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Functional Capacity Evaluations in Persons With Spinal Disorders: Predicting Poor Outcomes on the Functional Assessment Screening Test (FAST)

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*This study determines how performance on the simple, low exertion Functional Assessment Screening Test (FAST) relates to performance on more extensive physical and psychological testing. One hundred eighty-eight persons with chronic back disability and 17 spine healthy volunteers underwent the FAST (three 2-min static tests [kneeling, stooping, and squatting] and two 5-min tests [repetitive stooping and repetitive twisting while standing]), the Progressive Isoinertial Lifting Evaluation (PILE), trunk extension endurance, submaximal bicycle ergometry, and psychological profiles. All FAST components were completed by 88% of spine healthy subjects, but only by 19.7% (*n = *37) of the back patients. Internal consistency for overall test performance was 0.82 (alpha coefficient). Back pain noncompleters had poorer performance on the PILE and trunk extension endurance despite similar cardiovascular fitness and perceived exertion during testing. They had more dysfunctional coping mechanisms, pain avoidance, depression, and self-reported disability. Since performance on nonstrenuous testing is so poor, and psychosocial variables relate strongly to test performance, extensive Functional Capacity Evaluations may not be necessary or valid in assessing the physical performance of this population of chronic back pain patients.*

KEY WORDS: low-back pain; functional status; psychological assessment; Functional Capacity Evaluation.

INTORDUCTION

Quantifying functional status in individuals with chronic spinal pain is often a complicated process. Detection of deficits may result in work restriction, disability ratings, and rehabilitation planning. Contributions of physical, psychological, and social factors must be considered for optimal evaluation and treatment (1–7). To effectively address these issues,

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a multidisciplinary team approach to chronic spinal pain is now a commonly accepted model (6–9). However, the specifics of physical, psychological, and social testing remain controversial. Physical testing of spine strength can vary from simple tasks such as the sit-up or Sorenson Test (prone extension exercise) to the use of more sophisticated and expensive measures such as the ERGOS or Cybex II (10–12). Isokinetic and isoinertial machines are commonly used dynamic evaluations that give more exact and quantifiable data. Despite the perceived technological sophistication, the utility, validity, and reliability of these machines remains controversial, especially when applying the results to low-back pain patients (2,12,13). Simple, nondynamonmetric tests have been found to be more reliable in evaluating low-back pain subjects compared to the more sophisticated isokinetic testing (14). In addition, the accessibility and cost of the equipment can be prohibitive to testing (9,15).

Substantial evidence suggests that psychopathology must be considered when evaluating function or disability in chronic spinal pain (4,16,17). Depression and anxiety are related to both physical and psychosocial functioning of chronic pain patients (6,18–20). Self-reported screening measures are useful devices for the assessment of depression in chronic pain patients (21–24).

Fear and avoidance behavior that may initially reduce nociception in the acute phase of pain can have a negative effect on physical and psychological well being in chronic pain patients (25–29). A persistent expectation that movement causes injury or reinjury can limit physical activities and increase suffering (27). Vlaeyen *et al*. (28) used the Tampa Scale of Kinesiophobia (30) to identify a group of chronic pain patients in which disability was based on the specific fear of movement and (re)injury and not the actual level of pain intensity. McCracken *et al*. (31) have demonstrated that inaccurate self-prediction of pain during a task and pain related anxiety affect performance. Similarly, Crombez showed that for back pain patients performing a knee flexion–extension test, expectation of future pain affected peak torque (32). Isokinetic trunk strength was most affected by back pain patients' beliefs in their ability to endure physical activity in Estlander's study (33).

A number of self-report measures are used to quantify pain and functional disability in chronic spinal pain patients (3,34,35). With all self-report measures there are limitations. There is no one specific test that can be used in isolation for optimal evaluation or prediction of function (35). These tests may also be susceptible to manipulation and bias (36). Despite limitations, these tests have been helpful in identifying psychological factors and pain behaviors. When treated along with physical dysfunction in functional restoration programs, psychological factors do not have a negative effect on outcome (4,5,17,37).

Given the psychosocial complexities of chronic low-back pain and their known relationship with physical performance, one might question the applicability of detailed, complex, fatiguing, and expensive functional assessments. However such assessments are commonly performed, often in the absence of psychological testing, to determine "functional capacity." We have devised five brief and very simple physical functional assessment screening tests (FAST), all easily completed by able-bodied persons. The hypotheses of this study are as follows: 1) Persons who do not complete the FAST will not perform well on other more detailed tests of physical function, and 2) poor performance on the FAST relates strongly to psychosocial factors including depression, poor coping skills, and perceived disability.

MATERIALS

Subjects

One hundred eighty-eight patients (96 males and 92 females) with chronic spinal pain participated in a Spine Team Assessment (STA) from July 1, 1996, to May 1, 1998, at a major university spine center. Following an initial referral from a spine surgeon, primary care physician, or case manager, and once individualized treatment options had been exhausted, a staff physiatrist made the STA referral. All patients were medically cleared for aggressive rehabilitation testing by their attending physiatrists. Diagnoses included cervical (11.7%), thoracic (3.7%), and lumbar (84.6%) pain. Mean age was 42.1 years (SD = 9.7). Mean pain duration was 61.8 months (SD = 91.7). All patients had pain for more than 3 months except one with pain duration of 2 months. The cause of pain was reported by the patient as work-related in 77 patients (41%). Other causes include idiopathic (the patients could not recall a specific incident) (22.3%), motor vehicle accident (19.7%), falling (11.7%), and lifting (5.3%).

Seventeen back healthy individuals, 9 females, 8 males, ages 34.8 ± 13.7, were recruited from the community via posters and personal contact for an experiment involving all physical components of the STA. Other orthopedic conditions were not excluded as long as the subject was not at risk for substantial injury during testing. The university ethical review board approved this testing, and subjects were not paid.

Evaluations

The STA is a multidisciplinary standardized evaluation used to triage patients with chronic spinal disability (38). It takes approximately 4 h to administer. Evaluators include a vocational counselor, pain psychologist, physical therapist, occupational therapist, and exercise physiologist. Under the leadership of a staff physician, results are discussed in a team meeting to help guide further rehabilitation planning, including the need for a Functional Restoration Program.

Physical Testing

A physical therapist evaluates overall flexibility and strength subjectively with a manual examination. Trunk endurance includes the Sorensen Test (for trunk extensors) and upper and lower abdominal strength with use of a modified sit-up and leg raise, respectively. An exercise physiologist tests cardiovascular fitness with a submaximal bike test (39). Data collected includes maximum heart rate, VO2 max, and MET (metabolic equivalent of energy) level. An American College of Sports Medicine (ACSM) cardiovascular classification is calculated from the data (40).

Psychological and Pain Testing

A number of standardized tests including the Center for Epidemiological Studies-Depression Scale (CES-D) (21–23), Quebec Back Pain Disability Scale (41,42), and the

Multidimensional Pain Inventory (MPI) (43,44) are mailed to the patient and are to be completed prior to STA. A pain psychologist interviews the patient during the STA and later scores and interprets the psychological and pain profiles for a comprehensive report during the latter half of the trial (26,45).

The CES-D (22) was used to assess self-report of depressive symptoms. The CES-D is a 20-item scale, including four reversed items, where patients rate the frequency of depressive symptoms on a 0–3 scale in relation to how they felt during the past week. A total score is obtained by summing the responses to all of the items. A recent study by Turk and Okifuji (46) suggests that the CES-D has concurrent validity with *DSM-III-R* diagnoses of depression among patients with chronic pain.

The Quebec Back Pain Disability Scale (42) is a 20-item scale where patients are asked to rate the amount of difficulty they have performing various activities, such as getting out of bed, walking several miles, and making a bed. Patients are asked to rate their degree of difficulty ranging from 0 (*not difficult at all*) to 5 (*unable to do*). A total score for the scale is derived by summing the responses to each item. Test-retest reliability for the English version is reported to be 0.93, and internal consistency for the scale is 0.95. The scale has also been shown to be sensitive to changes in pain over time.

The MPI, Version II, is a 61-item inventory that is divided into three parts with several subscales in each part (45). Part I examines five dimensions of the pain experience (perceived interference of pain in various areas of patients' functioning, support and concern of significant others, pain severity, self-control, and negative affect). Part II evaluates the responses of significant others to communication of pain, and includes three subscales (perceived frequency of punishing, solicitous, and distracting responses). Part III assesses participation in four categories of daily activities (household chores, outdoor work, activities away from home, and social activities). Using statistical clustering techniques, Turk and Rudy (23) found three distinct patient profiles that they labeled 1) inadequate social support, 2) globally dysfunctional, and 3) adaptive responders. Inadequate social support profile includes lower than average levels of perceived social support, perceived solicitous responses from a significant other, and perceived distracting responses from a significant other; and higher than average levels of perceived punishing responses from a significant other. Globally dysfunctional profile includes lower than average levels of life control and general activity; and higher than average levels of pain severity, interference, and affective distress. Adaptive responders profile includes lower than average levels of pain severity, interference, and affective distress; and higher than average levels of life control and general activity.

Functional Testing

The Progressive Isoinertial Lifting Evaluation (PILE) (1,47,48) was used to assess strength, endurance, and psychophysical effort. Data collected for the PILE included the maximum weight lifted, expected weight lifted, and maximum heart rate during testing. The percent of expected weight lifted was calculated to normalize the data to gender and size based on Mayer's data (47). In our center, subjects who fail to achieve 70% of their maximum heart rate during this test are considered not to have put out full physiologic effort. The rate of perceived exertion using the Borg scale was recorded at the end of the test. Borg scores range from 6 (very, very light) to 20 (very, very heavy) (16).

The FAST

The Functional Assessment Screening Test (FAST) includes two 5-min repetitive tests and three 2-min static tests. These tests were designed after a number of clinical observations. We had observed that, based on their patients' behavior upon entering clinic, experienced therapists were able to predict performance on functional testing that required subjective reports of tolerance, but were less able to predict performance on more objective measures such as cardiovascular fitness. We had observed informally that many patients with chronic low-back pain appeared to give up just short of task completion, and that when we modified the length of the test, this relationship remained true.

Based on these observations, we concluded that these supposed physical measures were in fact measuring psychosocial behavior in most, but not all patients. We designed the FAST to include tests that had face validity as measures of spinal performance, and that were of sufficient duration to allow the subject to make choices about continuation or noncompletion of the task, but were, in fact, of minimal biomechanical stress comparable to participation in usual activities of daily living. For example, all able bodied persons tested prior to this study completed all components of the FAST.

The five tests are as follows:

1. The 5-min test of repetitive stooping (stoop5). The subject picks up small bolts from a plastic container on the floor and places them into another container overhead, using a reach that is at a comfortable level. A stopwatch is used to record the time and the patient is not notified of how much time has passed until the 5-min completion time is met. The patient stoops repeatedly at his or her own speed but once he or she stops, the test ends.
2. The 5-min repetitive twisting test (twist5). With the left hand, the subject takes a bolt from a plastic container at waist height starting on the right-hand side and places the bolt in another container directly in front. The patient then twists left and reaches with the right hand, continuing the activity, alternating side to side. Again, a stopwatch records time and the test ends at cessation of the activity or at the 5-min endpoint.
3. The 2-min test of kneeling (kneel2). The patient kneels on one or both knees while screwing and unscrewing bolts from a 30 cm high box directly in front of him or her for up to 2 min.
4. The 2-min squatting test (squat2). The subject squats down (attains a comfortable position that is not kneeling, in which the buttox is lower than the shoulders) and screws and unscrews bolts for up to 2 min.
5. The 2-min stooping test (stoop2). The subject bends at the waist (knees may be bent) and screws and unscrews bolts for up to 2 min.

For each of these tests, a stopwatch records the time from the moment the subject correctly assumes the test position. The test is completed when the patient requests to stop or after the full 2 (or 5, for stoop 5 and twist 5) min has passed. A test score of 0 is recorded if the patient attempts but is unable to perform the test position.

Statistical Analysis

To determine whether patients' completion of the five screening tests related to performance on other functional and psychological testing, the 188 patients were divided into

two groups. "Completers" were able to perform the full time for each of the five functional tests—2 min for kneel, 2 min for squat, and 2 min for stoop, 5 min for stoop and 5 min for twist. "Noncompleters" stopped short of the 5- or 2-min testing on one or more of the five functional tests. For data analysis, chi-square test of independence was conducted to test the hypothesis that persons who failed a number of the five functional screening tests would be more likely to perform poorly on the bicycle testing or the MPI. It was also used to examine whether the two groups differed in demographic characteristics and pain profiles (gender, cause of pain, and diagnostic locations of pain). *T*-tests were used to compare means of age, pain duration, and test scores of physical, psychological, and pain testing. Internal consistency analysis, using an alpha coefficient, evaluated the internal consistency of the five tests, based on the average interitem correlation. The measurement scale was made up of five test scores calculated as percent of test completed. For example, if a subject performed 90 s on a 2-min repetitive stooping test, the score was 75%.

RESULTS

FAST

The internal consistency analysis using an alpha coefficient of the five FAST test scores (measured by the percent of normal range) was 0.82. Table I presents the distribution of the total number of completed functional tests for the back pain group. Table II presents the completion status of the five functional screening tests. This includes those who completed each test, those who attempted but could not complete each test, and those that attempted the test but could not get into the required test position. Kneel2 had the highest completion rate for a test (72.9%, sensitivity 100%, specificity 33.8%). In the tests that were attempted but not completed, patients had the most difficulty with Stoop5 and Stoop2 with 48.9% not completing the test. Stoop2 and Squat2 had the highest percentage (16%) of patients that attempted but did not take the test.

Demographics

Table III presents the demographic and pain related variables between completers and noncompleters. There was no significant difference between groups in gender, age, pain duration, or cause of pain. The distribution of diagnoses in noncompleters vs. completers was significant ($p < 0.03$). The completer group had a high proportion of cervical (13.5%) and thoracic (10.8%) pain.

Table I. Number of Completed Functional Screening Tests

Number of tests completed	*n*	Percent
Completed no tests	37	19.7
1 test	29	15.4
2 tests	30	16.0
3 tests	27	14.4
4 tests	28	14.9
5 tests	37	19.7
Total	188	100.0

Table II. Completion Status of Five Functional Screening Tests

	Test				
	Stoop (5 min)	Twist (5 min)	Kneel (2 min)	Stoop (2 min)	Squat (2 min)
Completed test	77 (41.0%)	113 (60.1%)	137 (72.9%)	66 (35.1%)	74 (39.4%)
Mean performance (min)	5:00	5:00	2:00	2:00	2:00
Attempted but did not complete test	92 (48.9%)	71 (37.8%)	37 (19.7%)	92 (48.9%)	84 (44.7%)
Mean performance	1:51	2:14	1:18	0:59	0:58
Attempted but did not take test	19 (10.1%)	4 (2.1%)	14 (7.4%)	30 (16.0%)	30 (16.0%)
Mean performance	0:00	0:00	0:00	0:00	0:00

Physical Testing

Table IV summarizes the performances of the exercise testing, the Sorenson test, and the PILE. About half (52% of FAST noncompleters and 48% of completers) of the subjects did not attempt the exercise bicycle test; therefore, further analysis of this test was not performed. Although specific reasons were not recorded, typical reasons included inability to sit on the bicycle seat, refusal to participate, lack of cardiac clearance required per protocol, and technical or scheduling problems. Aside from the bicycle test, a large percent of patients attempted each of the other tests. Eighty-eight percent had Sorenson test data and 93% attempted the PILE floor-to-waist, and 94% attempted the PILE waist-to-shoulder tests.

Comparison of performance in the Sorenson Test of trunk extensors and lifting performance showed a significant difference between the two groups. The noncompleters scored significantly lower than the completers in the Sorenson Test (24.5 s vs. 53.7 s, $p < 0.01$) and a significantly greater percentage of them scored 0 s (24.4 vs. 6.3%, $p < 0.05$). The percent of expected weight lifted was significantly less for the noncompleters vs. completers. Interestingly, the maximum heart rate was also significantly lower in each component for

Table III. Demographic Characteristics and Pain-Related Variables by Noncompleters and Completers of the Screening Tests

	Total sample		Noncompleters		Completers		Sig
	N	Mean	*n*	Mean	*n*	Mean	(2-tailed)
Age (years)	188	42.1 (9.7)	151	42.5 (9.7)	37	40.5 (10.0)	0.283
Gender							0.132
Male	96	51.1%	73	48.3%	23	62.2%	
Female	92	48.9%	78	51.7%	14	37.8%	
Duration of pain (months)	187	61.8 (91.7)	150	61.9 (91.8)	37	61.6 (92.7)	0.987
Diagnosis							0.034
Low back pain	159	84.6%	131	86.8%	28	75.7%	
Neck	22	11.7%	17	11.3%	5	13.5%	
Thoracic	7	3.7%	3	2.0%	4	10.8%	
Cause of pain							0.570
Work-related injury	77	41.0%	63	41.7%	14	37.8%	
Motor vehicle accident	37	19.7%	28	18.5%	9	24.3%	
Fall	22	11.7%	20	13.2%	2	5.4%	
Lifting	10	5.3%	7	4.6%	3	8.1%	
Idiopathic	42	22.3%	33	21.9%	9	24.3%	

Note. Standard deviation is given in parentheses.

Table IV. Physical Test Results by Noncompleters and Completers of the Screening Tests

	Total sample		Noncompleters		Completers		Sig (2-tailed)
	N	Mean	*n*	Mean	*n*	Mean	
Exercise bicycle	99		82		17		0.150
Did not complete test	21	21.2%	19	23.2%	2	11.8%	
Very poor	48	48.5%	40	48.8%	8	47.1%	
Poor	11	11.1%	7	8.5%	4	23.5%	
Fair	10	10.1%	7	8.5%	3	17.6%	
Good	9	9.1%	9	11.0%	0	0.0%	
Sorenson test (s)	167	30.1 (36.5)	135	24.5 (32.9)	32	53.7 (41.7)	0.000
Scored 0 s	35	21.0%	33	24.4%	2	6.3%	0.023
PILE-floor to waist							
% Expected weight lifted	131	32.3 (24.5)	111	27.8 (22.6)	20	57.4 (19.1)	0.000
% Max heart rate	153	63.5 (13.1)	124	61.8 (12.0)	29	70.3 (15.3)	0.001
Failed to achieve 70% of max heart rate	107	69.9%	92	74.2%	15	51.7%	0.018
BORG	174	10.1 (5.8)	141	10.1 (5.8)	33	9.9 (5.9)	0.823
PILE-waist to shoulder							
% Expected weight lifted	132	43.2 (29.7)	112	39.5 (29.7)	20	64.0 (19.8)	0.001
% Max heart rate	162	60.3 (11.2)	132	59.4 (10.8)	30	64.7 (11.9)	0.019
Failed to achieve 70% of max heart rate	135	83.3%	114	86.4%	21	70.0%	0.034
BORG	176	10.6 (5.4)	143	10.7 (5.5)	33	10.1 (5.3)	0.603

Note. Standard deviation is given in parentheses.

the noncompleters while there was no difference in the Borg scores. Compared to the completers, a significantly greater number of noncompleters failed to achieve 70% of their maximum heart rate on the PILE in both components, floor-to-waist (74.2 vs. 51.7%, $p < 0.02$) and waist-to-shoulder (86.4 vs. 70.0%, $p < 0.04$).

Psychological and Pain Testing

Table V summarizes the differences in psychological scores for completers and noncompleters. On the MPI, the adaptive coper profile was more common in completers (44 vs. 15.5%). The most common profile for the noncompleters was dysfunctional (40.5%)

Table V. Psychosocial and Pain Testing Results by Noncompleters and Completers of the Screening Tests

	Total sample		Noncompleters		Completers		Sig (2-tailed)
	N	Mean	*n*	Mean	*n*	Mean	
MPI	109		84		25		0.003
Adaptive coper	24	22.0%	13	15.5%	11	44.0%	
Dysfunctional	37	33.9%	34	40.5%	3	12.0%	
Interpersonally distressed	18	16.5%	16	19.0%	2	8.0%	
Unanalyzable/hybrid	30	27.5%	21	25.0%	9	36.0%	
CESD (Center for Epidemiological Studies Depression Scale)	126	23.8 (13.2)	100	25.5 (13.3)	26	17.0 (10.3)	0.003
Quebec Back Pain Disability Scale	137	60.3 (16.2)	108	64.2 (14.8)	29	45.9 (12.9)	0.000
Tampa Scale of Avoidance	91	22.4 (4.9)	75	22.8 (4.8)	16	20.1 (4.9)	0.042
Tampa Scale of Fear	91	14.9 (3.8)	75	15.1 (3.9)	16	14.0 (3.5)	0.307

Note. Standard deviation is given in parentheses.

Table VI. Performance of Back Healthy Subjects on FAST Components

Sex	Age	Stoop (5 min)	Twist (5 min)	Kneel (2 min)	Squat (2 min)	Stoop (2 min)
F	21	5	5	2	2	2
F	30	5	5	2	2	2
M	30	5	5	2	2	2
F	23	5	5	2	2	2
F	43	5	5	2	2	2
F	48	5	5	2	2	2
M	23	5	5	2	2	2
M	21	5	5	2	2	2
M	26	5	5	2	2	2
F	61	5	5	2	1.7	2
F	48	5	5	2	2	2
M	39	5	5	2	2	2
M	22	5	5	2	2	2
M	29	5	5	2	2	2
M	47	5	5	2	2	2
F	59	3.72	5	2	1.75	2
F	22	5	5	2	2	2

followed by interpersonally distressed (19%). These differences were statistically significant between the two groups ($p < 0.003$). The higher mean scores for noncompleters on the CES-D and the Quebec Back Pain Disability Scale were statistically significant.

Asymptomatic Subjects

Table VI demonstrates the results in 17 persons without back pain disability. A 61-year-old subject with a previous minor stroke failed the 5-min and 2-min stoop test components, complaining of leg fatigue, and a 59-year-old subject failed the 2-min stoop, complaining of knee pain. In total, the back healthy subjects completed 96.5% of all tests.

DISCUSSION

The FAST is a simple, inexpensive, and easy to administer test that measures activity tolerance in common tasks such as kneeling, stooping, reaching, and squatting. It is not physically demanding, as evidenced by the 88% completion rate among back healthy subjects. Among a large population of chronic spinal pain patients, however, only 37 (19.7%) completed all five tests. The inability to complete all five tests was related to poorer performance on more extensive functional tests. Previous studies of patients with chronic spinal pain have suggested that psychopathology and pain behaviors contribute to their physical dysfunction (4,9,49). Data on depression and pain behavior from the current study support this literature.

Poor performance in the FAST was associated with poorer outcome in the Sorenson Test and the PILE. With one fourth of the group failing to perform on the Sorenson Test (scored above 0 s), the noncompleters averaged significantly lower than their counterpart in the test. Noncompleters lifted a significantly smaller percentage of the expected weight on both the floor-to-waist and waist-to-shoulder components of the test. Although there was no significant difference in their reported rate of perceived exertion, the maximum heart

rate for the noncompleters was significantly less than that for completers in both tests. This would indicate less physiologic effort on behalf of the noncompleters, despite a similar self perception of effort. Curtis *et al*. (1) describe three endpoints in the PILE. The safety endpoint is a calculated maximum weight based on gender and size. The aerobic endpoint is 85% of maximum heart rate. The third endpoint, the most common for chronic back pain patients, is psychophysical in which testing is discontinued because of perceived exertion, fatigue, or pain. The noncompleter group reached a significantly lower psychophysical endpoint than the completers ($p < 0.001$).

The group that completed all five tests had less depression and psychological dysfunction. On the MPI, 44% of completers were classified as adaptive copers. Conversely, among noncompleters, the most common classification was dysfunctional (40.5%) followed by interpersonally distressed (19%). In a group of 200 chronic back pain patients, those that were classified as dysfunctional on the MPI reported more pain-specific fear and avoidance than the other patients (25). The noncompleters' pain beliefs likely influenced their poorer performance in the FAST and PILE.

The Quebec Back Pain Disability Scale involves six domains of activity including 1) bed/rest, 2) sitting/standing, 3) ambulation, 4) movement, 5) bending/stooping, and 6) handling large/heavy objects up (41,42). The noncompleters' self-reported functional disability was confirmed in the poorer performance in all of the five functional tasks and the PILE that required activities addressed in the questionnaire. Jensen and colleagues (50) have also shown that patients' pain and avoidance beliefs were associated with physical disability.

Chronic pain and depression have a high degree of association and studies have reported decreased physical functioning in depressed patients (18,19,21). The noncompleter group had significantly higher scores on the CES-D (25.5 vs. 17.0, $p < 0.003$). Geisser and colleagues suggested 27 as an optimal cut-off score for depression in chronic pain patients indicating a substantial number of individuals in that group would meet criteria for depression (21).

It is noteworthy that more persons with cervical or thoracic pain were in the completers group than the noncompleters group. Persons with low-back pain may be more likely to perceive the FAST tasks as difficult, dangerous, or painful. As in the control group, it is also possible that some subjects with other significant orthopedic or neurologic impairments had difficulty with the test. The presence of functional deficits in the limbs should be taken into account in interpreting FAST results.

Quantification of function, an important component of evaluating chronic spinal pain patients, remains controversial in terms of optimal method, length, format of testing, and costs. Functional Capacity Evaluations (FCEs) were developed to evaluate a person's physical abilities in order to determine what work-related tasks can be done on a safe and dependable basis (51–53). Although guidelines have been recommended (54), there remains a wide variation in their application, which is easily demonstrated when comparing several well-known and standard models. The Blankenship (55) FCE is performed in 3–4 h, the Isernhagen Work Systems (52) FCE involves a 5-h evaluation performed over a 2-day period and the Saunders (56) FCE is a 22-h evaluation over 6 days.

There are no studies to determine whether longer FCEs are more valid than shorter FCEs (56). In fact, there are no studies in the literature that study the predictive validity of FCEs (52–54). Interpreting FCE performance results for low-back pain patients have

also been questioned when psychosocial factors are taken into account (10,49). The data presented here suggest that in persons with chronic back pain, psychosocial factors are important predictors of performance on even very easy functional tests.

The current study supports literature cited earlier in demonstrating that functional testing without an understanding of psychosocial factors may not be measuring the intended physical parameters. FCEs are typically performed in Occupational or Physical Therapy clinics without psychological screening. Practical reasons for this include cost, reimbursement, patient reluctance to reveal psychological information or the lack of affiliation with a psychologist. The FAST can be of great value here. The test can be administered prior to participation in a FCE, even in a physician clinic or other low-tech environment. Failure on the FAST suggests a high likelihood of psychosocial barriers to performance, poorer performance, and less physiologic effort, all of which may invalidate more extensive test results.

In the context of rehabilitation, the FAST has other uses. The question of "what can we do for this person?" is answered quite differently from "what is his or her capacity to perform?" It is important to acknowledge that the current study does not address the ability of the FAST to predict outcome from rehabilitation. Still, failure on the FAST suggests to individual therapists or physicians that a purely physical approach to functional improvement may be too simplistic.

In multidisciplinary rehabilitation programs, more detailed psychological, physiological, and functional testing are useful in defining individualized approaches to treatment. Data from this study suggest that the FAST is a valuable bridge between psychological and functional components of an assessment. Typically, patients who complete the FAST have found a way to perform at a level unusual for most chronic pain patients despite psychosocial factors, while FAST noncompleters will likely need special teamwork to tie physical and psychosocial improvements together.

A limitation of this study is the attrition in the number of subjects who completed the psychological questionnaires. Missing data were almost always because of patient issues (patient overlooking a test, consciously declining to fill out the questionnaire, or claiming to have not received the questionnaire). Although, there was no statistical significance, the noncompleters tended to have a higher percentage of missing test results especially for the MPI compared to the completers (44 vs. 32%). The MPI tends to be a longer and more time consuming questionnaire and may reflect the noncompleters' tendencies to not fully perform during testing. Compared to the subjects who completed the questionnaire, subjects who did not complete the questionnaire were more likely not to complete the FAST. However the difference (84.8 vs. 77.1%) was not statistically significant ($p = 0.13$).

Comparison of demographic characteristics between subjects who completed the MPI test and those who did not also shows no significant group differences with respect to gender (male 54.1 vs. 46.8%; female 45.9 vs. 53.2%), age (42.3 years vs. 41.8 years), pain duration (70.3 months vs. 49.9 months), diagnosis (low-back pain 86.2 vs. 82.3%; neck 11.0 vs. 12.7%; thoracic 2.8 vs. 5.1%), or cause of pain (work 42.2 vs. 39.2%; motor vehicle accident 15.6 vs. 25.3%; fall 10.1 vs. 13.9%; lifting 6.4 vs. 3.8%; idiopathic 25.7 vs. 17.7%). Thus, based on these factors, there does not appear to be selective attrition bias in the data. It is not clear whether fewer or shorter psychological batteries would increase patient completion of the batteries. Conceivably in an assessment such as the Spine Team Assessment, intended to triage patients, psychological tests need not be so specific. Rather

they would detect the presence of psychopathology, and more detailed assessments would be given at a later date to patients who will receive further psychological treatment. On the other hand, a less than detailed knowledge of the extent and type of psychopathology may hinder team decision making regarding factors such as future ability to comply with physical therapy. Other limitations of the study include a small sample size. Test-retest reliability, inter-rater reliability, construct validity, and other measurements are not yet available for this new test battery. These parameters might affect interpretation of test reliability.

The FAST requires more validation and study. A larger set of norms may be helpful, as frail older persons and persons with nonspinal impairments may not be able to complete the tests. There are opportunities to evaluate its ability to predict future function or rehabilitation success, and to further elucidate the factors that lead to performance deficits on these tests. The tests did demonstrate good internal consistency, and concurrent validities as demonstrated by completers' better performance on the PILE compared to noncompleters.

CONCLUSION

Psychosocial factors clearly play a role in the functional performance of the majority of patients with chronic back pain disability. The role of more detailed Functional Capacity Evaluations is called into question in this population. The FAST is a rapid, inexpensive, low stress functional test that identifies patients with poorer physical function and higher psychopathology. As a component of a rehabilitation assessment, it can draw attention to maladaptive interactions between psychosocial factors and function.

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