European Economic Letters
ISSN 2323-5233
Vol 16, Issue 1 (2026)
http://eelet.org.uk

Comparison of Dominant Arm Strength between Volleyball and Basketball Players: An Undergraduate Perspective

Mukesh Kumar

Lecturer, TMIMT College of Physical Education, TMU Moradabad

Dr. Manu Mishra

Professor, TMIMT College of Physical Education, TMU Moradabad

Abstract

The present study aimed to compare the dominant arm strength between volleyball and basketball players at the undergraduate level. Sixty male college players from Teerthanker Mahaveer University, Moradabad, participated in this research, including thirty volleyball and thirty Basketball players aged between 18 and 25 years. The dominant arm strength was measured using a six-pound medicine ball throw test. The independent t-test was applied to analyze the data. Results indicated that Basketball players (M = 8.81, SD = 1.24) exhibited significantly greater dominant arm strength than volleyball players (M = 7.09, SD = 1.18), with a calculated t-value of 5.49 exceeding the critical value of 1.671 at the 0.05 level. The findings suggest that sport-specific training and movement patterns in Basketball contribute to higher dominant arm strength. This study highlights the importance of tailored training programs for athletes based on the physical demands of their respective sports to enhance performance and prevent muscular imbalances.

Keywords- Arm strength, Basketball, Volleyball, Medicine, Undergraduate athletes, Sports performance, Strength comparison

1. Introduction

A sport has become a medium in today's time through which a person can keep himself fit while being entertained. A person's proficiency in any sport can be measured by 5 components of fitness (speed, endurance, strength, coordination ability, flexibility). Different sports activities make different demands on the organism with respect to circulatory, respiratory, metabolic, neurological and regulatory functions.

Volleyball is a dynamic team sport that requires coordination, speed, and precise skill execution. It is played by two teams separated by a net, where the primary objective is to send the ball over the net and ground it within the opponent’s court while preventing the same on one’s own side. The game demands quick reflexes, effective communication, and strong teamwork among players.

Participation in volleyball contributes significantly to physical fitness by enhancing muscular strength, flexibility, balance, and cardiovascular endurance. The sport also develops important psychological qualities such as concentration, cooperation, and confidence. Since volleyball involves continuous movement and rapid decision-making, it helps players improve both physical and mental agility.

Due to its minimal equipment requirements and adaptable playing conditions, volleyball is widely played in schools, colleges, recreational settings, and international competitions. Over the years, it has gained global recognition through major tournaments and professional leagues. Beyond competition, volleyball encourages fair play, discipline, and social interaction, making it an essential component of physical education and sports development programs.

Basketball is a fast-paced team sport that emphasizes coordination, agility, and strategic thinking. It is played between two teams, each aiming to score points by shooting the ball through the opponent’s hoop while following a set of defined rules. The game requires a combination of physical fitness, technical skill, and mental alertness, making it both challenging and engaging for players and spectators.

The sport promotes teamwork, discipline, and decision-making, as players must continuously adapt to changing game situations. Basketball also contributes significantly to physical development by improving endurance, strength, balance, and motor skills. Due to its simple equipment requirements and adaptability to different environments, basketball is played widely in schools, colleges, and professional arenas across the world.

Over time, basketball has evolved into a globally popular sport with organized competitions and professional leagues. Its influence extends beyond physical activity, fostering sportsmanship, leadership qualities, and social interaction among participants. As a result, basketball holds an important place in physical education programs and competitive sports worldwide.

1.2. Objective of the Study

The purpose of the study to make Comparison of Dominant Arm Strength between Volleyball and Basketball Players: An Undergraduate Perspective.

1.3. Delimitations

1.3.1. The study was delimited to college level players.

1.3.2. The study was further delimited to 30 male Players of each from Volleyball and Basketball.

1.4. Limitation

The study was limited to the interest of the participants during data collection which may affect result of the study.

1.5. Hypothesis

There is significant difference in Dominant arm strength between Volleyball and Basketball players.

1.6. Signification of the Study

1.6.1. Both academic and athletic scenarios can benefit from the current study comparing the dominant arm strengths of basketball and volleyball players. At the undergraduate level.

1.6.2. Understanding how arm strength impacts performance efficiency is important for athletes and coaches.

1.6.3. Training plans may be more effectively customized to improve performance, avoid overuse injuries, and preserve muscle balance by taking into account the differences in strength between these two groups.

1.6.4. This study not only improves undergraduate students' understanding of the subject area but also offers useful applications to improving sports performance, ensuring player safety, and enhancing training methods in basketball and volleyball.

2. Methodology

2.1. Selection of Subject

For the purpose of the study a total of 60 male students (30 Volleyball and 30 Basketball) aged between 19 to 25 years of Teerthankar Mahaveer University Moradabad were taken as subject.

2.2. Selection of Variables

For the purpose of the study Arm Strength was used as variable.

2.3. Criterion Measures

To measure Arm Strength of the dominant hand of Volleyball and Basketball a 6 pound medicine ball was used.

2.4. Test Administration

All participants performed a warm-up that included upper-body mobility and light throwing exercises. They stood behind the line with their feet shoulder-width apart. With the dominant hand, they bent the elbow and held the medicine ball at shoulder height. Although it could support the throw, the non-dominant hand did not provide assistance. When instructed by the tester, participants threw the medicine ball as far forward as possible using either an overhand or chest-pass motion. They avoided crossing the starting line and kept their feet stable throughout the movement. The distance was measured from the starting line to the first point of contact of the medicine ball with the ground. Each participant made three attempts, with one to two minutes of rest between each throw, and the distance was recorded in meters, rounded to two decimal places. The best throw out of the three was considered the official score.

2.5. Statistical Procedure

To compare the two independent groups' mean strength scores the dominant arm strength of basketball and volleyball players were compared using the t-test.

3. Result and Discussion on Finding

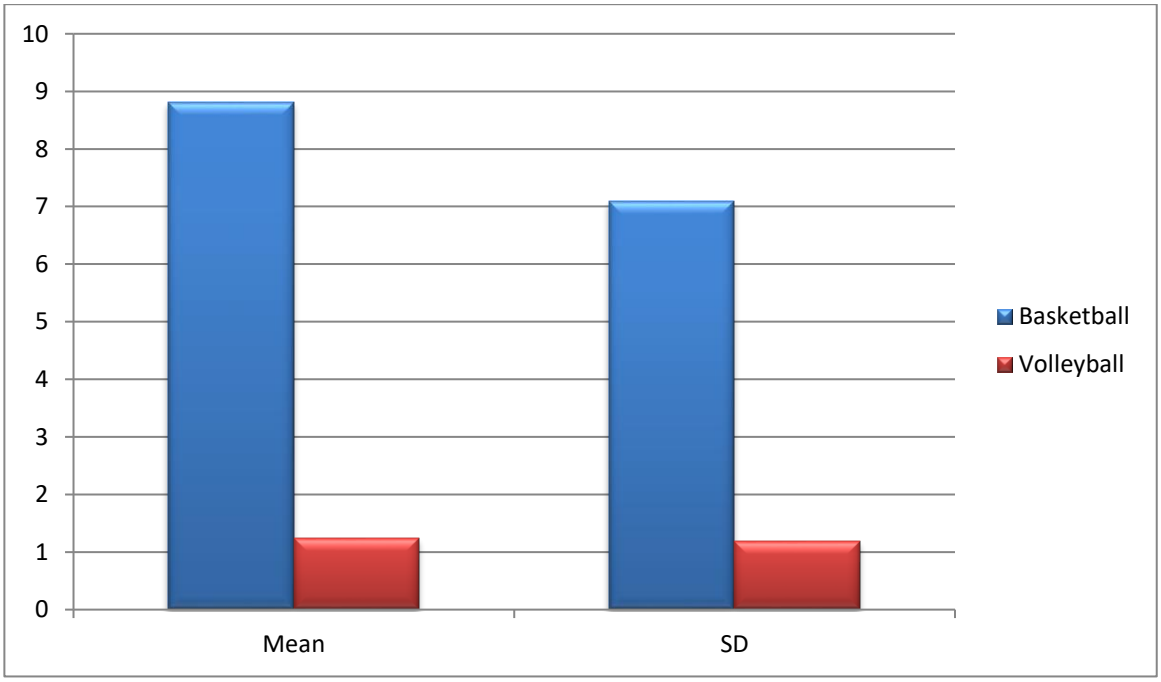
3.1. Result

Table 3.1: Mean, Standard Deviation and t-test between the Volleyball and Basketball Players

Players	N	Mean	SD	t-value	df	Critical value (0.05)	Sig.
Basketball	30	8.81	1.24	5.49	58	1.671	.652
Volleyball	30	7.09	1.18				

The table- 1 shows that basketball players (M = 8.81, SD = 1.24) had higher dominant arm strength than volleyball players (M = 7.09, SD = 1.18). An independent *t*-test produced a *t*-value of 5.49 with 58 degrees of freedom. The critical value at the 0.05 level was 1.671. Since the calculated value exceeded the critical value, the difference was statistically significant. Thus, the research hypothesis was accepted, indicating greater arm strength in basketball players.

Graph 3.1: Graphical Representation of Mean and Standard Deviation of Dominant Arm Strength between Basketball and Volleyball Players



With comparable variability (SD = 1.24 and 1.18, respectively), the graphical representation shows that basketball players (M = 8.81) had greater dominant arm strength than volleyball players (M = 7.09). This suggests that basketball players have stronger upper bodies.

3.2. Discussion on findings

An independent t-test was applied to compare the dominant arm strength between volleyball and basketball players. The study included 60 male undergraduate participants, consisting of 30 volleyball players and 30 basketball players. The mean score of dominant arm strength for bsketball players was 8.81 (SD = 1.24), whereas volleyball players recorded a mean score of 7.09 (SD = 1.18).

The calculated t-value was 5.49, which exceeded the critical value of 1.671 at the 0.05 level of significance with 58 degrees of freedom. Therefore, the result indicated a statistically significant difference in dominant arm strength between basketball and volleyball players. Hence, the research hypothesis stating that there is a significant difference between the two groups was accepted.

3.3. Discussion on Hypothesis

It was hypothesized that there would be a significant difference in dominant arm strength between volleyball and basketball players; in light of the present findings, the hypothesis was accepted at the 0.05 level of significance.

3.4. Conclusion

The findings of the study reveal that basketball players possess significantly greater dominant arm strength compared to volleyball players. This variation can be attributed to the specific movement patterns and physical demands of basketball, which involve repetitive use of the dominant arm during 3 point shot, Floater, and baseball pass.

Conversely, volleyball requires coordinated bilateral arm actions, such as setting and blocking, which distribute the workload between both arms rather than emphasizing unilateral dominance. Therefore, the nature of training and skill execution in each sport contributes differently to the development of arm strength.

The results emphasize that sport-specific training activities have a direct impact on muscular adaptation and upper limb performance among athletes.

3.5. Recommendations

3.5.1. Coaches should design training modules that strengthen the dominant arm in volleyball players to enhance individual power and maintain balance between both arms.

3.5.2. Incorporating resistance exercises and medicine ball training can help improve explosive upper body strength and overall athletic performance in both volleyball and basketball players.

3.5.3. Future investigations should include female athletes, larger sample sizes, and additional strength parameters such as grip strength and shoulder endurance to broaden the scope of findings.

3.5.4. Universities and sports organizations should develop structured strength-conditioning programs that align with the biomechanical requirements of each sport.

3.5.5. Continuous assessment of muscular symmetry and flexibility should be encouraged to minimize the risk of overuse injuries caused by repetitive use of the dominant arm.

References

1. Kansal, D. K. (1996). Test and measurement in sports and physical education. DVS Publications.
2. Singh, H. (1991). Science of sports training. DVS Publications.
3. Bompa, T. O., & Buzzichelli, C. (2019). Periodization: Theory and methodology of training (6th ed.). Human Kinetics.Reid, M., & Schneiker,
4. K. (2008). Strength and conditioning in tennis: Current research and practice. Journal of Sports Sciences, 26(6), 573–582. https://doi.org/10.1080/02640410701624546
5. Harris, C., Wattles, A. P., DeBeliso, M., Sevene-Adams, P. G., Berning, J. M., & Adams, K. J. (2011). The seated medicine ball throw as a test of upper body power in older adults. Journal of Strength and Conditioning Research, 25(8), 2344–2348. https://doi.org/10.1519/JSC.0b013e3181ecd27b