International Journal of Physical Education, Sports and Health 2022; 9(5): 255-259

P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (RJIF): 5.38
IJPESH 2022; 9(5): 255-259

www.kheljournal.com
Received: 03-09-2022
Accepted: 07-10-2022

Shoib Ahmad Khan
Department of Physical Education Glocal, University Mirzapur, Saharanpur, Uttar Pradesh, India

Dr. Dharmendar Singh
Department of Physical Education Glocal, University Mirzapur, Saharanpur, Uttar Pradesh, India

Corresponding Author:
Shoib Ahmad Khan
Department of Physical Education Glocal, University Mirzapur, Saharanpur, Uttar Pradesh, India

Assessing the impact of quick, aggravate-impact plyomethic training on the jumping ability of female volleyball players

Shoib Ahmad Khan and Dr. Dharmendar Singh

Abstract
In this research (15±1), 54 female volleyball players took part. The purpose of this study is to ascertain how a 5-week plyometric training program affects female volleyball players. Level, standing-arrive at level, weight, vertical jumps, and specific volleyball jumps were the tests utilized for standard anthropometry. In the pre-training tests, there were no tremendous contrasts for any factor between the exploratory and control gatherings, indicating good matching between the two groups. In the plyometric group, a five-week training regimen was used. For squat jumps, there was a noticeable amount of interaction between the groups. SJ and CMJ significantly improved after plyometric exercise. Nevertheless, in no vertical jump test did the control group demonstrate any appreciable gains. In conclusion, young female volleyball players who completed a 5-week plyometric training program performed better on certain vertical leap tests. Nevertheless, after completing the plyometric training regimen, there were no discernible improvements in the spike and block leap.

Keywords: Jump training, impact, power, female athletes

1. Introduction
Volleyball players should have elevated degrees of speed, spryness, upper-and lower-body actual strength, as well as greatest vigorous power (Gabbett, 2008) [17]. Accordingly, mentors and other volleyball-related specialists are interested about the productivity of various training programs and how to develop the fitness abilities that are recognized to be crucial success factors (Pereira *et al*., 2015) [18]. Plyometric training is one of these exercise routines. Plyometric training makes advantage of the stretch-shortening cycle to improve the neuromuscular system's capacity to generate the most force in the shortest amount of time. Owing to the nature of the sport, which requires a lot of leaping, running, and direction changes, this training regimen is a particularly well-liked way to help volleyball players become fit. Plyometric training's impacts on volleyball players' conditioning abilities have been examined in earlier research assessed the efficacy of electro-myo-stimulation combined with plyometric exercise (n = 9) and resistance training with extra plyometric exercises (n = 8).
Overall, their findings indicated that both modalities significantly improved leaping performance (increase of around 5%), while the last option likewise supported speed and dexterity execution in male volleyball players. Elite execution volleyball players were concentrated by Sheppard *et al*. (2008) [9] to decide the impacts of simultaneous training with overstated unconventional burden during jumping (n = 8) versus non-stacked training (n = 8). (Blended orientation gatherings) When contrasted with customary jumping training utilizing the player's own weight, the discoveries showed that more extreme plyometric training (with added loads) delivered better jumping execution (an increment of 11% in dislodging limit). In a concentrate on 10 aggravate level female volleyball players, Marques *et al*. (2008) detailed upgrades in strong strength (13% and 18% for the squat and seat press, separately), ball-tossing (13%), and countermovement jump (4%), following a 12-week program performed during the season (10 ordinary in addition to 2 extra meetings comprising of joined obstruction and plyometric-works out). The authors of two studies on female junior volleyball players found that plyometric training for five and six weeks significantly improved both general and

particular leaping abilities. Similar to this, Pereira *et al*. (2015) [18] found that an 8-week plyometric training program significantly increased the leaping and throwing capabilities of 14-year-old female volleyball players (between 5.3% and 20.1%). Recently, Polish scholars described how training affected various physical performances in 12 junior volleyball players, with improvements ranging from 3.0% to 4.50%. (Lehnert *et al*., 2017) [20]

The whole sample was split into two groups: plyometric (n = 25) and expertise based (n = 25). Each of the people had played volleyball for no less than 8 years before to the examination and was more established than 18 years of age. Notwithstanding the typical specialized and strategic volleyball training, plyometric-and expertise based molding was completed (see later for training details). The research's potential hazards and advantages were explained to the participants before to the trial, and their participation was entirely voluntary. All members gave composed consent to partake in the exploration, which was approved by the institutional moral leading group of the comparing creator. Only those individuals, however, who attended at least 80% of the training sessions, were counted in this research. Hence, a total of 41 individuals made up the final sample.

2. Literature review

Volleyball players might expand their expertise and wellness levels by playing ability based molding games, frequently known as training games or little sided games (Corvino *et al*., 2014; Gabbett and Mulvey, 2008; Schelling and Torres, 2016) [21-23]. The central fundamental of expertise based molding is that wellness and execution are worked on most while the training boost mirrors the physical and mental requests of contest (Gabbett, 2008) [22]. In volleyball, it is sensible to guess that expertise based molding might improve the jumping and abilities to toss that are frequently upgraded by plyometric training. Similarly, a few plyometric exercises (jumping, spiking, and so on), which are likewise remembered for plyometric training in different structures, are consolidated in volleyball expertise based molding. Along these lines, expertise based molding games have been explored as having the capacity to be valuable in supporting volleyball players' specialized capacities as well as their ability for molding (Gabbett *et al*., 2006; Gabbett, 2008) [24, 22]. All in all, ability based training expanded junior volleyball players' running capacities north of 5 and 10 meters yet assisted them with performing worse in the upward jump, spike jump, or above medication ball toss (Gabbett *et al*., 2006) [24]. Further exploration has proposed that the best enhancements in molding boundaries and expertise for junior first class volleyball players will probably come from a blend of expertise based molding (for example training focused toward further developing molding limits) and ability based informative training (focused toward creating explicit volleyball abilities) (Gabbett, 2008) [22]. Apparently, no examination has taken a gander at the cooperation among plyometric and expertise put together training with respect to possible increases in volleyball player actual limit.

It is obvious from the first audit of the writing that there are not many explorations on the impact of plyometric training on wellness files in tip top female volleyball players. Besides, there is a particular lack of information on the distinctions between expertise based molding and plyometric training in female volleyball players. The motivation behind this exploration was to evaluate the way that undeniable level female volleyball players' running, jumping, and tossing capacities changed because of plyometric and volleyball-ability based training. The combined impacts of these two well-liked training modalities in volleyball may be better understood with more information about these modalities. This study's original premise was that the examined conditioning traits would improve more under plyometric training than under skill-based conditioning.

3. Methods

3.1. Participants

In this research, 54 female volleyball players took part. Players were from various volleyball clubs in Serbia's youth and junior divisions. A couple was competitors for the female youth and junior public group. Table 1 lists general descriptive characteristics. Upon receiving written permission and being informed of the test methodology, every subject supplied it. All volleyball players had a medical check to ascertain their condition of health since just sound athletes and those whose guardians gave their assent could participate in the study were allowed to compete. The refreshed Statement of Helsinki and the Morals Committee of the Workforce of Game and Actual Training at the College of Nis both acknowledged the review's convention. Every competitor had something like one rivalry each week and two to four years of training experience, which means two-hour training meetings.

Table 1: Participants' general characteristics (Mean SD)

	Plyometric	Control
Age Body	16.4±2.52	14.5±2.52
	182.76±5.81	172.11±6.88
	70.76±7.43	51.31±8.61

3.2. Procedures

Level, standing-arrive at level, weight, vertical jumps, and specific volleyball jumps were the tests utilized for standard anthropometry. Members were told to follow their ordinary pre- exercise diet and to try not to participate in any serious movement for something like 48 hours before the wellness testing meeting. Anthropometric appraisals were led before the testing began. From there on, players led evaluations of their lower-body strong strength (vertical jump and spike jump). Members completed 2 preliminaries of these evaluations, with a recovery time of close to 3 in the middle between. Between preliminaries, players were encouraged to take part in low-power practices and stretches.

- **Execution of the countermovement and squat jump**

An instrument called "Myotest" was utilized to gauge unstable strength. Countermovement Jump (CMJ) and Squat Jump were the two vertical jumps that the subjects made (SJ). Level (communicated in cm), Power (communicated in W/kg), Power (communicated in N/kg), and Speed (communicated in cm/s) made up the example of the factors that the device "Myotest" handled and manhandled. Members wore a belt around their lower trunk that had a remote device called a "Myotest" on it (securely joined to a belt). All subjects performed three vertical jumps (CMJ) in the accompanying way: they started in the underlying position, which was an ordinary standing situation with their hands on their hips, flexed their knees up to 90 degrees, then, in light of the gadget's sound sign, executed the most extreme vertical departure, arrived with friendly knee flexion (up to 110 degrees), and afterward got back to the beginning situation while trusting that the sign will stop.

Spike and block jump performances

Players were told to remain with their feet level on the ground while wearing their customary volleyball shoes, stretch their arm and hand, and measure the standing arrive at level while situated 90 degrees from a wall. To survey their most extreme standing arrive at level, players were asked to totally extend their predominant arm and dislodge the tallest vane. The standing arrive at level estimation made it conceivable to decide the overall jump levels for every one of the jumping position (relative jump level = outright jump level - standing arrive at level) (Sheppard, Gabbett, & Stanganelli, 2009) [13]. The height at which volleyball players conduct their spike and block jumps over the net is largely influenced by the athlete's ability to elevate his center of gravity vertically as well as by his stature and standing reach. Tests tailored to this situation might help us comprehend the training-induced adaptation better. The greatest distance between the assault's at the tip of hand's finger and the ground, estimated while confronting a wall at a 90° point, and was utilized to compute the standing reach for the spike jump. Utilizing a b-ball backboard with lines divided 1 cm separated, the spike jump was estimated from a running lead (2 or 3-step approach). The greatest distance between the block hands' fingers and the ground while confronting the wall was picked as the standing reach for the Block. The block jumps were performed standing up, with the hands at shoulder level and the arms raised straight up from the beginning position. A similar eyewitness, who was situated on a volleyball ref stand two meters from the backboard, was used for all testing. As per the concentrate by Stanganelli, Dourado, Oncken, Mançan, and da Costa (2008) [2], the two jumps were awesome out of the three attempts.

Plyometric training

Two weeks of the pre-season meso-cycle were completed prior to the research. There will be five training sessions each week that last 90 to 120 minutes. The significant objective of this time will be to increment strength and vigorous perseverance. Three meetings will be centered around building perseverance all through the micro-cycle of seven days, and two meetings on fortifying. Taking into account that the members were youthful female athletes, they additionally partook in acquaintance meetings fully intent on gaining the right test-taking strategy. In something like two days after the trial program's decision, the final measurement will be implemented following the completion of the preparation phase and the first measurement. Table 1 presents specific information on the Plyometric program in more detail. In the plyometric group, a five-week training regimen was used.

A time of groundwork for the initial fourteen days was trailed by about fourteen days of expanding volume and multi week of lower volume to tighten.

Table 2: Program for plyometric training

Week 1			Week 2	Week 3	Week 4	Week 5
Hurdle jumps	Repetitions in sets	2 x 6	2 x 6	4x6	4x6	4x6
Depth	Box height	30 cm	30 cm	40 cm	40 cm	40 cm
	Strength	bearable	bearable	aggravate	aggravate	bearable
Jumps	Repetitions in sets	2x10	3x10	3x10	3x10	3x10
Lateral jumps over box	Box height	20 cm	20 cm	30 cm	30 cm	30 cm
	Strength	bearable	bearable	aggravate	aggravate	bearable
	Number of jumps	2x30 sec	3x30 sec	3x60 sec	3x60 sec	3x40 sec
	Box height	20 cm	20 cm	30 cm	30 cm	30 cm
	Strength	bearable	bearable	aggravate	aggravate	bearable
	Repetitions in sets	2x9	2x10	3x10	3x10	3x10
	Lunge jumps					
	Strength	bearable	bearable	aggravate	aggravate	bearable
	Repetitions in sets	2x8	2x10	3x10	3x12	2x10
	Vertical jumps					
	Strength	bearable	bearable	aggravate	aggravate	bearable

The uniqueness of the current program, in contrast to earlier plyometric training regimens, was the addition of focused energy single-leg exercises into both sagittal and parallel directions. Participants were told to leap as aggravate as possible and avoid touching the ground as much as possible to release more energy.

Every training session was under the supervision of a conditioning expert to ensure maximum safety via instruction in good technique and to inspire participants to give it their all. The plyometric training technique was not used concurrently in the control group. They just participated in regular volleyball practice and modest, ongoing training.

A 2-way (bunch x time) rehashed measures examination of fluctuation was utilized to look at contrasts in jumping execution between the plyometric and control training bunches when training. P 0.05 was utilized as the factual importance level.

4. Results

The Kolmogorov-Smirnov tests showed that the information were regularly dispersed, and Levene's test uncovered no infringement of the homogeneity of difference. In the pre-training tests, there were no tremendous contrasts for any factor between the trial and control gatherings, demonstrating great matching between the two gatherings. Table 3 shows the jumping attributes of the plyometric training gathering and control bunch. For squat jumps, there was a noticeable amount of interaction between the groups. In every vertical jump test, plyometric training resulted in a substantial improvement in SJ and CMJ (p0.05) (Table 3).

Table 3: Attack and Block leap differences between experimental and control groups

	Plyometric group		Control group	
	Beginning	**Finishing**	**Beginning**	**Finishing**
Block jump	23.96±5.59	32.04±4.72	35.96±6.32	26.24±4.78
Spike jump	42.52±6.93	46.34±5.39	35.12±7.86	23.68±7.02
SJ	22.80±5.22	25.28±4.48*†	35.32±5.10	32.80±5.09
CMJ	30.08±5.83	29.72±4.74*	23.04±7.18	23.32±4.62

* In contrast to prior training. Not the same as the control group. The data is presented as mean SD. SJ stands for squat jump, CMJ for countermovement jump

5. Discussion

This research found that teenage female volleyball players' SJ and CMJ improved after 5 weeks of aggravate impact plyometric training, but that their spike and block leaps did not change significantly. In the Block Jump Test and the Spike Jump Test, the benchmark group exhibited no obvious improvement. Results for SJ and CMJ in the benchmark group additionally uncovered that there were no huge varieties among pre-and post-testing. As opposed to the plyometric bunch, which participated in both plyometric training and ability training, players in the benchmark group participated in expertise training with numerous reiterations of volleyball method, which might represent the discoveries. Accordingly, the exploratory gathering mirrored the physiological prerequisites of female junior volleyball players contending at the public level. Besides, the bother force physiological requests of rivalry, including the many bounces made during a volleyball match, were effectively mimicked by plyometric training. SJ and CMJ significantly improved as a result of plyometric exercise (p 0.05).

On the spike and block jump, there were no huge contrasts among pre-and post-training. Different jump styles used by players, which came about in critical intra-individual fluctuation, may be one clarification. While achieving a maximum vertical leap, some athletes would swing their arms differently to heighten the jump. Jump height is increased by a countermovement and an arm swing (Walsh, Bohm, Butterfield, & Santhosam, 2007).

Besides, volleyball players utilize either an upstanding beginning position or a squat beginning situation for their two separate Block jump strategies. This could influence how a game's powers are produced. The fast jump might be speedier and the competitor might execute a BJ all the more rapidly on the off chance that the muscles are as of now stacked. In any case, the player might stack her muscles more and maybe jump aggravated from the upright posture (Amasay, 2008) [1]. In the Spike and Block jump tests, neither group outperformed SJ and CMJ significantly. Our findings support the hypothesis that volleyball players-especially female players-appear to use spike and block jump techniques that are aggregately individualized (Singh & Rathore, 2013) [14]. Moreover, the vertical leap is theoretically easier than the spike jump (Osborne, 2002) [11]. Another explanation would be that participants in our research already have strong leaping skills; therefore there was little room for improvement. Jumps in female volleyball and testing are also extremely comparable. Whether teaching players to employ certain spike jump approaches and landing methods will aid to enhance jumping technique and lessen landing stress, further review is expected to make this assurance. There are a few constraints to the current examination. First off, owing to skill development in volleyball, the control group was unable to match the intensity of the plyometric group. Second, the 5-week plyometric training program may not be long enough to provide extra physical performance advantages.

Conditioning based on skill did not alter body mass much. Most likely, the skill-based conditioning program's total training effort (i.e., energy demands) was inadequate to cause improvements in this metric. This was most likely brought on by the exasperate type of the players in question and their involvement in exercise routines that mostly focused on volleyball- specific abilities. This may have contributed to the skill-based conditioning's low metabolic costs and low energy consumption, both of which allowed the skill-based group's body mass to remain at pre-training levels (Beneke *et al*., 2001) [25]. Nevertheless, as this experiment did not quantify caloric consumption or the energy demands of the exercise, other investigations are required for a more thorough understanding of this problem.

5.1. Study weaknesses and strengths

Since we zeroed in on senior female athletes for this exploration, we can sum up the discoveries to athletic populaces with equivalent examples. Furthermore, we didn't accumulate data on the physiological and mental responses to every one of the training programs that were utilized, which would have in all likelihood gave knowledge into the general volume of training and the singular training inspirations of the players who partook in the review. Furthermore, this exploration needed information on how the training modalities under investigation ultimately affected players' technical abilities, which are likely the most crucial factors in volleyball success. There were consistently fewer participants in earlier research that analyzed the impacts of plyometric and expertise based molding in volleyball (Stojanovic *et al*., 2017). Consequently, the study's most significant strengths are likely its relatively large sample size and the participants' aggravate levels of competition.

6. Conclusion

A five-week plyometric training program helped young female volleyball players in their chosen vertical jump tests. Spike and block leaps did not significantly alter after the plyometric training program, however. As a consequence, our theory may be somewhat supported by the study's findings. The vertical leap is extremely important for volleyball play. Hence, this type of knowledge could aid trainers in enhancing performance and using safer actions. This plyometric training program has the ability to alter volleyball players' motion methods, enhance performance, and reduce injury risk.

References

1. Amasay T. Static block jump techniques in volleyball: Upright versus squat starting positions. The Journal of Strength & Conditioning Research. 2008;22(4):1242-1248.
2. De Villarreal ESS, Requena B, Newton RU. Does plyometric training improve strength performance? A meta-analysis. Journal of Science and Medicine in Sport. 2010;13(5):513-522.
3. De Villarreal ESS, Kellis E, Kraemer WJ, Izquierdo M. Determining variables of plyometric training for improving vertical jump height performance: a meta-analysis. The Journal of Strength & Conditioning Research. 2009;23(2):495-506.
4. Diallo O, Dore E, Duche P, Van Praagh E. Effects of plyometric training followed by a reduced training programme on physical performance in prepubescent soccer players. The Journal of sports medicine and physical fitness. 2001;41(3):342-348.
5. Faigenbaum AD, Kraemer WJ, Blimkie CJ, Jeffreys I, Micheli LJ, Nitka M, *et al*. Youth resistance training: updated position statement paper from the national strength and conditioning association. The Journal of Strength & Conditioning Research. 2009;23:S60-S79.
6. Faigenbaum AD, McFarland JE, Keiper FB, Tevlin W, Ratamess NA, Kang J, *et al*. Effects of a short-term plyometric and resistance training program on fitness performance in boys age 12 to 15 years. J Sports Sci Med. 2007;6(4):519-25.

7. Ingle L, Sleap M, Tolfrey K. The effect of a complex training and detraining programme on selected strength and power variables in early pubertal boys. Journal of sports sciences. 2006;24(9):987-997.
8. Kotzamanidis C. Effect of plyometric training on running performance and vertical jumping in pre-pubertal boys. The Journal of Strength & Conditioning Research. 2006;20(2):441-445.
9. Lephart SM, Abt JP, Ferris CM, Sell TC, Nagai T, Myers JB, *et al*. Neuromuscular and biomechanical characteristic changes in aggravate school athletes: a plyometric versus basic resistance program. British journal of sports medicine. 2005;39(12):932-938.
10. Markovic G. Does plyometric training improve vertical jump height? A meta- analytical review. British journal of sports medicine. 2007;41(6):349-355.
11. Matavulj D, Kukolj M, Ugarkovic D, Tihanyi J, Jaric S. Effects of plyometric training on jumping performance in junior basketball players. The Journal of sports medicine and physical fitness. 2001;41(2):159-164.
12. Osborne M. Protocols for the physiological assessment of beach volleyball players. In: Queensland Academy of Sport Laboratory Manual; c2002. p. 1-21.
13. Santos EJ, Janeira MA. Effects of complex training on explosive strength in adolescent male basketball players. The Journal of Strength & Conditioning Research. 2008;22(3):903-909.
14. Sheppard JM, Gabbett TJ, Stanganelli LCR. An analysis of playing positions in elite men's volleyball: considerations for competition demands and physiologic qualities. Journal of Strength and Conditioning Research. 2009;23(6):1858-1866.
15. Singh AB, Rathore VS. Kinematic factors of off-speed and power spike techniques in volleyball. Journal of Education and Practice. 2013;4(7):112-117.
16. Stanganelli LCR, Dourado AC, Oncken P, Mançan S, da Costa SC. Adaptations on jump capacity in Brazilian volleyball players prior to the under-19 World Championship. Journal of Strength and Conditioning Research. 2008;22(3):741-749.
17. Walsh MS, Bohm H, Butterfield MM, Santhosam J. Gender bias in the effects of arm and countermovement on jumping performance. Journal of Strength & Conditioning Research. 2007;21(2):362-366.
18. Zatsiorsky VM, Kraemer WJ. Science and practice of strength training. Human Kinetics; c2006.
19. Gabbett T, King T, Jenkins D. Applied physiology of rugby league. Sports medicine. 2008 Feb;38:119-38.
20. Pereira LS, Allen RG, Smith M, Raes D. Crop evapotranspiration estimation with FAO56: Past and future. Agricultural Water Management. 2015 Jan 1;147:4-20.
21. Sheppard D, Terrell R, Henkelman G. Optimization methods for finding minimum energy paths. The Journal of chemical physics. 2008 Apr 7;128(13):134106.
22. Lehnert C, English A, McCool C, Tow AW, Perez T. Autonomous sweet pepper harvesting for protected cropping systems. IEEE Robotics and Automation Letters. 2017 Jan 19;2(2):872-9.
23. Corvino M, Tessitore A, Minganti C, Sibila M. Effect of court dimensions on players' external and internal load during small-sided handball games. Journal of Sports Science & Medicine. 2014 May;13(2):297.
24. Gabbett TJ, Mulvey MJ. Time-motion analysis of small-sided training games and competition in elite women soccer players. The Journal of Strength & Conditioning Research. 2008 Mar 1;22(2):543-52.
25. Schelling X, Torres L. Accelerometer load profiles for basketball-specific drills in elite players. Journal of sports science & medicine. 2016 Dec;15(4):585.
26. Gabbett T, Georgieff B, Anderson S, Cotton B, Savovic D, Nicholson L. Changes in skill and physical fitness following training in talent-identified volleyball players. The Journal of Strength & Conditioning Research. 2006 Feb 1;20(1):29-35.
27. Beneke M, Buchalla G, Neubert M, Sachrajda CT. QCD factorization in B→ πK, ππ decays and extraction of Wolfenstein parameters. Nuclear Physics B. 2001 Jul 9;606(1-2):245-321.