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Effects of Plyometric Training on The Agility and Psychological Well-Being of Amateur Badminton Players

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I. INTRODUCTION

Badminton is a high-intensity sport requiring explosive movements, rapid directional changes, and strong psychological composure. Among the physical attributes essential to performance, agility, defined as the capacity to change direction rapidly without loss of balance, is considered a critical determinant of competitive success [1]. Speed, agility, and quickness (SAQ) training, including plyometric exercises, has gained prominence in badminton conditioning because it directly replicates match-specific movement demands [2]. Beyond physical performance, psychological factors such as confidence play a significant role in athletic outcomes, particularly under competitive pressure. Despite this, most research has examined physical and psychological outcomes separately. This study addressed that gap by investigating the dual effects of a structured three-week plyometric training programme on both agility and sport-confidence among amateur badminton players.

II. METHODS

This study employed a true experimental pre-test and post-test randomised design with 12 male amateur badminton players (mean age: 23.2 ± 0.72 years; mean BMI: 21.7 ± 2.60 kg/m²). Participants were purposively selected and divided equally into an experimental group ($n = 6$) and a control group ($n = 6$). Eligibility required active participation at university, club, or community level, no history of major injury, and no prior structured plyometric training within six months. G*Power analysis confirmed the adequacy of this sample size.

The experimental group underwent a three-week plyometric training programme (3 sessions/week) comprising side-to-side ankle hops, standing jumps, lateral cone hops, and barrier jumps, alongside routine badminton training. The control group continued only their regular badminton training. Agility was assessed using the Agility T-test (in seconds), and psychological well-being was measured using the Trait Sport-Confidence Inventory (TSCI; Vealey, 1986), scored from 13 to 117. Both tests were administered at pre-test and post-test.

Statistical analyses including Shapiro–Wilk normality tests, Paired Sample t-tests, and Independent Sample t-tests were performed using Jamovi at a significance level of $p < .05$.

III. RESULTS AND DISCUSSION

Normality was confirmed for all variables using the Shapiro–Wilk test ($p > .05$). Table I presents the pre- and post-test descriptive statistics for both groups.

TABLE I
PRE- AND POST-TEST AGILITY (S) AND CONFIDENCE (TSCI)
SCORES BY GROUP

Variable	Group	Pre M±SD	Post M±SD	t	p
Agility (s)	Plyometric	12.80±1.1 9	10.50±1.5 3	13. 6	<.00 1
	Control	13.00±0.8 9	13.65±0.8 5	3.3 1	.021
Confidence (TSCI)	Plyometric	40.50±6.1 2	99.83±2.8 6	- 23. 9	<.00 1
	Control	37.50±3.0 2	79.33±7.3 4	- 12. 3	<.00 1

*All paired t-tests $df = 5$. * $p < .05$; ** $p < .001$.

Paired sample t-tests revealed that the experimental group demonstrated a significant improvement in agility ($t(5) = 13.6$, $p < .001$), with agility time decreasing from 12.80 ± 1.19 s to 10.50 ± 1.53 s. Confidence scores increased substantially from 40.50 ± 6.12 to 99.83 ± 2.86 ($t(5) = -23.9$, $p < .001$). The control group showed no meaningful changes in agility and a comparatively modest rise in confidence. Independent samples t-tests confirmed that the experimental group outperformed the control group significantly on both post-test agility ($t(10) = -2.34$, $p = .042$) and post-test confidence ($t(10) = 7.19$, $p < .001$). These findings align with previous literature demonstrating plyometric training's effectiveness in enhancing neuromuscular coordination and reactive strength [3]. Improved physical performance likely triggered gains in perceived competence and self-efficacy, resulting in elevated confidence levels [4].

This study demonstrates that a three-week plyometric training programme significantly enhanced both agility and sport-confidence among amateur badminton players, outperforming conventional training alone. These findings underscore the value of integrating plyometric exercises into badminton conditioning to achieve holistic athlete development. Future research should consider larger and more diverse samples, longer intervention periods, and the inclusion of additional physical and psychological variables to further validate these outcomes.

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