

Functional Capacity Evaluation- A Critical Review of the Literature

Trang H. Nguyen M.D.

University of Cincinnati

Dept. of Environmental Health

Division of Occupational and Environmental Medicine

David C Randolph M.D., M.P.H.

Midwest Occupational Health Management

President of the American Academy of Disability Evaluating
Physicians

dococmed@aol.com

FCE

- Functional Capacity Evaluation-
 - A “ systematic approach including observation, measurement, reasoning, and conclusion ” of an examinee’s “ maximum ability” during “ a dynamic movement with a beginning and an end which can be measured” (1)

FCE

- Validity
 - Does the test or an instrument measure the attributes it reports to measure?
 - There are different types of validity
 - Face/ content validity
 - Criterion-related validity
 - Construct validity

FCE

- Face/Content Validity
 - Do the items of a testing instrument or a protocol accurately measure what the test intends to measure?

FCE

- Criterion-Related Validity
 - Concurrent Validity- The agreement between two instruments testing the same subject at the same time.
 - Usually one of the instrument should be a “ gold standard”.
 - Predictive Validity- The ability of a test to foretell the examinee’s future work performance

FCE

- Construct Validity-
 - The ability of a test to accurately measure a theoretical concept.
 - For example, the ability of a work-related functional test to differentiate between groups of sub-maximal and maximal effort.

FCE

- Methods

- Objectives:

- To identify Functional Capacity Evaluation systems or lifting protocols with validity studies.
 - To summarize objectives, methods, outcomes, strengths, and limitations of these studies.

FCE

- Methods

- The literature was searched using the following database:

- MEDLINE-1966 to present
 - CINAHL- nursing and allied health 1982 to present
 - Bibliographies obtained from articles found in the search
 - Verbal suggestions from researchers with the same interest.
 - The date for the conclusion of the literature search was 03/29/02.

FCE

- Methods-
 - Our study is not all inclusive
 - Inclusion Criteria:
 - Peer-reviewed articles published from 1966 to present
 - Functional Capacity Evaluation systems with respect to lifting
 - English language

FCE

- Methods-

- One hundred sixty two articles were identified. Twenty six articles met the inclusion criteria.
- Each article was classified according to: author, year published, purpose/problems, study design, sample size, instrument use in testing, outcomes, limitations/strengths in a table format.
- After all the articles have been analyzed and summarized, studies with the common types of validity were identified and results discussed.

FCE

- Results/Discussion :

- Criterion- Related Predictive Validity-

- There were 9 studies with predictive validity
 - Only 2 out of these 9 studies have sound methodology and validity was accepted.
 - Matheson and Mooney (2) described the CAL-FCP and its ability to detect loss of lifting capacity, which can be used for disability ratings.
 - Matheson and Danner (3) compared lifting capacity using verbal live instructions of the ELC system to the computerized instructions of the ERGOS system . The verbal instructions of the ELC system had higher validity in predicting frequent and infrequent lifting potential.

FCE

- Results/Discussion -
 - Criterion-Related Concurrent Validity-
 - There were six studies with concurrent validity
 - One out of six studies had sound methodology
 - Alpert (4) showed high correlation between isokinetic and gravity/inertia measurements of the Lido Lift versus Progressive Lifting Capacity II.

FCE

- Results/Discussion-

- Construct Validity

- There were nine studies with construct validity
 - Three out of nine studies had good methodology.
 - Jay et al (5) studied the ability of the EPIC system to differentiate subjects with sincere and insincere efforts during lifting evaluation.
 - Dueker (6) evaluated the usefulness of isokenetic testing using the Lido system in identifying subjects with diminished lifting capacity.

FCE

- Results/Discussion-

- Construct Validity

- Matheson (7) analyzed the reactive measures among low back pain subjects during lifting evaluation using the EPIC system.

FCE

- Results/Discussion-

- Content Validity

- Fishbain (8) was the only study found in this literature review with content validity.
 - Due to inexplicit testing protocols, qualifications and training of evaluator not mentioned, demographic data of the study subjects not stated, the content validity of the “ DOT-RFC Battery” can not be determined.

FCE

- Summary:
 - Most FCE systems have little validity published in peer-reviewed literature.
 - Most of the studies were limited by common methodological flaws.
 - Subject selection process is often vague and lacks randomization. Few studies have cases and controls.
 - High attrition rate or the number of subjects lost to follow up was not accounted for in most studies.
 - Few studies have double blinding effects.

FCE

- Summary:
 - Methodological flaws
 - Not all FCE systems have reliability established
 - Reliability needs to be established to have validity
 - Sample size was often too small to determine if true differences exist between groups.
 - Relative risk or confidence interval was not calculated in any of the study.
 - Very often, studies were done with subgroups of subjects. This decreases the capability of generalizing the outcomes of the study.

FCE

- Summary:
 - Future research in FCE should establish standards with which protocols and procedures are operationally defined and are generally accepted i.e. “gold standards”.
 - Methodology in published scientific studies should follow accepted protocols.
 - Cases and controls should be clearly identified and be as closely matched as possible.

FCE

- Summary:
 - Terminology used should be well defined and consistent.
 - Results or findings should be reproducible in other clinical settings.
 - The impact or relevance of the intervention should be calculated and included in the study (i.e. RR and CI)
 - Lastly, results should have clinical usefulness.

Bibliography

- 1) Isernhagen SJ. The Comprehensive Guide to Work Injury Management. Gaithersburg, Md: Aspen Publishers, 1995.
- 2) Matheson LN, Mooney V, Grant JE, Leggett S, Kenny K. Standardized Evaluation of Work Capacity. Journal of Back and Musculoskeletal Rehabilitation 1996;6:249-264.
- 3) Matheson LN, Danner R, Grant J, Mooney V. Effect of Computerized Instructions on Measurement of Lifting Capacity: Safety, Reliability, and Validity. Journal of Occupational Rehabilitation 1993; 3(2): 65-81.
- 4) Alpert J, Matheson LN, Beam W, Mooney V. The Reliability and Validity of Two Tests of Maximum Lifting Capacity. Journal of Occupational Rehabilitation 1991; 1(1): 13-29.

Bibliography

- 5) Jay MA, Lamb JM, Watson RL, Young IA, Fearon FJ, Alday JM, Tindall AG. Sensitivity and Specificity of the Indicators of Sincere Effort of the EPIC Lift Capacity Test on a Previously Injured Population. *Spine* 2000; 25(11): 1405-1412.
- 6) Dueker JA, Ritchie SM, Knox TJ, Rose SJ. Isokenetic Trunk Testing and Employment. *JOM* 1994; 36(1): 42-48.
- 7) Matheson LN, Mooney V, Holmes D, Leggett S, Grant JE, Negri S, Holmes B. A Test to Measure Lift Capacity of Physically Impaired Adults- Part 2- Reactivity in a Patient Sample. *Spine* 1995; 20(19): 2130-2134.
- 8) Fishbain DA, Abdel-Moty E, Cutler R, Khalil TM, Sadek S, Rosomoff RS, Rosomoff HL. Measuring Residual Functional Capacity in Chronic Low Back Pain Patients Based on the Dictionary of Occupational Titles. *Spine* 1994; 19(8): 872-880.