Mahmud N, Schonstein E, et al. Functional capacity evaluations for the prevention of occupational re-injuries in injured workers (Review). Cochrane Database of Systematic Reviews 2010, Issue 7, Art No. CD0078290

Design: Meta-analysis of randomized controlled trials

PICOS:

- **P**atients: injured workers or claimants for workers compensation
- **I**ntervention: functional capacity evaluation (FCE) of physical capabilities in relation to the physical demands of the job, with one or more physical capacity measures assessed by a health professional, resulting in a recommendation regarding the worker's physical capacity to return to work (RTW) safely, either relating to the time the worker is considered fit to return to work or relating to workplace adjustments required for safe RTW
- **C**omparison intervention: unspecified; could be either no evaluation or a different form of physical capacity evaluation
- **O**utcomes: Any re-injury outcome measures after functional evaluation, such as time for RTW, days on sick leave, or duration of workers' compensation claims
- **S**tudy types: Any type of randomized controlled trial which met inclusion criteria
    - Randomized trial with any type of control group, or prospective cohort study, or clinical controlled trial with any type of control group, or interrupted time series with 3 observations before and 3 after the intervention
    - FCE of worker to meet physical requirements of the job are measured (e.g., if job required lifting 20 kg, FCE measured whether worker could lift 20 kg)
    - Outcome was either occupational disease, occupational injury, time for RTW, work status (on or off work) at follow-up, or sick days

Study search and selection:

- Databases were searched through December 2009 and included the Cochrane Central Register of Controlled Trials, MEDLINE, EMBASE, CINAHL, PsycINFO, and PEDro
- Reference lists from relevant studies were also searched to identify potentially relevant trials
- Two authors independently screened titles and abstracts of studies for satisfaction of inclusion criteria
- Study quality was assessed in terms of allocation concealment, blinding, complete accounting for all patients at follow-up, unbiased outcome reporting, number of patients sufficient to furnish a precise estimate of benefit, and consistency/heterogeneity between studies

Results:

- Initial screening of articles by keywords, titles, and abstracts identified 70 potentially relevant articles whose full text was reviewed (although 3340 citations were retrieved by the initial search of databases)
- Only 1 article fulfilled the inclusion criteria; most of the excluded articles lacked a control group or were historical cohort studies
- The single article which met the inclusion criteria had an internal validity quality rating of 12 out of a possible 13 points, and it compared two forms of FCE (Gross 2007)
- The included study involved 372 claimants, but the randomization was of the evaluating clinicians (n=23), who were assigned to either a standard long-form FCE (Isernhagen Work Systems), which takes 5 hours and is usually done over 2 days, or a short-form FCE developed by the author, which allows the clinician to select the regions of the body being tested, takes 4 hours, and is completed in one day
    - 173 patients received the short FCE and 199 received the standard FCE
    - Three outcomes were compared during the 12 months over which patients were observed
        - All recurrences after claim closure
        - Re-starting benefits after initial suspension
        - Re-opening or filing of new claim after initial closure of claim for the same incident
    - For all three outcomes, the short FCE and the standard long-form FCE had the same hazard ratios; the prediction of successful RTW was the same
    - The only statistically significant difference was the duration of the FCE, which was 43% shorter in the short FCE group

Authors' conclusions:

- No studies were found which compared FCE to no intervention
- Low quality evidence was found from one study that short form FCE results in similar recurrence rates to long form FCE; even though the study met nearly all criteria for validity, the overall findings were rated as low quality, since only one study was found
- It is unlikely that any studies were missed which would have met all inclusion criteria, since there were no language restrictions and all non-English abstracts were translated to determine their suitability for inclusion
- The effectiveness of FCE-based work recommendations should be investigated in randomized trials which compare FCE to no FCE or which compare FCE to alternative recommendations
- These future studies should use the time to recurrence or the rate of injury recurrence as the primary outcome measure

Comments:

- The criteria for inclusion were quite liberal; not only RCT but any study of FCE which had a control group would have been eligible for inclusion

- The search of the relevant databases was very large (3340 initial citations)
- More recent studies of FCE which would meet inclusion criteria are not apparent as of September 2012
    - There are no citations of this review in Web of Science; any studies of FCE which include an adequate literature review would be expected to find and cite this review
    - A search of PubMed for FCE and RTW retrieved 14 articles indexed as RCTs, but these either were not studies of FCE (e.g., they were studies of various rehabilitation treatments, did not study musculoskeletal conditions (e.g., studied coronary artery disease), or did not have RTW as a measured outcome *
- It does appear that most evaluations of FCE recommendations for RTW are not based on adequate evidence of the validity of FCE

Assessment: High quality for a statement that there is a lack of evidence supporting the validity of FCE for prediction of re-injury following return to work

Reference:
Gross DP, Battie MC, Asante AK. Evaluation of a short-form functional capacity evaluation: less may be best. J Occup Rehabil 2007;17(3):422-495.

Appendix: Results of search of PubMed for FCE plus RTW restricted to RCTs.

1: Vermeulen SJ, Anema JR, Schellart AJ, Knol DL, van Mechelen W, van der Beek AJ. A participatory return-to-work intervention for temporary agency workers and unemployed workers sick-listed due to musculoskeletal disorders: results of a randomized controlled trial. J Occup Rehabil. 2011 Sep;21(3):313-24. PubMed PMID: 21336673; PubMed Central PMCID: PMC3173632.

Not a study of FCE.

2: Lomond KV, Côté JN. Shoulder functional assessments in persons with chronic neck/shoulder pain and healthy subjects: Reliability and effects of movement repetition. Work. 2011;38(2):169-80. PubMed PMID: 21297287.

RTW is not a primary outcome; comparison is between healthy subjects vs. shoulder injury.

3: Vermeulen SJ, Anema JR, Schellart AJ, van Mechelen W, van der Beek AJ. Cost-effectiveness of a participatory return-to-work intervention for temporary agency workers and unemployed workers sick-listed due to musculoskeletal disorders: design of a randomised controlled trial. BMC Musculoskelet Disord. 2010 Mar 28;11:60. PubMed PMID: 20346183; PubMed Central PMCID: PMC2858719.

This is the protocol for Vermulen et al 2011 (ref #1 above).

4: Steenstra IA, Knol DL, Bongers PM, Anema JR, van Mechelen W, de Vet HC. What works best for whom? An exploratory, subgroup analysis in a randomized, controlled trial on the effectiveness of a workplace intervention in low back pain patients on return to work. Spine (Phila Pa 1976). 2009 May 20;34(12):1243-9. PubMed PMID: 19412140.

Not a trial of FCE as an intervention

5: Bültmann U, Sherson D, Olsen J, Hansen CL, Lund T, Kilsgaard J. Coordinated and tailored work rehabilitation: a randomized controlled trial with economic evaluation undertaken with workers on sick leave due to musculoskeletal disorders. J Occup Rehabil. 2009 Mar;19(1):81-93. Epub 2009 Jan 24. PubMed PMID: 19169654.

This is a study of collaborative RTW planning and rehabilitation, not of FCE

6: Gross DP, Battié MC, Asante AK. Evaluation of a short-form functional capacity evaluation: less may be best. J Occup Rehabil. 2007 Sep;17(3):422-35. Epub 2007 May 30. PubMed PMID: 17534702.

This is reviewed in the Cochrane FCE study Mahmud 2010.

7: Brubaker PN, Fearon FJ, Smith SM, McKibben RJ, Alday J, Andrews SS, Clarke E, Shaw GL Jr. Sensitivity and specificity of the blankenship FCE system's indicators of submaximal effort. J Orthop Sports Phys Ther. 2007 Apr;37(4):161-8. PubMed PMID: 17469668.

RTW is not a primary outcome.

8: Heymans MW, de Vet HC, Bongers PM, Knol DL, Koes BW, van Mechelen W. The effectiveness of high-intensity versus low-intensity back schools in an occupational setting: a pragmatic randomized controlled trial. Spine (Phila Pa 1976). 2006 May 1;31(10):1075-82. PubMed PMID: 16648740.

RCT of back school, not of FCE.

9: Lemstra M, Olszynski WP, Enright W. The sensitivity and specificity of functional capacity evaluations in determining maximal effort: a randomized trial. Spine (Phila Pa 1976). 2004 May 1;29(9):953-9. PubMed PMID: 15105664.

RTW is not the outcome under study; submaximal effort is the outcome.

10: Steenstra IA, Anema JR, Bongers PM, de Vet HC, van Mechelen W. Cost effectiveness of a multi-stage return to work program for workers on sick leave due to low back pain, design of a population based controlled trial [ISRCTN60233560]. BMC Musculoskelet Disord. 2003 Nov 21;4:26. PubMed PMID: 14629775; PubMed Central PMCID: PMC317323.

This is a protocol of a proposed study of a RTW program.

11: Arnetz BB, Sjögren B, Rydéhn B, Meisel R. Early workplace intervention for employees with musculoskeletal-related absenteeism: a prospective controlled intervention study. J Occup Environ Med. 2003 May;45(5):499-506. PubMed PMID: 12762074.

Not a trial of FCE.

12: Gatchel RJ, Polatin PB, Noe C, Gardea M, Pulliam C, Thompson J. Treatment- and cost-effectiveness of early intervention for acute low-back pain patients: a one-year prospective study. J Occup Rehabil. 2003 Mar;13(1):1-9. PubMed PMID: 12611026.

Study of functional restoration as an early rehab intervention, not a trial of FCE.

13: Engblom E, Korpilahti K, Hämäläinen H, Rönnemaa T, Puukka P. Quality of life and return to work 5 years after coronary artery bypass surgery. Long-term results of cardiac rehabilitation. J Cardiopulm Rehabil. 1997 Jan-Feb;17(1):29-36. PubMed PMID: 9041068.

Coronary artery disease, not musculoskeletal condition.

14: Frick MH, Harjola PT, Valle M. Work status after coronary bypass surgery. A prospective randomized study with ergometric and angiographic correlations. Acta Med Scand. 1979;206(1-2):61-4. PubMed PMID: 314724.

Coronary artery disease, not musculoskeletal condition.