THE EFFECT OF SPECIAL EXERCISES IN LEARNING SOME BASIC SKILLS IN VOLLEYBALL AND SOME BIOMECHANICAL VARIABLES ACCORDING TO MAGNETIC RESONANCE MEASUREMENTS OF THE UPPER LIMBS

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Abstract

Objectives: Identifying the effect of special exercises in learning some basic skills in volleyball, as well as the extent of improvement by inferring them through biomechanical variables(Fleisig, 2010), in addition to identifying the differences between players in the level of skill performance based on some special measurements of muscles (the shoulder deltoid, biceps brachii, triceps brachii) and tendons and tendon fusion points in the bon(Journal et al., 2020).

Design: The study adopted the experimental method by designing the pre and post-tests.

Methods: The study relied on the use of magnetic resonance imaging (MRI)(Cagnie et al., 2011) technology to identifying some measurements of the length, size and mass of the muscles under study, as well as tendons and fusion points(Ammar et al., 2018). As well as adopting recommended tests for the purpose of identifying kinetic expectation as a criterion for the stability of kinetic behavior in terms of mechanical variables(Takei et al., 2020). The two-dimensional kinematic analysis technique was also adopted using digital cameras at a speed of (120 puls / sec), and the use of the kinetic analysis program (Kenovea) to reach the results of the biomechanical variables in the specified tests(Peter M McGinnis, 2013).

Results: The results showed significant differences in favor of the post-tests through the application of special educational exercises. It was found that there are indications associated with some structural standards of muscles and tendons that support the process of rapid learning and the stability of kinetic behavior(Journal et al., 2020), which can contribute to strengthening the work of athletes and coaches.

Keywords: Exercises. Athletes. Coaches

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Introduction

The processes of stabilizing skill and bringing it to the limits of the mechanism continue to concern researchers and their interests, there are many internal and external factors that have a great impact in determining the level of access to accurate learning or even contribute to the speed of learning some motor skills(Journal et al., 2020), and there is no doubt that mechanical aspects enter directly with the motor side to master learning and the stability of skill or movement required to reach a distinctive and consistent motor behavior.

And if we believe that motor behavior depends on the consistency of performance between the muscles of the body(Ismaeel, n.d.), which is the main source of each movement (as the muscles with the bones form the locomotor system), so the idea of the research aims to study some characteristics of the locomotor system, especially muscle components and ligaments(Journal et al., 2020), and to determine the response of these measurements and features for a specific type of learning and training programs that are in favor of stabilizing the skill.

Research procedures:

It is worth noting that this study adopted the experimental approach by designing the two groups with the pre and posttest, where the research sample consisted of (24) players who were divided into (10) members of a control group after excluding (4) players who were suffering from special cases and sports injuries(Fleisig, 2010).

The pre-tests included the anatomical measurements of the specific parts of the arm, which are the length, volume, and torques of each of the muscles (deltoid shoulder muscle, biceps brachii, triceps brachii), in addition to conducting a preliminary measurement of the performance level of skills (serving, setting, and diagonal crush hitting), All players were also subjected to general measurements to show the extent of their distribution normally under the Gauss curve and the absence of dispersion or extreme values in (age, weight, training age, the injuries involved)(Ammar et al., 2018).

After conducting the pre-test, the study aimed to reveal the effect of special exercises that were objectively developed to reveal the level of benefit and speed up learning and maintaining the three skills, bearing in mind that the research sample was within a single starting line in terms of the results of the Shapiro-wilk test to show the normal distribution of sample individuals, where the skill level test for all members of the research sample was subjected to examining the differences and using the (T. test) to find out the most important factors that could be an intrusive factor influencing the results of the research(Cagnie et al., 2011).

(26) special exercises were developed, varied and distributed in a training manner (from easy to difficult) and (from light to high intensity) and were distributed in the form of three units per week for a month and a half, so that the total units were (18) educational units(Cagnie et al., 2011).

The study relied on making use of modern devices and tools to support the measurement process in the tests (MRI magnetic resonance, fast cameras, radar to measure speed, muscular moment measurement devices) in addition to training tools (an auxiliary device for teaching crush hitting, an auxiliary device to control the serving movement, multiple training tools). After the lapse of time period for applying the exercises(Journal et al., 2020), which were included in the main part of the educational unit, taking into account that they did not overlap negatively in the time of the basic educational unit to avoid the case of bias for the experimental group, then the post-test was conducted under the same conditions and requirements as the pre-test (Table 1).

Magnetic resonance examination MRI

Before the examination, the sample was followed up for 24 hours to avoid extraneous conditions, the room temperature was checked(Cagnie et al., 2011), and all appropriate laboratory conditions were followed. A (coil) was used, recommended by the company, measuring 14 cm to measure the shoulder area, and another measuring 15 cm to measure The upper arm and forearm area[1].

Florian M. Buck;Degeneration of the Long Biceps Tendon: Comparison of MRI With Gross Anatomy and Histology, American Journal of Roentgenology. 2009;193: 1367-1375. 10.2214/AJR.09.2738

Results

The study came out with the results of laboratory measurements of muscles and field for biomechanical variables and the learning outcome of some basic skills in volleyball, as shown in the following tables[1] (Tables 2-6):

Joyce M. Harrison;Effects of Two Instructional Models—Skill Teaching and Mastery Learning—On Skill Development, Knowledge, Self-Efficacy, and Game Play in Volleyball, Journal of Teaching in Physical Education. 2009;193: 1367-1375.

Through table 4 it becomes clear to us that there are significant differences between the two groups A and B in the parametric measurements of muscle structures(Ahmed, 2020), on which the researchers relied in dividing the

Table 1: Shows some anthropometric measurements of the research sample.

	Arithmetic mean	Standard deviation +	Range
Body length cm	174,25	8,25	20
Trunk length cm	49,25	7,37	16
Arm length cm	57,88	2,53	6
Upper arm length cm	33,25	2,87	6
Forearm length cm	25,3	3,2	7

Table 2: Shows the parametric measurements of the muscles taken from the MRI device and the level of distributing the two groups homogeneously using the (Shapiro-wilk) law.

Measurements	Group A			Group B			Muscles
	Arithmetic mean	Standard deviation	(Shapiro-wilk) sig	Arithmetic mean	Standard deviation	(Shapiro-wilk) sig	
Muscle length	7,65	0,64	0,46	7,14	0,62	0,133	biceps brachii
Muscle volume	13,66	0,71	0,324	12,24	0,67	0,362	
Tendon length	1,87	0,045	0,324	1,67	0,064	0,122	
Pinnate angle	18,12	0,102	0,265	18,56	0,112	0,437	
Muscle length	8,24	0,62	0,133	8,11	0,64	0,511	triceps brachii
Muscle volume	11,22	0,67	0,362	11,12	0,71	0,46	
Tendon length	1,54	0,064	0,122	1,47	0,045	0,324	
Pennation angle	23,17	0,112	0,437	23,54	0,102	0,324	
Muscle length	5,12	0,54	0,511	5,07	0,42	0,265	Middle deltoid shoulder muscle
Muscle volume	9,43	0,61	0,196	9,22	0,43	0,437	
Tendon length	0,65	0,055	0,152	0,61	0,054	0,511	
Pennation angle	34,17	0,11	0,521	34,12	0,103	0,46	

Table 3: Shows the results of the pre and post tests for learning basic skills according to standardized tests for them[1].

Skills	Group A				Group B			
	Pre-test		Post-test		Pre-test		Post-test	
	Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation
Diagonal crush hitting	12,5	3,4	17,3	2,4	12,4	3,1	15,3	2,6
Serving	14,4	3,6	18,1	2,1	13,8	2,8	16,8	2,1
Setting	10,7	2,8	13,6	1,8	9,7	3,6	12,4	1,7

Table 4: Shows the differences between the two groups A and B in the measurements of muscle structures.

Structures	Differences between the two groups A&B		Muscles
	value T	Sig.	
Muscle length	3.15	0.032	biceps brachii
Muscle volume	2.45	0.0112	
Tendon length	2.31	0.023	
Pennation angle	3.76	0.0142	
Muscle length	4.21	0.037	triceps brachii
Muscle volume	2.65	0.041	
Tendon length	2.16	0.039	
Pennation angle	3.71	0.034	
Muscle length	2.48	0.012	Middle deltoid shoulder muscle
Muscle volume	4.61	0.018	
Tendon length	3.12	0.021	
Pennation angle	2.73	0.041	

Table 5: shows the differences between the pre and post tests for the two groups A and B in learning the skills under consideration.

Skills	Pre-post-test group A		Pre-post-test group B	
	value T	Sig.	value T	Sig.
Crush hitting	2.31	0.002	4.61	0.018
Serving	3.56	0.001	3.72	0.021
Setting	4.21	0.003	2.88	0.011

Table 6: Shows the differences between the two post-post-tests for the two groups A and B in learning the skills under consideration.

Skills	Post-post-test of the two groups A&B			
	Arithmetic mean of differences	Standard deviation of differences	value T	Sig.
Crush hitting	15.00	0.801	4.61	0.008
Serving	7.32	0.143	3.72	0.001
Setting	6.82	0.435	2.88	0.011

sample members. From table 5, it becomes clear to us the statistical results of the differences between the pre- and post-tests in learning the skills under study, which came with the significance of differences and in favor of the post-test. Here we note that this result came objectively, especially since the learning process continues in its general form, and there is a clear acquisition in the physical and motor aspects of mastery of skills(Exercise & Journal, 2021). Here, it becomes clear to us that the educational program continues in its entirety for all members of the research sample and in its entire items(Ahmed, 2020), which gives us a great and accurate opportunity to delve into the next step related to examining the differences between the two groups(García-Ramos et al., 2018). From table 6, it becomes clear to us that the differences between the two post tests for the two groups A and B were significant and in favor of the first group, where higher degrees were achieved in the acquisition of the learning skill of the motor skills under study(Cagnie et al., 2011). The researchers find here that the difference in the parametric measurements was clearly reflected in the extent of learning these skills, including the amount of torques generated around the elbow joint specifically, because the biceps and triceps brachii muscles work around this joint(Exercise & Journal, 2021). In addition, the shoulder deltoid muscle generated different amounts of mechanical outputs, depending on the proven difference in its measurements(Exercise & Journal, 2021), also the

two indicators of strength generation within the muscle, represented by the pennation angle of the muscle and its volume, have become an important and distinctive factor among individuals to acquire motor abilities based on the basis of difference in physical abilities and features(Vigotsky et al., 2019).

Conclusions

- The entire educational process gives the individual new motor characteristics based on the special physical abilities of each one of them.
- Outputs of greater muscle moments generated around specialized joints provide a greater opportunity to acquire a special ability that facilitates the learning process.
- The output of the internal strength of the muscle depends on special determinants added to the nervous processing.
- These measurements can be adopted within the principle of prediction or sport selection for the most appropriate activity.

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