THE INTERACTION OF 
FATIGUE AND ADAPTABILITY 
WITH LOWER EXTREMITY 
FUNCTIONAL PERFORMANCE 
tests: integrating 
neurocognition to 
evaluate adaptability

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Background
Functional performance tests are utilized by clinicians to compile injury risk profiles and within a criteria-based rehabilitation and return to sport decision-making approach. However, functional performance tests neglect the relevance of fatigue and adaptability as apparent in an athletic context.

Objective
The goal of the present dissertation is to gain more insight in how different types of fatigue interact with functional performance tests and adaptability and to contribute to the continuous development of injury risk management strategies and criteria based approach in rehabilitation and return to sport decision-making.

This PhD includes the results of a systematic literature review documenting the influence of acute fatigue on prospectively determined modifiable intrinsic risk factors for lower extremity injuries; the systematic development and test protocol of the Reactive Balance test, a neurocognitive functional performance tests that was developed to evaluate adaptability; and the results of two randomized cross-over trials documenting the effects of mental fatigue and acute physical fatigue on traditional and neurocognitive functional performance tests.

The most important findings of this PhD indicate that:
1. Acute fatigue can alter the lower extremity injury risk profile by affecting prospectively determined injury risk factors, but the popular hypothesis that acute fatigue increases injury risk cannot be generally accepted.
2. The reactive balance test is a neurocognitive functional performance test that evaluates adaptability and integrates the outcome measures visuomotor reaction time and accuracy. This neurocognitive functional performance test can complement the current use of functional performance tests.
3. Mental fatigue impairs neurocognitive functional performance as evidenced by a decreased accuracy in the Reactive Balance test, but does not affect traditional functional performance tests.

Clinicians and researchers should be aware of this interaction and a paradigm shift is needed towards evaluating individual fatigue responses.

ABSTRACT OF THE RESEARCH

CURRICULUM VITAE

Jo Verschueren obtained a Masters of Science degree in Rehabilitation Sciences and Physiotherapy – option Sports Physiotherapy in 2009 (VUB) and has been working as Assistant Academic Staff (Department KIMA, Research Group Human Physiology and Sports Physiotherapy) at the Vrije Universiteit Brussel since 2010. He combines his research and teaching activities with over 10 years of clinical expertise in Sports Physiotherapy and has worked with the National Volleyball Team and National Field Hockey team.

Jo is the secretary of the Belgian Federation of Sports Physiotherapy and is the author of 15 peer-reviewed publications (4 first author, 11 co-author) and has presented his work in many national, international and European congresses or lectures.