

BOOT-PITCH INTERACTION DURING A RAPID TURNING MANOEUVRE IN FOOTBALL

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Introduction

Traction generated on the playing surface during football is an important factor influencing performance and has also been considered a risk factor for lower limb injury. Mechanical tests for measuring the traction characteristics of natural and artificial (football turf) pitches have been criticised for probably not providing realistic player-like loading conditions. Detailed motion of the lower leg was examined during a rapid turn on different outdoor pitches in order to document the interaction with the surface and explore if a player testing approach could be used for traction assessment.

Methods

The same group of nineteen semi-professional male players performed a V-cut turn (135 deg.) on a series of outdoor turf pitches (six natural and three artificial (3G)) in three different countries. Each player performed 4-5 turns per surface using a sub-maximal approach (80%) and maximal exit speed. High-speed motion (500Hz) of reflective markers on the shank and foot of the pivot leg during ground contact were recorded using six opto-electronic cameras (Qualisys, Sweden) and video footage.

Results & Discussion

Group findings highlighted that the turns were executed in broadly the same manner and that there was little difference in both the average ground contact time and exit velocity across the various surfaces. An evaluation of peak foot displacements, velocities and accelerations during the initial and final stages of contact also revealed few differences across pitches. Peak resultant deceleration (traction) during landing was reduced on one natural turf surface which corresponded well with results from mechanical traction testing on that surface. Inversion motion of the ankle during the turn appeared to be similar on the natural surfaces but the rate and range of inversion was significantly increased on the artificial. This may suggest that there is greater demand placed on the ankle joint and this notion would be supported by evidence of an increased incidence of lateral ankle sprain when playing on artificial turf (1).

Conclusion

Execution of a rapid turn and peak traction measures appeared similar across the various pitches examined but there was evidence for changes in ankle motion during turning on artificial surfaces that could elevate the risk of ankle injury.

References

1. Ekstrand, J., Timpka, T., and Hägglund, M. (2006). *British Journal of Sports Medicine* (40): 975 – 980.