

Work Conditioning and Functional Capacity Evaluation: Strategies for Return-to-Work and Disability Management

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Objectives

- Describe the structure and components of a work conditioning program and its role in supporting functional recovery and return-to-work outcomes.
- Identify a functional capacity evaluation and explain how results are used to guide case management and work readiness decisions.
- Explain the application of impairment rating systems, including the Fifth and Sixth Edition.



Physical/Occupational Therapy Goals

- Acute tissue healing has occurred/medically stable
- Increased range of motion to at least 75%-80% (passive/active)
- Reduced pain, tenderness, and swelling (modalities)
- Increased strength 4/5 or higher
- Patient education & Postural training (Back School)
- No duty or Modified duty



Back School

- Cervical and Lumbar Patients
- Slide presentation reviewing causes of back pain and injuries, anatomy and biomechanics of spine, and ways to prevent re-injury.
- Physical demonstrations utilizing proper body mechanics through activities such as abdominal bracing, lifting, reaching, pushing/pulling, carrying, and pivot transfers.
- Allow patients a resource for more in depth information and 1:1 instruction.



Functional Baseline Test

Abbreviated Functional Capacity Evaluation.

PT/OT directing the work conditioning program given an outline of the IW's current physical ability before the first WC program visit.

Allows a more accurate estimation of total visits needed for a RTW status.

Graded, possibly catching submaximal effort early.



Work Conditioning Program

Plan:

Restore a client's physical health, confidence and function to safely RTW FD, RTW MD, or become physically reconditioned so vocational rehab can commence.

Program Content:

- Aerobic/Cardiovascular
- Stretching and Flexibility
- Functional Strengthening to attain Job Demands
- Patient Education
- Work or Job simulated activities



Work Conditioning Program

- 2-5 times a week at 2-4 hours, depending on work status and schedule
- Length of program 4-6 weeks
- 2025: Average 14.7 visits
- If unable to RTW FD after program recommend FCE



	2025	2024
Total Number of Patients in the Work Conditioning Program	91	91
Patients Return to Full-Duty	62 of 91 68%	66 of 91 73%
Patients Return to Modified-Duty	19 of 91 21%	20 of 91 21%
Patients need Further Medical Intervention	10 of 91 11%	5 of 91 6%
Visits per Referral	14.7 visits	11.3 visits



BTE Eval-Tech Functional Testing System



Components of a FCE

- Interview
- Vitals/Cardiovascular Intake
- Pain and Disability Index Scales
- Musculoskeletal screen
- Grip and Pinch tests
- Isometric tests: Horizontal, NIOSH, Push & Pull
- Positional tolerances determined by time-motion standards
- Bilateral and unilateral strength tests
- Lifting capacity protocol
- Functional activities based on Job Descriptions
- Aerobic Tests



Interview

- Create a timeline of events that have occurred since the date of injury.
- Gather subjective measures.
Ex: Perceived improvement %, outcome of therapy, current/best/worst pain levels, location and description.
- Determine if there are other factors that may affect the testing.
- Gather specifics on the client's work activities to better supplement the Job Description.



Vitals/Cardiovascular Intake

- The client's medical history is reviewed to determine if the client is cleared for testing.
- Pre-test blood pressure measurements are taken and are also tracked during certain testing applications.
- A client's heart rate is monitored throughout testing via Bluetooth wrist watch. The client's Maximum Heart Rate is programmed to stop or delay testing based on the real-time beats per minute reading.



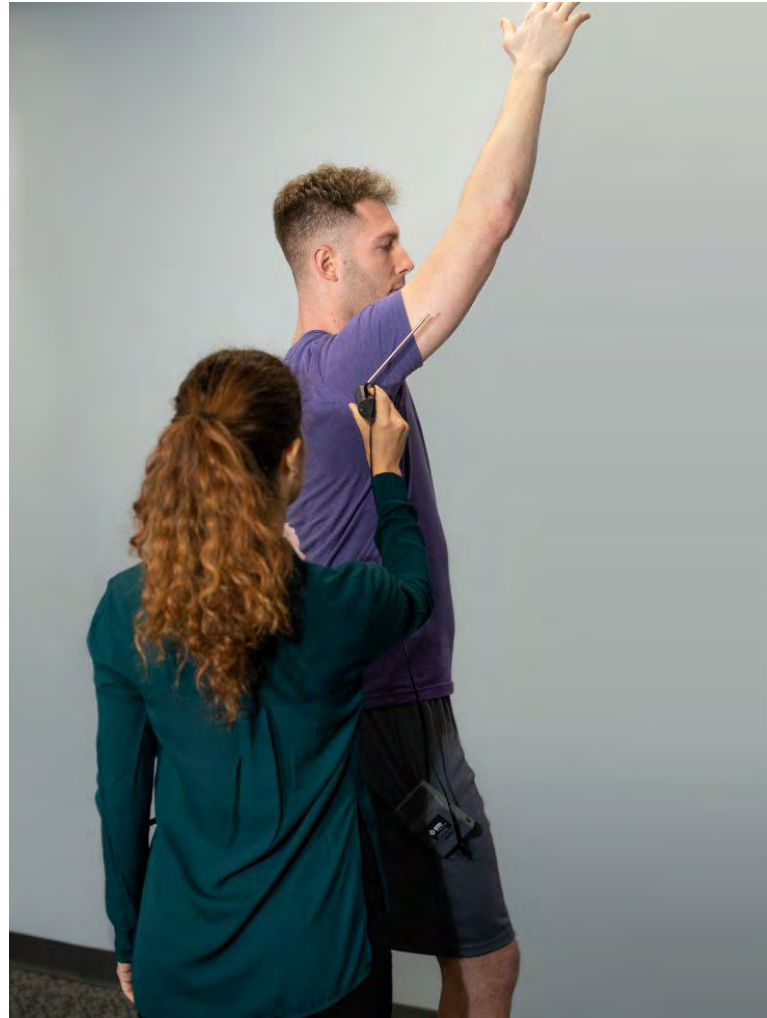
Pain and Disability Index Scales

- Upper Extremity = Quick Dash
- Lower Extremity = AAOS (American Academy of Orthopedic Surgeons) Lower Limb Outcome Scale
- Cervical = Neck Disability Index
- Low Back = Waddell's and Modified Oswestry



Musculoskeletal Screen

- Determine a client's strength and range of motion via manual muscle testing and goniometer measurements.
- Assess appearance, posture, gait and any assistive device use.
- Tests for sensation, reflexes, flexibility, atrophy, tenderness to palpation.
- Other clinical tests may be included based on the diagnosis.
- Inconsistencies
- Performed by PT or OTR/L, CHT



Coefficient of Variation (COV)

- Grip, Pinch, Isometric Lift/Push/Pull, and Manual Muscle Tests are all performed for three repetitions.
- All three lifts are expected to be within 15% of each other.



Grip Testing

- **MVE (Maximum Voluntary Effort)**

- COV's <15% with at least 6/10 trials
- 5 Hand Positions = Bell Shape Curves
- Power Position = 2 or 3
- Hand Position 1 < 2

- **REG (Rapid Exchange Grip)**

- REG < MVE
- COV's < 15%

- **Standard Grip**

- COV's < 15%
- Average force values compared to norms

- **Hand Dominance Comparison**

- If right handed, right should be within 8-12% > left
- If left handed, there should be minimal or no difference between hands (unless hand injury)



Pinch Testing

- COV's < 15%
- Cross test comparison:
Key > Palmar > Tip
- Hand grip strength > Key
pinch strength



Isometric Strength Test

Horizontal Validity Lifts:

Within 67% of horizontal displacement

3 Lifts: Squat lift, Torso Lift, High-Near Lift

COV < 15%

NIOSH Lifts:

National Institute for Occupational Safety and Health

COV < 15%

Leg lift, Torso Lift, Arm lift, High Far lift, and High Near Lift.

All Isometric Tests > 15 pounds to perform ADL's

Isometric Muscle Testing:

Strength testing to determine strength in specific joint ranges. (Shoulder flexion, extension, IR, ER)

Similar method to manual muscle testing done during therapy evaluations.



Horizontal Validity

- Squat lift, Back lift, and High Near Lift.
- 3 Lifts performed at a certain distance.
- 1 Lift performed afterwards at a closer or further distance from BTE.
- Lifts are compared and expected to be greater than 33% difference.



Positional Tolerances

Time-Motion Standards

- Measured ROM vs. Observed
- Standing, reaching all levels, stooping, bending, squatting, crouching etc.
- Occasional: 1-33% of work day.
1-20 minutes per hour
- Frequent: 33-67% of work day.
21-40 minutes per hour
- Constant: 67%-100% of work day.
41-60 minutes per hour



Dynamic Lifting and Carrying

- **Heart Rate Response**

At Minimum want a 10% increase in heart rate for all lifts and carry tests

- **Pain Reports**

Are they consistent across testing and objective findings

- **Observed vs. Measured**

Measured ROM should be consistent with ROM observed during lifting

- **Biomechanical Changes**

Are they consistent with diagnosis and subjective reports



Heart Rate Change

10% minimum increase in HR during each lifting phase to be considered maximal effort. HR is documented at the start and stop points of each lift.

Maximum heart rate(MHR) is compared to the client's stated level of exertion.

1-10 Perceived Exertion Scale. 1=80, 10=160. Each +1 on the scale is +10.

The difference must be 50 or lower to be considered maximal effort.

Example:

Client reached a MHR of 112 and rated their exertion at 7(140):

$140 - 112 = 28$. (Pass)



Isometric Push and Pull Tests

- COV's < 15%
- Cart Push 17% > Cart Pull
- Shoulder Push 20% > Shoulder Pull
- Cart Push & Pull 20% > Shoulder Push & Pull
- Cart Push 10-20% of body weight
- Maximal force should occur within 2 seconds of the timed duration



Dynamic Push/Pull



Functional and Job Specific Tasks



Functional and Job Specific Tasks



Aerobic Tests



FCE Results

- If job demands met, recommend return to work full duty
- Recommend positional restrictions and weight limitations if needed
- If no job description is provided, recommend patient return to work within their demonstrated physical abilities
- If patient inconsistent, test can justify returning to work full duty.



Impairment Ratings

Impairment is defined as “a significant deviation, loss, or loss of use of any body structure or body function in an individual with a health condition, disorder, or disease.”

Disability is defined as “activity limitations and/or participation restrictions in an individual with a health condition, disorder, or disease”

Impairment rating is a process that attempts to link impairment with functional loss and continues to be defined as a “consensus-derived percentage estimate of loss of activity reflecting severity for a given health condition, and the degree of associated limitations in terms of activities.”



5th & 6th Edition AMA Guides

5th

- First printing: November 2000
- 5th Edition AMA Guides most often used as source of impairment ratings in Virginia.
- Rating is specific to the body part.
Example: Hand, Arm, Foot, Leg, Finger, Toe etc.

6th

- First Printing: November 2007
- Second Printing: April 2009
- Last update 2025
- Used for Federal WC Claims

Federal Employees Compensation Act
Energy Employees Occupational Illness
Longshore and Harbor Worker's Act
Ex: D.O.L., Postal Workers, TSA



North Carolina Impairments

Last updated February 5th,
2009.

If injury occurred in NC then
you have to use the NC Rating
Guide.



Form 25R must be completed.



5th Edition



ImpairMaster Software

Upper Extremity IR - 5th Edition AMA

Right shoulder flexion, 168°, 160°, and 165°, maximum motion of 168° = 1% right upper extremity
(Figure 16-40, p. 476)

Right shoulder extension, 50°, 45°, and 42°, maximum motion of 50° = 0% right upper extremity
(Figure 16-40, p. 476)

Right shoulder abduction, 160°, 165°, and 150°, maximum motion of 165° = 1% right upper extremity
(Figure 16-43, p. 477)

Right shoulder adduction, 40°, 30°, and 30°, maximum motion of 40° = 0% right upper extremity
(Figure 16-43, p. 477)

Right shoulder internal rotation, 50°, 58°, and 50°, maximum motion of 58° = 2% right upper extremity
(Figure 16-46, p. 479)

Right shoulder external rotation, 70°, 60°, and 68°, maximum motion of 70° = 0% right upper extremity
(Figure 16-46, p. 479)

Upper Extremity Range of Motion Summary

Range of motion impairments within the same joint (i.e. shoulder, wrist, etc.) are added. The sum is then later combined with other impairments in the same body region.

Right shoulder ROM summary: 2% + 1% + 1% = 4% right upper extremity

Summaries and Conversions

Conversions from upper extremity and lower extremity to whole person are based on Table 16-2 (p. 439) and Table 17-3 (p. 527) respectively.

Right upper extremity summary: 4% right upper extremity

4% right upper extremity = 2% whole person



Digit IR -5th Edition AMA

Left Side

Left thumb IP flexion maximum motion of $30^\circ = 4\%$ left thumb (Figure 16-12, p. 456)

Left thumb IP extension maximum motion of $5^\circ = 2\%$ left thumb (Figure 16-12, p. 456)

Left thumb MP flexion maximum motion of $45^\circ = 2\%$ left thumb (Figure 16-15, p. 457)

Left thumb MP extension maximum motion of $0^\circ = 0\%$ left thumb (Figure 16-15, p. 457)

Left thumb lack of radial abduction maximum motion of $50^\circ = 0\%$ left thumb (Table 16-8a, p. 459)

Left thumb lack of radial adduction maximum motion of $0^\circ = 0\%$ left thumb (Table 16-8a, p. 459)

Left thumb opposition maximum motion of 6cm = 3% left thumb (Table 16-9, p. 460)

Left thumb ROM summary: $4\% + 2\% + 2\% + 3\% = 11\%$ left thumb

Hand Summary

Left thumb summary: 11% left thumb

Left thumb conversion: 11% left thumb = 4% left hand (Table 16-1, p. 438)

Left hand summary: 4% left hand

Left hand conversion: 4% left hand = 4% left upper extremity (Table 16-2, p. 439)



Lower Extremity IR – 5th Edition AMA

Lower Extremity Impairments

Muscle atrophy was observed in the subject's right thigh. Impairment is based on the difference in circumference between the left and right thigh as measured 10 cm above the patella with the knee fully extended and the muscles relaxed. The difference in circumference between the two sides is 1.5 cm. Based on Table 17-6, p. 530, the impairment is 6% right lower extremity.

Muscle atrophy was observed in the subject's right calf. Impairment is based on the difference in circumference between the left and right calf as measured at the same level on both sides. The difference in circumference between the two sides is 0.5 cm. Based on Table 17-6, p. 530, the impairment is 0% right lower extremity.

Summaries and Conversions

Conversions from upper extremity and lower extremity to whole person are based on Table 16-2 (p. 439) and Table 17-3 (p. 527) respectively.

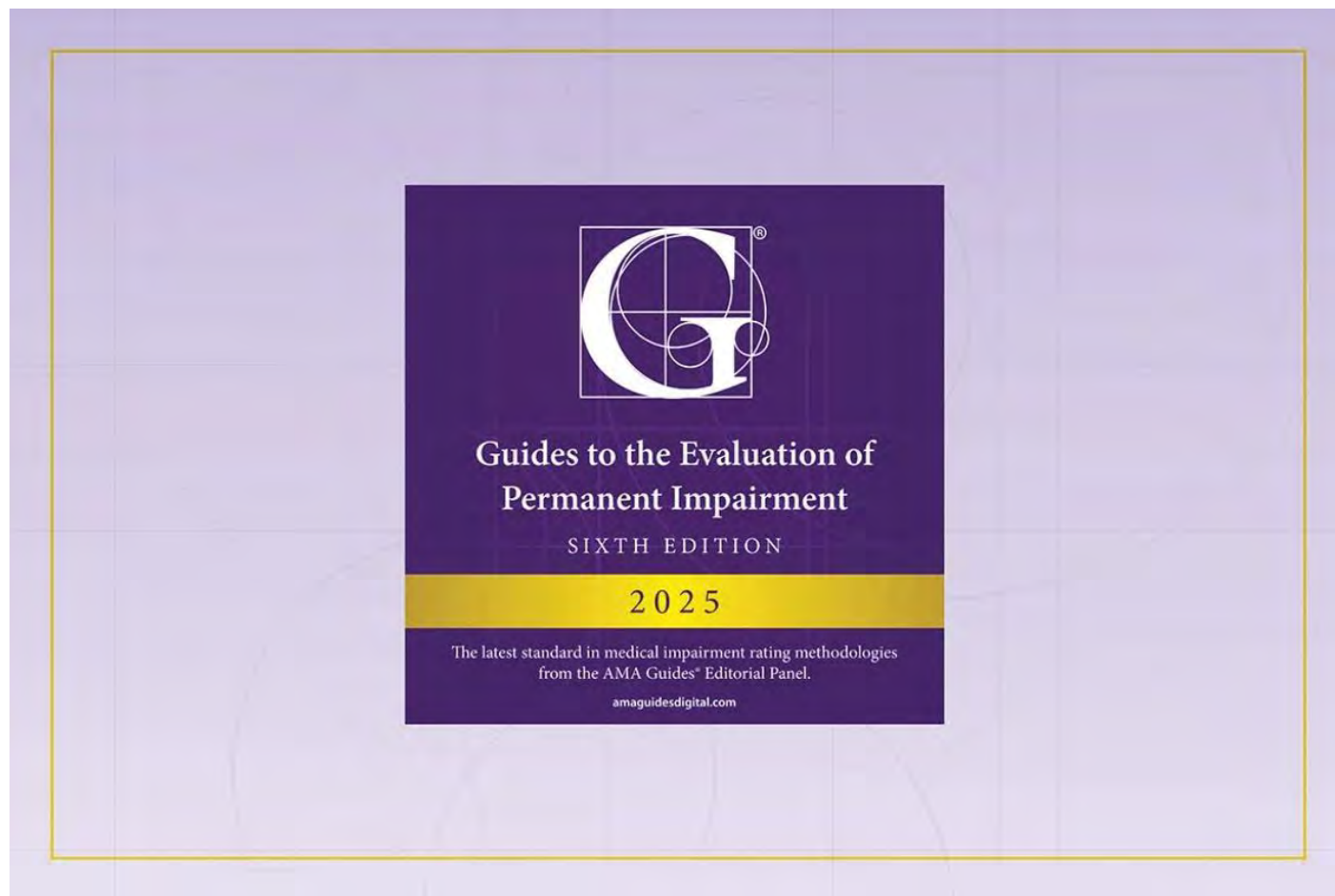
Right lower extremity summary: 6% right lower extremity

6% right lower extremity = 2% whole person

Whole person impairment (WPI) summary: 2% whole person



6th Edition Guides



5 Classes of Diagnosis Based Impairments (DBIs)

Class	Description	Example Diagnosis
0	No Problem	Soft Tissue
1	Mild Problem	Muscle/Tendon/Ligament
2	Moderate Problem	Joint Replacements
3	Severe Problem	Fusions
4	Very Severe Problem	Amputations



Upper and Lower Extremity Diagnosis Grid

Diagnosis Criteria	Class 0	Class 1	Class 2	Class 3	Class 4
Class Definitions	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
Ranges	0%	1% - 13%	14% - 25%	26% - 49%	50% - 100%
Grade		A B C D E	A B C D E	A B C D E	A B C D E



Grading Criteria

	Grade Modifier 0	Grade Modifier 1	Grade Modifier 2	Grade Modifier 3	Grade Modifier 4
Functional History	No problem	Mild Problem	Moderate Problem	Severe Problem	Very Severe Problem
Physical Exam	No problem	Mild Problem	Moderate Problem	Severe Problem	Very Severe Problem
Clinical Studies	No problem	Mild Problem	Moderate Problem	Severe Problem	Very Severe Problem



6th Edition AMA Report

Manual Report Example:

Mr. Smith is being seen for an impairment rating recommendation using the American Medical Association Guides to the Evaluation of Permanent Impairment, Sixth Edition.

Regional Impairment; Diagnosis: left elbow distal biceps tendon tear assigned to **class 1** with a midrange default value of 5% left upper extremity impairment.

Adjustment grids: Functional History: **Grade modifier 2** for a Quick Dash score of 48; Physical Examination; **Grade modifier 1** for minimal palpatory findings; Clinical Studies; **Grade modifier 2** for MRI confirmation of biceps tendon, moderate pathology.

Net adjustment is +2. Moved to the right of default value C to grade E resulting to a 7% left upper extremity impairment.



Impairmaster Software

- Impairmaster Software currently being updated to meet 2025 changes for the 6th Edition.



- Newer 6th Edition updates not available in a physical form. (Digital Only)



Updated 6th Edition for 2024 (Now 2025)

Objective:

To determine the ease of use, accuracy, consistency, reliability, and reproducibility for rating lower limb conditions when transitioning to the Sixth Edition 2024 compared with the *AMA Guides* Sixth Edition 2009

Methods:

Three physician experts and four premedical students completed two rounds of impairment ratings using the *AMA Guides* Sixth Edition 2009 versus the *AMA Guides* Sixth Edition 2024.

Results:

For experts, the average time to complete an impairment rating was 4.1 minutes using the Sixth Edition 2024 compared with 16.7 minutes using the Sixth Edition 2009, maintaining 100% accuracy and reliability for both methods. Premedical students averaged 5.3 minutes with the Sixth Edition 2024 and 24.0 minutes with the Sixth Edition 2009, showing increased accuracy, consistency, reliability, and reproducibility with *AMA Guides* 2024.

- Melhorn, J. Mark, et al. "Reliability and Methodological Advancements in the 2024 AMA Guides for Rating Lower Limb Impairment." *JAAOS: Global Research and Reviews*, vol. 9, no. 6, June 2025, <https://doi.org/10.5435/jaaosglobal-d-25-00072>. Accessed 20 Nov. 2025.



Determining which AMA Guide to Follow

- Client reliability and validity. If inconsistent will use the least rating possible which can be as low as 0%.
- Diagnosis Based Impairments(6th) are typically less than Range of Motion values(5th).
- Where did the injury occur? Varies by state.
- Virginia Workers' Compensation Commission states that Virginia does not require a specific edition to be used.
- Federal, Longshore, DOL – 6th Edition only.



Questions?

