CHARASTERISTIC OF THE KICKING MOTION IN FEMALE SOCCER PLAYERS

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Introduction

A number of studies have investigated the interaction between the ball and the foot during ball impact (Asami & Nolte, 1983; Shinkai et al., 2009; Ishii & Maruyama, 2009). However, in the majority of researches were done for male soccer players; studies on the kicking action of female soccer players are scarce (Barfield et al., 2002; Clagg et al., 2009). Accordingly, this study was designed to compare the ball impact kinematics between female and male soccer players to extract the mechanical and technical characteristics of female players.

Methods

The subjects were 17 male soccer players with at least 10 years of soccer experience and 17 female soccer players with at least 5 years of soccer experience. The motion of the foot and ball immediately before, during and after ball impact were captured by 3 high-speed video cameras (1000 fps). The direct linear transformation (DLT) method was used to obtain the three-dimensional coordinates of the foot and ball.

Results & Discussion

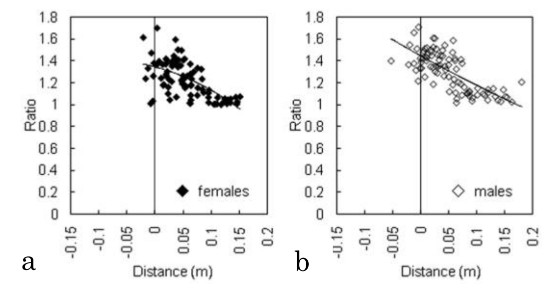

Figure 1. The relationship between impact distance and repulsion ratio in the instep kicks(a = females, b = males).

The repulsion ratio of the instep kick was ~1.35 for the female players (the *y*-intercept of the quadratic regression curve), which was slightly lower than ~1.45 for the male players. Furthermore, the average repulsion ratio was significantly lower for the female players than that of the male players ($p < 0.05$). The angular displacement of the foot (flexion and extension) for the female players also tended to become larger than that of the male players. In terms of mechanical characteristics during ball impact, these results suggested that the female players possess lower dynamic stiffness than the male players.

Conclusion

It can be concluded that the repulsion ratio of the instep kick was slightly lower for the female players than that of the male players. The difference of dynamic stiffness of foot between the male and female players may account for this.