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Review

The Effects Of Bosu Ball Exercises On Neuromuscular Control In Basketball Players: A Review Of Literature

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	<h3>Abstract</h3>
<p>Published on: 12 May 2025</p>	<p>Background Neuromuscular control (NMC) is crucial for athletic performance in sports like basketball, which demands quick directional changes and explosive movements. Common injuries to the knee, ankle, and lower extremities highlight the need for effective injury prevention strategies. Bosu Ball exercises may enhance NMC by activating stabilizing muscles and improving proprioception, which can benefit dynamic movements in basketball. While Bosu Ball training shows promise in improving balance and functional performance, research specifically targeting its effects on NMC in basketball players is scarce.</p>
<p>Published by: DrSriram Publications</p>	<p>Methodology: A literature review study was done using the specified search criteria to carry out a literature review, the search phrases "a study to evaluate the effects of bosu ball exercises on neuromuscular control among basketball players" were employed between the years 2015 and 2024. We have discovered 10 publications with complete text and methodologies for additional examination from diverse academic journals.</p>
<p>2025 All rights reserved.</p>  <p>Creative Commons Attribution 4.0 International License.</p>	<p>Results: The results indicate that a combination of targeted Bosu ball exercises focusing on neuromuscular control significantly reduced pain, improved functionality, and enhanced stability in both the left and right legs, showing an average increase. These findings suggest that both treatments are beneficial when tailored to the specific needs of basketball players regarding the effects of Bosu ball exercises on neuromuscular control.</p> <p>Conclusion We identified 10 publications that evaluated the impact of Bosu ball exercises on neuromuscular control in basketball players. The studies highlight that these exercises significantly improve dynamic balance, lower extremity stability, and landing mechanics. Incorporating Bosu ball exercises into basketball training can effectively enhance performance and prevent injuries by improving proprioception and balance during complex movements.</p> <p>Keywords: Neuromuscular control (NMC), Basketball players, Bosu ball exercises, Dynamic balance</p>

INTRODUCTION

Neuromuscular control is refers the coordination between nervous system and musculoskeletal system . It provides movements and it helps to understand the how voluntary moments are executed. It is a concept of neuromuscular control of idea in muscle synerics .it's activated the nervous system to simplify the control of complex movement . This concept has been supported by studies show consistent muscle activation to a various pattern and task , conditions(Daanish M Mulla et al 2020)(1).

Biomechanicals models are incorporative neural control strategies provide insights the body movement work in different positions along with neuromuscular system. To improve neuromuscular control is through balance and proprioception training which helps the athletic adapt to dynamic and un predictable movements.(Sañudo B et al. 2021)(2).

Basekball is a globally participating team sports with most popularity across the world especially america, australia, europe , southeast Asia, and the western Pacific. It has a high injury incidents will see because it is a high performance setting. (Aaron T Scanlan et al 2019)(3). In the basekball players u see lower limb injuries around 63.7 % and upper limb injuries are like 12 to 14 percent of cases, in lower limb are knee, ankle particularly prevelent due to dynamic nature of this sports. It have jumps, turns, rapid changes of directions it causes musculoskeletal injuries(Carlos Vicente Andreoli et al. 2018)(4).

Bosu ball is a half sphere balance design to improve the stability, coordination, core strength, and functional movement and it has a more popularity in athlete training program help to injury prevention, balance enhancement, sports specific conditions. It help both static and dynamic balance in sports players(Pavlova et al 2022)(5)

The bosu ball can leads the explosive power and vertical jumping in athletics it also helps found to activate deeper core muscles it helps rehabilitation, functional fitness, sports agility developments, it also indicated enhance the neuromuscular, coordination and proprioception(Karakoc et al. 2020)(6).

Incorporating Bosu Ball exercises into athletic training has been shown to improve balance, lower extremity stability, and proprioceptive skills, which are crucial for reducing the risk of injury and enhancing performance (Kim et al., 2015)(7).

REVIEW OF LITERATURE

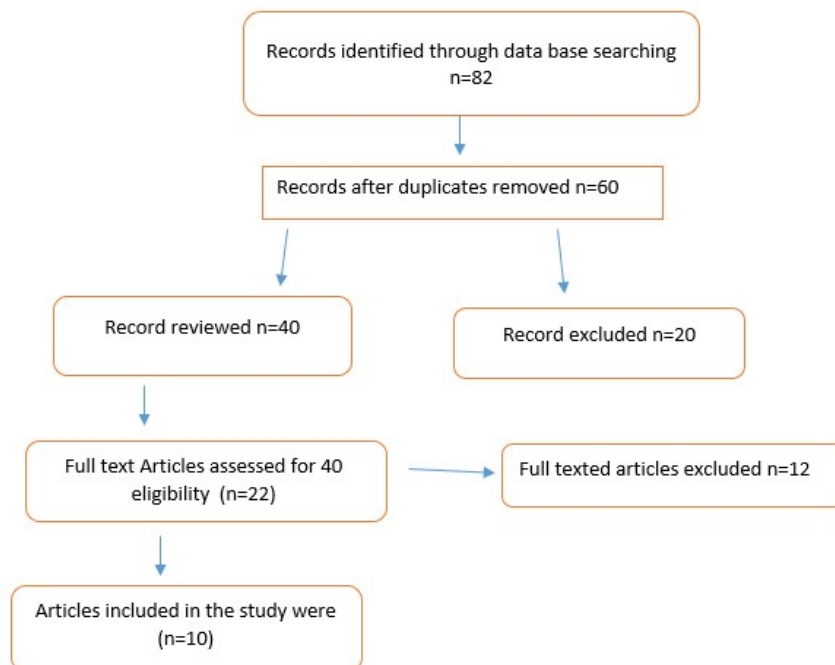
S.no	Authour	Published year	Remarks
1	Shudian Cao ⁸	2025	A systematic review of 13 articles with 374 subjects examined the effects of balance training (BT) on physical fitness and skill-related performance in basketball players, focusing on BT interventions lasting at least four weeks. The studies revealed significant improvements in balance, power, agility, stability, and basketball skill-related performance. However, certain assessments, including the balance error scoring system, triple hop distance, 30-second maximal performance jump, single-leg triple hop, Y reactive agility, and maneuver running tests, did not show significant improvements. The study concluded that BT is a valuable intervention for enhancing physical fitness and skill-related performance in basketball players.
2	Yang, Y-R, Chen ⁹	2025	A randomized controlled trial study investigated the effects of half-time re-warm-up (RW) with core strength exercises (CSE) on basketball players' power and change of direction (COD) performance. Twelve male collegiate players completed three conditions—CSE RW on a stable platform (STA), an unstable platform (USTA), and passive rest (control, CON)—in randomized order after a modified Loughborough intermittent shuttle test (LIST). Performance tests for COD and power were administered before and after the interventions. Heart rate (HR) was measured continuously. Results showed that the mean HR during USTA was significantly higher than in STA and CON ($p < 0.05$). The study concluded that CSE RW during halftime may help prevent declines in power and COD performance, with practical implications for coaches and players.
3.	shengyao luo ¹⁰	2023	This systematic review aimed to critically assess studies on the impact of core training on basketball players' physical and skill performance, providing recommendations for coaches and researchers. Eight articles were included, with four comparing core training to traditional strength or basketball training. The findings indicated that

			core training improved athletic performance, including strength, sprinting, jumping, balance, agility, shooting, dribbling, passing, rebounding, and stepping. Core training on unstable surfaces and combining static and dynamic exercises were particularly effective. While limited evidence was found for core training's impact on endurance, flexibility, and defensive skills, it was concluded that core training should be incorporated into basketball training sessions. ¹⁰
4.	mehmet sarikaya ¹¹	2023	A randomized controlled trial study investigate the acute effect of static warm-up exercises on vertical jump and balance performance in basketball players. The sample consisted of 15 male basketball players from Bingöl province, with a mean age of 14.86±0.83 years, average height of 1.68±0.09 cm, and body weight of 52.79±7.20 kg. After a 5-minute light jog, static stretching was performed for 5 minutes. The vertical jump performance was assessed using the Countermovement Jump (CMJ) and Squat Jump (SJ) tests, while balance performance was measured with static and dynamic balance tests, and leg strength was evaluated. Statistically significant improvements were found in dynamic balance performance and various swing area and reaction time values (p<0.05). The results suggest that static warm-up exercises have a positive acute effect on jump and balance performance in basketball players.
5.	wei zhao ¹²	2021	A randomized study that investigate effect of integrative neuromuscular training for injury prevention and sports performance of female badminton players. According to pretest value based on functional movement screening, 38 participants were divided into a high-risk group (HG) and a low-risk group (LG) with 22 and 16 people in each group. Two groups of athletes took part in an 8-week INT program consisting of four 90-min sessions each week. The asymmetries in movement, physical fitness, and special abilities were tested before and after the intervention. Independent sample t-test was used for the statistical analysis the study concluded effectively improve the asymmetry of female badminton athletes' limbs, prevent sports injury, and improve the athlete's performance ability. However, athletes in different risk groups have certain differences in the degree of improvement in their motor skills. ¹²
6.	özgür doğan ¹³	2021	A randomized study the effects of an 8-week core training program on general strength, balance, and psychomotor development in 12-14-year-old male basketball players. Thirty voluntary participants (experimental group n=16, control group n=14) were selected. The Basketball Psychomotor Development Level, Sport-Specific Core Muscle Strength, Stabilometer (static balance), and Y Balance (dynamic balance). Significant improvements were found in favor of the experimental group in core strength, stabilization, psychomotor development, static and dynamic balance (p<0.05). The results suggest that the core training program positively impacts core strength, balance, and psychomotor development in basketball players. For sustainable development, core training should be included in training routines.
7.	k.satheesh kumar ¹⁴	2020	A randomized control trail effect of balance training in basketball specifically for 13-14 year old youth athletes. Dynamic and static balance, fast shooting, passing accuracy, defensive sliding, lay up, maneuver running, a total of 30 young male and 25 female 13-14 – year- old basketball players (males ±0.52, females: ±0.48) were randomly allocated into the experimental group for boys (EB) and girls (EG), and into the control group for boys (CB) and girls (CG). Only two experimental groups underwent the balance and proprioceptive training program for 8 weeks. It was determined that an 8-week balance and proprioceptive training program improved passing accuracy scores of 13–14-year-old basketball players regardless of sex. In addition, this program improved static balance and fast shooting in boys and dynamic balance in girls

8.	Canli, Umut ¹⁵	2019	A randomized controlled trial study investigate the effects of an 8-week neuromuscular training program (NTP) on motoric and basketball skills in pre-pubescent male basketball players. Twenty-four players were divided into an intervention group (n=12, age=10.6 ± 0.75 years) and a control group (n=12, age=10.8 ± 0.68 years) based on pre-test results. The intervention group participated in NTP twice per week for 8 weeks, while the control group followed regular basketball training. Motoric skills were assessed through agility t-test, 20-meter sprint, back strength, vertical jump, long jump, sit-and-reach, and stork balance. Basketball skills were evaluated through shooting and dribbling tests. Significant improvements were observed in vertical jump and flexibility in the control group (p<0.05), while all motoric and shooting skills improved significantly in the intervention group (p<0.05).
9.	aisha elfateh ¹⁶	2017	A randomized controlled trial the study conduct on effects of ten weeks of instability resistance training (bosu ball) on muscular balance and the learning level of fencing basics 30 female students from faculty of physical education for girls (age 17.8 +/- 1.9 years) participated in this study. The sample was distributed equally into two groups, the experimental group contains (15 female students) and the control group contains (15 female students), the experimental group participated in the (BOSU ball) program for 10 weeks and the control group participated in the traditional program that used in the faculty. All participants completed the tests before and after the 10-week programs the study concluded that The findings indicated that the (BOSU ball) exercises for 10 weeks could an increase in balance (static and dynamic) and improvement of the performance level of the fencing basics. These results have to be taken into account by teachers in order to better understand and implicated of these concepts in educational lessons
10	olga borao ¹⁷	2015	Experimental study conducted Effects of a 6-week neuromuscular ankle training program on the Star Excursion Balance Test for basketball players Seventeen uninjured basketball players participated (8 experimental (EG), 9 control (CG). The EG performed the training program during the warm-up, and the CG completed the regular warm-up. The SEBT was performed before and after the 6-week training program. study concluded that One attempt seems to be sufficient for the completion of the test. The completion of a specific training program for healthy basketball players does not demonstrate improvements in balance.

Methodology

The evidence was gathered from online web publications obtained from different search engines, including Google Scholar, PubMed, and other obesity journals. A tailored search was conducted using a study to evaluate the effects of bosu ball exercises on neuromuscular control among basketball players. The period was designated as 2015 to 2025 to gather precise and current facts from throughout the globe over the past decade. We have identified a total of 10 articles that meet our specific criteria for inclusion and exclusion. All 10 publications were obtained in their entirety to be analyzed and continued with further analysis. The results are derived using a systematic approach from all articles and displayed in a tabular format for enhanced comprehension. The selection techniques are detailed in the PRISMA

Flow chart**DISCUSSIONS**

Several studies have demonstrated that balance training, in general, can improve neuromuscular control and reduce the risk of injury in athletes. Bosu Ball exercises, due to their instability and requirement for greater muscle engagement, are considered more effective than traditional balance training in activating the core, lower extremities, and stabilizing muscles. Research has shown that athletes who incorporate Bosu Ball exercises into their training routines often experience improvements in dynamic balance, agility, and proprioception, which are critical for basketball performance.

The effects of BOSU ball exercises on neuromuscular control among basketball players were evaluated in this study. A significant improvement in neuromuscular control was indicated after the incorporation of BOSU ball exercises into the training regimen. These findings were contributed to by the growing body of literature on the effectiveness of unstable surface training in enhancing balance, proprioception, and overall athletic performance (Tura S et al 2024) (18).

Despite these promising findings, there is a functional training improve core stability, balance and coordination but there is a no consistency improvements in sports specific outcomes like shooting accuracy, sprint time, and agility. And the review suggest the only functional training alone doesn't give improvements, unless u will combined with others exercises like skill based drills and strength programs.(Keiner M et al 2024)(19).

In basekball players the core muscles also effected It affected upper body strength and shooting performance. These improvements was contributed the better forces transmission through the core during shooting motions, we can also include the uneven surfaces also. (Qasem A et al 2023)(20). Furthermore in basketball players using bosu ball there is guidelines to do exercise atleast 10 to 40 mins with number of exercise and intensity, sets along with repetition based on patients and we can adjust based on their fitness level.(James Madison et al 2025)(21).

CONCLUSION

BOSU ball exercises show significant potential as an effective method for enhancing neuromuscular control in basketball players, particularly in improving balance, proprioception, and lower extremity stability. Evidence suggests that incorporating BOSU ball training into regular conditioning routines can reduce the risk of injury and may enhance certain aspects of athletic performance. However, further research is needed to determine the long-term effects and to identify the optimal training protocols for maximum benefit. Future studies should also explore the combination of BOSU ball exercises with other training methods to assess their combined effects on performance and injury prevention.

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