

UNIVERSITI TEKNOLOGI MARA

**THE EFFECTS OF PROLONGED
SIMULATED SOCCER
MATCH-PLAY ON DOMINANT AND
NON-DOMINANT KNEE AND HIP
EXTENSION ANGLES DURING
SIDE-CUTTING MANEUVERS**

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ABSTRACT

This study aimed to investigate the changes of the sagittal plane knee and hip extension angles following prolonged exertion from extra time during overground simulated soccer match-play using a two dimensional motion analysis system. In the first and second part of this study, a comparison of motion analysis system was compared for criterion validity by testing them inter-software, inter- and intra- tester using two-way random effects, single measures intraclass correlation coefficients ($ICC_{2,1}$). All, $ICC_{2,1}$ values for the knees and hips showed close to perfect scores thus supporting the utility of a two dimensional motion analysis system using an open-source, free software. In the third part of this study, the effects of a 90 minutes simulated match-play simulation on knee and hip kinematic was investigated. Sixteen ($n = 16$) male recreational players consented to this study and were required to complete a 90 minutes of simulated soccer match-play. Knee and hip angles were measured at initial contact during 45° anticipated side-cutting tasks performed prior to the simulation (time 0 min), at the end of the first half (time 45 min) prior to the second half (time 60 min), and at the end of the second half (time 105 min). A two (group: dominant, non-dominant) \times four (time: 0 min, 45 min, 60 min, 105 min) Split-plots ANOVA revealed that the hip and knee are observed to be more extended at the beginning of the second half ($p < 0.05$) with no difference across limb dominance ($p > 0.05$). In the fourth part of this study, the effects of a 120 minutes simulated match-play simulation on knee and hip kinematic was investigated. Eighteen ($n = 18$) male recreational players consented to this study and were required to complete a 120 minutes of simulated soccer match-play. Knee and hip angles were measured at initial contact during 45° anticipated side-cutting tasks performed prior at time 0 min, 45 min, 60 min, 105 min, immediately before extra time commences (time 110 min), in between two extra time halves, (time 125 min), and at the end of the soccer match simulation (time 140 min). A two (group: dominant, non-dominant) \times seven (time: 0 min, 45 min, 60 min, 105 min, 110 min, 125 min and 140 min) Split-plots ANOVA was utilized. Results revealed that both knee and hip extension angles were significantly altered over time ($p < 0.05$), however no significant differences were observed between dominant and non-dominant sides ($p > 0.05$). Pairwise comparisons indicated that the knee appears to be more extended post-extra time exertion (time 125 min, time 140 min) and the hip is more extended post-exertion (time 60 min, time 105 min, time 125 min, time 140 min), compared to pre-exertion conditions (time 0 min). The more erect knee and hip landing postures observed suggested a greater risk of ACL injury during the latter stage of each halves of match-play, supporting epidemiological observations. However, unlike the existing consensus, findings from these studies suggest that the non-dominant limb is as likely to be suffer non-traumatic ACL injury as the dominant limb. Further interrogations of the kinematic differences in the knees and hips across limb dominance are warranted for a more comprehensive understanding of the changes in a multiplanar perspective following soccer specific exertion.

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