Chapter 23:
Industrial Rehabilitation

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I. Importance of Work Program
- Most important component of work program is trained evaluator. "The professional preforming FCE needs to have experience and judgement appropriate to weight and significance FCE carries."[1]
    - First clarifies objective to referral question
    - Tailors format based on referral question and evaluee. No single or specified format applies
    - Administers test, documents data, and reports findings, which can have a profound impact
        - May determine final monetary settlement. Impairment is permanent, qualifiable physical loss related to injury. Disability is impairment and its impact on job performance.
        - Provides objective data for physician to make recommendations
        - Affects employment of evaluee (RTW)
        - Determines remedial or vocational candidacy
        - May affect workman's compensation payments
- Greatest negative effect on RTW is time off work. "The longer a worker has remained away from workplace, the less likely he or she will ever return."[1]

II. Testing (Must clarify objective to determine appropriate type of test)
A. Classifications of Work-Oriented Evaluations[1]
1. Functional Capacity Evaluation/Physical Capacity Evaluation
    - Both terms refer to a composite look at function—may be tailored to upper extremity or whole body
    - Typically a 4-8 hour evaluation, performed over one day. A second follow-up day can be useful for evaluating some clients.
2. Work Simulation
    - Evaluation of ability to return to job of injury or a transferrable skills job identified as a viable work option.
    - Simulation is based on actual job tasks deemed essential for the identified job.
3. Situational Assessment
    - Applies when evaluating ability to perform alternate type of work
    - Requires duplicating all aspects of the target (Fig. 1)
4. Evaluation of Specific Functional Capacity
    - Request to evaluate specific skill or physical demand (use a specific tool or machine, operate a keyboard, climb a ladder, lift a specific object/weight).
5. Fit-For-Duty Evaluation/Post-offer Screening
    - Determines whether worker can perform essential functions of a specific job
    - Screens for preexisting conditions that may place worker at risk
    - Only done after offer of employment has been made (pre-employment screening is no longer legal)
    - Considered a medical evaluation when performed by a trained clinician (medical professional, occupational therapist, physical therapist)

B. Safety

- Use trained clinicians, not technicians or new graduates
    - Trained clinician goes beyond basic protocol/administration aspects of testing. Takes on role of opinion providing expert with detailed observational skills.
    - Technician able to follow through with directions, protocols.
- Establish clinic safety guidelines for heart rate and blood pressure
- Screen for cardiac/stroke/high blood pressure history (Administer PAR-Q or other cardiac questionnaire)
- Take blood pressure and heart rate baselines to make sure they do not exceed clinic safety guidelines
- Get medical clearance from the referring or treating provider prior to testing if HR or BP measures exceed safety standards
- Whenever possible utilize instruments that are peer reviewed and/or have built in safety standards (i.e. The EPIC Lift Capacity Test)

C. FCE Components/Format
- Intake or initial interview
- Subjective evaluation
    - Pain assessment including VAS (which in its most valid form does not include numbers), Drawing, and/or Functional Pain Scale
    - ADL assessment and client's estimate of functional capacities (direct questioning, EPIC Hand Function Sort, DASH)
- Physical (neuromusculoskeletal) evaluation
    - Range of Motion
    - Strength
    - Sensation
    - Edema (volumetric or circumferential)
    - Soft tissue status
- Physical demand testing
    - Standardized tests (most work or time limited)
        - Purdue Pegboard (Fig. 2)
        - MRMT, Rosenbusch Test of Finger Dexterity—only test focused on simultaneously hold, manipulate, and place
        - Valpar Work Samples (Fig. 3)
        - Methods-time-measurement (MTM)-industry standard
    - Work simulation or general activity tests
    - Situational assessment or evaluation of specific functional capacity
    - Computerized variable resistance tests
    - Manual materials handling/lift capacity testing (EPIC, PILE, ISOINERTIAL-Select peer review tests)
        - Department of Labor Strength Categories (Sedentary 0-10 lb.; Light-10-20 lb.; Medium-20-50 lb.; Heavy 50-100 lb.; Very Heavy >100 lb.)
        - Kinesiophysical approach-trained observation (Isernhagen). High interrater and intrarater reliability especially for light and heavy categories of dynamic lifts.[2] Dynamic lift should be the standard to evaluate lifts in the workplace—not static.
        - Psychophysical approach - subjects determine own maximum levels

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Fig. 1. Situational Assessment. Actual equipment in actual setting.

Fig. 2. Purdue Pegboard Test. Standardized time limited test.

- Real-world dynamic testing is preferred over static
- Methods exist for static to dynamic extrapolation but have been shown to have poor correlation

- Re-evaluation
  - Response to activity-alteration of sensation, tissue inflammation, pain level
  - Follow-up questionnaire
- Sincerity of Effort/Consistency
  - Isometric testing-use of static force gauges or machines
    - Co-efficient of Variation (CoV) widely used but being questioned (Fig. 4)
      - Should never be used as sole indicator
      - Potentially flawed effort conclusions with lower scores (small stature, hand injured)[3]
    - Look for multiple instances of inconsistency-not just 1 or 2 tests such as CoV, REG (Fig. 5), 5 position grip, shape of static strength curve, but the validity of sincere effort of all these tests are being questioned.[4] Much research in this area is needed.
  - Cardiovascular-EPIC Lift Capacity Test[5]
    - Increased heart rate (HR) of 50% or more above RHR (standing) in EPIC Lift Capacity Test-definitive high effort
    - Increased HR less than 25%-definitive low effort
  - Behavioral (consistent vs. inconsistent)
    - States unable to do activity in interview, but then does activity requiring same strength, positioning, and motion
    - Scores don't match activity level-demonstrates minimal grip (6 pounds) on Jamar and 1 pound of pinch, but drove a large car to the FCE and parked in a difficult ramp
    - Reliability of pain and disability reports-battery of tests designed to look at dependability and accuracy of client's subjective reports of pain and associated disability
      - Test of non-organic findings (Waddell's test of non-organic back pain). Also being questioned as a measure of sincerity of effort.[4]
      - Tests that compare client's subjective reports of disability with client's functional capacities tested with distraction based activities
        - Direct client report of capacities
        - Formal Questionnaires (EPIC Hand Sort, Tool Sort)
  - Reasons for low or variable voluntary effort may include:
    - Misunderstanding instructions or test anxiety
    - Desire to be believed or cry for help
    - Lack of familiarity with testing equipment
    - Fear of re-injury or exacerbation of pain
    - Unidentified impairment

Chapter 23 Figures

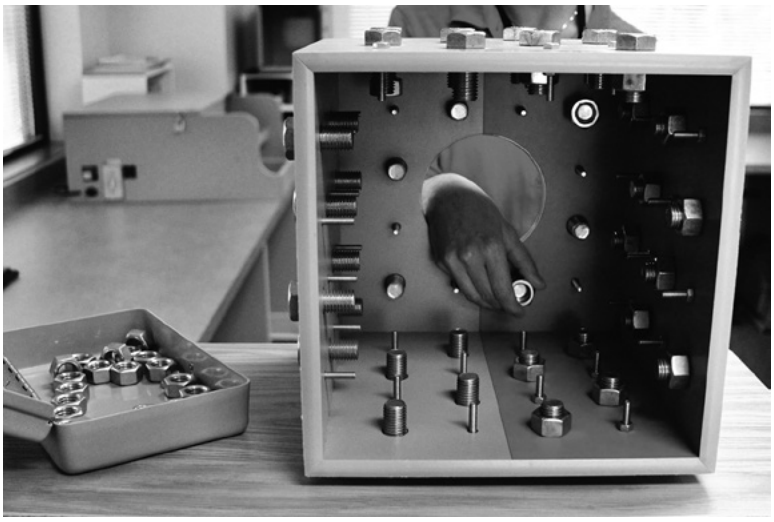

Fig. 3. Valpar Upper Extremity ROM.
Work limited test with MTM score-meaningful to industry.

Dynamometer Readings (lbs)

Position	Left			Avge	CV%	Right			Avge	CV%
position 1	6.4	5.4	7.5	6.4	16.3	17.1	9.6	10.0	12.2	34.5
position 2	7.9	7.8	7.9	7.9	0.7	9.9	8.9	8.5	9.1	7.9
position 3	8.1	8.2	9.9	8.7	11.6	11.4	10.8	11.4	11.2	3.1
position 4	6.8	8.3	6.4	7.2	14.0	8.5	8.6	8.2	8.4	2.5
position 5	7.2	7.9	6.3	7.1	11.2	8.3	10.1	9.0	9.1	9.9

Dynamometer Graph

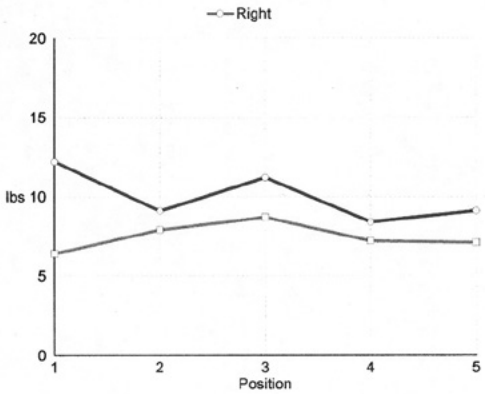

Fig. 4. 5 Handle Jamar Grip Test. Done on ULE system;
high COV on Right 1st handle position; unusual line graft.

- Issues related to secondary gain (enjoys staying home, makes better money comparatively when off work, increased attention with injury)

D. FCE Report should include:
- An overview of referral and background information
- The information gathered during the intake interview
- A summary of subjective symptoms taken from the pain and ADL evaluations
- Findings from the physical (neuromuscular) evaluation
- Observations from the physical demand testing, including standardized testing and observations from a work or task-specific evaluation, if performed
- A summary of effort findings (Isometric, Cardiovascular, Behavioral)
- A comment on the reliability of pain and disability reports when compared to observation of distraction based test components
- A summary, conclusions, and recommendations section

III. Therapy

A. Classification/Types

- **Work Therapy**
  - Part of an acute care program
  - May assist in maintaining worker identity
- **Work Conditioning**
  - May be provided by a single discipline
  - Objective is to restore physical capacity and function to enable RTW
  - Uses limited work tasks; emphasis on exercise (Fig. 6)
  - Multi-hour sessions up to 4 hrs/day, 5 days/week, 8 weeks
  - Most appropriate for early referral without psychological or vocational complications
- **Work Hardening**
  - Multidisciplinary including OT, PT, vocational specialist, and psychologist
  - Objective is to create mindset to prepare worker to RTW. Includes addressing client's physical, functional, behavioral, and vocational needs
  - Uses real or simulated work activities as its primary modality (Fig. 7)
  - Multi-hour sessions up to 8 hr./day, 5 day/wk, 8 weeks
  - Most appropriate for chronic cases with global issues

B. Evaluation

- Candidacy Screening (must be able to benefit)
  - Feasibility (energy, symptom control, ADL)
  - Cognitive function (memory, attention span, concentration)
  - Psychological qualities (mood, attitude, affect, goals)
  - Physical Function (stabilized pathology, medical complications)
- Components
  - Intake/interview
  - Subjective evaluation
  - Neuromusculoskeletal examination
  - Physical demand testing
  - Reevaluation

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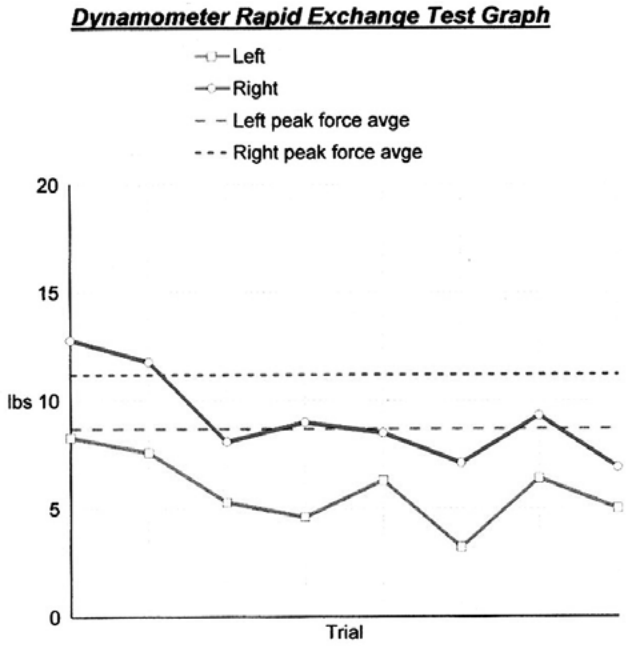

Fig. 5. Rapid Exchange Grip. Unusual pattern with both hands in mirrored decline.

Fig. 6. BTE Work Simulator 2. Pulling ropes as simulated activity.

C. Establishing an Individualized Treatment Plan
- List Problems
- Develop Program Intervention

D. Grading Participation
- Repetitions
- Duration
- Resistance (amount for repetitive 33-50% maximum static)
- Range of Motion
- Rate
- Accuracy
- Coordination (Fig. 8)
- Complexity

E. Documentation
- Progress note (daily)
  - Whether the patient completed the program
  - Pain behaviors and psychosocial complaints
  - Whether the patient made progress
  - Modalities received: when and what kind
  - Classes attended
  - Derogatory remarks
  - Plans for the next day
  - Cancellations and reason, no-shows, and attempts to reach the patient
  - Patient's attempts to problem solve
  - Characteristic extremity and prehension patterns used
  - Description of adaptations and modifications tried and their outcomes
- Daily Schedule Sheets and Circuit Sheets
- Progress Summary and re-evaluation
  - Communicates with referring physician, vocational specialist, and insurance company

IV. Establishing/Setting Up A Work Program

A. Identifying needs, Markets, and Programs

B. Staffing
- Patient staff ratio - 5:1 commonly accepted[6]
- Experience important

C. Physical Plant
- Clinic or warehouse setting
- On job site

D. Equipment
- Types of Workstations and Activities[6]
  - Resistive exercise equipment, computerized or noncomputerized (Fig. 6)
  - Aerobic exercise equipment
  - Commercially available, standardized or nonstandardized work samples
  - Custom-designed workstations
  - Workstation assignments (e.g., work in the clinic front office)
  - Therapeutic projects (e.g., crafts)

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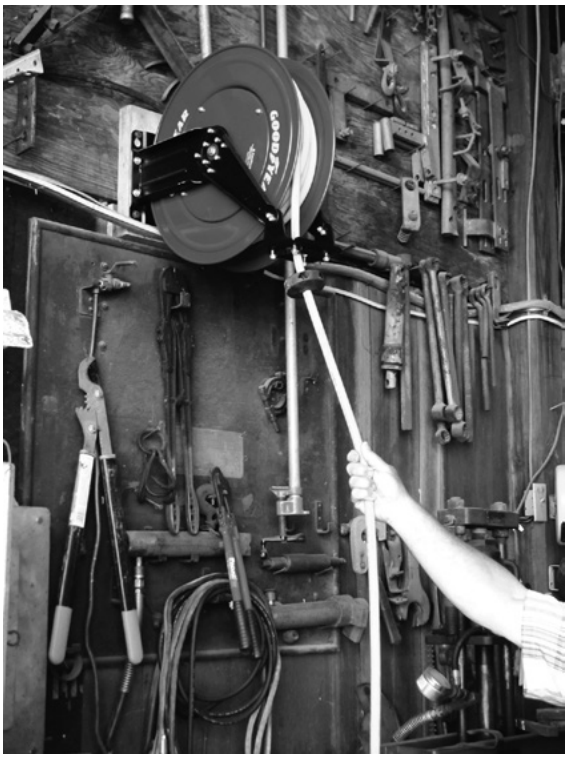

Fig. 7. Pulling air hose reel. Actual work activity requiring similar motion.

Fig. 8. Grooved Pegboard.
As with other standardized tests cannot be used for therapy and then testing.

- A workstation for each of the physical demands defined by U.S. Dept. of Labor
    - Fingering/Feeling/Handling/Reaching
    - Pushing/Pulling
    - Lifting/Carrying
    - Twisting/torquing
    - Crawling/Climbing

E. Successful Program Outcomes
- Return to Work
    - With same or different employer
    - With same, modified, or different job

F. Customer Satisfaction
- Client
- Referral source
    - Physician
    - Rehab Nurse
    - Vocational counselor
    - Attorney
    - Insurance Carrier

G. Evaluation of Work Programs
- Much research is needed to establish/improve outcome data
- Many things can complicate results
    - FCE is only as good as therapist designing, administering, and interpreting it
    - PPOs, HMOs, MCCs force use of less experienced therapists and/or often authorize an inadequate amount of time
    - The UE FCE, compared to spine or whole-body FCE, does not lend itself to standardized procedures

References

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4. Lechner D, Bradbury S, Bradley L. Detecting sincerity of effort: a summary of methods and approaches. Journal of Physical Therapy. 1998;78(8):867-888.
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Multiple Choice Questions

1. In it's most valid form the pain visual analogue scale (VAS) is…
   A. A pictoral display of facial expressions on a line
   B. A line with centimeter marks
   C. A line with descriptors at each end
   D. A line with descriptive comments along it

2. What are the three chief components of effort assessment in an FCE?
   A. Isometric, isotonic and isokinetic
   B. Isometric, behavioral and cardiovascular
   C. Isotonic, behavioral and coefficient of variation
   D. Isotonic, psychometric and coefficient of variation

3. Which factor has the greatest negative influence on return to work
   A. Age
   B. Endurance
   C. Lifting ability
   D. Time off work

4. Which term describes a work program that is multidisciplinary and comprehensive?
   A. Work conditioning
   B. Work therapy
   C. Work hardening
   D. Work simulation

5. If an evaluee's maximum lift is 40 pounds, in which physical demand category does he fall?
   A. Medium
   B. Sedentary
   C. Light
   D. Heavy

6. Which key candidacy screening concern addresses energy, symptom control, and ADL?
   A. Cognitive
   B. Feasibility
   C. Psychological
   D. Medical

7. Which testing equipment has higher face validity for lifting?
   A. BTE Work Simulator
   B. PRIMUS Work Simulator
   C. Jtech adjustable shelf unit
   D. Work Cube

Multiple Choice Questions

8. Which standardized test is scored using methods-time-measurement?
   A. Purdue Pegboard
   B. Valpar Simulated Assembly
   C. Minnesota Rate of Manipulation
   D. Jebsen's Hand Function Test

9. Which standardized test is a work limit test?
   A. Purdue Pegboard
   B. Minnesota Rate of Manipulation Test
   C. Valpar Simulated Assembly
   D. Jamar 5-Handle Grip Test

10. Which test is the only standardized test that focuses on the ability to simultaneously hold, manipulate, and place small objects?
   A. Rosenbusch Test of Finger Dexterity
   B. Crawford Small Parts Dexterity Test
   C. Bennett Hand Tool Dexterity Test
   D. Minnesota Rate of Manipulation Test

11. The ability of a test to provide a positive result when a condition exists (true positive)?
   A. Specificity
   B. Reliability
   C. Reactivity
   D. Sensitivity

12. Which of the following is an example of a time-limited test?
   A. Minnesota Rate of Manipulation
   B. Rosenbusch Test of Finger Dexterity
   C. Purdue Pegboard
   D. Valpar Simulated Assembly

13. When using standardized testing, what measurement is most useful to industry?
   A. Motion-time-standard
   B. Percentile score
   C. Co-efficient of variation
   D. Standard deviation

Multiple Choice Question Answer Key
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1-C, 2-B, 3-D, 4-C, 5-A, 6-B, 7-C,
8-B, 9-B, 10-A, 11-D, 12-C, 13-A