

Culvenor et al., SUPER-Knee trial protocol

Supplementary File 4. Details of physical performance tests*Battery of hops: single hop, triple crossover hop, and side hop*

The single hop for distance assesses the distance (cm) the participant can hop from a stationary position, taking off and landing on the same foot. The triple cross-over hop for distance assesses the cumulative distance (cm) the participant can achieve by hopping three consecutive times, crossing over the outside of two strips of tape placed 15cm apart each time. The side-hop evaluates the number of hops participants can achieve (hopping side to side outside two parallel strips of tape placed 40cm apart on the floor) in 30 seconds. The vertical hop assesses the maximal height participants can hop from a stationary position. For all hop tests, participants wear their usual athletic footwear, start with their left leg (regardless of ACLR limb) and hands held behind the back. If participants make subsequent smaller hops, separate their hands or do not remain balanced, the hop is not recorded. Single, triple cross-over and vertical hops are repeated until at least three successful trials are recorded and no increase in distance is observed. The left leg is tested first.



Figure SF3.1. Battery of hop tests. **A:** Single hop for distance; **B:** Side-hop; **C:** Triple-crossover hop for distance; **D:** Vertical hop

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One-leg rise

For the one-leg rise, participants sit on the edge of a plinth with the heel of the test leg on a marked line 10cm in front of the edge of the plinth. Plinth height is adjusted so the angle of the test knee in sitting is 90°. With arms folded across the chest, participants are instructed to rise from sitting to standing on one leg, achieve full knee extension, and return to lightly touch the plinth with buttocks. Rises are performed to a metronome to maintain a consistent cadence of 45 beats per minute. The maximum number of rises achieved at the predetermined cadence is recorded. The left leg is tested first.



Figure SF3.2 One leg rise test

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Knee muscle strength

Maximal voluntary isometric contractions are evaluated during knee extension and flexion with the knee flexed to 60° using an isokinetic dynamometer (Biodex Medical Systems, NY, USA). Participants are seated (hips/non-tested knee flexed 90°) and the centre of the knee joint is aligned with the axis of the dynamometer. Four belts are used to stabilise the trunk and non-test limb, two crossing the trunk, one around the pelvis and one on the distal thigh. An inelastic strap fixed to the dynamometer arm is placed around the distal tibia (proximal to the ankle).

Two submaximal practice contractions of 5-seconds with an interval of 30-seconds between trials are performed as a familiarisation procedure. Then, with standardised verbal encouragement, three maximal isometric contractions of 5-seconds with an interval of 30-seconds between each trial are performed. The test alternates between knee extension and knee flexion (three trials for each). The left leg is tested first. Force curves will be recorded for all trials and the peak force (Nm), normalised for body mass as appropriate (Nm/kg), used for analyses. Knee extension and flexion rate of force development will also be assessed using the slope (change in force divided by change in time) of muscle contraction onset. To correct the influence of gravity, the assessed limb is weighed before each test and the data acquisition software automatically corrects the output data.



Figure SF3.3 Set up of knee muscle strength assessment using Biodex isokinetic dynamometer