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Original Research Article

Effect of Plyometric Exercises Versus Speed Agility Quickness Training on Agility, Speed, Power, Dynamic Balance and Reaction Time in Amateur Badminton Players

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ABSTRACT

Background: Badminton being one of the most popular and fastest racket sport, demands the players to have different skills and fitness level in-order to excel. Skills like power, agility, speed, dynamic balance and reaction time are few of them.

Aim: This study aims to compare the effect of plyometric exercises versus speed agility quickness (SAQ) training on agility, speed, power, dynamic balance and reaction time in badminton players.

Methods: An experimental study was conducted in 36 amateur badminton player who were divided in 3 groups with 12 participants in each - Plyometric training group, SAQ training group and control group. All received intervention for 6 weeks. The outcome measures used were a) agility- Illinois agility test, b) speed- 30 meters' sprint test, c) power- vertical jump test, d) dynamic balance- modified star excursion balance test and e) Reaction time- simple visual reaction time task.

Statistical analysis: Statistical analysis was performed using SPSS software, version 24. Paired t test was used to compare pre-post differences in each group. Intergroup comparison was evaluated using ANOVA test.

Results: Plyometric group showed a significant improvement in the agility, speed, power, posterolateral and posteromedial directions in modified star excursion balance test and reaction time using paired t test. Speed Agility Quickness group revealed significant difference in speed, agility, all three directions in modified star excursion balance test. In control group, significant improvement was seen only in anterior and posteromedial directions in modified star excursion balance test. There was significant difference between the groups in agility, power and speed using ANOVA test. Further post hoc analysis revealed that plyometric and SAQ group showed no statistically significant difference when compared with each other except for power which showed more improvement in the plyometric group.

Conclusion: Both plyometric and SAQ training were equally effective in improving speed and agility in badminton players. Power was seen to be improved more in plyometric group. Hence, these training protocols can be used as evidence-based approach to improve skills in badminton players for optimal performance.

KEYWORDS: plyometric, SAQ, badminton players, power, agility, speed, dynamic balance, reaction time.

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INTRODUCTION

Badminton is one of the most popular fastest racket sports in the world [1]. This sport involves a great deal of high intensity movements, including accelerations, decelerations, and changes in direction over short

distance[2].

A shot is taken by performing multiple lunge movements and being agile on court, especially when the shuttlecock is returned near the net. The game also requires powerful jumping movements to take the smash shot [3]. A recent study suggested the importance of maintaining good postural stability by maintaining the centre of gravity well within the base of support during dynamic upper limb movements during the game to prevent injuries and perform efficiently. Agility is of utmost importance for a badminton player for both defending and attacking manoeuvre during the game [4]. Another essential skill demonstrated by a badminton player was focused upon by a cross sectional study conducted on amateur badminton players in 2019 which is a good visual reaction time that is required in order to react quickly to the competitors' shots [1].

Plyometric exercise is a high intensity exercise that has 3 phases - eccentric phase, amortization phase and the concentric phase. Regular training conditions the nervous system to react more quickly to the stretch-shortening cycle. This type of exercise helps in enhancing the speed of movement, increasing power production and reinforcing the bone architecture given by Wolff's law [5]. Adults and pubertal children have been proven to benefit from plyometric training programmes for developing strength, running speed, and jumping ability. Strength training in all muscle groups can improve muscle performance and coordination; however, plyometric training may be an appropriate intervention for improving the motor ability of children to run, jump, hop, skip, kick, and throw, as children benefit more from practising and perfecting sports skills [6]. A recently published study investigated the effects of 6 weeks of upper limb plyometric training on proprioception and kinesthesia and on muscle performance using Biodex II in female swimmers and found it to facilitate peripheral and neural adaptations that enhances the measured variables [7]. It was also seen that plyometric training can be an effective training technique to improve athlete's agility when assessed using three different agility tests [8].

SAQ training is a method of progressive exercises and instruction targeted at building fundamental motor abilities in order to improve the competence of sportsmen to be more skilled at higher speeds and with more precision. SAQ training has been thought to improve reaction to stimuli, acceleration and agility in soccer players [4]. It has become an integral part of the athlete's training program for gaining sports specific explosive power [9]. It was seen in basketball players that SAQ training group had a significantly better effect than the control group on skill related fitness like speed, agility, explosive power, breath holding time and resting pulse rate [10].

Thus, the literature lacks evidence of a particular training type or a reference protocol that would be beneficial in improving badminton specific skills. This study intends to find out the effect of plyometric exercises and SAQ training on agility, speed, power, dynamic balance and reaction time in amateur badminton players.

METHODS

Study design: It was an experimental study design with purposive sampling of 36 sample size which was calculated using G Power. 36 players from across four badminton academies in Mumbai and Navi Mumbai volunteered to participate in the study.

Participants: The players were selected on the basis of inclusion and exclusion criteria. Badminton players in the age group of 13-25 years and having training age of minimum 2 years and regularly undergoing badminton training (>4 h/ week) were included. Exclusion criteria was history of any recent musculoskeletal, neurological, ocular, vestibular, cardiorespiratory, or cognitive impairment that necessitated medical treatment or participation in any sport on a regular basis other than badminton [11]. They were random allocated into three groups with 12 participants in each – Group A received plyometric training, Group B received Speed Agility Quickness Training and group C was the control group. The athletes and their Parents/Guardian's (for players below 18 years) provided with written

informed consent mentioning their individual right to voluntarily participate in the study and that they could withdraw any time during the study.

Outcomes: Agility was assessed using Illinois Agility Test. The athlete is in the starting position, and when the signal "go" is given, the athlete begins running through the course of the test to the finish line. The athlete is not allowed to touch the cones during the race, and the time it takes to cross the finish line will be recorded. The test area's width and height are 5 and 10 meters, respectively [12].

Power was evaluated using Vertical Jump Test. The athlete stood against a wall and reaches up with his or her closest hand. The point of the finger tips was marked with a chalk while keeping the feet flat on the ground. The athlete then leaped as high as possible vertically, marking the highest point in each of the three paths [13].

Speed was assessed using 30 mts Sprint Test. The test involves running a single maximum sprint over 30 meters, with the time recording. Start from a stationary position with one foot in front of the other. The front foot should be on the starting line and the position should be held for 2 secs and no rocky movements. Two trials are allowed and the average of two trials was recorded [14].

Dynamic Balance was evaluated using Modified Star Excursion Balance Test (mSEBT). For each limb (without shoes): - The most distal aspect of the great toe was positioned in the center of the "Y" - The patient was instructed to reach with their free limb in the anterior (Ant), posteromedial (PM) and posterolateral (PL) directions while maintaining single leg posture. Three recorded reaches in each test direction was measured. Average distance in each direction and normalized distance in each direction was calculated [15].

Reaction time was evaluated using simple visual reaction time task (Inquisit software). The test screen had a "+" sign that after some time turns into a red circle. The subject is asked to press the space bar key whenever the red circle appears and the time is recorded by the software. The best and worst response is noted along with the mean of all trails [16]. All the outcome measures were assessed pre and post intervention 6 weeks.

Intervention protocol: The exercises were given to the players along with warm up exercises including active full body dynamic stretching and 10 minutes of running. Each session was conducted for 20-30 minutes. After the interventional protocol the players underwent their regular skill training. The following protocol was followed.

Table 1: Plyometric training group intervention protocol [17].

Week	Drills
Week 1	Side to side ankle hops x 10
	Standing jump and reach x 10
	Front cone hops x10
	Diagonal cone hops (40 contacts)
Week 2	Standing jump and reach x 10
	Front cone hops x 10
	Diagonal cone hops x 10
	Lateral jump over barrier x 10
	Standing long with lateral sprintx5(45contacts)
Week 3	Double leg hops x10
	Standing jump and reach x 10
	Front cone hops x10
	Diagonal cone hops x10
	Single leg bounding x10(50 contacts)
Week 4	Front cone hops x 10
	Diagonal cone hops x 10
	Single leg bounding x10
	Lat jump single leg x 10
	Depth jumps x 5(55 contacts)
Week 5	Single leg bounding x 20
	Lateral jump single leg x 20
	Diagonal cone hops x 10
	Depth jumps x 10 (60 contacts)
Week 6	Single leg bounding x 20
	Lat jump single leg x 25
	Depth jumps x 15(60 contacts)

Control Group: The control group underwent their usual training protocol which included warming with dynamic stretches and running followed by technical training which included practising various shots and matches with their co-players. As a part of skill-based training or strengthening program the players underwent few bouts of agility drills twice a month.

Statistical analysis: The data was analysed using Statistical package of social sciences (SPSS) version 24. The normality of the data

was calculated using Shapiro Wilk test. As the data was normally distributed, parametric tests were used. The pre-post analysis of each group was performed using paired t test. The comparison between the groups was done using ANOVA test. The p value less than 0.05 was considered as statistically significant.

Table 2: Speed Agility quickness training group intervention protocol [2].

Week	Drills
Week 1	Forward sprint (30 mts x 4)
	Backward sprint (30 mts x 4)
	Side shuffling (30 mts x 4)
Week 2	Forward sprint (30 mts x 5)
	Backward sprint (30 mts x 5)
	Side shuffling (30 mts x 5)
	lunge walk (30 mts x 2)
Week 3	Side shuffle run (30 mts x 4)
	Carioca walk (30 mts x 4)
	Forward Step hop (30 mts x 4)
Week 4	Carioca run (30 mts x 4)
	Forward and backward Step hop (30 mts x 8)
	Side shuffle run (30 mts x 4)
Week 5	Agility box training (forward sprint + backpedaling + shuffle + carioca) x 5 min
	Dot drill (diagonal sprint and back) x 5 min
Week 6	Agility box training (forward sprint + backpedaling + shuffle + carioca) x 10 min
	Dot drill (diagonal sprint and back) (increasing laps and speed) x 10

RESULTS

The demographic characteristics of the badminton players is represented in table 3.

The plyometric group showed a significant improvement in the agility, speed, power, posterolateral and posteromedial directions in modified star excursion balance test and reaction time using paired t test. In Speed Agility Quickness group, significant difference in speed, agility, all three directions in modified star excursion balance test were observed. However, there was no significant improvement in power in the SAQ group. In control group, significant improvement was seen only in anterior and posteromedial directions in modified star excursion balance test. (Table 4)

There was significant difference between the groups in agility, power and speed using ANOVA test. Further post hoc analysis revealed that plyometric and SAQ group showed no statistically significant difference when compared with each other except for power which showed more improvement in the plyometric group. (Table 5)

Table 3: Demographic data of the badminton players.

	Plyometric	Speed agility quickness	Control
Age (years)	17.4 ± 2.8	16.9 ± 2.9	18.9 ± 2.3
Sex -Male	66.6% (N=8)	25%(N=3)	41.7% (N=5)
Female	33.3% (N=4)	75%(N=9)	58.3% (N=7)
BMI (kg/m2)	21.8 ± 3.2	20 ± 3.3	21.1± 3.1
Hours of training per week	6.8 ±1.9	4.9± 2.5	5.9 ±1.6
Years of training	5.8 ± 3.2	6.6 ± 3.9	6 ± 3.6

Table 4: Comparison of pre and post scores of outcome measures in the three groups.

Outcome	Plyometric			SAQ			Control		
	Pre	Post	p value	Pre	Post	p value	Pre	Post	p value
Illinois agility test (sec)	24.72 ± 2	23.5 ± 1.9	0.00*	23.9 ± 2.1	23.1 ± 2	0.005*	22.9 ± 3.2	24.2 ± 2.2	0.202
Vertical jump test (cm)	31.3 ± 6.8	35.5 ± 6.3	0.003*	35.33 ± 6.8	37.4 ± 9.2	0.199	35.93 ± 6.3	34.79 ± 4.3	0.39
30 mts sprint test (sec)	7.03 ± 1.6	6.37 ± 1.3	0.001*	6.9 ± 1.7	6 ± 1.3	0.00*	6.5 ± 1.1	6.5 ± 1.1	0.89
mSEBT (right) (%) - Ant									
PM	79.24 ± 8.3	81.6 ± 5.2	0.371	75.51 ± 9.8	80.6 ± 8	0.026*	81.6 ± 7.7	79.8 ± 8.7	0.41
	99.3 ± 4.9	104.8 ± 7.9		94.9 ± 9.7	104.5 ± 7.2		99.4 ± 11	98.4 ± 9.8	
PL	95.3 ± 8.8	100.6 ± 8	0.005*	87 ± 14.6	88.8 ± 137	0.007*	93.9 ± 11.5	94.4 ± 10.3	0.72
			0.006*			0.459			0.83
mSEBT (left) (%)									
Ant									
	79.04 ± 9.4	82.5 ± 6.2	0.302	76.8 ± 5.7	82.3 ± 5.3	0.00*	77.8 ± 9.4	79.5 ± 9.4	0.001*
PM	97.7 ± 8.1	104 ± 10.8		96.6 ± 9.3	104 ± 7		98.6 ± 11.9	103 ± 11.3	
	93.6 ± 9.9	98.3 ±11.5	0.082	88.3 ±12.8	95.5 ± 11.8	0.001*	92.3 ±14.2	94 ± 10.3	0.005*
PL									
			0.124			0.017*			0.596
Simple visual reaction time task (msec)	273.2 ± 26.9	245.8 ± 32.2	0.00*	311.7 ± 122.4	257.8 ± 41.5	0.066	289.4 ± 46.7	279.1 ± 44.7	0.71

Table 5: Intergroup comparison of the mean difference using ANOVA test.

	Plyometric	Speed agility quickness	Control	P value
Illinois agility test (sec)	1.2 ± 0.7	0.8 ± 0.8	-1.17± 3	0.006*
Vertical jump test (cm)	4.2 ± 3.8	2.1 ± 5.4	-1.14 ± 4.4	0.024*
30 mts sprint test (sec)	0.67± 0.4	0.8 ± 0.5	0.017 ± 0.4	0.001*
mSEBT (right) (%)				
Ant	2.3± 8.8	5.08 ± 6.8	-1.8 ± 7.6	0.106
PM	8.03 ± 8.3	1.2 ± 12.6	3.2 ± 7.8	0.296
PL	3.7 ± 6.3	1.5 ± 10	-3.2 ± 10.5	0.453
mSEBT (left) (%)				
Ant	3.4± 11	5.5± 6.2	1.7 ± 7.9	0.56
PM	6.1 ± 11.1	7.7 ± 8.6	4.4± 10.3	0.736
PL	4.6 ± 9.6	7.2± 8.9	1.6 ± 10.5	0.385
Simple visual reaction time task (msec)	27.3 ± 16.5	53.8 ± 91.5	10.2 ± 17.7	0.16

DISCUSSION

The study intended to observe the effects of different skill specific exercises in amateur badminton players which demonstrated improvements in various parameters measured. It was observed that there was significant improvement in the values of Illinois agility test, 30 meters' sprint test, vertical jump test, modified star excursion balance test and simple visual reaction time task in the plyometric group. This could be attributed to the stimulation of proprioceptors which facilitates increased muscle recruitment in minimal amount of time [18]. Muscle spindle and Golgi tendon organs are the two receptors that function on the stretch reflex as the basis of muscle contraction. Muscle spindle along with Golgi tendon organ works in achieving overall control of the muscle contraction and body movement [18]. An elastic potential energy is generated while actively stretching a series of these elastic components. This energy adds on to the contraction produced by the muscle fibres [18]. These neurophysiological adaptations could be the reason for significant improvement in power in the plyometric training group. Plyometric training has also been shown to increase the activation of motor units and thus increases neural adaptation which improves the rate of force development and thus helps in improving agility and speed. As power increases the force production during sprinting increases thus leading to an increase in the ground reaction force which helps increasing the maximum force production and in reducing the sprint time thus improving speed [19]. These changes help in developing better co-ordination between the CNS signal and proprioceptive feedback and also an improved intramuscular co-ordination [20].

In a study conducted by Hammami et al. in 2019 on female basketball players, 8 weeks' intervention with plyometric training was shown to be effective in enhancing change of direction abilities, components of static and dynamic balance but did not have any significant effect on the hamstrings to quadriceps ratio, it was observed that sagittal plane plyometric training led to an improvement in the mediolateral stability along with posterolateral and posteromedial stability [20].

Myer et al., 2006 in a study on female athletes suggested that plyometric exercises can be used to increase balance, joint awareness and overall proprioception by enhancing distribution of centre of pressure and by lowering the leg dominance [21,22].

The effects of plyometric training on balance have been attributed to the promotion of anticipatory postural adjustments, particularly in peripheral joints. appropriate feed-forward adjustments prior to landing is a result of repetitive balance training [22]. As plyometric exercises improve stretch reflex activity thus improving involuntary reflex muscle action by stimulating the fast acting muscle fibres and the nerves supplying it leading to an improvement in the reaction time [22].

The speed agility quickness training given hereby had a significant effect on agility, speed and dynamic balance. SAQ training have been shown previously to have a beneficial effect on power in horizontal, linear and lateral directions with effects on reaction time [4]. The drills majorly focused on power production in linear and lateral direction which could be a reason of a non-significant improvement on power production in the vertical plane attributing to the principle of SAID (specific adaptations to imposed demands). Changes in the velocity of the impulses generated by alpha motor neurons occurred as a result of neuromuscular stimulation with rapid change of directions and muscular contractions during the drills which helped in developing control for improving the dynamic balance. The improvement in the balance is attributed to the improvement in ankle and hip muscle strength thus, enhancing postural stability [23]. An 8-week intervention of SAQ training in soccer players assessed the improvements in speed, agility and acceleration demonstrated a significant improvement in all the parameters when assessed with 30 meters' sprint, agility T test and 10 meters' sprint respectively [24].

The control group though involving more of technical training involving practice of shot drills which involved change of directions, acceleration and decelerations did not demonstrate a significant effect as also stated in a study that different types of training are important in developing the skills efficiently than any individual training program alone [19].

Limited literature is available that compared the effect of plyometric and speed agility quickness training. On comparing the three groups both plyometric group and speed agility and quickness training group proved to be more beneficial than the regular training program for improving speed, power and agility in amateur level badminton players. Both were equally effective in improving speed and agility. However, plyometric group showed significant improvement in power as compared to SAQ group. Both the trainings proved to be statistically equal in improving the parameters that were tested in this study. Further studies can be conducted with different intensities and effects on other skill and fitness related physiological parameters can be undertaken.

CONCLUSION

Both plyometric and speed agility quickness training have a significant effect on agility, power, speed, dynamic balance and reaction time individually but when compared with each other no one training is better than the other. Hence, both the training techniques play an equally important role in improving the skills that are required for badminton players in order to prevent injuries and enhance performance. Starting it at the amateur level would be beneficial as amateur level players are fit enough to undergo moderate to high intensity of training and development of appropriate skills at the initial level would help the players for future and progress without any injuries.

Conflicts of interest: **None**

REFERENCES

[1]. Phomsoupha M, Laffaye G. The science of badminton: game characteristics, anthropometry, physiology, visual fitness and biomechanics. Sport Med. 2015;45:473–95.

[2]. Parsons LS, Jones MT. Development of speed, agility, and quickness for tennis athletes. Strength Cond J. 1998;20(3):14–9.

[3]. Nadzalan AMD, Mohamad NI, Lee JLF, Chinnasee C. Relationship between muscle architecture and badminton-specific physical abilities. Hum Mov. 2018;19(1):44–50.

[4]. handrakumar N, Ramesh C. Effect of ladder drill and SAQ training on speed and agility among sports club badminton players. Int J Appl Res. 2015;1(12):527–9.

[5]. Kuibida V, Kokhanets P, Lopatynska V. Mechanism of strengthening the skeleton using plyometrics. J Phys Educ Sport. 2021;21(3):1309–16.

[6]. Johnson BA, Salzberg CL, Stevenson DA. A systematic review: Plyometric training programs for young children. J Strength Cond Res. 2011;25(9):2623–33.

[7]. Swanik KA, Lephart SM, Swanik CB, Lephart SP, Stone DA, Fu FH. The effects of shoulder plyometric training on proprioception and selected muscle performance characteristics. J shoulder Elb Surg. 2002;11(6):579–86.

[8]. Miller MG, Herniman JJ, Ricard MD, Cheatham CC, Michael TJ. The effects of a 6-week plyometric training program on agility. J Sports Sci Med. 2006;5(3):459.

[9]. Miller JM, Hilbert SC, Brown LE. Speed, quickness, and agility training for senior tennis players. Strength Cond J. 2001;23(5):62.
[10]. Pathak K, Dar KI. Effect of speed agility and quickness (SAQ) training on selected skill related fitness and physiological variables among intercollegiate basketball players. Int J Physiol Nutr Phys Educ. 2019;4(2):256–60.
[11]. Wong TKK, Ma AWW, Liu KPY, Chung LMY, Bae Y-H, Fong SSM, et al. Balance control, agility, eye–hand coordination, and sport performance of amateur badminton players: A cross-sectional study. Medicine (Baltimore). 2019;98(2).
[12]. Kutlu M, Yapici H, Yilmaz A. Reliability and validity of a new test of agility and skill for female amateur soccer players. J Hum Kinet. 2017;56(1):219–27.
[13]. Ostojiæ SM, Stojanoviæ M, Ahmetoviæ Z. Vertical jump as a tool in assessment of muscular power and anaerobic performance. Med Pregl. 2010;63(5–6):371–5.
[14]. Zagatto AM, Beck WR, Gobatto CA. Validity of the running anaerobic sprint test for assessing anaerobic power and predicting short-distance performances. J Strength Cond Res. 2009;23(6):1820–7.
[15]. van Lieshout R, Reijneveld EAE, van den Berg SM, Haerkens GM, Koenders NH, de Leeuw AJ, et al. Reproducibility of the modified star excursion balance test composite and specific reach direction scores. Int J Sports Phys Ther. 2016;11(3):356.
[16]. Baker SJ, Maurissen JPJ, Chrzan GJ. Simple reaction time and movement time in normal human volunteers: A long-term reliability study. Percept Mot Skills. 1986;63(2):767–74.
[17]. Potach DH. Plyometric and speed training. NSCA's. 2004;
[18]. Irawan D. Six Weeks Progressive Plyometrics Training on Badminton Player's Agility. In: Health Science International Conference (HSIC 2017). Atlantis Press; 2017. p. 18–21.
[19]. Sonoda T, Tashiro Y, Suzuki Y, Kajiwara Y, Zeidan H, Yokota Y, et al. Relationship between agility and lower limb muscle strength, targeting university badminton players. J Phys Ther Sci. 2018;30(2):320–3.
[20]. Hammami M, Gaamouri N, Shephard RJ, Chelly MS. Effects of contrast strength vs. plyometric training on lower-limb explosive performance, ability to change direction and neuromuscular adaptation in soccer players. J Strength Cond Res. 2019;33(8):2094–103.
[21]. Myer GD, Ford KR, Brent JL, Hewett TE. The effects of plyometric vs. dynamic stabilization and balance training on power, balance, and landing force in female athletes. J Strength Cond Res. 2006;20(2):345–53.
[22]. Cherni Y, Jlid MC, Mehrez H, Shephard RJ, Paillard T, Chelly MS, et al. Eight weeks of plyometric training improves ability to change direction and dynamic postural control in female basketball players. Front Physiol. 2019;10:726.
[23]. Meng HC, Lee JLF. Effects of agility ladder drills on dynamic balance of children. J Sains Sukan Pendidik Jasm. 2014;3(1):68–74.
[24]. Azmi K, Kusnanik NW. Effect of exercise program speed, agility, and quickness (SAQ) in improving speed, agility, and acceleration. In: Journal of Physics: conference series. IOP Publishing; 2018. p. 12043.

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