrent predictors only).

Conclusions: There was a significant relation between FCE information and RTW with and without concurrent predictors, but the predictive efficiency is poor. Primarily, the number of failed tests seemed to be of significance for patients with ambiguous RTW prognosis. A first proposal for a prediction rule was discussed.

Key Words: Musculoskeletal diseases; Rehabilitation.

PATIENTS WITH MUSCULOSKELETAL disorders lasting longer than 3 months have an increased risk of long-term sick leave and permanent work-related disability. This represents a substantial economic problem.[1-3] In this context, an RTW depends on diverse personal and environmental factors. Particularly imminent or already existing chronic pain considerably increases the risk to remain off work.[4-7]

Appropriate problem-oriented rehabilitation can significantly reduce long-term sick leave.[8,9] However, the medical diagnosis is often not sufficient to identify possible future problems concerning occupational participation or to develop the necessary forms of therapy. It is important to identify relevant risk factors and deficits at an early stage because they indicate that a patient might not be able to return to work because of the MSD. The identification of persons affected by unsuccessful RTW could theoretically be facilitated by FCEs. FCEs are defined as batteries of standardized tests designed to assess systematically a person's work-related functional capacity.[10,11] Their development goes back to the 1970s.[12,13] FCEs may be applied in workers' compensation claims. Thus, the use of FCEs should provide the basis for a realistic evaluation of a person's capacity to work and of future employment opportunities. A detailed evaluation of functional capacity and deficits can also be applied in rehabilitation—for example, in planning and monitoring therapeutic interventions.[14]

The IWS FCE—currently known as WorkWell Systems FCE—was applied in this study. About 75% of all rehabilitation facilities in Germany applying FCE use the IWS FCE.[14] The test-retest reliability[15-17] and the interrater reliability[18] of FCEs were estimated as good or very good. Acceptable results concerning construct validity compared with self-assessed functional capacity were found.[19-21]

The application of IWS FCE in a clinical setting is effective in the assessment of individual activity limitations and consequently the therapeutic measures. A randomized controlled trial[22] showed that patients performing function-centered multidisciplinary rehabilitation, based on FCE results, had better results than multidisciplinary rehabilitation only. Within the

List of Abbreviations

DOT	Dictionary of Occupational Titles
FCE	Functional Capacity Evaluation
IWS FCE	Isernhagen Work System Functional Capacity Evaluation
MSD	musculoskeletal disorder
PRE_{ref}	proportional reduction of error
RTW	return to work
WHO	World Health Organization

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1-year follow-up, an improvement in occupational participation and pain management could be verified.

Hence, IWS FCE may be considered a valid and reliable instrument for assessing the functional capacity and for providing important information regarding the enhancement of more effective multidisciplinary rehabilitation.[23] However, there is only limited evidence that FCE information can predict the time until RTW.[24,25] Consistent effects regarding a sustained RTW (eg, no additional negative occupational occurrences during follow-up) could not be proved.[26,27] Other authors conclude that FCE can predict the occupational status only to a limited extent.[28,29] There are indicators that competitive constructs can predict the occupational status to at least the same degree.[30,31] Especially patients' self-reported measures have been shown to be significant predictors of successful RTW. So far, 2 studies have confronted FCE-based predictions with self-reported measures: first, the self-reported pain intensity,[28] and second, the patient's expected disability in the job.[27] In both studies, a poor predictive quality of FCE tests is shown after adjusting for self-reported measures. Therefore, it is indicated that FCE provides little additional information for predicting RTW status after rehabilitation.[28]

However, a number of questions remain unanswered. First, previous studies predominantly used data from legal proceedings as variables for RTW. The problem arising from the underestimation of the actual RTW quotas may have occurred more in this environment than in a nonlegal rehabilitation setting.[27,32] Second, to date the physical capacity (often maximum weight tested in floor-to-waist lifting) has been used as potential predictor. It may be expected, however, that further information from the FCE records will be able to predict occupational participation after rehabilitation more precisely. Beyond mere test scores, personal contextual factors (eg, pain management, ergonomic handling, and potential medical or occupational interventions after rehabilitation) may be more closely related to the complex phenomenon of occupational reintegration.

For these reasons, we aimed at studying the predictive quality of FCE information regarding future occupational participation, as well as presenting these findings in contrast with concurrent predictors.

METHODS

Study Design

This study was considered a prospective cohort study and part of a comprehensive study to evaluate an FCE-based multidisciplinary rehabilitation for employable persons with MSDs. It was conducted at the Klinik Niedersachsen, an inpatient rehabilitation clinic near Hanover in Northern Germany.[33] Between July 2002 and June 2003, all patients covered by regional German statutory pension insurance with imminent or prevailing occupational disability because of MSDs were integrated in this study. This regional pension insurance mainly deals with blue collar workers. All patients filled out a questionnaire including instruments measuring health-related constructs concerning MSDs on admission, at the end of rehabilitation, and at the 6-month and 12-month follow-ups.[33]

The IWS FCE was conducted on 2 consecutive days during the first rehabilitation week and guided by physiotherapists with the necessary additional training. (All physiotherapists have an IWS FCE license. In Germany this is given out by the IWS FCE Academy.) The IWS FCE reflects work-related activities such as lifting, carrying, and bending. It consists of 29 standardized tests that are measured and interpreted to obtain a patient's individual physical work-related capacity. The job demands were identified by a guided interview. The patient's functional capacity and job demands were then compared according to IWS FCE protocols (based on the DOT[34,35]). The resulting FCE report contained the single test results as well as the tester's rating for the actual work ability (h/d) and prospective occupational participation. To enable a comparison between FCE and self-reported measures, the FCE information was matched with the patients' questionnaires.

Measures

Sample characteristics were measured with commonly used instruments—for example, the Medical Outcome Study 36-Item Short Form Health Survey[36] measuring self-reported health status, the Pain Disability Index[37] measuring self-reported pain-related disability, and a Numeric Rating Scale measuring pain intensity.[38]

FCE report. Three FCE-based sources of information were included in the analysis. The maximum functional capacity was measured by using kinesiophysical FCE—for example, the tests were done with steadily increasing weights until the patient showed clear physiologic signs of personal maximum ability. FCE scores of 8 tests were transformed into DOT classification (category 1, sedentary; 2, light; 3, medium; 4, heavy; 5, very heavy).[20] Seven tests were already available in DOT classification. This classification provides average physical capacity for every patient (DOT scale, 1–5). The rating of physical capacity was compared with job demands. For each of the 25 tests, a rating was given for whether the specific value corresponding to job demands was met. A recommendation of work-related capacity was made based on the total of deficits (number of failed tests, 0–25).[39] Finally, the tester's rating of actual capacity for his/her last job was stated in the FCE report. The rating, based on test scores, provided the recommendation of work ability for less than or at least 6 hours a day.

Concurrent predictors. Potential concurrent predictors were used to test or exclude competitive hypotheses. Literature concerning successful RTW for patients with acute MSD provided much information.[40] Indeed, there were limited predictors for patients with chronic disorders. Among those, the patient's expected disability in the job was considered an effective predictor.[31] This construct was measured by the following question: "Do you think that your performance in the job is limited due to your health status in the long term?" (not limited, partly limited, or heavily limited). Further, 2 stable predictors closely related to samples of the German rehabilitation system were included in the analysis: employment status at admission and sick leave 1 year prior to admission in weeks.[6,30]

Outcome. The outcome of this study was a successful occupational participation 1 year after the rehabilitation process. The term *participation* was based on the WHO's biopsychosocial model of the *International Classification of Functioning, Disability and Health*.[41] The WHO definition of occupational participation referred to 2 main aspects: the access to the job market, and the prospect of adequate participation or RTW in good health. Accordingly, 2 conditions for RTW in good health are necessary[42]: employment status at the 1-year follow-up, and low levels of sick leave during follow-up. In this study, all those who were employed at 1-year follow-up and who were sick-listed for a period of 6 weeks or less because of MSD were considered to have a successful occupational participation.

Analysis

Firstly, bivariate correlation between the outcome (RTW) and the FCE information (DOT scale, number of failed tests,