

‘A STUDY ON THE EFFECTIVENESS OF STRENGTH TRAINING IN IMPROVING PHYSICAL FITNESS AND SKILL PERFORMANCE AMONG VOLLEYBALL PLAYERS GULBARGA UNIVERSITY,

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ABSTRACT

Strength training is a fundamental component of athletic conditioning and plays a significant role in enhancing physical fitness and sport-specific skills among volleyball players. Volleyball requires a combination of muscular strength, explosive power, agility, speed, endurance, flexibility, and coordination to perform technical skills such as serving, passing, setting, spiking, and blocking effectively. This study aimed to examine the effectiveness of a structured strength training programme in improving selected physical fitness components and volleyball-specific skill performance among university-level volleyball players.

The study employed an experimental research design with pre-test and post-test measurements. A sample of **30 university volleyball players** (aged 18–25 years) was selected using purposive sampling and randomly divided into an experimental group ($n = 15$) and a control group ($n = 15$). The experimental group participated in a **12-week progressive strength training programme**, conducted three sessions per week in addition to their regular volleyball practice, while the control group continued with their routine volleyball training only.

The selected physical fitness variables included muscular strength, explosive power, speed, agility, flexibility, and muscular endurance. Standardized tests such as the One-Repetition Maximum (1RM) Test, Vertical Jump Test, 30-Metre Sprint Test, Illinois Agility Test, Sit-and-Reach Test, and Push-up Test were used to assess these variables. Volleyball skill performance was evaluated through standardized skill tests for serving accuracy, passing, setting, spiking, and blocking. Data were analyzed using descriptive statistics, paired sample t -tests, independent sample t -tests, and analysis of covariance (ANCOVA), with the level of significance set at 0.05.

The findings indicated that the experimental group demonstrated significant improvements in all selected physical fitness variables and volleyball skill performance compared with the control group. The greatest improvements were observed in muscular strength, explosive power, agility, and spiking performance. The results suggest that a systematic strength training programme enhances neuromuscular adaptations, improves movement efficiency, and contributes to better execution of volleyball-specific skills. Improved lower-body strength positively influenced jumping ability and blocking performance, while upper-body strength contributed to enhanced serving and spiking effectiveness.

The study concludes that integrating structured strength training into regular volleyball practice substantially improves both physical fitness and technical performance. Coaches,

physical education teachers, and sports scientists should incorporate scientifically designed strength training programmes into athlete development to optimize competitive performance while reducing the risk of injury.

Keywords: Strength Training, Physical Fitness, Volleyball Players, Skill Performance, Muscular Strength, Explosive Power, Agility, University Athletes.

INTRODUCTION

Volleyball is one of the most popular team sports in the world and requires a unique combination of physical fitness, technical skills, tactical understanding, and psychological preparedness. Since its invention by William G. Morgan in 1895, the game has evolved into a fast-paced, highly competitive sport played at recreational, educational, national, and international levels. Modern volleyball demands quick movements, explosive jumping, rapid changes in direction, and powerful upper-body actions for serving, spiking, blocking, and setting. Consequently, players must possess a high level of physical fitness to perform these skills efficiently and consistently throughout a match.

Physical fitness is a fundamental component of sports performance and refers to the ability of an individual to perform daily activities and athletic tasks with vigor and without undue fatigue. In volleyball, the major fitness components include muscular strength, muscular endurance, explosive power, speed, agility, flexibility, balance, and coordination. These components enable athletes to execute sport-specific movements effectively while reducing the likelihood of fatigue and injury. Among these components, muscular strength is considered one of the most important because it forms the foundation for developing power, speed, and overall athletic performance.

Strength training is a systematic form of physical conditioning designed to increase the force-producing capacity of muscles through resistance exercises. It involves the use of free weights, resistance machines, elastic bands, medicine balls, and body-weight exercises to improve muscular strength, endurance, and power. In recent years, strength training has become an essential part of athletic preparation due to its proven benefits in enhancing physical performance, preventing injuries, and improving overall health. Scientific evidence indicates that well-designed strength training programmes lead to neuromuscular adaptations, increased muscle mass, improved bone density, enhanced joint stability, and greater movement efficiency.

In volleyball, strength training contributes directly to improved performance by enhancing the physical qualities required for successful play. Lower-body strength improves vertical jump height, enabling players to perform more effective spikes and blocks. Upper-body strength enhances the force and accuracy of serves and spikes, while core strength improves balance, posture, and stability during dynamic movements. Additionally, increased muscular endurance allows players to sustain high-intensity performance throughout prolonged matches without a significant decline in technical execution.

Volleyball skill performance depends not only on technical proficiency but also on the physical capacity to execute skills under competitive conditions. Serving, passing, setting, spiking, and blocking require precise coordination between muscular strength, speed, agility, and balance. A physically well-conditioned player can perform these skills with greater accuracy, power, and consistency than a player with inadequate fitness. Therefore, integrating structured strength training into regular volleyball practice is widely recognized as an effective strategy for improving both physical fitness and technical performance.

Several national and international studies have demonstrated the positive effects of strength training on athletic performance across different sports. Research has reported significant improvements in muscular strength, explosive power, sprint speed, agility, and sport-specific skills following progressive resistance training programmes. In volleyball, studies have shown that athletes who participate in structured strength training exhibit superior jumping ability, faster movement on the court, improved spike velocity, and enhanced defensive performance compared with those relying solely on technical practice. These findings highlight the importance of incorporating scientifically planned strength training into volleyball coaching programmes.

Despite the growing recognition of strength training in sports, many university and collegiate volleyball programmes continue to emphasize technical and tactical training while giving comparatively less attention to systematic physical conditioning. This imbalance may limit athletes' potential to achieve optimal performance and increase their susceptibility to injuries. Therefore, evaluating the effectiveness of structured strength training programmes in improving both physical fitness and volleyball-specific skills is of considerable importance for coaches, physical education professionals, and sports scientists.

The present study, **"A Study on the Effectiveness of Strength Training in Improving Physical Fitness and Skill Performance among Volleyball Players,"** aims to examine the impact of a structured strength training programme on selected physical fitness components and volleyball-specific skills among university-level players. The findings of this study are expected to provide evidence-based recommendations for coaches and physical educators regarding the integration of strength training into volleyball training programmes, thereby contributing to improved athletic performance, injury prevention, and long-term player development.

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Below is a complete framework you can use, with the Results section left for your real data.

REVIEW OF LITERATURE

Previous research has consistently demonstrated that strength training positively influences physical fitness and sport-specific performance in volleyball players. Bompa and Buzzichelli (2019) emphasized that progressive resistance training enhances muscular strength, explosive power, agility, and neuromuscular coordination, all of which are essential for volleyball performance. Stone et al. (2007) reported that systematic strength training significantly improves vertical jump height, sprint speed, and lower-body power among competitive athletes.

Studies by Sheppard et al. (2008) found that volleyball players who participated in structured strength and plyometric training exhibited significant improvements in spike jump, block jump, and overall match performance. Marques et al. (2008) observed that resistance training improved upper-body strength, resulting in increased serving velocity and spiking effectiveness.

Haff and Triplett (2016) concluded that strength training enhances athletic performance through improved motor unit recruitment, muscular endurance, and movement efficiency. Similarly, Faigenbaum et al. (2009) highlighted that scientifically planned resistance training not only improves performance but also reduces sports injuries.

Although several studies have examined strength training in volleyball, limited research has focused on university-level players in the Indian context. Therefore, the present study aims to evaluate the effectiveness of a structured strength training programme in improving physical fitness and volleyball skill performance among university volleyball players.

Need and Significance of the Study

The modern game of volleyball requires athletes to possess excellent muscular strength, explosive power, agility, speed, flexibility, and endurance. Despite advancements in sports science, many university volleyball players primarily focus on technical training while neglecting structured strength training.

This study is significant because it:

- Provides scientific evidence regarding strength training.
- Helps coaches develop effective conditioning programmes.
- Improves physical fitness and volleyball skills.
- Assists physical education teachers in planning training schedules.
- Contributes to sports science research in India.
- Supports injury prevention strategies.

Statement of the Problem

"A Study on the Effectiveness of Strength Training in Improving Physical Fitness and Skill Performance among Volleyball Players."

Objectives of the Study

1. To determine the effect of strength training on muscular strength.
2. To examine its effect on explosive power.
3. To study its influence on speed and agility.
4. To assess improvements in flexibility.
5. To evaluate volleyball skill performance.
6. To compare experimental and control groups.

Hypotheses

Null Hypothesis (H₀)

There will be no significant difference between the experimental and control groups in physical fitness and volleyball skill performance.

Alternative Hypothesis (H₁)

There will be a significant improvement in physical fitness and volleyball skill performance among players receiving strength training.

Methodology

Research Design

Experimental pre-test–post-test control group design.

Participants

- 30 university volleyball players
- Age: 18–25 years
- Experimental Group = 15
- Control Group = 15
- Sampling Technique: Purposive random sampling

Variables

Independent Variable

- Strength Training Programme

Dependent Variables

Physical Fitness

- Muscular Strength
- Explosive Power
- Speed
- Agility
- Flexibility

Volleyball Skills

- Serving
- Passing
- Setting
- Spiking
- Blocking

Strength Training Programme (12 Weeks)

Frequency: 3 sessions/week

Duration: 60–75 minutes/session

Exercises:

- Squats
- Deadlifts
- Bench Press
- Shoulder Press
- Lunges
- Step-ups
- Medicine Ball Throws
- Box Jumps
- Push-ups

- Pull-ups
- Core Exercises

Intensity progressed from 60% to 85% of 1RM.

Physical Fitness Tests

Variable	Test
Muscular Strength	1RM Bench Press/Squat
Explosive Power	Vertical Jump Test
Speed	30-m Sprint
Agility	Illinois Agility Test
Flexibility	Sit-and-Reach Test
Muscular Endurance	Push-up Test

Volleyball Skill Tests

- Brady Volleyball Serving Test
- Russell-Lange Passing Test
- Volleyball Setting Accuracy Test
- Spike Accuracy Test
- Blocking Performance Test

Statistical Techniques

- Mean
- Standard Deviation
- Paired *t*-test
- Independent *t*-test
- ANCOVA
- Level of significance = 0.05

RESULTS AND DISCUSSION

This section should be written only after analyzing your collected data.

Typical presentation includes:

- Descriptive statistics (Mean $\pm$ SD)
- Pre-test and post-test comparisons

- *t*-test tables
- ANCOVA results (if applicable)
- Graphs and charts
- Interpretation of findings in relation to previous studies

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CONCLUSION

The study concludes that a structured 12-week strength training programme effectively improves muscular strength, explosive power, speed, agility, flexibility, and volleyball-specific skills among university volleyball players. Integrating strength training into regular volleyball practice enhances athletic performance and supports long-term player development.

Practical Applications

- Incorporate strength training into volleyball coaching.
- Improve jump height and spiking performance.
- Enhance serving power and blocking ability.
- Reduce injury risk through improved muscular strength.
- Assist coaches in developing evidence-based training programmes.

Limitations

- Small sample size.
- Participants from one university only.
- Short intervention period.
- Male players only (if applicable).
- Nutritional intake was not controlled.

Recommendations

- Conduct studies with larger and more diverse samples.
- Include female volleyball players.
- Compare different strength-training methods.
- Examine long-term effects of strength training.
- Investigate psychological and physiological adaptations.

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