



A Comparative Analysis of Explosive Strength Disparities Among Female Basketball and Volleyball Players

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ABSTRACT

The comparative study presented focuses on evaluating the explosive strength characteristics of female athletes participating in two distinct sports: basketball and volleyball. Explosive strength is a critical factor in both games, contributing to dynamic movements such as jumping, blocking, and quick accelerations. This study aims to analyze and contrast the explosive strength profiles of female basketball and volleyball players through two tests (Standing broad jump and Hand medicine ball throw (3 kg)). By quantifying and comparing the athletes' explosive strength performance, the study aims to uncover potential differences between basketball and volleyball players. Factors such as training techniques, biomechanical demands, and sport-specific movement patterns may contribute to the observed disparities. The findings from this research could have implications for sports training programs, offering coaches and athletes insights into optimizing explosive strength development based on the specific demands of their chosen sport. Furthermore, this study could contribute to a deeper understanding of the physiological adaptations that occur in female athletes engaged in basketball and volleyball, potentially informing future training methodologies and injury prevention strategies. The data collected was analyzed by using the statistical technique 't' test. The result showed there was no significant difference in explosive strength of legs and shoulders of Basketball and Volleyball women players, which could be due to similar performance level of the players.

Keywords: Basketball, Volleyball, Women players, Explosive strength, Physical Performance

INTRODUCTION

Different sports plays varying demands on athletes' physical performance parameters due to their unique requirements, tactics, and movement patterns. Some games need combination of endurance, agility, quick bursts of speed, and aerobic capacity (soccer/ Football), some need explosive power, strength, and technique (Weightlifting) while some need endurance and cardiovascular fitness (Marathon running). Cyclists need exceptional endurance and cardiovascular fitness while Gymnasts need exceptional strength-to-weight ratio, flexibility, balance, and body control. While some need upper body strength, cardiovascular fitness, Endurance, Explosive power, Boxers rely on a mix of aerobic and anaerobic fitness, speed,



agility, and explosive power whereas Martial artists need a balance of strength, flexibility and speed.

Each sport requires a tailored training regimen to develop the specific physical attributes that contribute to success. Athletes and coaches design training programs to target these unique demands, enhancing their performance in the areas critical to their sport. Ball games need a combination of explosive power, agility, coordination, and endurance. Jumping ability, quick lateral movements.

Strength, in a general sense, refers to the physical and/or mental capacity of an individual to exert force or withstand resistance. It encompasses the ability to overcome challenges, resist external pressures, and endure difficult situations. Strength can manifest in various forms, including physical strength, emotional resilience, and in intellectual form.

In the physical context, strength usually pertains to the muscular capability to generate force against resistance. This can involve lifting, pushing, pulling, or any activity that requires the application of force through muscle contraction.

However, strength is not solely limited to the physical domain. It can also refer to inner qualities such as mental toughness, determination, and the ability to persevere in the face of adversity. This broader concept of strength encompasses qualities that allow individuals to navigate challenges, setbacks, and life's complexities with resilience and resolve.

Overall, strength is a multifaceted attribute that encompasses both physical and mental aspects, embodying the capacity to face difficulties, accomplish tasks, and grow as an individual.

Explosive strength, also known as power, refers to the ability of a muscle or group of muscles to generate a high amount of force in a short period of time. It involves the rapid contraction of muscle fibers, resulting in swift and forceful movements. Explosive strength is particularly crucial in activities that require quick accelerations, jumps, throws, and other rapid movements where a significant amount of force needs to be generated in a brief timeframe. This type of strength is essential in sports like sprinting, jumping events, weightlifting, basketball, volleyball, and various combat sports.

In simple terms, explosive strength is the capacity to unleash a burst of forceful energy quickly, enabling an individual to execute powerful movements with speed and efficiency. It's often developed through specific training exercises that emphasize both strength and speed components, allowing athletes to perform explosive actions that can give them a competitive advantage in their respective sports.

Both sports demand a combination of overall strength and explosive strength, but the emphasis on specific muscle groups and types of movements differs due to the unique nature of each game. In volleyball, the focus might be on vertical jumping and quick lateral movements, while in basketball, it's about rapid accelerations, direction changes, and dynamic jumping. Each of these abilities needs different physical performance parameters.



Volleyball and basketball are two distinct sports with unique demands, which lead to different physical performance parameters being emphasized for success. Here's a breakdown of the key physical attributes required for each sport:

Volleyball:

1. ***Vertical Jump***: Volleyball players need excellent vertical jumping ability for spiking, blocking, and reaching high for digs. A strong vertical jump enhances a player's offensive and defensive capabilities.
2. ***Agility***: Quick lateral movements and rapid changes of direction are essential for reacting to the ball's trajectory and positioning on the court.
3. ***Reaction Time***: Volleyball demands quick reflexes for reading opponents' actions, responding to fast-paced plays, and making split-second decisions.
4. ***Upper Body Strength***: Players need upper body strength for powerful serves, effective setting, and strong blocks.
5. ***Coordination***: Precise hand-eye coordination is crucial for accurate passing, setting, and spiking the ball.
6. ***Endurance***: Volleyball matches can be physically demanding, requiring players to maintain a high level of performance throughout the game.

Basketball:

1. ***Speed and Agility***: Basketball involves frequent changes of direction, fast accelerations, and quick transitions between offense and defense.
2. ***Endurance***: Basketball games are continuous and can be physically demanding, requiring players to have good cardiovascular fitness.
3. ***Hand-Eye Coordination***: Precise shooting, passing, and dribbling skills rely on excellent hand-eye coordination.
4. ***Vertical Jump***: Jumping for rebounds, layups, and shots requires a solid vertical jump ability.
5. ***Strength***: Upper body strength aids in shooting, passing, and defense, while lower body strength supports jumping and explosive movements.
6. ***Quick Decision-Making***: Players must make rapid decisions on the court regarding passing, shooting, and defensive positioning.
7. ***Teamwork and Communication***: Effective communication and understanding of teammates' movements are essential for successful plays.

While both sports involve teamwork, strategy, and athleticism, the specific physical attributes emphasized in volleyball and basketball vary due to the distinct movements and requirements of each game. Training programs for athletes in these sports focus on developing the necessary skills and physical qualities to excel in their respective fields.

Objectives of the study

1. To compare the explosive strength of shoulder between Basketball and Volleyball players.
2. To compare the explosive strength of legs between Basketball and Volleyball players.

Sample

The present study consists of 30 players, 15 players each from the Basketball and Volleyball teams of one college of University of Delhi. The age group of the players is 17-20 years.



Methods and materials

All the subjects were assessed for their explosive strengths. The female Volleyball and Basketball players explosive strength for legs was measured with standing broad jump and shoulders' explosive strength was measured with 3 kg medicine ball throw with both hands.

Statistical Analysis

Descriptive statistics such as mean and standard deviation were used. T-test was used to compare between both teams explosive strength.

Results

To achieve the purpose of the study the collected data was analyzed and the results were presented in the following table:-

TABLE 1: Showing the Mean value and standard deviation and 't' score of standing Broad Jump of Basketball and Volleyball women players.

S. No	Players	Sample Size	Mean	Standard Deviation	't' value
1.	Volleyball	15	1.50	0.184	0.0097
2.	Basketball	15	1.71	0.181	

The above table shows the mean value, S.D and T value of the female Volleyball players on the variable Standing Broad Jump as 1.50 and 0.184 respectively. However, female basketball players had mean and S.D as 1.71 and 0.181 and T value 0.0097. The mean value shows that Basketball players have more explosive leg strength as compared to Volleyball players.

TABLE 2: Showing the mean value and standard deviation and 't' score of medicine ball throw between Basketball and Volleyball women players.

S.No	Players	Sample Size	Mean	Standard Deviation	't' value
1.	Volleyball	15	5.38	0.46	0.00076
2.	Basketball	15	6.12	0.63	

The above table shows the mean value, S.D and T-value of the female Volleyball players on the variable Ball Throw as 5.38 and 0.46 respectively. However, female basketball players had mean and S.D as 6.12 and 0.63 and T-value 0.00076. The mean value shows that female basketball players have more explosive strength than female Volleyball players.

In both the tables, T-value shows not much of a significant difference between Basketball and volleyball players.



The demand of the two games with respect to certain skills like rebounding, spiking, throwing and shooting may require explosive actions.

In Conclusion

1. The results of the experiment shows there exists no significant difference in the explosive strengths between Volleyball players and basketball players.
2. The role of other factors, such as conducive training routines, natural and inherent strength and it being on a specific age of women players, whose diet patterns may significantly differ, cannot be overlooked.

Recommendations for Improvement in Explosive Strength:-

1. The need of the athletes should be kept in mind according to their sport and physical capabilities.
2. The training schedules and programmes should be specific to their needs.
3. Exercises specific to the actions (jumping, sprinting) should be an integral part of the programme. (squats, plyometric exercises etc.)
4. Regular tests of explosive strength to gauge the improvement/ effects of specific training programmes.
5. Player-specific requirements (keeping in view the natural and inherent differences in physical capabilities) should be tended to for improving their performance.

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