



FSEM / WFATT 2014



Faculty of Sports and Exercise Medicine 11th Annual Scientific Conference
& World Federation of Athletic Training and Therapy World Congress
The sporting hip, groin and hamstring – a complete picture
Thursday, Friday & Saturday 4-6th September 2014
The Helix, Dublin City University, Ireland

SCI 88 Effect of changing muscle length on electromyographic activity and maximal force production of the knee flexor musculature

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Introduction: Hamstring muscle injuries occur frequently in field based sports. Despite studies evaluating hamstring injuries and rehabilitation, rates of injury and re-injury have not improved significantly over the last three decades. We investigated the effect of varying hamstring length on EMG activity and force production during maximal knee flexor isometric actions. **Methods:** Currently, six healthy male participants (mean: age 24yr, height 1.86m, mass 85.3kg) have attended on two occasions for familiarisation and testing. Following standardised warm-up, participants performed three maximal voluntary knee flexor isometric actions in 16 different (4 hip by 4 knee) positions on an isokinetic dynamometer. Maximal knee flexor moment and surface EMG (sEMG) activity of biceps femoris, semimembranosus, semitendinosus and vastus lateralis were recorded. Data were analysed using repeated measure two-way ANOVA. **Results:** Knee flexor moment was significantly higher at hip angles of 90, 60 and 30 compared to 0° (all $P < 0.001$), and at 90 and 60° ($P < 0.01$) compared to 30°. Knee flexor moment was significantly higher at knee angles of 30 and 0° ($P < 0.05$) compared to 90°. Higher knee flexion angles induced significantly greater semitendinosus sEMG activity, data at 90 was greater than data at 0° across all hip angles ($P < 0.05$). No significant interaction was identified between sEMG data in biceps femoris or semimembranosus with alterations in hip or knee angle. **Discussion:** Preliminary data identified increased force production at increased angles of hip flexion and decreased angles of knee flexion. Interestingly, this did not correspond with increased sEMG activity from the knee flexor musculature, with semitendinosus showing increased sEMG at higher knee flexion angles.