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ANALYSIS OF THE MOTOR PERFORMANCE OF THE FOREARM PASSING SKILL, IN VOLLEYBALL, AT THE FIRST YEAR STUDENTS OF THE FACULTY OF PHYSICAL EDUCATION, TISHREEN UNIVERSITY

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ABSTRACT. Volleyball is one of the most representative team sports all over world. It already has two Olympic disciplines (regular and beach volleyball) with a 3rd one under expectation for winter Olympics in the following years (snow volleyball). It is known that is a connection between proper biomechanics and performance in sports (Robertson, 2011). As willing to study the progress of the students regarding the forearm passing skill and the training methodology used we undertook this research. A number of 108 students were involved in the study, from the first year of Faculty of Physical Education, Tishreen University. They practised the volleyball classes two times a week, during the February – June 2022 period. Were divided into four groups, two of them as the experimental group and two as the control group. In the first two groups (consisting of 54 students), the experimental group, we eliminated the pair exercises, so they practised only self and against wall exercises. The other two groups, the control, did the regular training, including self, wall and pair exercises. As there is no standard methodology of evaluate the forearm passing skill, we decided to use a scoring system adapted by author to the needs of the students. After the testing and retesting, the control groups scored better, improved more their skills regarding the forearm passing, comparing to the groups that haven't practices pair exercise.

Key words: *volleyball, forearm pass, exercise with partner, exercise without partner, first year students*

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Introduction

Volleyball is currently considered to be a dynamic game, during which low intensity and high intensity movements alternate (Kutac, 2020). As Ajayati (2017) notice, the involvement of students in learning volleyball program is expected to help optimize the growth and development of students, improve students' physical fitness components, such as endurance strength, power, flexibility, agility, balance and motor coordination. Gazali (2016) divides the basic techniques in the volleyball game in service, passing, smash, and block. The underarm pass is the most versatile gesture in volleyball (Villanueva, 2020). It is very often used to play the ball when it comes low and with high speed. As Villanueva defines, it consists of four phases:

- The static position before hitting. It is one crucial aspect of the pass, the player has to move very quick to the ball and set up the right static position before hitting.
- Placing of the feet. The feet have to be placed wider than the shoulders, but not too much. The knees will be bended, so the body is in a slightly forward position. The position is similar to sitting on an imaginary chair. In the mean time one feet is placed a little bit in from of the other. This will help the player to give direction of the ball.
- Position of the arms. The arms have to be completely extended and in an almost parallel to the tights position. The thumbs have to be placed together, leaving no gap between them.
- Setting the pass. Is the last phase of the forearm pass, similar with the lift up from the imaginary chair. The ball has to be hit with the forearms (so the name of forearm pass) – not with the wrists, with a dry hit, not abrupt, always followed by the extension of the legs.

When undertaking a forearm pass, there are varied types of mistakes that students could experience: bad hand positioning, bent arms, bad placing against the ball, inadequate trunk inclination, incorrect direction of the arms, failure in the coordination of kinematic chain by legs and arms, asymmetrical hit of the ball.

Objectives

In the literature could be identified more types of exercises used in volleyball. Under research of different authors (Villanueva 2020, Ozawa 2021, Astuti 2021 etc) we could identify three main types of exercises self-

administered, with partner or against the wall. Because of the limited amount of time students have to practice the forearm pass we considered to find out the best design for their training. The hypothesis that we find out was: "*Do the same number of exercises have a better effect if their specific is varied (with or without partner) or if are practised only without partner (self administration of the ball or against the wall)?*"

Materials and Methods

The study was carried out on a group of 108 students from the first year of Tishreen University. They were divided into four groups. Group A and B (practising only exercises without partner) – 54 students and group C and D (practising both exercises with and without partner) – other 54 students. The students were all of them students of the University, none of them practising performance volleyball. They were asked for participation approval and all ethical criteria were respected.

The study was carried out between February – June 2022, consisting of two training sessions (100 min each) for all groups. Because a specific test for the lower pass is not defined in the literature, for testing the initial level of the lower pass we used an adapted scoring board.

The self and the wall assessment consisted of self playing at least 20 forearm passes for 30 seconds The partner assessment requested two players forearm passing the ball over the net for 30 seconds. Each test was taken two times, with 30 seconds recovery between repetitions, keeping the best scoring for each aspect. For game assessment, regular sets were played where each player was substitute after playing 3 forearm passes.

The tests were carried out for all participants in first week of February 2022 without any volleyball training before. Between February – June 2022 all groups participate in the volleyball training with the same frequency, 2 times per week, 100 min per training session. Two of the groups practised only exercises without partner (self and wall) and the other two groups, both exercises with partner and without partner. The number of exercises during each training session was the same and as well all the other aspects of the training (physical training, video training, games against opponent etc).

After ending the training the same tests were taken, in the same conditions – number of repetitions, scoring card, scoring points etc.

The results in the initial testing were compared using a t-test with the results in the final tests. Statistics were discussed as following trying to confirm or not the work hypothesis.

Results

In the initial testing the following results were obtained by groups A (27 students) and B (27 students) - practising only without partner exercises, C (27 students) and D (27 students) – practising all types of exercises.

Self assessment

According to the number of students scoring 1, 2, 3 or 4 p the total points of the group were calculated:

Table 1. Points scored during self assessment

Aspect/ Test	A	B	C	D
Thumbs together	64	64	65	63
Arms straight and flat	69	74	71	70
Ball contacts forearms	75	70	77	72
Shoulders in front of knees	61	67	69	63
Feet shoulder width apart	80	72	70	75
One foot slightly forward	75	66	66	70
Weight balanced	67	77	74	70
Moves to ball	77	68	72	72
Passes the ball to aim	64	65	68	65

Wall assessment

Table 2. Points scored during wall assessment

Aspect/ Test	A	B	C	D
Thumbs together	63	67	61	66
Arms straight and flat	69	74	71	71
Ball contacts forearms	71	71	75	70
Shoulders in front of knees	66	64	69	65
Feet shoulder width apart	80	73	70	73
One foot slightly forward	74	68	66	70
Weight balanced	66	72	74	67
Moves to ball	73	68	71	70
Passes the ball to aim	66	66	69	66

Partner assessment

Table 3. Points scored during partner assessment

Aspect/ Test	A	B	C	D
Thumbs together	61	65	64	66
Arms straight and flat	67	77	72	72
Ball contacts forearms	77	72	72	70
Shoulders in front of knees	64	61	66	67
Feet shoulder width apart	78	72	71	75
One foot slightly forward	77	67	69	70
Weight balanced	66	73	75	66
Moves to ball	71	66	70	70
Passes the ball to aim	65	68	67	66

Game

Table 4. Points scored during game assessment

Aspect/ Test	A	B	C	D
Thumbs together	58	60	59	61
Arms straight and flat	63	70	67	69
Ball contacts forearms	70	68	68	63
Shoulders in front of knees	60	58	62	62
Feet shoulder width apart	72	66	70	69
One foot slightly forward	71	63	63	62
Weight balanced	61	68	71	60
Moves to ball	70	61	64	65
Passes the ball to aim	64	62	62	61

As calculated, the averages of the performance, in the initial testing were the following:

Table 5. Averages calculated after all assessments

	A	B	C	D
Self	70.22	69.22	70.22	68.88
Wall	69.77	69.22	69.55	68.66
Partner	69.55	69	69.55	69.11
Game	65.44	64	65.11	63.55

After the training carried out for 18 weeks, the same tests were taken again, under same protocol. During training in group A and B were practised both exercises with and without partner and in groups C and D only exercises without partner. The results on the final tests were the following:

Self assessment

Table 6. Points scored during self assessment – final testing

Aspect/ Test	A	B	C	D
Thumbs together	66	67	68	67
Arms straight and flat	69	75	71	74
Ball contacts forearms	76	73	79	75
Shoulders in front of knees	63	69	70	69
Feet shoulder width apart	82	74	77	77
One foot slightly forward	77	67	67	72
Weight balanced	69	79	78	74
Moves to ball	77	69	76	76
Passes the ball to aim	68	68	69	67

Wall assessment

Table 7. Points scored during wall assessment – final testing

Aspect/ Test	A	B	C	D
Thumbs together	65	68	66	69
Arms straight and flat	71	75	75	73
Ball contacts forearms	72	72	78	76
Shoulders in front of knees	67	66	72	68
Feet shoulder width apart	83	75	75	75
One foot slightly forward	75	69	67	72
Weight balanced	66	73	77	69
Moves to ball	73	70	74	72
Passes the ball to aim	68	69	70	68

Partner assessment

Table 8. Points scored during partner assessment – final testing

Aspect/ Test	A	B	C	D
Thumbs together	63	66	67	69
Arms straight and flat	68	79	76	76
Ball contacts forearms	77	74	74	76
Shoulders in front of knees	64	62	69	69
Feet shoulder width apart	79	72	73	77
One foot slightly forward	77	67	72	73
Weight balanced	68	74	78	69
Moves to ball	73	67	72	73
Passes the ball to aim	66	69	69	69

Game

Table 9. Points scored during game assessment – final testing

Aspect/ Test	A	B	C	D
Thumbs together	60	63	63	63
Arms straight and flat	65	72	69	72
Ball contacts forearms	72	70	73	66
Shoulders in front of knees	62	60	65	65
Feet shoulder width apart	74	67	72	72
One foot slightly forward	72	64	66	67
Weight balanced	61	69	74	65
Moves to ball	73	63	66	67
Passes the ball to aim	67	65	67	65

As calculated, the averages of the performance, for the final testing were the following:

Table 10. Averages calculated after final testing

	A	B	C	D
Self	71.88	71.22	72.77	72.33
Wall	71.11	70.77	72.66	71.33
Partner	70.55	70	72.22	72.33
Game	67.33	65.88	68.33	66.88

To analyse the results from initial and final testing we chose to group them into a table including both.

Table 11. Compared averages initial and final testing

	A ini	A fin	B ini	B fin	C ini	C fin	D ini	D fin
Self	70.22	71.88	69.22	71.22	70.22	72.77	68.88	72.33
Wall	69.77	71.11	69.22	70.77	69.55	72.66	68.66	71.33
Partner	69.55	70.55	69	70	69.55	72.22	69.11	72.33
Game	65.44	67.33	64	65.88	65.11	68.33	63.55	66.88

The following reports between the initial and final tests were found:

Table 12. Reports between initial and final testing

	A ini/ A fin	B ini/ B fin	C ini/ C fin	D ini/ D fin	Average
Self	1.023	1.028	1.036	1.050	1.034
Wall	1.019	1.022	1.044	1.038	1.030
Partner	1.014	1.014	1.038	1.046	1.028
Game	1.028	1.029	1.049	1.052	1.039
Average	1.021	1.023	1.041	1.046	1.033

Discussion

As previous studies shown, notice that all reports are higher than 1, meaning an overall all progress during volleyball classes practices in the University was recorded during the exercise. Still, the average in the groups C and D, that practised all types of training is higher (1.041 & 1.033 compared to 1.021 & 1.023). We notice also that the higher progress of the forearm pass was recorded during games (increase 3.9%), that shows the exercises were well chosen, aspect that was not relieved by previous studies (a comparation to the results during games). We consider that a final aim of the training is to record a progress during games, not into isolated practise.

As we can see in groups A and B the lowest progress is recorded in exercises with partner (1.4%). In groups C the lowest progress is in exercises with self administration (3.6%) and in group D for wall practice (3.8%). Also, here we notice that is a difference about the lowest progress 1.4% compared to 3.8%, meaning that in the A and B groups the progress that is down, is much under the lowest progress in groups C and D. Regarding the previous studies we had the evidences of the efectivity of the exercises, but not a comparation between them.

Applying the t-test to test if the difference between the averages is statistically relevant, we found the next values:

The mean of A&B minus C&D equals -0.02190;

95% confidence interval of this difference: From -0.02704 to -0.01676;

t = 8.9498;

df = 18 Standard error of difference (one tail P) = 0.002.

This means that the two-tailed P value is less than 0.0001. By conventional criteria, this difference is considered to be extremely statistically significant.

Conclusions

Practising regular volleyball training improves the ability of forearm passing. This could be noticed both in isolated exercises and in regular volleyball game. There are varied categories of volleyball exercise and methods used in training.

The results of the study show that a varied training will improve better the ability of forearm passing. Using only one type of exercises will not have the same effectiveness like a mixed one. Although further research should be done to find out the exact ration between each type of exercise. In the mean time, the results prove that none of the partner or single type exercises have to be excluded. Including exercises – self administrated, against wall and with partner is the best way to improve the passing. This has to be accepted by coaches and included in the management of training process, especially in the university field.

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APENDIX

The model of the data interpretation

Scoring table for volleyball forearm pass

Aspect/ Test	Self assessment	Wall assessment	Partner assessment	Game
Thumbs Together				
Arms Straight and flat				
Ball Contacts Forearms				
Shoulders in front of Knees				
Feet shoulder width apart				
One foot slightly forward				
Weight Balanced				
Moves to ball				
Passes the ball to aim				

The scoring system was a 4 point grade scale as following:

1 point – poor execution, unable to carry on the task;
2 points – poor to average – sometimes playing well the task, but not succeeding in difficult situations;
3 points – average to good – fair execution, playing well more than half of the balls;
4 points – good execution – succeeding the tasks, saving difficult balls, few errors.