

Analysis of Volleyball Smash Ability Among Amateur Players of the Rambah Hilir Tengah Village VC Team

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ABSTRACT

Volleyball smash ability is an important component of attacking performance because it combines accuracy, speed, coordination, and power. Preliminary observations of the Amateur VC Team of Rambah Hilir Tengah Village indicated several technical problems, including inaccurate ball contact, poor movement coordination, incorrect follow-through, and low target accuracy. This study aimed to determine and describe the volleyball smash ability of the team's players. A quantitative descriptive design was employed. The population consisted of 15 players, all of whom were selected through total sampling. Data were collected using observation and a volleyball smash test in which each participant completed five attempts toward predetermined target areas. The results were analysed using the mean, standard deviation, frequency, and percentage. The findings showed a highest score of 67.31, a lowest score of 33.52, a mean score of 50.01, and a standard deviation of 9.98. One player (7%) was classified as very good, three players (20%) as good, seven players (47%) as moderate, two players (13%) as poor, and two players (13%) as very poor. It was concluded that the players' overall smash ability was in the moderate category. These findings provide baseline information for developing more systematic, individualised, and target-oriented training

Keywords:

Volleyball; Smash Ability; Amateur Players; Accuracy; Descriptive Study

INTRODUCTION

Preliminary observations of the Amateur VC Team of Rambah Hilir Tengah Village revealed several problems in smash execution, including a rushed approach, poor movement coordination, inaccurate hand contact, bent elbows, incorrect follow-through, unstable landing, and low target accuracy. These weaknesses frequently resulted in unsuccessful attacks during training sessions and matches, indicating the need for a systematic assessment of the players' smash ability.

The smash is a decisive offensive technique used to direct the ball into the opponent's court and end a rally. Its effectiveness is influenced by attack type, attack zone, timing, direction, and target selection (FIVB, 2025; Sitti & Rangubhet, 2025). An effective smash requires coordinated movements involving the approach, take-off, arm swing, ball contact, follow-through, and landing. Jumping performance, body

coordination, trunk involvement, and arm-swing technique contribute significantly to smash power and accuracy (Giatsis & Tilp, 2022; Guntur et al., 2022; Wang et al., 2024).

Physical capacity also supports successful smash performance. Vertical-jump ability enables players to contact the ball at a higher point and create a more effective attack angle. Lower-limb muscle characteristics, physical fitness, and explosive power have been associated with attack-jump and smash performance (Albaladejo-Saura et al., 2022; Jiang et al., 2024; Tanjung et al., 2025). Plyometric, drop-jump, and weight-training programmes have also been shown to improve spike-jump performance, reactive strength, and movement control (Sotiropoulos et al., 2023; Yu et al., 2025).

Smash performance includes not only the hitting phase but also safe and controlled landing. Differences in landing mechanics have been identified between experienced and novice players, while ball position and fatigue may influence trunk movement, lower-limb loading, and movement stability (Garcia et al., 2022; Kawai et al., 2024; Vermeulen et al., 2023). Repeated matches and intensive training may also alter jump kinetics and contribute to neuromuscular fatigue (Rebelo et al., 2023; Ruggiero et al., 2022).

Previous studies have mainly examined elite athletes, adolescent players, school extracurricular participants, and specific training interventions. Hanging-ball exercises, for example, have been reported to improve smash accuracy and technical performance (Guntori et al., 2024; Kurniawati et al., 2024; Mahfud et al., 2023; Purwanto et al., 2025; Sinurat et al., 2023). However, limited research has described the actual smash ability of community-based amateur village teams, which may have different training conditions, facilities, coaching systems, and competitive experience.

The novelty of this study lies in its focus on providing an empirical profile of smash ability among the Amateur VC Team players of Rambah Hilir Tengah Village before any specific training intervention is applied. Therefore, this study aims to determine, describe, and analyse the players' volleyball smash ability. The findings are expected to provide baseline information for evaluating technical weaknesses and developing more systematic, measurable, and needs-based training programmes.

METHODOLOGY

Research Design

This study employed a quantitative descriptive design to determine and describe the volleyball smash ability of the Amateur VC Team players of Rambah Hilir Tengah Village. The study was conducted in Rambah Hilir Tengah Village, Rambah Hilir District, Rokan Hulu Regency, Indonesia.

Population and Sample

The population consisted of all 15 players of the Amateur VC Team of Rambah Hilir Tengah Village. Because the population was relatively small, the study used a total sampling technique, in which all members of the population were selected as research participants. Therefore, the sample consisted of 15 amateur volleyball players.

Research Instrument

The research instrument was a volleyball smash test adapted from Albertus and Muhyi (2015). The test aimed to measure the players' ability to direct the ball accurately and rapidly into predetermined target areas on the opponent's court.

The equipment used in the test consisted of a volleyball court, a net and supporting poles, volleyballs, a stopwatch, score sheets, and writing instruments. The test involved

three officials: one person tossed the ball to the participant, one recorded the time, and one observed the landing position of the ball and recorded the score.

During the test, each participant stood in the attack area or another permitted position within the court. The ball was tossed near the top of the net, after which the participant performed a smash, either with or without an approach, toward the target area on the opposite court. The stopwatch was started when the participant contacted the ball and stopped when the ball touched the court surface. The time was recorded to the nearest one-tenth of a second.

Each participant was given five smash attempts. A warm-up was permitted before the test, but participants were not allowed to perform test trials. The score for each attempt was determined based on the target area reached by the ball and the time required for the ball to reach the court. A score of zero was awarded when the ball touched the net or landed outside the designated target area. The final score was obtained from the total target scores and ball-travel times across the five attempts.

Data Collection Procedures

The data were collected through observation, literature review, and testing and measurement. Observation was conducted directly during training sessions to identify problems related to the players' smash performance. The literature review was used to obtain relevant theoretical and empirical information concerning volleyball smash techniques. Testing and measurement were conducted using the volleyball smash test to obtain data regarding the players' accuracy and ball speed.

Data Analysis

The data were analysed using descriptive statistics. The raw scores obtained from the smash test were calculated to determine the mean, standard deviation, frequency, and percentage. The participants' smash abilities were then classified into five categories: very good, good, moderate, poor, and very poor.

The classification criteria were determined using the following intervals:

Score Interval	Category
$(X > M + 1.5SD)$	Very good
$(M + 0.5SD < X \leq M + 1.5SD)$	Good
$(M - 0.5SD < X \leq M + 0.5SD)$	Moderate
$(M - 1.5SD < X \leq M - 0.5SD)$	Poor
$(X \leq M - 1.5SD)$	Very poor

where (M) represents the mean score, (SD) represents the standard deviation, and (X) represents the individual score.

The percentage of participants in each category was calculated using the following formula:

$$[P = \frac{f}{n} \times 100\%]$$

where (P) is the percentage, (f) is the frequency of participants in each category, and (n) is the total number of participants.

RESULTS AND DISCUSSION

The volleyball smash test was administered to 15 players of the Amateur VC Team of Rambah Hilir Tengah Village. Each player performed five smash attempts, and the final score combined ball-placement accuracy and the time required for the ball to reach the court. The raw results were converted into T-scores.

The analysis produced a highest score of 67.31 and a lowest score of 33.52. The mean score was 50.01, with a standard deviation of 9.98. Based on the established criteria, the players' average volleyball smash ability was classified as moderate.

Table 1. Distribution of Volleyball Smash Ability

Score Interval	Category	Frequency	Percentage
$X > 64.99$	Very good	1	7%
55.01-64.98	Good	3	20%
45.03-55.00	Moderate	7	47%
35.05-45.02	Poor	2	13%
$X \leq 35.04$	Very poor	2	13%
Total		15	100%

Most players were classified in the moderate category, comprising seven players (47%). Three players (20%) were in the good category and one player (7%) was in the very good category. Meanwhile, two players (13%) were classified as poor and another two players (13%) as very poor.

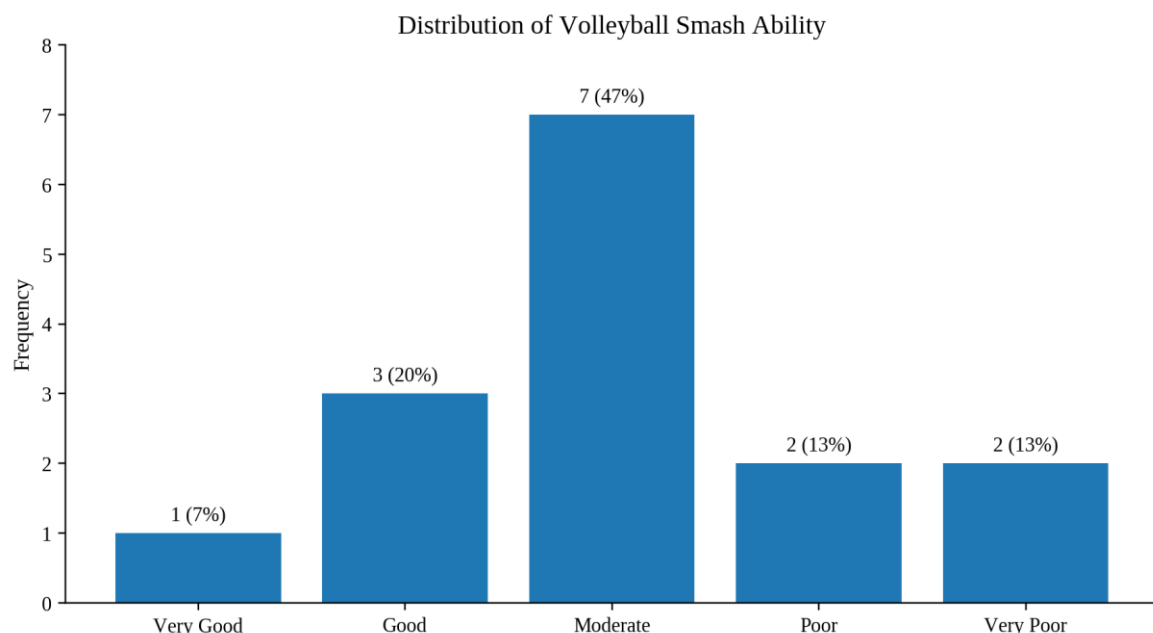


Figure 1. Distribution of Volleyball Smash Ability among the Amateur VC Team Players

Discussion

The findings indicate that the volleyball smash ability of the Amateur VC Team players of Rambah Hilir Tengah Village was generally moderate. Most players could perform the basic smash movement and direct the ball toward the target, but their performance was not yet consistently accurate and effective. The dominance of the moderate category shows that the team still has substantial potential for technical improvement.

A volleyball smash requires coordination among the approach, take-off, body movement, arm swing, ball contact, and landing. Jumping performance and body coordination influence the height of ball contact and the effectiveness of the attack (Guntur et al., 2022). Differences in arm-swing technique may also affect spike speed and

control (Giatsis & Tilp, 2022). Therefore, the variation in scores may reflect differences in timing, coordination, technical mastery, and physical capacity among the players.

The presence of players in the poor and very poor categories indicates that a uniform training programme may not meet every player's needs. Lower-scoring players require more basic technical correction and repeated target-oriented practice. Training should focus on approach rhythm, take-off timing, full arm extension, accurate ball contact, target placement, and balanced landing. Exercises to improve lower-limb explosive power and trunk involvement may also support smash performance because the movement depends on coordinated force transfer from the lower body to the attacking arm (Wang et al., 2024).

These findings have practical implications for coaching. Players can be grouped according to their current ability so that training intensity and difficulty can be adjusted. Players in the moderate category should focus on consistency and accuracy, while players in the lower categories require fundamental technical correction. Those in the good and very good categories can progress to exercises involving attack direction, variations in sets, and decision-making against blockers.

Overall, the mean score of 50.01 and the concentration of players in the moderate category confirm that the team's smash ability has not yet reached an optimal level. Systematic, individualised, and periodically evaluated training is needed to improve the accuracy, speed, and consistency of the players' smashes

CONCLUSION

The study concludes that the volleyball smash ability of the Amateur VC Team players of Rambah Hilir Tengah Village was generally moderate, as indicated by a mean score of 50.01. Most players were classified in the moderate category, while performance differences remained evident across the five categories. The results show that the team requires systematic and individualised training focused on approach rhythm, jumping ability, arm swing, ball-contact accuracy, target placement, and landing control. Periodic evaluation is also necessary to monitor improvements and adjust training programmes according to each player's needs.

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