

## MOTION ANALYSIS OF LOWER LIMB IN FUTSAL BALL KICKING

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### **Introduction**

A futsal ball is smaller than a soccer ball and the futsal ball also has lower elastic resilience than the soccer ball. Due to these differences, it is thought that the kicking motions of futsal players are distinct from those of soccer players. But there is no previous study of motion analysis in futsal ball kicking. Therefore, most of futsal coaches instruct soccer-style kicking methods in their training. The aim of this study was to clarify the characteristics of futsal kicking motion.

### **Methods**

Ten male professional futsal players (including four players who were members of the national team) were instructed to kick the futsal ball with maximum-effort. Three-dimensional motions of the kicking foot, shank and thigh before the impact were recorded using a ten-camera optoelectronic motion analysis system (VICON MOTION SYSTEMS) operating at 500Hz.

### **Result and Discussion**

The mean angle of the thigh-shank plane (defined as the vector normal to and pointing outward from the thigh-shank plane and relative to the anterior direction within the horizontal plane) in this study showed 105° at the impact. On the other hand, Nunome et al. have reported that the mean angle of the thigh-shank plane during instep and side-foot soccer kicking showed 92° and 130° respectively. Comparing with their study, we observed that the maximum-effort motion involved in kicking the futsal ball had the characteristics of both instep kicking and side-foot kicking, as seen in soccer players. Further, it was thought that when futsal players kicked the ball with maximum-effort, they hit the ball at a little inside of the foot. This action results in good impact of the foot on the ball and can be effected by decreasing the positive extension of the foot joint.

### **Conclusion**

Futsal coaches training players for powerful kicking should advise the players to use an original futsal-style kicking.

### **References**

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