

## 4<sup>th</sup> International Conference on Physical Medicine & Rehabilitation

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## Does asymptomatic generalized hypermobility influence movement?

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**Statement of the Problem:** Generalized joint hypermobility is an important risk factor for knee injuries, including to the Anterior Cruciate Ligament (ACL). A recent framework for the classification of joint hypermobility [1] suggests dividing hypermobile individuals into three groups: asymptomatic, symptomatic and individuals with a well-defined syndrome. Knowledge of the differences between these groups may change the physical activity recommendations, prevention of injury, and rehabilitation approaches. Our aim was to examine if asymptomatic hypermobile individuals between the movement patterns associated with greater risk of ACL injury compared with non-hypermobile individuals during sport-specific tasks.

**Methodology & Theoretical Orientation:** In the first study, 85 individuals (31% asymptomatic hypermobile) were tested using the Landing Error Scoring System (LESS) examining movement patterns during double-leg jump-landing task. LESS scores between asymptomatic hypermobile and non-hypermobile groups were compared using T-test. In the second study, 42 (36% asymptomatic hypermobile) individuals performed unanticipated side-step cutting (Figure 1). Ankle, knee, hip, pelvis, and trunk angles in all planes of motion were collected during the first 100 ms after initial contact using a 3-dimensional infrared system. Data from asymptomatic hypermobile and non-hypermobile groups were compared using multiple regression models.

**Findings:** The mean LESS scores were similar between two groups (P = 0.95). During cutting the asymptomatic hypermobile individuals presented with lower minimum knee valgus angles [mean difference (MD) =  $3.5^{\circ}$ , P = 0.03], greater peak knee external rotation angles (MD =  $-4.5^{\circ}$ , P = 0.04) and lower peak ankle plantarflexion angles (MD =  $4.5^{\circ}$ , P = 0.03) compared with non-hypermobile individuals. Based on current scientific evidence, however, the identified differences are not crucial biomechanical injury risk factors for ACL injury.

**Conclusion & Significance:** The asymptomatic hypermobile individuals tested in our studies did not present movement patterns during jump-landing and cutting tasks that could predispose them to noncontact ACL injury.



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#### **Recent Publications**

- 1. Castori M, Tinkle B, Malfait F, Francomano C, Byers P, Levy H, Grahame R, Hakim, A (2017). A framework for the classification of joint hypermobility and related conditions. American Journal of Medical Genetics Part C: Seminars in Medical Genetics 175:148-157.
- Hanzlíková I, Hébert-Losier K (2020). Do asymptomatic generalised hypermobility and knee hyperextension influence jump landing biomechanics? European Journal of Physiotherapy 23:362-367.
- Hanzlíková I, Richards J, Athens J, Hébert-Losier K (2021). The influence of asymptomatic hypermobility on unanticipated cutting biomechanics. Sports Health 13: 548-553.

#### Biography

Ivana Hanzlíková is a physiotherapist from Czech Republic who finished her PhD at the University of Waikato, Adams Centre for High Performance, New Zealand. Her PhD project was concerning sport-related injury prevention, mainly concentrating on injury risk screening tools and clinically assessable injury risk factors. Now Ivana is a lecturer at the Palacky University Olomouc, Czech Republic and work park-time in a physiotherapy clinic. Ivana expertise are injury prevention, anterior cruciate ligament, hypermobility, 3D motion capture system, biomechanics, running and overuse injuries.

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