EGZERSİZ VE SPOR FİZYOLOJİSİ / EXERCISE AND SPORTS PHYSIOLOGY
EVALUATION OF THE RELATIONSHIP BETWEEN THE BALL VELOCITY AND LEG STIFFNESS IN YOUNG SOCCER PLAYER

Introduction and Aim: The motion activities during soccer kick, back-swing and forward swing phases, are defined as the stretching-shortening cycle followed by eccentric-concentric contractions. Leg stiffness (LS) is important for effective storage and reutilization of elastic energy in repetitive stretch-shortening cycle activities. The purpose of this study was to examine the relationship between the ball speed and leg stiffness in soccer players. Method: 13 soccer players (Age: 16.7 ± 0.8 years, Height: 175.7 ± 5.9 cm, Body Weight: 70.2 ± 12.5 kg) from amateur leagues took part in the study. Participants were performed 5 kicks at maximum speed regardless of the target with the dominant leg at 11-m distance from the standard soccer goal. The ball speed was measured with 'Bushnell Radar Speed-Gun' and the highest data was recorded. They performed two vertical jump tests of a repeated maximal hopping (5max) and a 20 repeated submaximal hopping at a metronome frequency of 2.5 Hz (20submax) on the contact mat. During the 5max and 20submax vertical tests, the contact and flying times were recorded by video camera (240fps, GoPro3), and then LS(LSmax,
LS submax, respectively) was calculated by analyzing with the Kinovea Software (Boston, USA). LS data was normalized relative to body mass. The maximum vertical jump height (VJ) was determined by the contact mat (Microgate-Witty). The relationship between the data was assessed by Pearson-correlation analysis (means±SD). Results: There were no statistically significant relationship between ball velocity values and LS max, LS submax, and VJ (p>0.05). There were no significant relationship between VJ and LS (p>0.05).

Conclusion: As leg-stiffness determines performance in successive recurring stretch-shortening-cycle activities, kicking and jumping are ballistic movement that shows a single stretch-shortening-cycle. Differences between the motion patterns could be a reason of the absence of relationship between LS vs kicking and LS vs VJ. Evaluation of the relationship between ball speed and leg-stiffness, the differences of the muscle groups involved in the movement and the kick technique must also be considered. Keywords: Soccer, stretch-shortening-cycle, vertical jump.