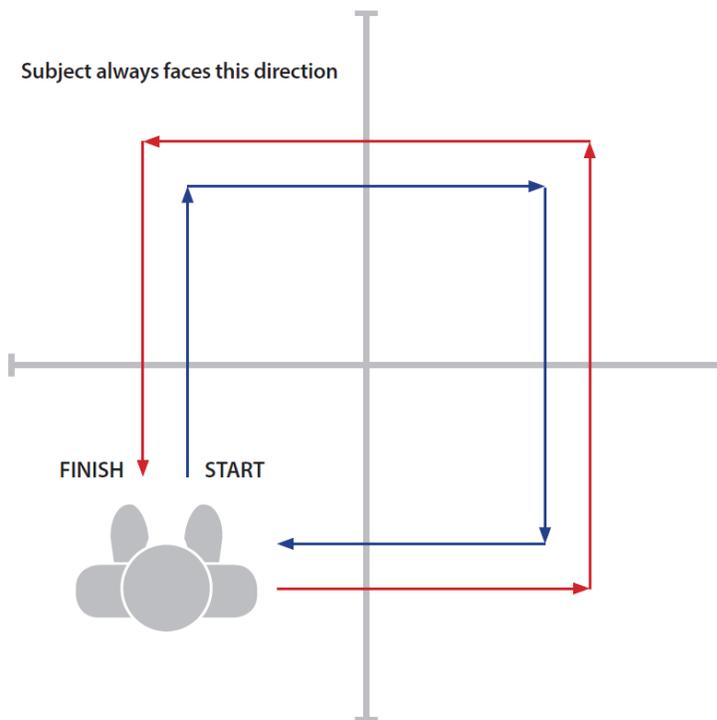


Performance Assessments Used in METRC Studies

Physical performance is measured using objective tests in four domains of function: agility, strength and power, speed, and postural stability. The performance test battery includes a dyad of less demanding and more demanding tests of agility, strength and speed to delineate the impact of injury on high functioning study participants, in particular those enrolled at Military Treatment Facilities. Tests were selected by an expert panel of physical therapists and orthopaedic surgeons and include those that were feasible to conduct in the hospital clinic and which could be facilitated by Research Coordinators with minimal training. As a measure of safety, written approval is required from the treating surgeon before participants complete the performance tests. Participants are asked to complete one practice trial followed by two timed trials for each test, starting with the less demanding and then moving to the more demanding test as described below.

Agility

Four Square Step Test (FSST)- Participants are asked to rapidly step forward, sideways, and backward over PVC piping laid out in a cross on the floor and then again in reverse order (figure). All steps are taken while facing the same direction as the starting position and one foot is in contact with the ground at all times.¹ Participants move onto the Illinois Agility Test if they are able to complete the FSST in 15 seconds or less.



Illinois Agility Test- Participants are required to navigate through a series of cones placed 3.3 meters apart as quickly as possible (figure)². The course tests participant's ability to turn in different directions and at different angles making it more challenging than the four square step test.

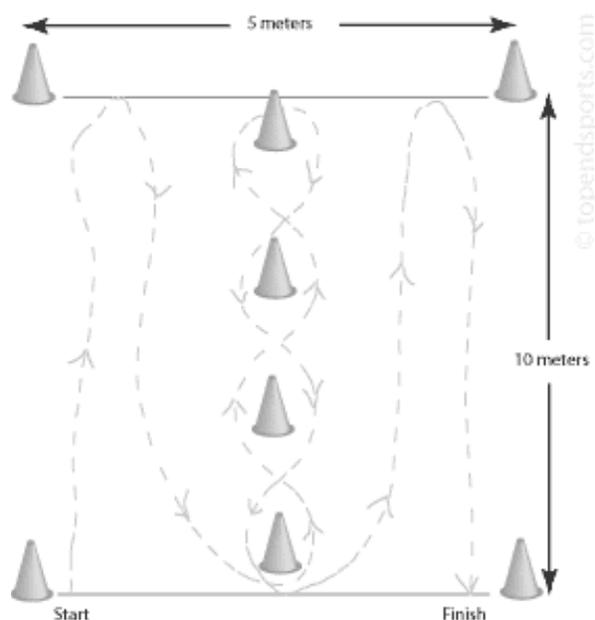


Illustration borrowed from <http://www.topendsports.com/testing/tests/illinois.htm>

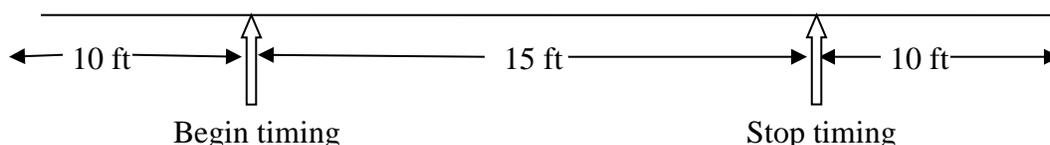
Strength/Power

Sit to Stand – This test is used to assess lower extremity muscle strength. Participants are required to complete five full stands from a sitting position in a straight back chair with arms folded across the chest as quickly as possible (figure)³. The participant is unable to do the test if 1) his/her back goes into the back of the chair, 2) he/she loses balance, 3) if he/she can't keep arms crossed or if 4) he/she kicks legs out. Participants are asked to complete the timed stair ascent (i.e. the “more demanding test of strength/power) even if they can't do the sit to stand. The timed stair ascent tests different aspects of strength and power and it is possible that a participant can't do sit to stand but will be able to climb stairs with little difficulty.

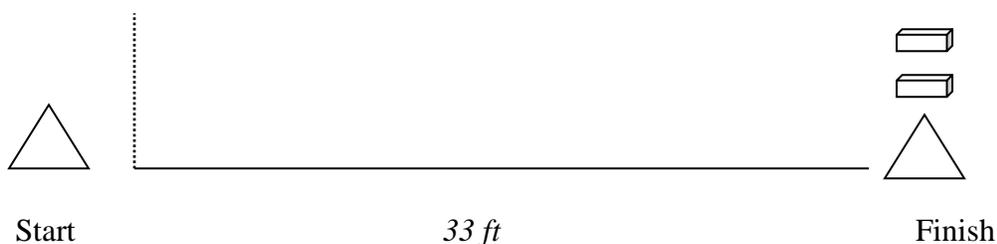
Timed Stair Ascent- This test measures mobility and power that requires greater strength and range of motion than level ground walking.³ Participants are required to climb a flight of stairs (minimum of 10 consecutive equally sized stairs with 11" Run, 7" rise) without the use of a handrail as quickly as possible. Each step must be touched on the ascent; handrails should only be used when absolutely necessary.

Speed

Self Selected Walking Speed- Participants are required to walk 30 feet on a level surface at normal walking pace with or without an assistive device. The course is marked off so participants have 10 feet to obtain a steady state (i.e. obtain their normal walking speed and pattern). The stop watch is started when the participant reaches the 10' mark and stopped when they pass the 25' mark. Participants will travel an additional 10' before stopping and resting for 15 seconds (figure). The same measurements will be collected as they return to the starting position. If participants are unable to walk the 35 feet at their usual pace, they are not asked to do the shuttle run.



Shuttle Run- This test assesses speed. Participants are required to move as fast as possible for a 10 meter stretch, stop to pick up a wooden block and return the block to the ground behind the starting line. Participants then walk or run as fast as possible back to the finishing line, pick up the 2nd block and walk or run as fast as possible back to the start line (Figure).



Balance

The single leg stance is used to assess balance on the right and left leg. Participants are required to stand with arms crossed and knee bent to 90 degrees for 60 seconds (Figure). For this test, participants are asked to complete one practice trial followed by three timed trials on each leg with one minute rest in between. If legs touched each other the foot touched down or arms became uncrossed the time is stopped.



References:

1. Dite W, Temple VA. A clinical test of stepping and change of direction to identify multiple falling older adults. *Arch Phys Med Rehabil.* 2002;83(11):1566-1571.
2. Getchell B. *Physical fitness: A way of life.* 2nd ed. New York: John Wiley and Sons, Inc.; 1979.
3. Guralnik JM, Ferrucci L, Simonsick EM, Salive ME, Wallace RB. Lower-extremity function in persons over the age of 70 years as a predictor of subsequent disability. *N Engl J Med.* 1995;332(9):556-561.