Factors Associated with Performance on Short-Form Functional Capacity Evaluations in Workers’ Compensation Claimants

Tamseela Chughtai, MSc
Patricia Manns, Iain Muir, Douglas P. Gross
Faculty of Rehabilitation Medicine
University of Alberta
Limitations of Traditional FCE

- Lengthy
- Time consuming
- Expensive
Isernhagen Short-Form Protocols

Floor-to-Waist Lift
Waist-to-Overhead Lift
Horizontal Lift
Front Carry
Right Carry
Left Carry
Elevated Work
Crawl
Kneel
Crouch
Squatting
Static Push
Static Pull
Trunk Flexion in Sit
Trunk Flexion in Stand
Rotation in Sitting
Rotation in Stand
Stair Climbing
Stepladder Climbing
Balance
Bending in Standing
Rotation in Standing
Standing
Walking
Hand Grip Strength
Hand Coordination

Trunk
- Stand
- Floor-to-Waist Lift
- Crouch
- Sustained Flexion
- Rotation

Upper Extremity
- Waist-to-Overhead
- Elevated Work
- Crawling
- Grip Strength
- Coordination

Lower Extremity
- Stand
- Floor-to-Waist Lift
- Crouch
- Kneel
- Stepladder or Stairs

Created from Isernhagen and UMich FAST
Predictive Validity of Short Form FCE (5 test items)

Brief assessments as/more predictive than long protocols
More research needed on SF-FCE

- When to use?
- Construct validity – does it measure the same functional ‘work ability’ construct
- Or is information lost?
Factors Influencing Results of Functional Capacity Evaluations in Workers’ Compensation Claimants With Low Back Pain

Table 2.
Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>FCE No. of Failed Tasks</th>
<th>Percentage PDI</th>
<th>VAS</th>
<th>Work-Related Recovery Expectations Questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCE floor-to-waist lift</td>
<td>-.60 b (−0.69 to −0.50)</td>
<td>-.55 b (−0.65 to 0.44)</td>
<td>-.42 b (−0.55 to −0.28)</td>
<td>.20 b (0.05 to 0.34)</td>
</tr>
<tr>
<td>FCE no. of failed tasks</td>
<td>.52 b (0.40 to 0.63)</td>
<td>.37 b (0.22 to 0.50)</td>
<td>.30 b (0.16 to 0.43)</td>
<td></td>
</tr>
<tr>
<td>Percentage PDI</td>
<td></td>
<td>.70 b (0.61 to 0.78)</td>
<td>.37 b (0.24 to 0.50)</td>
<td>.16 (−0.01 to 0.31)</td>
</tr>
<tr>
<td>VAS (n=146)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a All values are Pearson correlation coefficients (95% confidence intervals). FCE=functional capacity evaluation, PDI=Pain Disability Index, VAS=visual analog scale.

b Significant at .05 level.
Objectives & Hypothesis

• Examine construct validity of short-form FCE by testing factors associated with performance

• We hypothesized:
  – Associated factors would be the same as on full FCE
  – Moderate correlations with self-report functional tests
Methods

• Secondary analysis of a previous study

• Cross-sectional study design

• Uses Workers’ Compensation Board-Alberta data

• 316 Claimants assessed during SF-FCE RCT

• Uni- and Multivariable correlation/regression
SF-FCE Measures

- Number of failed FCE items
  - Continuous variable ranging from 0 to 5 failed

- Floor to waist lift performance
  - Amount of weight lifted (only on trunk and lower extremity protocols)
# Results – Univariable Correlations

## # of Failed FCE items (n=316) vs Floor to Waist Lift (n=133) Correlation Coefficients (95% CI)

<table>
<thead>
<tr>
<th>Variable</th>
<th># of Failed FCE items</th>
<th>Floor to Waist Lift</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Failed FCE items</td>
<td>1.0</td>
<td>-0.36 (-0.50, -0.20)</td>
</tr>
<tr>
<td>Male Sex</td>
<td>0.06 (-0.05, 0.17)</td>
<td>0.28 (0.12, 0.43)</td>
</tr>
<tr>
<td>Age in years</td>
<td>-0.07 (-0.18, 0.04)</td>
<td>-0.33 (-0.47, -0.17)</td>
</tr>
<tr>
<td>English Language</td>
<td>-0.09 (-0.20, 0.02)</td>
<td>-0.03 (-0.20, 0.14)</td>
</tr>
<tr>
<td>Job Attachment Status</td>
<td>-0.04 (-0.15, 0.07)</td>
<td>0.02 (-0.15, 0.19)</td>
</tr>
<tr>
<td>Injury Duration</td>
<td>0.02 (-0.13, 0.09)</td>
<td>-0.06 (-0.23, 0.11)</td>
</tr>
<tr>
<td>Annual Salary</td>
<td>0.07 (-0.04, 0.18)</td>
<td>0.03 (-0.20, 0.14)</td>
</tr>
<tr>
<td>Occupation (Trades vs Other)</td>
<td>-0.02 (-0.13, 0.09)</td>
<td>-0.04 (-0.21, 0.13)</td>
</tr>
<tr>
<td>Number of Testing Sessions</td>
<td>-0.27 (-0.37, -0.17)</td>
<td>0.05 (-0.12, 0.22)</td>
</tr>
<tr>
<td>Pain Disability Index (% )</td>
<td>0.39 (-0.48, -0.29)</td>
<td>-0.43 (-0.56, -0.28)</td>
</tr>
<tr>
<td>Pain Visual Analogue Scale</td>
<td>0.15 (0.04, 0.26)</td>
<td>-0.24 (-0.39, -0.07)</td>
</tr>
<tr>
<td>Recovery Expectations Score</td>
<td>0.31 (0.21, 0.41)</td>
<td>-0.19 (-0.35, -0.02)</td>
</tr>
</tbody>
</table>
## Results – Multivariable Models

### Independent Variable # of Failed FCE Items

n=316

<table>
<thead>
<tr>
<th>Variable</th>
<th>Standardized Beta (95% CI)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Disability Index (%)</td>
<td>0.34 (0.21, 0.47)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Recovery Expectations Score</td>
<td>0.15 (0.04, 0.27)</td>
<td>0.01</td>
</tr>
<tr>
<td># of Sessions (1 or 2)</td>
<td>-0.21 (-0.31, -0.11)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Male Sex</td>
<td>-0.004 (-0.10, 0.10)</td>
<td>0.94</td>
</tr>
<tr>
<td>Age in Years</td>
<td>-0.09 (-0.22, 0.02)</td>
<td>0.09</td>
</tr>
<tr>
<td>Pain Visual Analogue Scale</td>
<td>-0.07 (-0.19, 0.05)</td>
<td>0.24</td>
</tr>
<tr>
<td>Injury Duration in Days</td>
<td>0.02 (-0.001, 0.10)</td>
<td>0.69</td>
</tr>
</tbody>
</table>

*Model Adjusted $R^2=0.22$*
## Results – Multivariable Models

### Independent Variable Floor-to-Waist Lift

**n=133**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Standardized Beta (95% CI)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Disability Index (%)</td>
<td>-0.55 (-0.74, -0.36)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Male Sex</td>
<td>0.33 (0.18, 0.47)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Age in Years</td>
<td>-0.34 (-0.48, -0.19)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Recovery Expectations Score</td>
<td>-0.03 (-0.21, 0.14)</td>
<td>0.74</td>
</tr>
<tr>
<td>Pain Visual Analogue Scale</td>
<td>0.12 (-0.06, 0.29)</td>
<td>0.18</td>
</tr>
<tr>
<td>Injury Duration in Days</td>
<td>0.11 (-0.06, 0.33)</td>
<td>0.14</td>
</tr>
<tr>
<td># of FCE Sessions (1 or 2)</td>
<td>0.10 (-0.04, 0.24)</td>
<td>0.16</td>
</tr>
</tbody>
</table>

*Model Adjusted $R^2=0.38$*
Interpretation

- Better performance on short-form FCE was consistently and moderately associated with lower self-reported disability (PDI).
- Results support the construct validity of this short-form FCE protocol.
- Further research is needed to evaluate the validity of short-form FCE in other contexts.
Inclusion and Exclusion Criteria

**Inclusion Criteria:**
- Workers’ Compensation Claimants with MSK conditions
- Considered eligible and safe for FCE
- No further diagnostic investigations
- Complete data needed for this analysis

**Exclusion Criteria:**
- Claimants with brain injury
- Diagnosed with occupational diseases (i.e. asbestosis)
- Claimants with injuries of multiple body parts were excluded
Available Measures

- **Demographic:** Age, Sex, Injury Duration, Language
- **Occupational:** Employment Status, Number of Prior Claims, Annual Salary, Occupational Category
- **Health:** Diagnosis, Number of FCE sessions (1 or 2)
Self Report Questionnaires

- Pain Disability Index
- Pain Visual Analogue Scale
- Recovery Expectation Questionnaire
Results

Descriptive Characteristics (n=316)

Male sex 68%
English 98%
Employed 75%
Trades and transport 48%
Average Age 43 years (11.9 SD)
Injury Duration 406 days (905 SD)
Statistical Analysis

1) Descriptive Statistics

2) Univariable correlations between variables and SF-FCE performance indicators

3) Multivariable regression with SF-FCE performance indicators as dependent variables
## Results

### Clinical Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Failed SF-FCE Tasks (out of 5)</td>
<td>2.1 (1.6)</td>
</tr>
<tr>
<td>Percentage Failing SF-FCE Tasks</td>
<td></td>
</tr>
<tr>
<td>Failed 0</td>
<td>61 (19.3%)</td>
</tr>
<tr>
<td>Failed 1</td>
<td>55 (17.4%)</td>
</tr>
<tr>
<td>Failed 2</td>
<td>80 (25.3%)</td>
</tr>
<tr>
<td>Failed 3</td>
<td>58 (18.4%)</td>
</tr>
<tr>
<td>Failed 4</td>
<td>30 (9.5%)</td>
</tr>
<tr>
<td>Failed 5</td>
<td>32 (10.1%)</td>
</tr>
<tr>
<td>Floor-to-Waist Lift (kg, n = 133)</td>
<td>14.3 (10.3)</td>
</tr>
<tr>
<td>Pain Disability Index (%)</td>
<td>46.2 (21.0)</td>
</tr>
<tr>
<td>Pain Visual Analogue Scale (out of 10)</td>
<td>4.3 (2.6)</td>
</tr>
<tr>
<td>Recovery Expectation (out of 5)</td>
<td>3.7 (0.9)</td>
</tr>
</tbody>
</table>