

Research Paper :

## Effect of plyometric training with and without weight jacket on elastic strength and explosive power

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### ABSTRACT

The purpose of this paper was to enhance the sports performance with the objective is to analyse the plyometric training with and without weight jacket on elastic strength and explosive power. To achieve this, thirty nine physically active and interested students (N = 39) were selected as subjects and their age group ranged between 18 and 24 years. The subjects were categorized into three groups randomly. Group I plyometric training with weight jacket (PTWWG), group II plyometric training without weight jacket (PTWOWG), group III control group (CG) and each group comprised of thirteen subjects (N = 13). Both experimental groups underwent their respective experimental treatment for twelve weeks, 3 days per week and a session on each day. Control group was not exposed to any specific training. Elastic strength and explosive power were taken as variables for this study. The collected data were analysed using analysis of covariance (ANCOVA) and Scheffe's post hoc test. The results revealed significant difference in all the selected strength variables (P < 0.05) among PTWWG and PTWOWG pointing towards the use of plyometric training for performance improvement.

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Plyometrics is a type of exercise training designed to produce fast, powerful movements and improve the functions of the nervous system, generally for the purpose of improving performance in sports – plyometric movements, in which a muscle is loaded and then contracted in rapid sequence, use the strength, elasticity and innervations of muscles and surrounding tissue to jump higher and run faster, depending on the desired training goal (Goran *et al.*, 2007). It is used to increase the speed or force of muscular contractions, providing explosiveness for a variety of sport specific activities. This training involves and uses, practicing plyometric movements to toughen tissues and train nerve cells to stimulate a specific pattern of muscle contraction, so the muscles generate as strong a contraction as possible in the shortest amount of time. A plyometric contraction involves first a rapid muscle lengthening movement (eccentric phase), followed by a short resting phase (amortization phase), then an explosive muscle shortening movements (concentric phase), which enable muscles to work together in doing the particular motion. This training engages the myotactic reflex, which is the automatic contraction of muscles when their stretch sensory receptors are stimulated. Some

plyometric exercises are used to perform this study for strengthening the lower body and upper body and these are 1. Drop jump, 2. Tuck jump, 3. Split jump, 4. Bounding, 5. Single leg hop, 6. Hurdling, 7. Medicine-ball exercises. Plyometric exercises with additional weights have been used successfully by many athletes as a method of training to enhance power (Andrew, 2010). In order to realize the potential benefits of plyometric training, the stretch shortening cycle must be involved. The rate of stretch rather than the magnitude of stretch are of primary importance in plyometric training and the coupling time or ground contact time must be as short as possible.

Elastic strength is the ability to exert force quickly and to overcome resistance with a high speed of muscle action. High level elastic strength requires good coordination and a combination of high speed and strength of muscle action. It is important in explosive activities such as jumping and sprinting. Plyometric exercises with weights are the best method to improve elastic strength. Explosive power is the ability to expand energy in one explosive act or in a series of strong sudden movements in jumping (Dodd and Alvar, 2007). In this action, the neuromuscular system to overcome resistance with high