Advanced Concepts in Functional Capacity Evaluations



Academy of Orthopaedic Physical Therapy, APTA Occupational Health SIG

Dr. Steve Allison, P.T., DPT FUNCTIONAL CAPACITY EXPERTS, LLC

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Main Objective

To provide FCE examiners with an advanced understanding of best practice guidelines for determining an individual's effort level during functional capacity testing.

Course Objectives

- 1. Recognize and discuss terms routinely used in describing an individual's work level: residual functional capacity; functional abilities; functional limitations; work restrictions; work tolerances; and functional impairment.
- 2. Identify evidence-based methods for determining an individual's safe work tolerances and effort level during FCEs.
- 3. Identify evidence-based methods for determining a safe work level for an injured worker that provided poor effort during a FCE.

- Best practices guideline.
- Adopted on 04/30/2018.
- Developed by a panel with expertise in design, administration, and interpretation of FCEs.

• Relied on available literature and clinical experience.

• Reviewed by a multidisciplinary, international group of professionals (6 PTs, 2 OTs, and 3 MDs) who either have expertise in FCEs as researchers or examiners, or who use the results of FCEs in the administration of workers' comp and disability claims.

• Standardized definition of FCE as:

A comprehensive performance-based medical assessment of an individual's physical and/or cognitive abilities to safely participate in work and other major life activities.

Identified 4 primary components of FCEs:

- 1. Intake interview.
- 2. Medical records review.
- 3. Physical examination.
- 4. Content valid functional testing.

Identified 2 primary types of FCEs:

1. Job/Occupation Specific FCE.

> Individual's functional abilities are matched to the physical and/or cognitive demands of a specific job(s) or a specific occupation(s).

2. Any Occupation FCE.

- > Individual's functional abilities are not matched to the physical and/or cognitive demands of a specific job(s) or a specific occupation(s).
- > Often used in long term disability claims and Social Security Disability claims, but also in workers' compensation claims when it is known that the individual will not return to their prior job.

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• Defined qualification standards for a FCE examiner.

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Allowance for up to 8 hours of functional testing over a 1 or 2 day period for individuals with chronic impairments who have reached MMI to objectively establish permanent functional limitations and work restrictions.

• Allowance for up to 4 hours of functional testing over a 1 day period for individuals with acute or sub-acture impairments who have not reached MMI to objectively establish temporary functional limitations and work restrictions for early return to work.

Specific guidance regarding physiological, biomechanical, and psychophysical monitoring throughout the FCE, and comprehensive pain behavior assessment.

 Cautions FCE examiners against the use of the term "sincerity of effort" and common functional testing methods purportedly used to identify "insincere effort" such as static (isometric) lift strength testing, five-rung (bell-curve) grip strength testing, rapid exchange grip strength testing, and using the coefficient of variance statistical measure with static lift strength testing and hand grip strength testing.

• Specific guidance relative to interpretation and reporting of FCE results.

• Emerging trends in FCEs.

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• Physical demands reference tables.

• Glossary with standardized definitions of terminology commonly used in FCEs.

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https://www.orthopt.org/uploads/content_files/ files/2018%20Current%20Concepts%20in%20 OH%20PT-FCE%2006-20-18%20FINAL.pdf

Residual Functional Capacity

Represents what an individual can still do despite functional limitations resulting from a <u>medically determinable impairment(s)</u> and impairment-related symptoms.

Medically Determinable Impairment

An impairment that results from anatomical, physiological, or psychological abnormalities that can be shown by medical evidence consisting of signs, symptoms, and diagnostic findings. A medically determinable impairment cannot be established in the absence of objective medical abnormalities.

Residual Functional Capacity

- What an individual can still do despite his or her functional limitations.
- "The most you can still do despite your limitations."
- "An assessment of an individual's ability to do sustained work-related physical and mental activities in a work setting on a regular and continuing basis."
 - * "A regular and continuing basis means 8 hours a day, for 5 days a week, or an equivalent work schedule."

APTA FCE Guidelines, 2018. CFR 416.945 Residual Functional Capacity.



American Medical Association

- "Most physicians are not trained in assessing the full array of human functional activities and participations that are required for comprehensive disability determinations."
- "The relationship between impairment and disability remains both complex and difficult, if not impossible, to predict."
- Guides to the Evaluation of Permanent Impairment. 6th Edition. American Medical Association. 2009.



American Medical Association

• "The physician or treating" provider may determine diagnosis and medical prognosis, but functional testing is more objective than the current use of estimates, commonly called restrictions. In an evidence-based medical model, measurements are preferable to estimates."





Medically Determinable Impairment Ø Functional Limitation

- In SSD claims, the medical diagnosis or medically determinable impairment may be sufficient to meet the "listing of impairments."
- You can not reliably predict the severity of a claimant's functional limitations based on their medical diagnosis or medically determinable impairments.
- How does a physician or an ALJ reliably establish the existence or non-existence of significant functional limitations without objective evidence from functional testing performed by a qualified FCE examiner?





American Medical Association & Social Security Administration

- Both organizations essentially agree that:
 - Measured evidence is more objective than speculation.
 - The functional limitations caused by most medically determinable impairments can not be reliably predicted.



Best Practices

Medically determinable impairments <u>combined with</u> the results from content valid functional testing administered by a <u>qualified</u> <u>FCE examiner</u> form the basis for establishing the severity of functional limitations.

WHEN THE WHY IS CLEAR, THE HOW IS EASY.

Residual Functional Capacity

How Do You Know if the Injured Worker Gave their Best Effort During a FCE?



How is Effort Determined?

- Psychophysical monitoring.
- Biomechanical monitoring.
- Physiological monitoring.
- Isometric/Static Strength testing.
- Hand Grip Strength testing.
- XRTS Lever Arm testing.



Oh what to do, what to dooo?

Psychophysical Monitoring?

- Rating of Perceived Exertion (RPE)
- Pain Level/Symptoms

May provide a good indication of a claimant's safe tolerance to activities, but validity relies completely on the claimant's subjective perceptions.

Borg. Psychophysical bases of perceived exertion. Med & Sci in Sp & Exer. 14(5):377-381, 1982.

Garg, Waters, Kapellusch, Karwowski. Psychophysical basis for maximum pushing and pulling forces: A review and recommendations. Int J Ind Ergo. 44(2):281-291, 2014.

Genaldy, Asfour, Mital, Waly. Psychophysical models for manual lifting tasks. App Ergo. 21(4):295-303, 1990.

An, Wang, Cope, Williams. Quantitative evaluation of pain with pain index extracted from electroencephalogram. Chi Med J. 130(16):1926-1931, 2017.

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Rating of perceived effort (RPE)	Intensity of effort
0	Nothing at all
1	Very weak
2	Weak
3	Moderate
4	Somewhat hard
5	Hard
6	Moderately hard
7	Very hard
8	Very, very hard
9	Near maximal
10	Extremely strong or maximal



Psychophysical Monitoring?

1-5 Rating of Perceived Exertion Scale

We will be using the following 1-5 Rating of Perceived Exertion Scale to have you rate how hard it was for you to complete various activities during the evaluation.

Your responses will be <u>compared to your performance and test behaviors</u> as a component of the level of effort you provided during the functional testing.

Very Easy	Easy	Somewhat Hard	Hard	Very Hard
1	2	3	4	5

Rating of Perceived Exertion Guidelines

- Very Easy. Like nothing at all.
- 2 Easy. Light effort.
- 3 Somewhat Hard. Moderate effort, but I can do more.
- 4 Hard. I can probably do a little more, but not much.
- 5 Very Hard. That's all I can do.

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Psychophysical Monitoring?

0-10 Functional Pain Scale

0-10 Functional Pain Scale

We will be using the following 0-10 Functional Pain Scale to have you rate your pain during the evaluation.

Please be honest and select only ONE number.

Your responses will be <u>compared to your performance and test behaviors</u> during the evaluation, and to objective evidence contained in your medical records as a component of your pain behavior assessment.

No Pain	Mild Pain			Moderate Pain		Severe Pain			Extreme Pain	
0	1	2	3	4	5	6	7	8	9	10

Functional Pain Score Guidelines

0	No pain.	Pain is not present at all.
1-3	Mild pain.	Pain doesn't limit me from doing my normal daily activities.
4-6	Moderate pain.	Pain limits me to light activities. I need help from others with some of my normal daily activities.
7-9	Severe pain.	Pain limits me significantly. I need help from others with almost all of my normal daily activities.
10	Extreme pain.	Pain completely limits my ability to do anything. I am totally dependent on someone else to help me with all of my daily activities.

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Biomechanical Monitoring?

- Muscle recruitment
- Base of Support
- Posture
- Control & Movement patterns

Clinical observations (by trained examiners) of biomechanical signs of effort based on operationally defined criteria have shown good validity and reliability to determine safe effort levels.

Gross, Battie. Construct validity of a kinesiophysical functional capacity evaluation administered within a workers' compensation environment. J Occu Rehab. 13(4):287-295, 2003.

Reneman, Fokkens, Dijkstra, Geertzen, Groothoff. Testing lifting capacity: validity of determining effort level by means of observation. Spine. 30(2), E40-E46, 2005.

Gross, Battie. Reliability of safe maximum lifting determinations of a functional capacity evaluation. Phys Ther. 82(4): 364-371, 2002.

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Biomechanical Monitoring?

	Light	Moderate	Heavy	Maximal		
Muscle Recruitment	Prime movers only	Recruitment of accessory muscles, trunk and neck stabilizers	Pronounced recruitment of accessory muscles and stabilizers	Bulging of accessory muscles and stabilizers		
Base of Support	Natural stance	Stable base	Wider base	Very solid base		
Posture	Upright	Beginning of counterbalancing	Increasing counterbalancing	Marked counterbalancing		
Control & Movement Pattern	Easy movement patterns	Smooth movements	Begins to use momentum, difficult but not max	Uses momentum in a controlled manner, loss of control with added weight		

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Physiological Monitoring?

- Heart rate
- \odot O2 saturation
- Blood pressure
- Respiration rate

Continuous heart rate monitoring to calculate % heart rate increase and % maximum aerobic capacity have shown to have good validity and reliability for determination of safe effort levels.

Morgan, Allison, Heart rate changes in functional capacity evaluations in a workers' compensation population. Work. 42(2):253-257. 2012.

Innes. Reliability and validity of functional capacity evaluations: an update. Int J Dis Mgmt Res. 1(1):135-148, 2006.

Jay, Lamb, Watson, Young, Fearon, Alday, Tindall. Sensitivity and specificity of the indicators of sincere effort of the EPIC lift capacity test on previously injured population. Spine. 25(11):1405-1412. 2000.



Physiological Monitoring?

Load (lbs)	Pre-Test HR	Peak HR	% HR ↑	% Max AC	PWT C<30 F=30-41 O>41	MPHR	HRR	85% MPHR
20	70	82	17	12	С	170	103	145
30		90	29	20	С			
40		102	34	32	F			
50		116	66	46	Ο			

• 54 y/o male.

 % Maximum Aerobic Capacity = (Peak HR* – Resting HR)/[220-age] – Resting HR) *maximum heart rate during activity.

Becker T, Morrill J, Stamper E. Applications of work physiology science to capacity test prediction of fulltime work eight hour work day. The Rehab Prof 15 (4):45-56.

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Isometric/Static Strength Testing?

- Static leg lift test
- Static arm lift test
- Horizontal validity lift test
- Coefficient of Variance

Isometric/static lift testing has shown no relationship to dynamic lift capacity and the use of CV to classify effort level is not scientifically reliable.

Feeler, St. James, Schapmire. Isometric strength assessment, part 1: static testing does not accurately predict dynamic lifting capacity. Work. 37:301-308, 2010.

Townsend, Schapmire, St. James, Feeler. Isometric strength assessment, part II: static testing does not accurately classify validity of effort. Work. 37:387-394, 2010.





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Hand Grip Strength Testing?

- Maximum Voluntary Effort (Bell-shaped curve)
- Rapid Exchange Grip
- Stokes protocol
- Coefficient of Variance

Hand grip strength testing and COV have shown to be invalid and unreliable for determination of effort level.

Sindhu, hechtman, Veazie. Identifying sincerity of effort based on the combined predictive ability of multiple grip strength tests. J Hand Ther. 25(3):308-318, 2012.

Shechtman. The coefficient of variation as a measure of sincerity of effort of grip strength, part II: sensitivity and specificity, J Hand Ther. 14(3):188-194, 2001.

Niebuhr, Marion. Voluntary control of submaximal grip strength. Am J Phys Med Rehab. 69(2):96-101, 1990.





XRTS Lever Arm Testing?

 20% or less variance when compared to "similar" dynamic lift test.

The lever arm has a fixed axis point of rotation. This causes a forward displacement of the body's center of gravity as the load is raised. In contrast, a box and most other objects being lifted in the workplace do not have a fixed axis but allow for freedom of the body's center of gravity to move the load. The biomechanics of lifting are not identical as advertised.

Schapmire, St. James, Townsend, Feeler. Accuracy of visual estimation in classifying effort during a lifting task. Work. 40:445-457, 2011.





Recommended Methods for Determining Effort

- Psychophysical monitoring
- Biomechanical monitoring
- Physiological monitoring

Use of all 3 methods by a qualified FCE examiner provides the most valid and reliable assessment of a claimant's residual functional capacity.



NOT Recommended Methods for Determining Effort

- Isometric/Static
 Strength Testing
- Bell-Shaped Curve, Rapid Exchange Grip, Coefficient of Variance





• XRTS Lever Arm and HG Testing

CAUTION: Do NOT rely on the above testing methods or "high tech" equipment to produce a reliable, valid, or usable FCE result. Copyright© Functional Capacity Experts, LLC



Functional Limitations/Restrictions with Good Effort?

If Effort is Good and Pain Behavior is Normal.....

- FCE examiner should consider Pain/Symptom reports and RPE in final RFC determinations.
- If Effort is Poor and Pain Behavior is Abnormal.....
 - > Work Physiology Principles Heart Rate Response
 - FCE examiner should disregard reliability of self-reported Pain/Symptoms and RPE in final RFC determination.



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Functional Limitations/Restrictions with Poor Effort?

• If Effort is Good and Pain Behavior is Abnormal.....

- > FCE examiner should disregard reliability of selfreported Pain/Symptoms and RPE in final RFC determination.
- However, FCE examiner should consider recommendation for Psych eval and treatment if necessary to compliment Voc Rehab and improve RTW prognosis.

• If Effort is Poor and Pain Behavior is Normal.....

- > Work Physiology Principles Heart Rate Response
- > Age-Gender lifting norms.
- > FCE examiner should consider Pain/Symptom reports and RPE in final RFC determinations.



My 25 years of experience....don't provide a FCE report stating.....

- The claimant was only willing to perform activities falling within a Light work level. While it is likely they can perform work activities classified at a higher physical demand level, their current safe maximal work level could not be established due to their failure to fully cooperate during the FCE.
- Since the claimant invalidated their test results, their ability to participate in work related activities could not be determined.



Instead Expect a FCE Report to provide.....

- An opinion about the claimant's work level whether the individual provided good effort or poor effort.
 - > Good effort (Valid performance).
 - Objective evidence from functional testing
 - Objective evidence from physical exam
 - Objective evidence from medical records review
 - Symptoms + or –
 - > Poor effort (Invalid performance).
 - Same objective evidence as above with special emphasis on
 - Work Physiology
 - Age-gender norms for material handling activities.
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