

RESEARCH ARTICLE

# A comparison of the isometric force fatigue-recovery profile in two posterior chain lower limb tests following simulated soccer competition

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## Abstract

### Aim

To evaluate the reliability of isometric peak force (IPF) in a novel “long-length” 90°Hip:20°-Knee (90:20) strength test and to compare the simulated soccer match induced fatigue-recovery profile of IPF in this test with that of an isometric 90°Hip:90°Knee (90:90) position test.

### Methods

Twenty semi-professional soccer players volunteered for the study of which 14 participated in the first part of the study which assessed 90:20 reliability (age =  $21.3 \pm 2.5$  years, height =  $1.79 \pm 0.07$  m, body mass =  $73.2 \pm 8.8$  kg), while 17 completed the second part of the study evaluating fatigue-recovery (age  $21.2 \pm 2.4$  yrs., height =  $1.80 \pm 0.09$  m, body mass  $73.8 \pm 8.9$  kg). We evaluated the inter-session reliability of IPF in two 90:20 test protocols (hands on the wall (HW); and hands on chest (HC)) both performed on two occasions, 7 days apart. We then assessed 90:20 (HC) and 90:90 IPF immediately before (PRE) and after (POST) after a simulated soccer match protocol (BEAST90mod) and 48 (+48 h) and 72 hours (+72 h) later.

### Results

Part one: the 90:20 showed moderate to high overall reliability (CV's of 7.3% to 11.0%) across test positions and limbs. CV's were lower in the HW than HC in the dominant (7.3% vs 11.0%) but the opposite happened in the non-dominant limb where CV's were higher in

the HW than HC (9.7% vs 7.3%). Based on these results, the HC position was used in part two of the study. Part two: 90:20 and 90:90 IPF was significantly lower POST compared to PRE BEAST90mod across all testing positions ( $p < 0.001$ ). IPF was significantly lower at +48 h compared to PRE in the 90:20 in both limbs (Dominant:  $p < 0.01$ , Non-dominant:  $p < 0.05$ ), but not in the 90:90. At +72 h, IPF was not significantly different from PRE in either test.

## Conclusions

Simple to implement posterior IPF tests can help to define recovery from competition and training load in football and, potentially, in other multiple sprint athletes. Testing posterior chain IPF in a more knee extended 90:20 position may provide greater sensitivity to fatigue at 48 h post simulated competition than testing in the 90:90 position, but also may require greater degree of familiarization due to more functional testing position.