

Upper Extremity Functional Assessment

The upper extremity functional assessment is designed to test the upper extremity following surgery or injury to determine the patient's readiness to return to sport. The assessment addresses ROM, proprioception, strength, endurance, motor control and functional testing. Descriptions of each test with recommended standards is found in the back. The assessment should be utilized once patient has completed the appropriate rehab and has been cleared by physician.

Patient Name: _____

MRN: _____

Injury/Surgery: _____

Date of Injury/Surgery: _____

Concomitant Injuries/Procedures: _____

	Operative Limb	Non-operative limb	Limb Symmetry Index
Passive Range of Motion: ER-0-IR at 90° ABD	- 0 -	- 0 -	-
Joint Position Sense – Mid range (Avg 3 trials each limb)			
Joint Position Sense – end range (Avg. 3 trials each limb)			
External Rotation Strength (Avg of 3 trials) <i>Handheld Dynamometer</i>			
In scapular plane			
In 90° ABD			
Eccentric ER in scapular plane			
Internal Rotation strength (Avg/3 trials) <i>Handheld dynamometer</i>			
In scapular Plane			
In 90° ABD			
Ratio of ER/IR in scapular plane			
Ratio of ER/IR in 90° ABD			
Periscapular Strength (Avg/3 trials)			
Middle Trapezius			
Lower Trapezius			
Motor Control			
Scapular Dyskinesia Test	Symmetry: Yes or No		
Functional Performance Tests (Avg/3 trials)			
Upper Quarter Y-Balance			
Closed Kinetic Chain Upper Extremity Stability	Males: ≥ 21 Yes or No		Females ≥ 23 Yes or No

Single arm seated shot-put test			
Shoulder Endurance			
Posterior shoulder endurance test			

Cleared for sport activities: Yes No

Recommendations:

Examiner: _____

Joint Position Sense: Patient in supine. Arm ABD to 90 degrees with elbow flexed 90 degrees. Patient’s eyes closed, move the patient’s arm passively to an angle of either ER or IR, measure that angle. Then passively move the shoulder through ER and IR, then ask patient to actively reproduce the angle measured. Repeat at various angles for 3 trials and record for both mid-range and end range.

- A > 5 degrees error is considered abnormal

Strength Testing

External rotation strength: Using a handheld dynamometer(HHD). Patient is supine and instructed to apply maximal isometric force against the HHD positioned just proximal to the wrist. Measured in both the scapular plane and in 90 degrees ABD. Average of 3 trials for each limb, in each position.

- Limb Symmetry: Involved \geq 90% of uninvolved

Internal rotation strength: Using an HHD. Patient is supine and instruct them to apply a maximal isometric force against the HHD positioned just proximal to the wrist. Measured in both scapular plane and in 90 degrees ABD. Average of 3 trials for each limb, in each position.

- Limb Symmetry: Involved \geq 90% of uninvolved

Eccentric external rotation strength: Measured with the HUMAC system. Patient is seated and it is measured in both scapular plane and 90 degrees ABD. Average of 3 trials for each limb, in each limb.

- Limb Symmetry: Involved \geq 90% of uninvolved

ER/IR Ratio: Calculated for each limb based on the average of 3 trials. The average external rotation isometric strength is divided by the average internal rotation isometric strength.

- Limb Symmetry: involved arm \geq 90% of uninvolved arm

Middle Trapezius: Measured with HHD. Patient in prone with arm ABD 90 degrees. Instruct patient to apply maximal isometric force against the HHD that is proximal to the elbow in the horizontal abduction direction. Average of 3 trials for each limb.

- Limb Symmetry: Involved \geq 90% of uninvolved

Lower Trapezius: Measured with HHD. Patient in prone with arm elevated to 120 degrees. Instruct patient to apply maximal isometric force applied against the HHD that is just proximal to the elbow in the elevation direction. Average of 3 trials for each limb.

- Limb Symmetry: Involved \geq 90% of uninvolved

Motor Control

Scapular dyskinesis test: Patient is standing facing away from clinician. Patient's arms at the sides in neutral rotation. Bilateral shoulder flexion and ABD performed through the full range of motion. Arms elevated at a cadence of 25 bpm for 5 repetitions. Patients that weigh < 150lb use 3 lbs., patients weighing > 150lb use 5lbs. The clinician is determining if there is symmetry or asymmetry in scapulohumeral motion. Document the quality of motion.

Functional Performance tests

Upper Quarter Y-balance Test: Patient in push-up position, with feet \leq 12 inches apart. Patient performs a maximal effort reach with the free hand in 3 directions: medial, superolateral and inferolateral (named in relation to stationary arm). Distance reached is recorded for each hand. Average the 3 trials for each direction. The sum of the 3 directions is calculated for total excursion score.

- Limb Symmetry: Involved \geq 90% of uninvolved

Closed Kinetic Chain Upper Extremity Stability test (CKCUEST): Place 2 strips of 1.5-inch athletic tape on the ground parallel to each other 36-inches apart. Starting Position: push-up position with one hand on each piece of tape. Males have knees off the ground, females may have knees on the ground in modified position. Move one hand across their body and touch the piece of tape on the opposite side, then return to starting position. Then perform with the opposite arm. Back should remain straight and hands and shoulders in a perpendicular position. Test is 15 seconds. Each tape touch is 1 repetition. Average of 3 trials.

Single arm seated shot-put test: Patient is long sitting with back against a wall/backrest. 2kg medicine ball is in their hand with elbow tucked against their torso as far back into the backrest/wall as possible. Opposite arm is on the patient's lap. Instruct patient to shot-put the medicine ball as hard as they can to throw the greatest distance. Patient's knees cannot bend. Test is repeated if the patient's test arm crosses midline, torso moved away from wall/backrest, knees bent, or preloaded before putting the ball. Average of 3 trials.

- Limb Symmetry: Involved \geq 90% of uninvolved

Shoulder Endurance

Posterior shoulder endurance test: Patient in prone with test shoulder off the table and arm perpendicular to the floor with elbow extended. Patient holds a weight that is 2% of bodyweight. Patient horizontally abducts the arm to 90 degrees at a cadence of 30 bpm. There is a 1 second hold at the top of the arc of motion. Repeat until patient fatigues indicated by inability to hold arm at top of the arc of motion (1 second), compensation with elevation of entire upper torso, verbal report of inability to continue. Total repetitions are counted for each side.

- Limb Symmetry: Involved \geq 90% of uninvolved

References:

- Ager LA, Roy JS, et al. Shoulder proprioception: how is it measured and is it reliable? A systematic review. *Journal of hand therapy*. 2017; 30: 221-231.
- Chmielewski TL, Martin C, Lentz TA, et al. Normalization Considerations for Using the Unilateral Seated Shot-Put Test in Rehabilitation. *Journal of Orthopaedic & Sports Physical Therapy*. 2014;44(7):518-524. doi:10.2519/jospt.2014.5004
- Davies GJ, Wilk KE, Irrgang J, Ellenbecker TS. The use of a Functional Testing Algorithm (FTA) to make qualitative and quantitative decisions to return athletes back to sports following shoulder injuries. *Clinical Orthopedic Rehabilitation: A Team approach*. 2018. Doi: 10.1016/b978-0-323-39370-6.00037-8.
- De Oliveira VMA, Pitangui A, Nascimento V, et al. Test-retest reliability of the closed kinetic chain upper extremity stability test (CKCUEST) in adolescents. *The International Journal of Sports Physical Therapy*. 2017; 12(1): 125-132.
- Lee D-R, Kim LJ. Reliability and validity of the closed kinetic chain upper extremity stability test. *Journal of Physical Therapy Science*. 2015;27(4):1071-1073. doi:10.1589/jpts.27.1071
- McClure P, et al. A clinical method for identifying scapular dyskinesis, part 1: reliability. *Journal of athletic training*. 2009; 44(2): 160-164.
- Michener LA, Boardman ND, et al. Scapular muscle tests in subjects with shoulder pain and functional loss: reliability and construct validity. *Physical therapy*. 2005; 85(11): 1128-1138.
- Moore SD, Uhl TL, et al. Improvements in shoulder endurance following a baseball specific strengthening program in high school baseball players. *Sports health*. 2013; 5(3): 233-238.
- Pontillo M, Spinelli BA, Sennett B. Prediction of In-season shoulder injury from preseason testing in Division I collegiate football players. *Sports Health*. 2014;6(6): 497-503.
- Pontillo M, Sennett BJ, Bellm E. Use of an upper extremity functional testing algorithm to determine return to play readiness in collegiate football players: A case series. *International Journal of Sports Physical Therapy*. 2020;15(6):1141-1150. doi:10.26603/ijsp20201141
- Roush JR, Kitamura J, Waits MC. Reference values for the closed kinetic chain upper extremity stability test (CKCUEST) for collegiate baseball players. *North American Journal of Sports Physical Therapy*. 2007; 2(3): 159-163.
- Schwartz G, Bauer J, Muehlbauer T. Upper Quarter Y Balance test performance: Normative values for healthy youth aged 10 to 17 years. *PLoS ONE*. 2021;16(6): e0253144. <https://doi.org/10.1371/journal.pone.0253144>. Accessed on July 1, 2021.
- Tucci HT, Martins J, Sposito GC, et al. Closed kinetic chain upper extremity stability test (CKKUEST): a reliability study in persons with and without shoulder impingement syndrome. *BMC Musculoskeletal disorders*. 2014;15(1):1-9. <http://www.biomedcentral.com/1471-2474/15/1>. Accessed on July 1, 2021.
- Westrick RB, Miller JM, Carrow SD, Gerber JP. Exploration of the Y-balance test for assessment of the upper quarter closed kinetic chain performance. *The International Journal of Sports Physical Therapy*. 2012; 7(2): 139-147.

Contact	Please email *** with questions specific to this protocol
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References