

EFFECTS OF A 10 WEEK TRAINING PROGRAM ON PHYSICAL CONDITIONING AND INSTEP KICK KINEMATICS IN SOCCER

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INTRODUCTION: The instep kick is the kick of choice in soccer scoring and passing over medium to long distances. Its success depends on many factors including the strength of the muscles responsible for the actions of the (kicking lower) extremity, the rate of muscle force production, the synchronization and energy transfer between lower extremity segments (Plagenhoef, 1971), the linear approach velocity (Opavsky, 1988) and approach angle (Isokawa and Lees, 1988), and the ability of muscle to utilize effectively the stretch/shorten cycle (Bührle, 1985). Ultimately, on a given kick, the velocity of the kicking foot and the point of (foot) force application on the ball determine the trajectory characteristics of the ball. Other factors such as flexibility and aerobic/anaerobic capacities also determine the ability of players to successfully perform in a game. The purpose of this study was to study the effects of a 10 week training program on selected physical conditioning and instep kick kinematic parameters in soccer.

METHODS: Two groups consisting of ten professional soccer players and 10 physical education majors acting as controls participated in the study. The experimental group participated in a 10 week physical conditioning program design to improve strength, endurance, speed, and flexibility. Both groups were pre-and-post tested for: a) maximum pedaling speed with zero resistance (PS_{max}); b) vertical jump from a static squat (SJ) position; c) dropped vertical jump (DJ20-40)-dropping from 20, 30 and 40 cm; d) maximum knee joint extension (isometric) strength (F_{maxiso}); e) anaerobic threshold; and f) lower extremity flexibility, and g) kinematic variables of the instep kick. Additional variables computed were: a) muscle reaction ability [defined as ((DJ_{max}-SJ_{max})/SJ_{max})100], and b) per cent of F_{max} achieved during the first 100ms. A Kistler force plate, an AMD Corp. Loadcell, a MONARK bicycle ergometer, Cardiosport heart monitors, 2 Panasonic 60 Hz video cameras, and an Ariel Performance Analysis System (APAS) were used for data collection and kinematic analysis. ANOVA with repeated measures was used to study the effects of training on physical conditioning measures and instep kick kinematics.

RESULTS AND DISCUSSION: Preliminary results show that the 10 weeks training program had a positive influence in some indicators of physical conditioning such as F_{maxiso}, anaerobic and aerobic capacities, and flexibility. In addition, selective kinematic variables including ball take off velocity were also positively influenced. It appears that a specific 10 week physical conditioning program significantly improves characteristics of physical conditioning in professional soccer players and, ultimately, performance in the instep kick.

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