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Biomechanical Analysis of Explosive Strength of Legs of Athletes

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Abstract

Aim: The purpose of the study was to analyze the explosive strength variables of legs of athletes of different sports. **Method:** The study was conducted on 45 male players (fifteen handball players; age: 15.80 ± 0.68 years, fifteen football players; age: 16.13 ± 0.83 years & fifteen basketball players; age: 16.40 ± 0.83 years) of Punjab State coaches in Patiala (India).**Results**: The results of the study shows that the basketball players performed better in explosive strength parameters like the squat jump flight time, squat jump height, counter movement jump height, counter movement flight time, peak power (45-60sec) and mean power (0-60sec), then the football and handball players. The least performance was recorded by the handball players. The results also indicate that there was a highly significant correlation exists among the various explosive strength variables. **Conclusion:** The explosive strength variables measurement could be used by coaches to plan or adjust the training program of athletes.

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Introduction

The explosive strength is an action that is accomplished with maximum effort in a minimum amount of time. The basis for explosive strength is in speed-strength, a physical quality displayed in many sports skills such as jumping for maximum height (Rousanoglou et al., 2008), hitting for maximum power or distance (Silvia et al., 2009), running at top speed (Sannicandro et al., 2014), throwing for maximum distance or power (Samah, 2016) and kicking for distance or power (Nurper O., 2015). Successful sporting performance at elite levels of competition often depends heavily on the explosive leg power of the athletes (Cabri et al.,1988; Bangsbo, 1994, Stølen et al., 2005, Silvia et al., 2009). Coaches and trainers are greatly interested in developing training techniques designed to improve and measure the explosive strength and power performance of the legs of the athletes (Blattner, Stuart 1978, Haff et al., 2015). Vertical Jump (VJ) has widely been used by sports performance professionals as direct assessment method to measure the explosive strength in the lower limbs (Arteaga et al., 2000, Hara et al., 2006, Sargent 1921, Bosco et a;l., 1983) and to know the effectiveness of training programs (Hara et al., 2006, Peterson et al., 2006, Nicole et al. 2015). The VJ performance is a complex movement including several factors i.e. the maximal force developed by the muscles, the rate of force developed and the neuromuscular coordination of the upper and lower body segments ((Brian R.1998, Hopkins 2000, Sargent 1921). Some common explosive strength measures calculated from the VJ tests are the peak power (PP) or mean power (MP). Power is the product of muscular force and velocity or as an instantaneous value during a given movement. The latter, often referred to as peak power (PP), is typically associated with