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METHODOLOGY FOR IMPROVING THE TECHNICAL PREPAREDNESS OF 13–15-YEAR-OLD FEMALE VOLLEYBALL PLAYERS THROUGH A DIFFERENTIATED APPROACH

Toyirova Zulfina Gaybulla kizi
Second-year Master's candidate at Bukhara State Pedagogical Institute
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Abstract: The article addresses the problem of improving the technical preparedness of 13–15-year-old female volleyball players through a differentiated training approach. The relevance of the study is determined by the fact that athletes of the same chronological age may differ considerably in biological maturation, anthropometric characteristics, coordination abilities, physical fitness, rate of motor skill acquisition, and the structure of technical errors. Therefore, the use of identical training loads and technical tasks for all adolescent players may reduce the effectiveness of technical preparation. The study substantiates a methodological system based on the sequence diagnostics → differentiated grouping → adapted technical exercises → individualized feedback → control → correction. Particular attention is paid to the differentiation of exercise complexity, number of repetitions, distance, speed, time pressure, and game-related decision-making requirements. The proposed methodology is aimed at improving technical accuracy, stability, movement coordination, application of technical actions under game conditions, and reducing recurrent technical errors. The article also describes criteria for evaluating technical preparedness and offers a weekly microcycle for differentiated volleyball training.
Keywords: volleyball, female athletes, technical preparedness, differentiated approach, adolescence, biological maturation, technical skills, feedback, training methodology, individualization.

Introduction

Modern volleyball places high demands on the technical preparedness of young athletes. Successful performance requires not only the acquisition of isolated motor actions but also their stable and accurate application under changing game conditions, limited decision-making time, and interaction with teammates and opponents. In adolescent volleyball, this task becomes more complex because players of the same chronological age may differ substantially in their physical, morphological, functional, and coordinative development.

The age period of 13–15 years is characterized by intensive biological development. Differences in maturation may influence body height, body mass, limb proportions, strength, jumping ability, and other physical characteristics. Research has shown that biological maturation is significantly associated with anthropometric and physical fitness characteristics in adolescent volleyball players, and more advanced maturation may provide a temporary advantage in some physical performance indicators. onstrate that chronological age alone does not fully explain

individual di PubMed Studies involving adolescent male and female volleyball players also dem fferences in kinanthropometric and fitness characteristics. PubMed

This issue is particularly important in technical training. A physically more developed player may not necessarily have a higher rate of technical skill acquisition, while an athlete with lower current strength indicators may demonstrate better coordination, motor learning ability, and long-term developmental potential. Therefore, technical training should not be organized solely according to chronological age or current physical performance.

Another important factor is pedagogical feedback. Barzouka, Bergeles, and Hatziharistos demonstrated that different forms of augmented feedback can contribute to the acquisition and retention of volleyball reception skills in adolescents. Their study involved pupils aged 12–15 and showed the importance of systematic feedback during technical skill learning.

For these reasons, a differentiated approach appears to be one of the most appropriate ways to organize the technical preparation of adolescent female volleyball players. Such an approach allows the coach to preserve common technical goals while adapting the means and conditions of their achievement to the individual characteristics of athletes.

The purpose of this study is to develop and theoretically substantiate a methodology for improving the technical preparedness of 13–15-year-old female volleyball players through a differentiated approach.

Literature Review

Technical preparedness in volleyball includes the quality of performing fundamental skills such as overhead passing, forearm passing, serving, attacking, blocking, and movement on the court. However, the effectiveness of these actions depends not only on technical knowledge but also on the interaction between coordination, physical fitness, perception, decision making, and experience. Research on adolescent volleyball has increasingly emphasized the importance of biological maturation in interpreting young athletes' current performance. Albaladejo-Saura and colleagues found that maturation status affects anthropometric and physical fitness indicators in adolescent volleyball players. In female players, maturity status has also been associated with differences in body composition and fitness characteristics. These findings suggest that current physical superiority should be interpreted cautiously when evaluating technical potential. A broader analysis of adolescent volleyball players showed that selection based only on superior kinanthropometric or physical fitness results may overlook the influence of maturation. More successful adolescent players may differ from less successful players in several characteristics, but maturation and developmental stage should be considered when interpreting these differences. A systematic review and meta-analysis of young athletes similarly confirmed the relationship between biological maturation, physical fitness, and kinanthropometric variables, reinforcing the need for age-appropriate and development-sensitive assessment. From a pedagogical perspective, technical training should therefore be based on regular diagnostics and differentiated intervention. The central principle is not to lower the technical standards for less-prepared athletes, but to vary the route through which different athletes achieve the same target performance.

Materials and Methods

The methodological framework includes theoretical analysis, pedagogical observation, technical control tests, video analysis, individual error recording, pedagogical experiment, and mathematical-statistical analysis.

The assessment of technical preparedness is based on five principal criteria:

1. **Technical accuracy** — the ability to direct the ball to a predetermined target or zone.
2. **Technical stability** — the ability to reproduce the skill successfully across repeated attempts.

Movement coordination — the consistency and correctness of the phases of the technical action.

Application in game situations — the ability to select and perform the appropriate technical action under time and opponent pressure.

Dynamics of technical errors — the reduction in the number and frequency of recurrent errors over time.

The methodology also considers the athlete's rate of motor skill acquisition, coordination abilities, current physical fitness, and individual developmental characteristics.

Differentiated Grouping of Athletes

Based on diagnostic results, athletes are conditionally divided into three groups.

Group A — Basic Level

This group includes players who demonstrate frequent technical errors, unstable execution, and a slower rate of technical skill acquisition.

Training characteristics include:

- ❖ simplified exercise conditions;
- ❖ shorter distances;
- ❖ lower movement speed;
- ❖ more repetitions;
- ❖ segmented learning of technical actions;
- ❖ frequent direct feedback from the coach;
- ❖ increased use of demonstration.

Group B — Developmental Level

This group includes players who can correctly perform the main technical action but lose stability when task conditions become more complex.

Training characteristics include:

- ❖ variation of distance;
- ❖ changes in movement direction;
- ❖ increased speed;
- ❖ limited execution time;
- ❖ combined technical tasks;
- ❖ guided feedback and problem-solving questions.

Group C — Advanced Level

This group includes players who demonstrate stable technical execution and are ready for game-like conditions.

Training characteristics include:

- ❖ opponent pressure;
- ❖ time constraints;
- ❖ variable ball trajectories;
- ❖ tactical decision making;
- ❖ combination of several technical actions;
- ❖ self-analysis and reflective feedback.

Importantly, these groups should not be permanent. Athletes may move from one group to another according to their developmental dynamics and control results.

The "DIF-VOLEY" Differentiated Technical Training Methodology

The proposed authorial methodology is termed **"DIF-VOLEY"**.

The abbreviation reflects the initial stages of the methodological process:

D — Diagnostics

I — Identification of individual characteristics

F — Functional and technical grouping

The full methodological sequence is:

diagnostics → individual analysis → differentiated grouping → adapted exercise → individualized feedback → control → correction.

The central formula of the methodology can be expressed as:

DIF-VOLEY = diagnostics + grouping + adapted exercise + individualized feedback + control + correction.

The methodology is based on the principle that the final technical objective remains common to all athletes, while the complexity, volume, pedagogical support, and execution conditions are adapted to the individual player.

Differentiation of Technical Exercises

For example, forearm passing can be differentiated as follows.

For Group A, the player receives a predictable ball from the coach at a distance of approximately 3–4 m and directs it to a large target area. Emphasis is placed on body position, platform formation, and stable execution.

For Group B, ball height, direction, and distance are varied. The player performs the reception after movement and directs the ball to a smaller target area.

For Group C, the player receives serves or attacking balls under game-like conditions and must select the appropriate direction while under time pressure.

Overhead passing can be differentiated in the same manner. Group A performs stationary and wall passing; Group B performs passing after movement and direction changes; Group C performs jump sets, deceptive sets, and combination tasks.

Serving exercises are also differentiated. Basic-level players serve toward broad target zones, intermediate players serve toward specified zones, and advanced players perform tactically targeted serves under competitive conditions.

Differentiation of Repetition Volume

The number of repetitions should not be identical for all athletes.

A possible methodological range is:

Group	Repetitions per series	Rest interval
A	12–16	30–40 s
B	10–14	25–35 s
C	8–12	20–30 s

These values should be viewed as methodological ranges rather than fixed norms. If a player repeatedly performs the same technical error, mechanical repetition should be interrupted. The coach should identify the cause of the error, simplify the exercise if necessary, and provide corrective feedback. This prevents the consolidation of incorrect movement patterns.

Individualized Pedagogical Feedback

Feedback is one of the central components of the methodology.

The recommended sequence is:

error identification → explanation of the cause → demonstration or verbal correction → repeated execution → evaluation of the result.

For Group A, feedback is more frequent, direct, and specific.

For Group B, the coach increasingly uses guiding questions and partial self-correction.

For Group C, feedback focuses on reflection, self-evaluation, and tactical reasoning.

This approach is consistent with evidence showing that augmented feedback can facilitate the acquisition and retention of volleyball reception skills in adolescents.

Individual Technical Error Map

For each athlete, an individual technical error map may be maintained.

Technical skill	Main error	Possible cause	Corrective exercise	Subsequent result
Forearm pass	Unstable platform	Elbows flex during contact	Wall passing drill	Improved
Overhead pass	Ball travels backward	Incorrect trunk position	Target passing	Stabilizing
Serve	Low accuracy	Inconsistent contact point	Zone serving	Improved
Attack	Poor timing	Incorrect approach	Step-by-step attack	In progress

		rhythm	drill	

The map makes the differentiated approach systematic and allows the coach to monitor individual changes over time.

Structure of a Differentiated Training Session

A single training session may be organized as follows:

Part of the session	Duration	Main content
Preparatory part	10–15 min	General and coordination exercises
Diagnostic-corrective part	10 min	Checking previously identified technical errors
Differentiated technical part	25–30 min	Group A, B, and C tasks of different complexity
Game-related application	20 min	Technical actions combined with decision making
Control	10 min	Accuracy, stability, and game application assessment
Reflection	5 min	Short self-evaluation by athletes

This structure integrates diagnostics, intervention, control, and correction within the same training process.

Weekly Microcycle

A three-session weekly microcycle may be organized as follows:

Session 1: Diagnostics and Technical Correction

The primary task is to identify individual technical errors and restore the correct structure of the movement.

Session 2: Differentiated Developmental Training

Speed, distance, direction, number of repetitions, and degree of pedagogical support are differentiated according to the athlete's current level.

Session 3: Game Application and Control

Technical actions are performed under conditions involving decision making, time pressure, movement variability, and opponent resistance.

Thus, the weekly cycle follows the sequence:

identification → correction → development → game application → control → further correction.

Expected Results and Discussion

The proposed methodology is expected to improve technical training in several ways.

First, differentiated grouping allows athletes to work at an appropriate level of task difficulty. Tasks that are too easy may fail to stimulate development, while tasks that are too difficult may increase error frequency and reduce learning quality.

Second, the use of individualized feedback makes correction more targeted. Athletes with limited technical stability require more explicit instructions, whereas advanced athletes benefit from reflective and problem-solving feedback.

Third, the dynamic movement of players between groups prevents rigid labeling. The grouping is based on the athlete's current performance rather than a permanent classification.

Fourth, the methodology reduces the risk of interpreting physical superiority caused by early biological maturation as evidence of superior technical potential. Evidence from adolescent volleyball research confirms that maturation may substantially influence anthropometric and fitness indicators.

Finally, the combination of technical accuracy, stability, coordination, game application, and error dynamics creates a more comprehensive assessment framework than reliance on a single test result.

Conclusion

The technical preparation of 13–15-year-old female volleyball players should be organized with consideration of individual differences in biological maturation, physical fitness, coordination abilities, motor learning rate, and technical errors. The proposed DIF-VOLEY methodology is based on the sequence: diagnostics → individual analysis → differentiated grouping → adapted technical exercises → individualized feedback → control → correction. Its methodological value lies in maintaining common technical objectives while differentiating exercise complexity, repetition volume, speed, distance, decision-making requirements, and pedagogical assistance. The approach may contribute to improving technical accuracy, stability, movement coordination, the application of skills under game conditions, and the reduction of recurrent technical errors. At the same time, it offers coaches a systematic way to monitor individual development and adjust the training process according to each athlete's current needs and developmental dynamics.

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