



ADVANTAGES OF DEVELOPING TECHNIQUE AND ACCURACY IN BALL RECEPTION AND PASSING IN MODERN VOLLEYBALL FROM AN EARLY AGE UNDER THE INFLUENCE OF INTENSIVE LOADS

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Abstract: This article analyzes the results of a study aimed at substantiating the advantages of developing technique and accuracy in ball reception and passing in volleyball, which ensure the effectiveness of attacking actions. Special attention is given to the process of forming these skills from an early age (11–12 years) under the influence of vestibulokinetic and anaerobic loads.

Keywords: volleyball, ages 11–12, ball passing, reception, technique, accuracy method, vestibulokinetic loads, anaerobic load.

It is well known that in volleyball, receiving the ball directed by an opponent and passing it into a “useful” zone, followed by an accurate set from this zone to the attacker, form the foundation for the effectiveness of offensive actions. However, as observations show, even at the most prestigious international competitions, highly qualified volleyball players often make technical mistakes or fail to deliver the ball precisely “to the target” when performing these game techniques. In practice, such problems are explained by the instability of technical and tactical preparedness, as well as by factors related to physical or mental fatigue [A.A. Pulatov, 2025, pp. 5–58; A.A. Pulatov, S.F. Ashirkova, 2020, pp. 64–66; I.A. Lysova et al., 2010, pp. 124–125; A.G. Furmanov, L.I. Akulich, 2019, pp. 125–126]. In essence, this assumption is also well founded. However, there are other contributing factors. The fact is that during the game, repeatedly performed intensive motor activities — such as running, turning and rotating, bending and extending, jumping and stepping, falling, etc. — on the one hand, affect the vestibular analyzer by disturbing balance, and on the other hand, act as anaerobic loads that intensify hypoxic–hypercapnic reactions in the player (oxygen debt and increased CO₂ concentration). As a result, the frequency of oscillations of the body and its parts (tremor) increases. Such reactions undoubtedly have a negative impact on both the technique of performing these actions and their accuracy.

Therefore, it can be argued that the development of technique and tactics of ball reception and passing from an early age under the influence of vestibulokinetic and anaerobic loads contributes to the stabilization of these parameters. The results of pedagogical observations showed that at the stage of initial training, among volleyball players aged 11–12 who are trained using traditional methods, the discussed technical skills and their accuracy are practically not formed under the influence of vestibulokinetic and anaerobic loads. For this reason, a series of studies was conducted to explore this issue in greater depth.

The purpose of the study was to examine the influence of vestibulokinetic and anaerobic loads on the technique and accuracy of performing the forearm (underhand) reception of the ball with both hands, followed by a pass to zone 2, as well as the subsequent overhead pass from zone 2 to zone 4 in volleyball players aged 11–12.

The results of the study showed that, under calm (resting) conditions, the technique and accuracy of the forearm reception and passing with both hands, as well as the overhead two-handed pass, when evaluated by score and number of attempts, averaged about 50% of the 10 possible points. However, under the influence of loads such as trunk rotations to the left and right, and running, these indicators decreased by two or even three times.

For example, in a calm state, the technique of performing a forearm reception from zone 3 and passing the ball to a target-training device located in zone 2 at the beginning of the training year was rated at 4.7 ± 0.49 points out of 10 possible. By the end of the training year, this value increased only to 4.9 ± 0.52 points, showing an absolute increase of just 0.2 points (Table 1).

The technique of reception and passing to the target from zone 6 during the training year increased from 4.5 ± 0.38 to 4.8 ± 0.51 points, and from zone 5 — from 4.1 ± 0.33 to 4.5 ± 0.46 points.

As can be seen, firstly, the technique of receiving and passing the ball to the target developed at an extremely slow rate throughout the training year; secondly, when

Table 1

Growth rates of technique and accuracy in ball reception among 11–12-year-old volleyball players when receiving balls from zone 3 to zones 1, 6, and 5 under the influence of rotational movements and passing them to a target-training device installed in zone 2 during one training year (n = 47×2 = 94).

Nº	Tests	At the beginning of the training year	At the end of the training year	Absolute Increase
In a calm (resting) state				
Technique of ball reception and passing (points):				
1.	from zone 1	4,7±0,49	4,9±0,52	0,2
2.	from zone 6	4,5±0,38	4,8±0,51	0,3
3.	from zone 5	4,1±0,33	4,5±0,46	0,4
Accuracy of ball reception and passing (out of 10 attempts):				
4.	from zone 1	4,1±0,38	4,3±0,39	0,2
5.	from zone 6	4,8±0,47	4,9±0,45	0,1
6.	from zone 5	4,6±0,35	4,8±0,37	0,2
With forward bending and 10 torso rotations to the left:				
Technique of ball reception and passing (points):				
1.	from zone 1	2,3±0,17	2,5±0,19	0,2
2.	from zone 6	2,2±0,15	2,6±0,18	0,4
3.	from zone 5	2,0±0,13	2,4±0,14	0,4
Accuracy of ball reception and passing (out of 10 attempts):				



4.	from zone 1	2,4±0,15	2,7±0,17	0,3
5.	from zone 6	2,5±0,16	2,8±0,18	0,3
6.	from zone 5	2,1±0,14	2,3±0,16	0,2
With forward bending and 10 torso rotations to the right:				
Technique of ball reception and passing (points):				
1.	from zone 1	1,5±0,08	1,7±0,11	0,2
2.	from zone 6	1,3±0,07	1,6±0,09	0,3
3.	from zone 5	1,0±0,05	1,4±0,07	0,4
Accuracy of ball reception and passing (out of 10 attempts):				
4.	from zone 1	1,4±0,08	1,8±0,11	0,4
5.	from zone 6	1,7±0,10	1,9±0,12	0,2
6.	from zone 5	1,2±0,06	1,5±0,07	0,3

Note: – The technique and accuracy of ball reception and passing were evaluated based on 10 attempts; – Both the reception and the pass were performed using a two-handed underhand technique; – The serves to zones 1, 6, and 5 were executed by a partner positioned in the corresponding zone.

passing the ball from zone 5, its performance indicators significantly decreased. Consequently, an increase in the passing distance had a negative effect on the technique of performing this skill.

The accuracy of performing a two-handed underhand reception in zone 1 and passing the ball to the target in zone 2 increased only slightly—from 4.1 ± 0.38 to 4.3 ± 0.39 out of 10 attempts. The accuracy of reception in zone 6 and passing to the target in zone 2 over one training year rose from 4.8 ± 0.47 to 4.9 ± 0.45 , while the same indicator for passing from zone 5 increased from 4.6 ± 0.35 to 4.8 ± 0.37 out of 10 attempts.

It should be noted that the technique and accuracy of performing these actions, which under calm conditions were below 50%, sharply decreased under the influence of loads such as forward bends and trunk rotations to the left and right (10 repetitions). Specifically, the technique of two-handed underhand reception in zone 1 and passing to the target in zone 2 dropped from 4.7 ± 0.49 points (at rest, at the beginning of the training year) to 2.3 ± 0.17 points, and by the end of the training year—from 4.9 ± 0.52 to 2.5 ± 0.19 points.

Similarly, the technique of reception and passing from zone 6 decreased to 2.2 ± 0.15 and 2.6 ± 0.18 points, respectively, while from zone 5 it dropped to 2.0 ± 0.13 and 2.4 ± 0.14 points compared to the indicators recorded under calm conditions.

The accuracy of receiving and passing the ball to the target from the corresponding zones (out of 10 attempts) also decreased to the levels indicated above. Even more striking is that the technique and accuracy of receiving the ball from zones 1, 6, and 5 and passing it to the target device installed in zone 2 after a serve from zone 3 decreased even more significantly under the influence of loads in the form of forward bending and trunk rotation to the right (the inconvenient side).

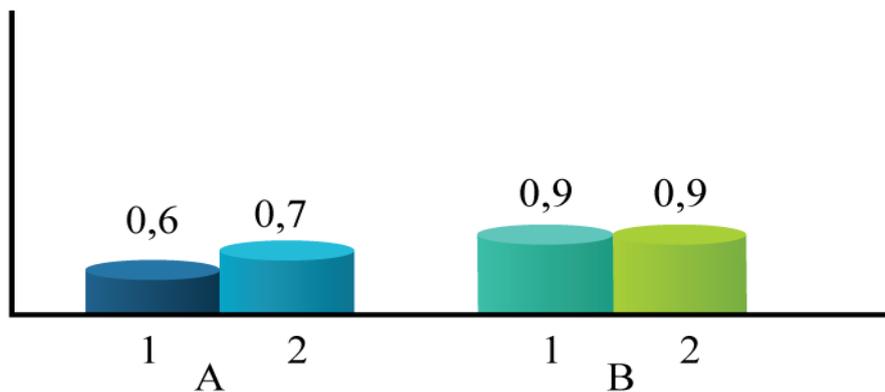
In particular, the technique of reception and passing from zones 1, 6, and 5 decreased respectively to 1.5 ± 0.08 and 1.7 ± 0.11 points; 1.3 ± 0.07 and 1.6 ± 0.09 points; 1.0 ± 0.05 and



1.4 ± 0.07 points. The accuracy of receiving and passing the ball to the target in 10 attempts, compared to the indicators under calm conditions, decreased respectively: to 1.4 ± 0.08 and 1.8 ± 0.11 times; 1.5 ± 0.10 and 1.9 ± 0.12 times; 1.2 ± 0.06 and 1.5 ± 0.09 times.

A comparative analysis of these indicators shows that, firstly, the technique of two-handed underhand reception in zones 1, 6, and 5 and passing the ball accurately to zone 2, as well as the accuracy itself, demonstrated under calm conditions, decreased almost twofold under the influence of 10 repetitions of trunk rotations to the left (the convenient side), while under rotations to the right (the inconvenient side), it decreased up to threefold.

Therefore, it can be emphasized that the stability of dynamic balance in 11–12-year-old volleyball players involved in the study is at an extremely low level. Another noteworthy observation is that under the influence of loads associated with trunk rotations to the left and right, a pronounced asymmetrical difference between the technique and the accuracy of reception and passing to the target was identified (**Fig. 1**).



Note: 1 – at the beginning of the training year;
2 – at the end of the training year;
A – technique of ball reception and passing;
B – accuracy of ball reception and passing.

Figure 1. Diagrams illustrating the asymmetrical differences in the technique and accuracy of ball reception and passing among 11–12-year-old volleyball players under the influence of trunk rotations to the left and right.

The technique of performing an overhead two-handed pass from zone 2 to a target device installed in zone 4, under calm conditions, was 3.7 ± 0.41 points at the beginning of the training year. By the end of the training year, this indicator increased to 4.2 ± 0.45 points, meaning its absolute growth over the period was only 0.5 points.

The accuracy of passing the ball from zone 2 to zone 4 out of 10 attempts increased from 2.9 ± 0.34 times to 3.5 ± 0.36 times during the training year, with an absolute increase of 0.6 times (**Table 2**).

Table 2

Growth rates of technique and accuracy in performing an overhead two-handed pass from zone 2 to a target device installed in zone 4 among 11–12-year-old volleyball players during one training year (n = 47×2 = 94).

N ^o	Tests	At the beginning of the training year	At the end of the training year	Absolute Increase
In a calm (resting) state				
1.	Technique of ball passing from zone 2 to zone 4 (points)	3,7±0,41	4,2±0,45	0,5
2.	Accuracy of ball passing from zone 2 to zone 4 (out of 10 attempts / times)	2,9±0,34	3,5±0,36	0,6
With forward bending and 10 torso rotations to the left				
1.	Technique of ball passing from zone 2 to zone 4 (points)	1,4±0,09	1,9±0,11	0,5
2.	Accuracy of ball passing from zone 2 to zone 4 (out of 10 attempts / times)	1,3±0,09	1,7±0,13	0,7
With forward bending and 10 torso rotations to the right				
1.	Technique of ball passing from zone 2 to zone 4 (points)	0,9±0,05	1,4±0,09	0,3
2.	Accuracy of ball passing from zone 2 to zone 4 (out of 10 attempts / times)	0,5±0,02	1,0±0,07	0,4

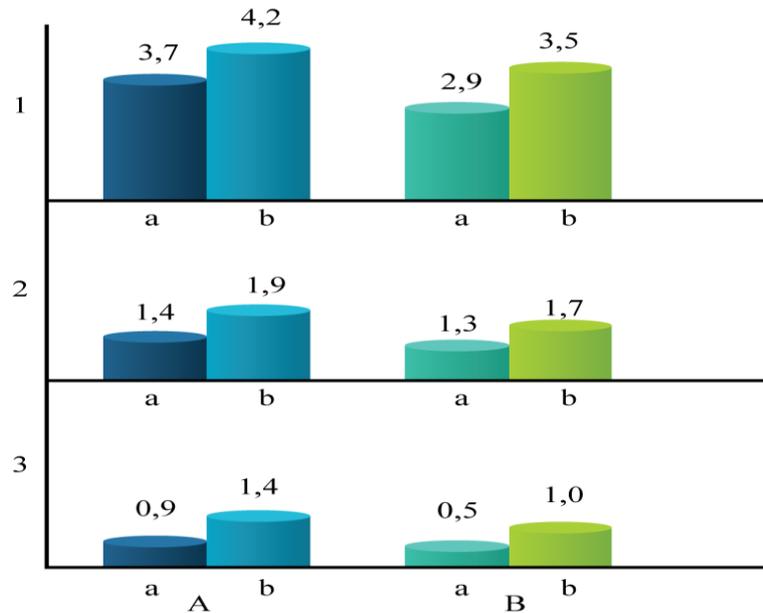
As can be seen, among the 11–12-year-old volleyball players involved in the study, the technique of passing the ball from zone 2 to the target in zone 4, as well as its accuracy, showed extremely low results. It should also be noted that considering these young athletes began practicing volleyball at the age of 9, the effectiveness of the traditional training conducted during this period can be regarded as very low. It is noteworthy that the indicators of ball passing recorded under calm conditions (both in terms of technique and accuracy) decreased almost threefold under the influence of loads involving forward bending and ten trunk rotations to the left. Specifically, before the experiment, the passing technique dropped from 3.7 ± 0.41 points to 1.4 ± 0.09 points, while passing accuracy decreased from 2.9 ± 0.34 times to 1.3 ± 0.09 times. After the experiment, these indicators decreased respectively from 4.2 ± 0.45 points to 1.8 ± 0.11 points, and from 3.5 ± 0.36 times to 1.7 ± 0.10 times.

Under the influence of loads in the form of forward bending and ten trunk rotations to the right (the inconvenient side), the passing technique, compared to the values in calm conditions (3.7 ± 0.41 points), decreased more than threefold, to 0.9 ± 0.05 points. After the experiment, these indicators declined from 4.2 ± 0.45 points to 1.4 ± 0.09 points.

Passing accuracy before the experiment dropped from 2.9 ± 0.34 times to 0.5 ± 0.02 times, and after the experiment — from 3.5 ± 0.36 times to 1.0 ± 0.07 times.

It should be emphasized that throughout the entire training year, these indicators also demonstrated extremely low growth rates. **Figure 2** presents the actual indicators of ball-passing technique and accuracy under calm conditions, as well as under the influence of trunk rotations to the left and right, along with their growth levels by the end of the training year.





Note: 1 – at rest;

2 – under the influence of 10-fold trunk rotation to the left;

3 – under the influence of 10-fold trunk rotation to the right;

A – technique of overhead ball passing from zone 2 to zone 4;

B – accuracy of overhead ball passing from zone 2 to zone 4;

a – at the beginning of the training year;

b – at the end of the training year.

Figure 2. Dynamics of changes in the technique and accuracy of overhead ball passing in 11–12-year-old volleyball players during the training year at rest and under the influence of 10-fold trunk rotations to the left and right.

As can be seen, among the 11–12-year-old volleyball players involved in the study, both at the beginning and at the end of the training year, the technique and accuracy of ball reception and passing demonstrated under calm conditions were below 45% (relative to the standard of 10 points and 10 attempts). Under the influence of loads involving trunk rotations to the left and right, these indicators decreased three to four times further.

Secondly, under the influence of loads caused by trunk rotations to the left (convenient side) and to the right (inconvenient side), pronounced asymmetrical differences in the technique and accuracy of ball reception and passing were recorded.

This phenomenon undoubtedly indicates an extremely low level of development of dynamic balance stability among volleyball players of this age group. Consequently, the observed asymmetrical differences inevitably have a negative impact on both the technique and accuracy of ball reception during turns or rotations to the left and right followed by passing to a designated zone.

In a state of rest, as well as under the influence of intensive running loads that included exercises in the form of “zigzag” running with sharp changes of direction, the technique of the studied skills and their accuracy differed significantly. In particular, at rest, the technique of

underhand ball reception with both hands after a serve from zone 3 to zone 1 and its subsequent pass to zone 2 in volleyball players of this age at the beginning of the training year amounted to 4.7 ± 0.49 points, and by the end of the training year increased to 4.9 ± 0.52 points, with an absolute growth of only 0.2 points over this period (**Table 3**).

The technique of ball passing after reception in zone 6 and passing to zone 2 increased from 4.5 ± 0.38 to 4.8 ± 0.51 points, and when receiving from zone 5—from 4.1 ± 0.33 to 4.5 ± 0.46 points.

The rates of improvement in the technique of ball reception and passing amounted to 0.3 and 0.4 points, respectively.

The accuracy of passing the ball to the target installed in zone 2 after reception in zone 1 increased from 4.1 ± 0.38 to 4.3 ± 0.39 attempts, from zone 6—from 4.8 ± 0.47 to 4.9 ± 0.45 attempts, and from zone 5—from 4.5 ± 0.35 to 4.8 ± 0.37 attempts.

Table 3

Growth rates of technique and accuracy in receiving balls served from zone 3 to zones 1, 6, and 5, and passing them to a target installed in zone 2 under various running loads among 11–12-year-old volleyball players during one training year (n = 47×2 = 94).

No	Tests	At the beginning of the training year	At the end of the training year	Absolute Increase
In a calm (resting) state				
Technique of receiving and passing the ball to the target (points):				
1.	from zone 1	$4,7 \pm 0,49$	$4,9 \pm 0,52$	0,2
2.	from zone 6	$4,5 \pm 0,38$	$4,8 \pm 0,51$	0,3
3.	from zone 5	$4,1 \pm 0,33$	$4,5 \pm 0,46$	0,4
Accuracy of receiving and passing the ball to the target (10 attempts/times):				
4.	from zone 1	$4,1 \pm 0,38$	$4,3 \pm 0,39$	0,2
5.	from zone 6	$4,8 \pm 0,47$	$4,9 \pm 0,45$	0,1
6.	from zone 5	$4,5 \pm 0,35$	$4,8 \pm 0,37$	0,2
Under the influence of the "zigzag" running load (92 m):				
Technique of receiving and passing the ball to the target (points):				
1.	from zone 1	$2,3 \pm 0,10$	$2,8 \pm 0,12$	0,5
2.	from zone 6	$2,4 \pm 0,11$	$2,9 \pm 0,16$	0,5
3.	from zone 5	$2,1 \pm 0,05$	$2,5 \pm 0,11$	0,4
Accuracy of receiving and passing the ball to the target (10 attempts/times):				
4.	from zone 1	$2,0 \pm 0,13$	$2,9 \pm 0,17$	0,9
5.	from zone 6	$2,5 \pm 0,15$	$2,8 \pm 0,14$	0,3
6.	from zone 5	$1,9 \pm 0,14$	$2,4 \pm 0,15$	0,5



Under the influence of the running load scheme 6-2-6-4-6-5-6-1-6:

Technique of receiving and passing the ball to the target (points):				
1.	from zone 1	2,6±0,18	2,9±0,19	0,4
2.	from zone 6	2,7±0,14	3,0±0,16	0,3
3.	from zone 5	2,5±0,11	2,8±0,13	0,5
Accuracy of receiving and passing the ball to the target (10 attempts/times):				
4.	from zone 1	2,3±0,12	2,5±0,11	0,2
5.	from zone 6	2,7±0,16	3,1±0,17	0,1
6.	from zone 5	2,2±0,11	2,4±0,12	0,4

It is evident that the technique of ball reception and its passing to zone 2, performed in 10 attempts, as well as its accuracy, did not reach even 50 % of the reference level.

At rest, the technique of receiving the ball from all zones and passing it to the target installed in zone 2 decreased almost twofold under the influence of running loads performed in a “zigzag” pattern over a distance of 92 m. For example, after such a load, the technique of receiving and passing the ball to the target from zones 1, 6, and 5 at the beginning of the training year amounted to 2.3 ± 0.10 , 2.4 ± 0.11 , and 2.1 ± 0.09 points, respectively. By the end of the training year, these indicators increased only slightly — up to 2.8 ± 0.12 , 2.9 ± 0.16 , and 2.5 ± 0.11 points.

The accuracy of passing the ball to the target (zone 2) accordingly increased from 2.0 ± 0.13 , 2.5 ± 0.15 , and 1.9 ± 0.14 points to 2.9 ± 0.17 , 2.8 ± 0.14 , and 2.4 ± 0.15 points.

A comparative analysis of these data indicates that, among the 11–12-year-old volleyball players involved in the study, the technique of passing the ball to the target from zones 1, 6, and 5, as well as its accuracy, decreased almost twofold under the influence of the “zigzag” running exercise compared to the corresponding values recorded in a state of rest.

Presumably, this phenomenon can be explained by the occurrence of hypoxic-hypercapnic reactions in children under the influence of running load. This is due to the fact that such loads primarily increase the respiratory rate, which, in turn, raises the heart rate. As a result, these physiological reactions have a negative effect both on the technique of receiving and passing the ball and on their accuracy.

Conclusion

Based on the comparative analysis of the results obtained in the conducted study, it can be concluded that this situation is primarily explained by the fact that, in traditional training sessions with 11–12-year-old volleyball players, the instruction in the technique of underhand ball reception with two hands and passing it to a specific zone — including the overhead pass from zone 2 to zone 4 — as well as the development of accuracy in performing these actions, is mainly carried out under conditions of low intensity, without the influence of loads associated with sudden turns, rotations, and running.

It should also be emphasized that in such traditional training methods, insufficient attention is paid to the systematic development of abilities for maintaining both static and dynamic balance, as well as speed, which has led to the lack of intensive improvement in

technical mastery. In this regard, it is especially important to purposefully develop the function of maintaining balance under the influence of various rotational movements.

If balance stability controlled by the vestibular analyzer is not systematically developed from an early age through a variety of rotational exercises, then — as in all sports — in volleyball, the process of forming technical skills, their accuracy, and most importantly, their stabilization, will not occur at an intensive pace.

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