

Six Weeks Progressive Plyometrics Training on Badminton Player's Agility

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ABSTRACT

Background: badminton is one of favorite sports by the community. Improved performance is influenced by technical play and physical abilities of athletes. One of the important skills in badminton is agility. agility can be achieved by improving balance and strenght of lower limb. plyometric exercise can increase power of lower extrimity. A gradual, progressive, and measurable exercise improves athlete performance and reduces risk of injury. **Objective:** Purpose of this study are to observe 6 weeks progressive plyometric training on improving ability of agility in badminton players. **Method:** This research is Quasi-eksperimental study, pre and post test with control group design. 32 badminton players as respondents, sixteen players done progressive plyometrics training, and others as a control group. Training was conducted for 6 weeks, three times a week. Agility performance was measured by Illinois Agility Test. **Result:** Plyometric group shows agility improvement 1.17 faster than control group, with an average 1.35 seconds significant improvement after 6 weeks training. **Conclusion:** 6 Weeks Progressive Plyometric Training improves overall agility in badminton players and could become training design to improve skills

Keywords: Progressive, Plyometrics, Training, Agility

INTRODUCTION

Exercise is an important need in society. In modern life society not only exercises as part of an achievement, but becomes a necessity to maintain body fitness. In sports, many factors affect the performance of a team, including the ability to master the techniques and physical endurance. One of the competitive sports is badminton. Badminton is a very explosive sport, involving unique movement techniques and relatively small field strength supported by physical condition, mental attitude, courage, intelligence and technical skills of players as well as tactical efficiency (Heang, 2006)

Agility is one of important components in badminton. Agility is needed to maintain balance when performing maneuvers quickly and accurately. Agility in badminton is associated with the ability of the athlete to move and move around in maintaining the position of the shuttlecock, so there is a need for accuracy and speed of reaction in changing direction Changing direction quickly requires leg muscle power, which exercises involving rapid jumps are able to stimulate muscle to increase power (Vaczi, et al, 2011).

Plyometric exercise has been used in all areas of the sport to increase muscle strength and explosive power. Plyometric exercises consist of eccentric movements which are then followed by concentric contractions in the same muscle group. Muscle strength training can contribute to increased acceleration, strength and limb power (Vaczi, et al, 2011), defines a programmed plyometric exercise as an exercise that incorporates elements of plyometric exercise, which usually involves repetitive jumping, running, and explosively altering motion. These movements are components that can help in improving agility because it

exploits the adaptation of stretch-shortening cycles through the neuromuscular system in helping to increase leg muscle power so agility improvement can be achieved.

METHOD

This study is quasi-experimental pre and posttest with control group design. The first step is determine the sample, then do an assessment for general physical condition. The next step is the initial measurement of Agility capability. Then the sample was given progressive plyometric exercise for 6 weeks. After 6 weeks of treatment, the sample was tested to determine the ability of agility after treatment. Measure agility using "Illinois Agility test". Each group practiced badminton three times a week. Experimental group was given additional training like in the table below

Table 1 Six Weeks Progressive Plyometric Training

Training	Plyometric Drill	Set x Reps	Intensity
Week 1	Side to side ankle hops	2 x 15	Low
	Standing jump and reach	2 x 15	Low
	Front cone hops	5 x 6	Low
Week 2	Side to side ankle hops	2 x 15	Low
	Standing jump	5 x 6	Low
	Lateral jump over barrier	2 x 15	Medium
	Double legs hops	5 x 6	Medium
Week 3	Side to side ankle hops	2 x 12	Low
	Standing jump	5 x 6	Low
	Lateral jump over barrier	2 x 12	Medium
	Double legs hops	3 x 8	Medium
	Lateral cone hops	2 x 12	Medium
Week 4	Diagonal cone hops	4 x 8	Low
	Standing long with lateral sprint	4 x 8	Low
	Lateral cone hops	2 x 12	Medium
	Single leg bounding	4 x 7	High
	Lateral jump single leg	4 x 6	High
Week 5	Diagonal cone hops	2 x 7	Low
	Standing long with lateral sprint	4 x 7	Medium
	Lateral cone hops	4 x 7	Medium
	Cone hops with 180 degree turn	4 x 7	Medium
	Single leg bounding	4 x 7	High
	Lateral jump single leg	2 x 7	High
Week 6	Diagonal cone hops	2 x 12	Low
	Hexagonal drill	2 x 12	Low
	Cone hops with change of direction sprint	4 x 6	Medium
	Double leg hops	3 x 8	Medium
	Lateral jump single leg	4 x 6	High

RESULT AND DISCUSSION

There were 32 badminton players, 21 man and 11 woman aged 20 – 24 years, were randomly divided into two groups. Experimental group was given 6 Weeks Plyometric Training.

Tabel 2 Differences average Agility Using Illinois Agility Test

	Average Agility (Second)		Difference
	Pre-Test	Post-Test	
Plyometric	18,31	16,38	1,35
Control	16,92	16,74	0,18

Table 2 shows that after 6 weeks of training, plyometric group improves agility of 1.17 seconds faster than the control group. Agility is one of the biomotor components that is defined as the ability to change direction effectively and quickly. The agility occurs due to the explosive power movement (Miller, 2006). Agility also depends on muscle strength, speed, coordination, and dynamic balance (Heang, 2006). Kisner (Meylan & Malatesta, 2009) describes three phases in plyometric exercises called stretch-shorthening cycles: phase during elongation is also called stretch cycle, and shortening phase is also called shortening cycle. In plyometric exercises basically focus on stretch-shorthening cycle to generate maximum power. The muscle function is drawn before concentric contraction is maximized, followed by rapid movement from the eccentric phase to the concentric which helps stimulate the proprioceptors to facilitate increased muscle recruitment in a minimal amount of time (Meylan & Malatesta, 2009). With the number of motor units activated the neural adaptation will increase. With increased neural adaptation it can affect agility, especially to improve intermuscular coordination (Vaczi, et al, 2011).

There are two types of receptors that function on the stretch reflex as the basis of muscle contraction, namely muscle spindle and golgi tendon organ. The main function of the muscle spindle is to obtain a stretching reflex or myotatic reflex considered in the neuromuscular process that represents the basis of pliometric motion (Vaczi, et al, 2011). The Golgi tendon organ is considered a protective device, which prevents muscle tearing and or tendon under extreme conditions, but may also work together with the muscle spindle reflex in achieving overall control of muscle contraction and body movement. (Meylan & Malatesta, 2009) Stretching a series of these elastic components during contraction Muscle produces an elastic potential energy similar to that of a burdened spring. When this energy is released, it adds a certain energy level to the contraction produced by the muscle fibers (Heang, 2006).

CONCLUSION

Six Weeks Progressive Plyometric Training significantly improve power of lower limb muscle, so it give effect to increase agility at badminton athlete.

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