UNANTICIPATED COMPARED TO PREPLANNED TURNING MOVEMENTS INCREASE LOWER EXTREMITY LOADS IN SOCCER PLAYERS

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Introduction

In soccer, rapid changes of directions are fundamental for game success. Thereby, unanticipated changes of direction lead to higher knee abduction moments [1] and altered lower extremity joint angles [2] compared to preplanned movements. The goal of this study was to investigate kinematics and kinetics of the lower extremities during unanticipated (UT) compared to preplanned turning movements (PT).

Methods

23 experienced soccer players (age: 24.3 ± 2.6 years, height: 178.3 ± 3.7 cm, weight: 71.8 ± 6.3 kg) performed five repetitive preplanned and unanticipated 135° turning movements with the right foot across a Kistler force plate (960Hz) following a 6m approach. UT were randomly enforced by use of a light signal (reaction time: 150ms before foot strike). Kinematics of the right lower extremity were captured by a 12-camera-motion analysis system (Vicon, 240Hz). Analyzed variables were ground contact time, ankle and knee internal moments and foot angles. Means and standard deviations were calculated of each variable and analyzed by a one-way ANOVA ($p<0.05$).

Results & Discussion

Ground contact time increased during UT ($p<0.01$). For UT compared to PT knee flexion moments (6%) and knee rotation moments (8%) were increased as well as ankle plantarflexion moments (7%) and ankle eversion moments (12%). At initial ground contact, subjects showed a decreased foot adduction angle and decreased tibial rotation towards the new running direction ($p<0.05$) in UT.

Conclusion

In soccer, UT increases the loads acting on the player compared to PT. A less thoroughly prepared foot placement and leg alignment at initial ground contact, according to limited movement preparation time, increases lower extremity loads and may be considered as confounding factor for injury occurrence.

References

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