

Review of a Criterion-Referenced Performance Test Battery for Essential Volleyball Skills among Young Athletes

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Abstract: Volleyball is a technically demanding team sport in which successful performance depends on the consistent execution of fundamental skills such as serving, passing, setting, attacking/spiking, blocking, and defensive play. For young athletes, systematic assessment of these skills is important for identifying strengths and weaknesses, monitoring learning and development, guiding individualized training, and supporting talent identification. A criterion-referenced performance test battery provides an alternative to purely norm-referenced assessment because athletes can be evaluated against predetermined technical and performance standards rather than only against the performance of their peers.

Keywords: Criterion-Referenced Assessment, Performance Test Battery, Skill Assessment, Validity, Reliability, Talent Identification.

I. INTRODUCTION

Volleyball requires athletes to perform repeated technical actions under rapidly changing spatial and temporal conditions. Although physical qualities such as jumping ability, speed, agility, strength, and endurance contribute to performance, technical execution remains central to successful participation. The principal skills include serving, receiving/passing, setting, attacking, blocking, and defensive actions. Because these skills are interconnected during rallies, weakness in one technical component can influence subsequent actions and ultimately affect team performance.

Skill assessment is particularly important during childhood and adolescence because young athletes are undergoing continuous physical, perceptual, cognitive, and technical development. Coaches require objective information to determine whether athletes have achieved the expected level of competence and to identify specific areas requiring additional practice. Traditional assessment based primarily on coach observation can be useful but may be influenced by evaluator experience and subjective judgment. Standardized skill tests provide a more systematic alternative.

Gabbett and Georgieff (2006) developed a standardized skill assessment for junior volleyball players involving spiking, setting, serving, and passing. Their findings demonstrated strong reliability and the ability of the battery to discriminate between athletes with different levels of playing ability. Similarly, research involving junior volleyball talent identification has shown that technical measures, particularly passing and serving technique, can help distinguish selected from non-selected athletes.

A criterion-referenced approach is particularly relevant for young athletes because it evaluates performance against predefined standards. In contrast to norm-referenced assessment, where an athlete's performance is interpreted relative to other athletes, criterion-referenced assessment focuses on whether specific competencies or performance standards have been achieved. In volleyball, this approach could allow an athlete to be classified as demonstrating *emerging*, *developing*, *competent*, or *advanced* performance based on predetermined technical and accuracy criteria.

II. CONCEPT OF CRITERION-REFERENCED VOLLEYBALL SKILL ASSESSMENT

Criterion-referenced testing evaluates performance against clearly defined criteria rather than ranking individuals against a reference group. The approach is particularly suitable when the purpose of assessment is to determine mastery of specific skills. A criterion-referenced volleyball battery should therefore answer the question: "Has the athlete achieved the required standard for this skill?" rather than simply asking whether the athlete performed better than another athlete.

For young volleyball players, criterion standards can be established for:

1. technical execution;
2. accuracy;
3. consistency;
4. decision-making;
5. movement quality;
6. successful outcomes;
7. progression from basic to advanced skill levels.

Criterion-referenced testing should not, however, be assumed to be valid merely because the criteria appear appropriate. Validity requires evidence supporting the interpretation and intended use of test scores. Linn (1980) emphasized that content validity is important for criterion-referenced measures but is not by itself sufficient to support all interpretations of test results.

Therefore, a volleyball battery should incorporate evidence of content validity, construct validity, criterion-related validity, reliability, sensitivity, and feasibility.

III. ESSENTIAL VOLLEYBALL SKILLS FOR YOUNG ATHLETES

1. Serving

The serve initiates every rally and is the only volleyball skill performed completely under the control of one player. Assessment may include service accuracy, consistency, ball velocity where appropriate, and technical execution. For young athletes, accuracy should generally receive greater emphasis than maximal velocity because technical control develops progressively.

2. Forearm Passing

Passing or reception is fundamental for controlling the opponent's serve and initiating an offensive sequence. A useful criterion-referenced test can assess whether the athlete consistently directs the ball toward a predetermined target area. Technical criteria may include body positioning, platform formation, contact point, balance, and directional control.

3. Overhead Setting

Setting connects reception to attack and requires precise control of ball trajectory, body positioning, hand contact, and timing. Assessment should therefore consider both accuracy and technique rather than simply counting successful contacts.

4. Spiking/Attacking

Spiking represents one of the major offensive actions. Young athletes should be assessed on approach coordination, take-off, arm action, contact point, body control, and accuracy of attack placement. Because attack performance is influenced by physical maturation, criterion standards should be age- and developmentally appropriate.

5. Blocking

Blocking requires coordinated footwork, jumping, arm positioning, timing, and spatial awareness. Although less frequently included in traditional skill batteries, blocking should be considered when developing a comprehensive volleyball assessment because it represents an essential component of front-court defense.

6. Defensive Skills

Digging and defensive movement require anticipation, reaction, body positioning, and controlled ball contact. Unlike isolated technical tests, defensive assessment can benefit from semi-open or game-like situations because defensive success depends substantially on perception and decision-making.

IV. EVIDENCE FOR EXISTING VOLLEYBALL SKILL BATTERIES

One of the strongest foundations for a volleyball-specific battery comes from Gabbett and Georgieff (2006). Their standardized assessment included spiking, setting, serving, and passing accuracy and technique. The study reported high test-retest reliability for accuracy, with ICC values ranging approximately from .85 to .94, while technical ratings also demonstrated high intra-rater reliability. The battery additionally differentiated players according to playing level and detected improvements following skill-based training.

Earlier work by Downs and Wood (1996) examined the Volleyball Skills Assessment Test and reported ICC reliability coefficients above .80 for most forearm-pass, spike, set, and serve subtests. This provides additional evidence that volleyball-specific skill assessment can achieve acceptable reliability across different populations.

Thissen-Milder and Mayhew (1991) demonstrated that specific volleyball tests, including overhead volley, forearm pass, wall spike, and bump/set performance, could differentiate high-school players at different competitive levels. Combinations of specific skills and physical variables were also able to classify players according to team level and starter status.

Gabbett et al. (2007) extended this approach by combining anthropometric, physiological, and technical data in junior volleyball talent identification. Their analysis found that passing and serving technique were significant discriminators between selected and non-selected players, with an overall classification accuracy of 78.6%.

However, not all batteries have demonstrated sufficient sensitivity. A 15-month follow-up of elite adolescent volleyball players found that a battery containing physical, motor, and skill tests was not sufficiently sensitive to distinguish “good” from “very good” players, illustrating the difficulty of using isolated performance tests to represent open-skill volleyball ability.

V. PROPOSED CRITERION-REFERENCED PERFORMANCE TEST BATTERY

Based on the reviewed evidence, a comprehensive battery for young volleyball athletes can incorporate six major skill domains.

Table 1. Proposed Criterion-Referenced Volleyball Skill Test Battery

Skill	Main performance component	Suggested assessment	Primary scoring
Serve	Accuracy and technique	Target-zone serving	Successful target contacts (%)
Forearm pass	Reception control	Target passing	Accurate passes (%)
Overhead set	Ball control and placement	Target setting	Accurate sets (%)
Spike/attack	Attack accuracy and technique	Target attack	Successful target attacks (%)
Block	Timing and positioning	Block movement/jump test	Correct technical executions (%)
Defense/dig	Control and movement	Target defensive test	Controlled defensive contacts (%)

A practical scoring system could classify athletes into four performance levels:

Table 2. Suggested Criterion-Referenced Performance Classification

Level	Performance interpretation
Level 1	Emerging – below minimum competency
Level 2	Developing – demonstrates partial competency
Level 3	Competent – achieves expected skill standard
Level 4	Advanced – consistently exceeds expected standard

The exact cut-off values should not simply be adopted arbitrarily. They should be established empirically through expert consensus, pilot testing, normative/criterion data, and validation against meaningful external indicators of volleyball performance.

VI. SENSITIVITY TO SKILL DEVELOPMENT

An effective youth volleyball test should be sensitive enough to detect meaningful changes resulting from training. Gabbett and Georgieff (2006) found that their standardized battery detected training-related improvements following an eight-week skill-based training program.

Sensitivity is particularly important in youth sport because the objective is not simply to classify athletes but also to monitor development. A battery should therefore be administered periodically for example, at the beginning and end of a training cycle while controlling for changes in age, maturation, training exposure, and competitive experience.

VII. FEASIBILITY AND PRACTICALITY

A test battery intended for schools, academies, clubs, and youth development programs should be inexpensive, easy to administer, and require minimal specialized equipment. Ball targets, cones, measuring tapes, a volleyball net, recording sheets, and video recording where available are generally sufficient.

Robertson et al. (2014) highlighted feasibility as an important but inconsistently reported characteristic of sporting skill tests. A technically sophisticated test that requires expensive equipment may have limited usefulness in ordinary youth training environments.

Consequently, the proposed battery should emphasize standardization without excessive complexity.

VIII. IMPORTANCE OF COMBINING OBJECTIVE AND TECHNICAL SCORES

A major limitation of isolated accuracy tests is that they may not adequately represent the quality of technique. For example, two athletes may achieve the same number of successful passes, but one may demonstrate considerably better posture, platform control, balance, and movement efficiency.

The standardized junior volleyball battery developed by Gabbett and Georgieff appropriately combined accuracy and technical assessment, providing a stronger representation of skill than a simple ball-contact count.

Accordingly, a criterion-referenced battery should ideally contain two complementary scores:

Total Skill Score = Accuracy Score + Technical Execution Score

The relative weighting of these components should be established empirically rather than arbitrarily.

IX. DEVELOPMENTAL CONSIDERATIONS IN YOUNG ATHLETES

Assessment of young volleyball players requires particular attention to biological maturation. Differences in height, body mass, strength, jumping ability, coordination, and experience can influence test performance independently of technical learning.

Research on volleyball talent identification has increasingly emphasized multidimensional assessment. Recent work suggests that youth volleyball talent identification benefits from considering physical, functional, tactical, and perceptual characteristics rather than relying on a single performance dimension.

A 2024 scoping review similarly concluded that volleyball talent identification research has relied heavily on test batteries but that evidence concerning long-term predictive validity remains limited. The authors recommended more multidimensional and longitudinal approaches combining objective and subjective indicators.

Therefore, criterion-referenced skill testing should not be interpreted as a stand-alone talent selection mechanism. It is better viewed as one component of a broader athlete-development system.

X. CONCLUSION

The available evidence supports the use of standardized volleyball-specific performance testing for young athletes. Research has demonstrated that serving, passing, setting, and spiking can be assessed with acceptable to high levels of reliability, while standardized batteries can differentiate athletes according to playing ability and detect training-related improvements.

A criterion-referenced approach offers an important advantage because it allows athletes to be evaluated against clearly defined standards of competency rather than merely ranked against peers. However, the development of such a battery requires rigorous evidence for reliability, content validity, construct validity, criterion-related validity, sensitivity, and feasibility.

The proposed battery should include serving, forearm passing, setting, spiking/attacking, blocking, and defensive skills, with both technical execution and objective accuracy assessed. For young athletes, performance standards should be age-appropriate and sensitive to maturation. The evidence also indicates that skill testing should be integrated with physical, tactical, perceptual, and longitudinal information rather than being used as the sole basis for talent identification.

A well-designed criterion-referenced volleyball performance test battery can provide coaches, researchers, physical educators, and talent-development programs with a practical and scientifically defensible method for monitoring technical development and identifying areas for targeted intervention.

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