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# The effect of physical rotation on soccer instep kicking

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It has been demonstrated that the kicking foot speed highly correlate with the trunk twisting by Takahashi and Kawamoto (2013). According to them, it was defined that shoulder and pelvis rotation were included in trunk twisting. The purpose of this study was to examine whether pelvis and shoulder rotation angles influence on soccer instep kicking by different kick directions. Sixteen male and female soccer players (8 males and 8 females) required to perform maximum instep kick towards three angled directions (0, 45 and 90 degrees) based on their approach-run pathway. The motions were captured using 8 high-speed video cameras at 250Hz. The selected kinematic parameters concerning the ball, kicking ankle, shoulder and pelvis were calculated. The absolute velocity between ball and kicking ankle was

significantly lower in 90 degrees condition than in the other conditions. That result was induced by a significantly reduced foot velocity component towards the target direction while the kicking directions had no significant effects on the absolute foot velocity. The rotation angles of the pelvis and shoulder in male and female increased systematically as the kicking angles changed. There were significant differences between the sexes in rotation angle of shoulder. On the other hand, the rotation angles of pelvis were no significant differences between the sexes. This can be explained that the shoulder rotation has some dominant role for movements of a kicking foot beginning with pelvis rotation.