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Effects of Visual Exercises on Improving the Serve Performance Level for Junior Volleyball Female Players

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Abstract:

The current research aims to identify the effects of visual exercises on improving the serve skill for junior female volleyball players. The researchers used the experimental approach (two-group design) with pre- and post-measurements. The researchers purposefully chose (27) junior female volleyball players from Ismaily Sports Club. Five players were recruited as a pilot sample while two others were excluded due to non-punctuality in training. The main sample (n=20) was divided into two equivalent groups (experimental – control = 10). Results indicated that:

- *The visual exercises program improved the visual abilities of the experimental group, compared with the control group. Improvement percentages ranged from (9.408%) as the least value on the Saccade test to (44.557%) as the max value on the Spontaneous test.*
- *Visual exercises improved the technical performance of the serve skill of the experimental group, compared with the control group with improvement percentage of (30.273%).*
- *Visual exercises proved effective in improving visual abilities and the serve skill in volleyball.*

Key Words: *Visual Exercises – Serve – Volleyball - Female Players*

I. Introduction:

Scientific and practical applications of sports research aim to improve the athletic performance level in general, and especially in volleyball, through using applied physiological knowledge, information and facts that help in designing and controlling training loads programs during the season to be suitable for athletes' abilities and help them to functionally adapt to volleyball and achieve elite performance on the Olympic and international levels.

Different sensory systems play major roles during the performance of individual skills that require one or multiple responses, or even groups of interrelated skills where one skill is the preliminary stage of the main part of the movement. This affects the speed of realizing motor skills and forming a preliminary motor realization for

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the new skills, in addition to improving coordination of complex skills. In turn, this leads to a greater ability to control movement accurately and maintain correct motor positions and motor integration. Nearly 80% of the cognitive contribution is considered visual. Some authors think that visual contribution may exceed 90% while the rest 10% is for other senses. This clearly indicates the importance of vision as it contributes greatly to forming our daily life cognition in general, and especially in sport (Ariel, 2012). The eye can lead to the performance of the body as the player performs according to specific visual information (Seiller,2004).

Sports coaches, athletes, and sports scientists are in continuous pursuit of modern training methods to improve athletic performance and gain competitive advantage. Visual training one of the cutting-edge techniques in sports training (Walker, 2000). In the past, visual skills didn't have sufficient consideration in sports training programs as coaches and athletes dealt with vision as linked to traditional training unintentionally. But modern studies asserted the importance of visual skills in athletic performance (Elmurr, 2000). The first step towards the success of visual training programs is to identify the nature of specific visual skills of a specific sports activity as each sport has a distinct set of visual skills compared with other sports (Williams et al., 2000).

Serve is a basic attack skill that is very important in volleyball and enables the player to win points directly without effort, compared with other methods. It is a difficult skill that requires greater control, motor coherence, and neuromuscular coordination to be performed correctly. Recently, the serve developed greatly due to interconnection among various sciences to improve the athletic performance of the serve and other skills. Data gathered from Olympic volleyball players indicated that 50% of them examined their eyes. Nevertheless, one out of four players had visual difficulties. About 19.59% of the players wore glasses but only 3.2% could use them effectively during play, compared with 94.3% who used contact lenses. Also, 12.5% had limitations in visual accuracy in one eye while 4.6% had limitations in visual accuracy in both eyes. Nearly 30% of players suffer from limitations in visual accuracy and correct vision (Ariel,2012).

The player's body responds only to what the eyes can see. In addition, coaches always ask their players to follow and monitor the ball accurately and this signifies the importance of visual abilities in volleyball. Nevertheless, visual exercises don't have sufficient attention in volleyball. A few studies tried to identify the implied mechanisms or specific sensory information involved in the identification process that leads to successful performance. Unfortunately, these studies that try to verify results in different ways are very rare (Casanova et al., 2009). Very few studies dealt with improving these skills in athletes. Some of these studies indicated that visual cognition can be trained as they asserted the significant effects of visual training programs on improving visual abilities as visual training can distinguish winners from losers (Schwab & Memmert 2012).

Accordingly, and according to the researcher's experience in teaching and coaching volleyball, The researchers noticed the weak performance level of junior female volleyball players in general, and especially on the serve skill, through a preliminary test for measuring the performance level of the serve. This may be due to the weak visual abilities of those players. In addition, many coaches neglect visual exercises as they think they have performed automatically during the practice of the game. This makes such exercises unsystematically performed as part of the general training framework of junior female volleyball players. Accordingly, The researchers performed this study to try to improve the serve skill for junior female volleyball players by using visual exercises.

Aim:

The current research aims to identify the effects of visual exercises on improving the serve skill for junior female volleyball players.

Hypotheses:

- There are statistically significant differences between the pre- and post-measurements of the experimental group on visual abilities and the serve skill in favor of post-measurements.
- There are statistically significant differences between the pre- and post-measurements of the control group on visual abilities and the serve skill in favor of post-measurements.
- There are statistically significant differences between the post-measurements of the experimental and control groups on visual abilities and the serve skill in favor of the experimental group.
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II. Methods:

Approach:

The researchers used the experimental approach (two-group design) with pre- and post-measurements.

Participants:

The researchers purposefully chose (27) junior female volleyball players from Ismaily Sports Club. Five players were recruited as a pilot sample while two others were excluded due to non-punctuality in training. The main sample (n=20) was divided into two equivalent groups (experimental – control = 10). The researchers identified the dominant eye (the eye that leads the body through sending neural signals to the brain) before pre-measurements as seen in The table (1).

Table (1): the dominant eye for participants of the main sample (n=20)

Test	Right	Left
Dominant Eye	18	2

The researchers verified data normality of participants on growth factors (height – weight – age), visual efficiency of dominant eye, visual abilities and serve performance level as seen in table (2) and (3).

Table (2): mean, SD and Kolmogorov–Smirnov values for both groups (n=20)

Tests	Measurement	Mean	SD	Kolmogorov–Smirnov	Error probability P	Significance
Growth factors						

Age	Year/month	14.910	1.881	0.459	0.984	Not significant
Height	Cm	162.150	5.263	0.416	0.995	Not significant
Weight	Kg	60.140	4.678	0.503	0.962	Not significant
Visual efficiency of dominant eye	Point	5.410	1.391	0.782	0.573	Not significant
Visual abilities tests						
Saccade test (eye movement in jumps)	Number	17.507	1.478	0.417	0.995	Not significant
Gaze test (eye fixation in different direction)	Number	20.100	1.897	0.384	0.999	Not significant
Tracking test (eye movement while tracking a pendulum)	Point	2.670	0.483	0.374	0.999	Not significant
Optokinetic test (eye movement while counting points)	Point	6.355	1.391	0.724	0.671	Not significant
Spontaneous test (spontaneous eye movement)	Point	2.091	0.736	0.462	0.983	Not significant

Visual reaction speed	Sec	0.205	0.063	0.552	0.921	Not significant
Technical test						
Serve	Point	5.390	2.468	0.432	0.992	Not significant

Z table value on significance level ≤0.05 = 1.96

Table (2) indicated that values of Kolmogorov–Smirnov test for both groups were less than Z table value while P > 0.05 on a significance level of 0.05. this means that there were no statistically significant differences between the two groups and is data normally distributed.

Table (3): Difference significance between the two groups on all research variables using Mann-Whitney Test for Pre-measurements (n 1 = n 2 = 10)

Tests	**Experimental**		**Control**		**Z value**	**Error probability P**
	Mean	**SD ±**	**Mean**	**SD ±**		
Growth factors						
Age	14.850	2.123	14.970	1.876	0.458	0.651
Height	162.340	6.074	161.960	5.937	0.571	0.567
Weight	59.985	5.218	60.294	4.946	0.131	0.989
Visual efficiency of dominant eye	5.390	1.451	5.430	1.568	0.269	0.789
Visual abilities tests						

Saccade test (eye movement in jumps)	17.552	1.673	17.461	1.549	0.114	0.909
Gaze test (eye fixation in different direction)	20.211	2.089	19.989	2.123	0.127	0.893
Tracking test (eye movement while tracking a pendulum)	2.639	0.690	2.700	0.438	0.691	0.490
Optokinetic test (eye movement while counting points)	6.380	1.521	6.329	1.411	0.462	0.644
Spontaneous test (spontaneous eye movement)	2.071	0.709	2.110	0.837	0.265	0.791
Visual reaction speed	0.210	0.072	0.200	0.039	0.076	0.939
Technical test						
Serve	5.870	2.128	4.910	3.128	0.569	0.569

Z table value on significance level ≤0.05 = 1.96

Table (3) showed that Z calculated values using Mann-Whitney test were less than its table value. While P > 0.05. this means that there were no statistically significant differences between the two groups on pre-measurements as an indicator for their equivalence.

Data Collection Tools:

- A restameter for measuring highest .
- A medical balance for measuring wights .
- A measuring tap .
- Multi-height wooden boxes.
- Volleyballs .
- Colored plastic hoops .
- Colored Wood planks.
- White shaded glasses .

Visual Tests:

Videonystagmography (VNG):

This device is designed to measure the speed and accuracy of eye movement. It consists of glasses and an infra-red camera attached to another small device. Both of them are attached to a computer. The small device is used for testing internal ear functions and central movers. This is called vestibular evaluation. The anti-infrared glasses are used to track eye movement during visual stimulation and local changes.

Fig. (1): Videonystagmography (VNG)

Pilot Study:

The pilot study aimed to identify all aspects of the application for the recommended training program. This included training duration, number of repetitions for each exercise, and suitable time for daily units. The first three units were applied to a pilot sample. Results indicated the following :

1 .Daily duration for each unit was set at (45) minutes .

2 .Unit duration was distributed as follows: warm-up (5 min) – muscular stretches (5 min) – visual exercises (30 min) – cool down (5 min .(

3 .Daily number of exercises (12) was set as follows :

-Head fixation exercises (3. (

-Static and dynamic visual accuracy (3. (

-Vision distance exercises (3. (

-Visual perception exercises (3 .(

4 .Duration (30 min) for each type of exercises was set as follows :

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-Head fixation exercises (7 min): 2 minutes for each exercise and 10 sec as rest interval between every two exercises .

-Static and dynamic visual accuracy (10 min): 3 minutes for each exercise and 10 sec as rest interval between each two exercises

-Vision distance exercises (7 min): 2 minutes for each exercise and 10 sec as rest interval between every two exercises .

-Visual perception exercises (7 min): 2 minutes for each exercise and 10 sec as rest interval between every two exercises .

5. The number of repetitions for each exercise is decided according to participants' conditions and the total training timeframe.

The Recommended Visual Exercises Program:

The recommended program aimed to improve visual abilities for junior female volleyball players of Ismailiy Sports Club.

Program Principles:

The researchers designed the program according to the following principles:

- Variation of exercises inside the training unit to avoid boredom.
- Content is suitable for the age group.
- Progression from easy to difficult and from simple to complex.
- Review of related literature to decide on training load components.

Program Exercises:

The selected exercises were classified as follows:

- Head fixation exercises (17) (from 1 to 17).
- Static and dynamic visual accuracy (24) from (18 to 41).
- Vision distance exercises (12) (from 42 to 53).
- Visual perception exercises (13) (from 54 to 66).
- The program was initiated for (8) weeks (3 units per week).
- Training load was formed according to pulse rate.

Distribution of Unit Duration:

- Warm-up (5 min) .
- Muscular stretches (5 min) .
- Visual exercises (30 min) .
- Cool down (5 min).

Post-Measurements:

Following the same protocol of pre-measurements, The researchers took post-measurements at the end of the recommended training program.

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Statistical Treatments:

The researchers used SPSS Software to calculate: Mean; SD ; Mann–Whitney U test; Kolmogorov–Smirnov test ; Z test ; Improvement percentage (%).

III. Results:

Table (4): Difference Significance using Wilcoxon Test Between the Pre- and Post-Measurements of the Experimental Group on Visual Abilities Tests (n = 10)

Tests	Pre -		Post-		Signs	Number	Mean Ranks	Sum of Ranks	Value	Error probability	Improvement percentage (%)
	Mean	SD ±	Mean	SD ±							
Saccade test (eye movement in jumps)	7.552	.673	0.125	.341	Negative	0	.00	.00	.805	.005	14.659
					Positive	10	.50	5.00			
Gaze test (eye fixation in different direction)	0.211	.089	4.310	.962	Negative	0	.00	.00	.812	.005	20.281
					Positive	10	.50	5.00			
Tracking test (eye movement while tracking a pendulum)	.639	.690	.770	.419	Negative	0	.00	.00	.812	.005	42.857
					Positive	10	.50	5.00			
Optokinetic test (eye movement while	.380	.521	.692	.082	Negative	0	.00	.00	.844	.004	36.238
					Positive	10	.50	5.00			

counting points)											
Spontaneous test (spontaneous eye movement)	.071	.709	.141	.320	Negative	0	.00	.00	.803	.005	51.666
					Positive	10	.50	5.00			
Visual reaction speed	.210	.072	.160	.081	Negative	10	.50	5.00	.803	.005	23.810
					Positive	0	.00	.00			

Z table value on significance level ≤0.05 = 1.96

Table (4) showed that P < 0.05. This means that there are statistically significant differences between the pre- and post-measurements of the experimental group on the visual abilities' tests. Sum of ranks for positive signs was (55.00) while the same value for negative signs was (0.00) for all tests except for visual reaction speed test where sum of ranks for positive signs was (0.00) while the value for negative signs was (55.00). this indicates that participants performed better on the post-measurement with improvement percentage of (100%), compared with pre-measurement.

Table (5): Difference Significance using Wilcoxon Test Between the Pre- and Post-Measurements of the Experimental Group on the Technical Test (n = 10)

ests	**Pre -**		**Post-**		**igns**	**umber**	**ean Ranks**	**um of Ranks**	**Value**	**rror probability**	**Improvement percentage (%)**
	ean	**D ±**	**ean**	**D ±**							
erve	.870	.128	.185	.612	Negative	0	.00	.00	.803	.005	39.438
					Positive	10	.50	5.00			

Z table value on significance level ≤0.05 = 1.96

Table (5) showed that P < 0.05. This means that there are statistically significant differences between the pre- and post-measurements of the experimental group on the technical performance test. Sum of ranks for positive

signs was (55.00) while the same value for negative signs was (0.00). This indicates that participants performed better on the post-measurement with improvement percentage of (100%), compared with pre-measurement.

Table (6): Difference Significance using Wilcoxon Test Between the Pre- and Post-Measurements of the Control Group on Visual Abilities Tests (n = 10)

Tests	Pre -		Post-		Signs	Number	Mean Ranks	Sum of Ranks	Value	Error probability	Improvement percentage (%)
	Mean	SD ±	Mean	SD ±							
Saccade test (eye movement in jumps)	7.461	.549	8.378	.468	Negative	1	.50	.50	.289	.197	5.252
					Positive	3	.83	.50			
					Equal	6					
Gaze test (eye fixation in different direction)	9.989	.123	0.391	.011	Negative	2	.50	.00	.577	.115	2.011
					Positive	4	.50	8.00			
					Equal	4					
Tracking test (eye movement while tracking a pendulum)	.700	.438	.780	.388	Negative	1	.50	.50	.725	.084	2.963
					Positive	5	.70	8.50			
					Equal	4					
Optokinetic	.329	.411	.747	.939	Negative	0	.00	.00	.366*	.018	22.405

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test (eye movement while counting points)					Positive	7	.00	8.00			
					Equal	3					
Spontaneous test (spontaneous eye movement)	.110	.837	.260	.481	Negative	0	.00	.00	.604	.109	7.109
					Positive	3	.00	.00			
					Equal	7					
Visual reaction speed	.200	.039	.179	.091	Negative	0	.00	.00	.060*	.039	10.500
					Positive	5	.00	5.00			
					Equal	5					

Z table value on significance level ≤0.05 = 1.96

Table (6) showed that P < 0.05. This means that there are statistically significant differences between the pre- and post-measurements of the experimental group on the Optokinetic test where the sum of positive ranks was (28.00) while the sum of negative ranks was (0.00). In addition, there are three equal values for this test. As for visual reaction speed test, sum of positive ranks was (15.00) while sum of negative ranks was (0.00) with five other equal values. Considering the rest of tests, there were no significant differences between the pre- and post-measurements.

Table (7): Difference Significance using Wilcoxon Test Between the Pre- and Post-Measurements of the Control Group on Technical Performance Tests (n = 10)

ests	**Pre -**		**Post-**		**Signs**	**Number**	**ean Ranks**	**um of Ranks**	**Value**	**rror probability**	**Improvement percentage (%)**
	ean	**D ±**	**ean**	**D ±**							

erve	.910	.128	.360	.443	Negative	0	.00	.00	.023*	.043	9.165
					Positive	5	.00	5.00			
					Equal	5					

Z table value on significance level ≤0.05 = 1.96

Table (7) showed that P < 0.05. This means that there are statistically significant differences between the pre- and post-measurements of the experimental group on the technical performance test as the sum of positive ranks was (15.00) while sum of negative ranks was (0.00) with five other equal values.

Table (8): Difference significance between the two groups on all research variables using Mann-Whitney Test for Post-measurements of Visual Abilities Tests (n 1 = n 2 = 10)

Visual abilities tests	**Experimental**		**Control**		**Z Value**	**Error probability P**	**Improvement percentage (%)**
	Mean	**SD ±**	**Mean**	**SD ±**			
Saccade test (eye movement in jumps)	20.125	1.341	18.378	1.468	2.310	0.021	9.408
Gaze test (eye fixation in different direction)	24.310	1.962	20.391	2.011	2.163	0.031	18.270
Tracking test (eye movement while tracking a pendulum)	3.770	0.419	2.780	0.388	2.239	0.025	39.894
Optokinetic test (eye	8.692	1.082	7.747	0.939	2.156	0.031	13.833

movement while counting points)							
Spontaneous test (spontaneous eye movement)	3.141	0.320	2.260	0.481	2.548	0.011	44.557
Visual reaction speed	0.160	0.081	0.179	0.091	2.273	0.023	13.310

Z table value on significance level ≤0.05 = 1.96

Table (8) showed Z values calculated by Mann-Whitney Test between the post-measurements of the experimental and control groups as P < 0.05. This indicates statistically significant differences between the post-measurements of the experimental and control groups on visual abilities tests in favor of the experimental group.

Table (9): Difference significance between the two groups on all research variables using Mann-Whitney Test for Post-measurements of Technical Performance Test (n 1 = n 2 = 10)

Visual abilities tests	**Experimental**		**Control**		**Z Value**	**Error probability P**	**Improvement percentage (%)**
	Mean	**SD ±**	**Mean**	**SD ±**			
Serve	8.185	2.612	5.360	2.443	2.042	0.041	30.273

Z table value on significance level ≤0.05 = 1.96

Table (9) showed Z values calculated by Mann-Whitney Test between the post-measurements of the experimental and control groups as P < 0.05. This indicates statistically significant differences between the post-measurements of the experimental and control groups on the technical performance test in favor of the experimental group.

IV. Discussion:

Table (4) showed that P < 0.05. This means that there are statistically significant differences between the pre- and post-measurements of the experimental group on the visual abilities' tests. Sum of ranks for

positive signs was (55.00) while the same value for negative signs was (0.00) for all tests except for visual reaction speed test where sum of ranks for positive signs was (0.00) while the value for negative signs was (55.00). this indicates that participants performed better on the post-measurement with improvement percentage of (100%), compared with pre-measurement. Table (5) showed that $P < 0.05$. This means that there are statistically significant differences between the pre- and post-measurements of the experimental group on the technical performance test. Sum of ranks for positive signs was (55.00) while the same value for negative signs was (0.00). This indicates that participants performed better on the post-measurement with improvement percentage of (100%), compared with pre-measurement.

The researchers thinks that these improvements are due to the recommended visual training program that improved visual abilities and the serve skill of participants through improving their vision and their perception of movement in general as these abilities work on forming accurate timing of movement in time and place. This is consistent with Casanova et al. (2009) who indicated that using advanced visual clues helps the player to make accurate anticipations based on information derived from the opponent's posture and body directions before any major event like receiving the ball. This perceptual skill is crucial for performance in any ball sport that depends on speed, due to limitations imposed on the player.

Amr, H. (2005) indicated that visual exercises are very important for both athletes and non-athletes and everyone should practice it, especially eye drills, to avoid visual exhaustion that negatively affects visual functions with age. Rowe & McKenna (2001) indicated that training of visual abilities is usually dealt with through reading the ball and opponent movements in addition to recalling previously used movements and identifying distinct features of the opponent.

Memmert et al., (2009) asserted the interrelation between athletic performance and sensory and perceptual skills in addition to motor and physical abilities. Recently, sensory skills got more research attention in the sports field, especially when comparing experienced and novice players. Allen et al., (2012) indicated that in this respect, studies showed differences between experienced and novice players in their essential sensory abilities along different sports. Barry, (2004) indicated that specific visual abilities can be evaluated, trained, developed and improved as this will reflect on the technical performance level.

The researchers thinks that these results are due to the effective effects of the recommended visual training program on visual abilities and technical variables of the experimental group. Visual exercises are very important to improve visual skills that include peripheral vision, visual tracking, dynamic visual accuracy, hand-eye coordination and focus. These skills helped greatly the improvement of visual abilities. This is reflected in the players' abilities to make decisions and correct physical performance based on good vision. Good vision comes through transferring visual data to the brain that regulates performance according to this data. The brain deals with incorrect vision in a way that reflects negatively on the player's performance in the court. Visual exercises had positive effects on the performance level of participants of the experimental group. This proves the first hypothesis.

Table (6) showed that $P < 0.05$. This means that there are statistically significant differences between the pre- and post-measurements of the experimental group on the Optokinetic test where the sum of positive ranks was (28.00) while the sum of negative ranks was (0.00). Also, there are three equal values for this test. As for the visual reaction speed test, sum of positive ranks was (15.00) while sum of negative ranks was (0.00)

with five other equal values. Considering the rest of the tests, there were no significant differences between the pre- and post-measurements. Table (7) showed that $P < 0.05$. This means that there are statistically significant differences between the pre- and post-measurements of the experimental group on the technical performance test as the sum of positive ranks was (15.00) while sum of negative ranks was (0.00) with five other equal values.

The researchers thinks that these improvements in the control group are due to participants' punctuality in regular training concerning total duration, number of units, time distribution to physical, technical, and tactical preparation and different exercises used by the coach to improve different physical, technical and tactical variables. Weaknesses in results of some visual abilities tests and technical performance clearly show that the control group needs a well-planned training program to improve their visual abilities. This proves the second hypothesis.

Table (8) showed Z values calculated by the Mann-Whitney Test between the post-measurements of the experimental and control groups as $P < 0.05$. This indicates statistically significant differences between the post-measurements of the experimental and control groups on visual abilities tests in favor of the experimental group. Table (9) showed Z values calculated by the Mann-Whitney Test between the post-measurements of the experimental and control groups as $P < 0.05$. This indicates statistically significant differences between the post-measurements of the experimental and control groups on the technical performance test in favor of the experimental group.

The researchers thinks that the recommended training program led to positive effects on the technical and visual variables of the experimental group compared with the control group as improving visual abilities contributes greatly to the performance level of volleyball players. Good decision making and correct performance are based on good vision. Visual training programs improve both visual abilities and technical performance (Abernethy & Wood,2001 ; Mazyn et al., 2004).

Jafarzadehpur & Yarigholi (2004) indicated that improving adaptability and vision sharpness may improve the efficiency of the visual system by shortening the time to acquire a clear image. This helps the player to modify adaptation as quickly as the eye movement to achieve his/her objectives during play. Therefore, when improving peripheral vision, the player improves dynamic visual accuracy as well. Mangine et al. (2014) indicated a relation between the tracking speed of a visual path and reaction speed. Sports exercises can improve visual skills and, in turn, enhance motor skills and performance.

Their results indicated improvements in hand-eye coordination, visual sharpness, tracking, and visualization tests of the experimental group and this led to improvements in visual skills, motor skills, cognitive learning, and performance (Du Toit et al., 2011). The visual training program had positive effects on improving performance in (8) weeks as participants showed improvements in peripheral vision, focus, focus flexibility, and coordination (Kruger et al., 2008).

The researchers thinks that visual abilities play a major role in volleyball. This is clear in the quickness and effectiveness of performance. These abilities can be improved through designing well-planned visual training programs as visual exercises are closely related to improving performance where vision plays a vital role in spatial guidance, coordination, accuracy, reaction speed, and response. Visual exercises led to optimum performance under the match conditions after improving visual muscles, visual perception, tracking, and the ability

to estimate distances. This indicates that visual variables under investigation had positive effects on volleyball. In addition, the positive effect of visual exercises led to improvements in visual abilities which in turn improved the performance level of the serve skill for junior female volleyball players of the experimental group, compared with the control group. This proves the third hypothesis.

V. Conclusions:

According to this research aim, hypotheses, methods, and results, The researchers concluded the following :

1 -The visual exercises program improved the visual abilities of the experimental group, compared with the control group. Improvement percentages ranged from (9.408%) as the least value on the Saccade test to (44.557%) as the max value on the Spontaneous test .

2 -Visual exercises improved the technical performance of the serve skill of the experimental group, compared with the control group with improvement percentage of (30.273% .(

3- Visual exercises proved effective in improving visual abilities and the serve skill in volleyball.

VI. Recommendations:

According to these conclusions, The researchers recommends the following :

- Applying the recommended visual exercises program to junior female volleyball players .
- Activating the role of visual exercises in sport in general, and especially in volleyball .
- Providing teams with ophthalmology specialists to evaluate players' visual abilities and functions in addition to providing them with accurate identification of suitable glasses and contact lenses, based on quality and color, to protect their eyes .
- Performing more studies on the effects of visual exercises in other sports and other samples .
- Establishing a specialized lab for optical measurements as part of the lab system in faculties of physical education.

References:

1. Abernethy, B., & Wood, J. M. (2001). Do generalized visual training programs for sport really work? An experimental investigation. Journal of sports sciences, 19(3), 203-222.
2. Allen, R., Mcgeorge, P., Pearson, D. G., & Milne, A. (2006). Multiple-target tracking: A role for working memory?. The Quarterly journal of experimental psychology, 59(6), 1101-1116.

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3. Amr, H. (2005). A specific Visual Skills Training Programme Improves Fencing Performance Level, Visual Variables and Statics Balance. In 10th Annual Congress of the European College of Sport Since, Belgrade (Vol. 316).

4. Ariel, B. (2012). Sports Vision Training: An expert guide to improving performance by training the eyes, Human Perception and Human Performance, 8, 127-136

5. Seiller B. (2004). Positive Effects of a Visual Skills Development Program, Optometry & Vision Science. 79(5):279-280

6. Casanova, F., Oliveira, J., Williams, M., & Garganta, J. (2009). Expertise and perceptual-cognitive performance in soccer: a review. Revista Portuguesa de Ciências do Desporto, 9(1), 115-122.

7. Du Toit, P. J., Kruger, P. E., Mahomed, A. F., Kleynhans, M., Jay-du Preez, T., Govender, C., & Mercier, J. (2011). The effect of sports vision exercises on the visual skills of university students:: sport science. African Journal for Physical Health Education, Recreation and Dance, 17(3), 429-440.

8. Elmurr P. (2000). Assessing and Training Eye-Hand Coordination. Sport vision Australia, summer 8-10.

9. Walker I.(2001). Why visual training programmes for sport don't work, Sports Sci, Mar 19(3) p203-22.

10. Jafarzadehpur, E., & Yarigholi, M. R. (2004). Comparison of visual acuity in reduced lumination and facility of ocular accommodation in table tennis champions and non-Players. Journal of sports science & medicine, 3(1), 44.

11. Kruger, P. E., Campher, J., & Smit, C. E. (2009). The role of visual skills and its impact on skill performance of cricket players:: physical education and sport science. African Journal for Physical Health Education, Recreation and Dance, 15(4), 605-623.

12. Mangine, G. T., Hoffman, J. R., Wells, A. J., Gonzalez, A. M., Rogowski, J. P., Townsend, J. R., ... & Fragala, M. S. (2014). Visual tracking speed is related to basketball-specific measures of performance in NBA players. The Journal of Strength & Conditioning Research, 28(9), 2406-2414.

13. Mazyn, L. I., Lenoir, M., Montagne, G., & Savelsbergh, G. J. (2004). The contribution of stereo vision to one-handed catching. Experimental brain research, 157(3), 383-390.

14. Memmert, D., Simons, D. J., & Grimme, T. (2009). The relationship between visual attention and expertise in sports. Psychology of Sport and Exercise, 10(1), 146-151.

15. Mohammed Nader Shalaby. (2017). “The Determinants of Leadership: Genetic, Hormonal, Personality Traits Among Sport Administrators”, International Journal of Pharmaceutical and Phytopharmacological Research, 7(5), pp:9-14.

16. Mohammed Nader Shalaby. (2018). "The Effect of Whey Protein (Natural Nanoparticle) on Muscle Strength, GH, IGF, T. Protein and body composition". Int. J. Pharm. Res. Allied Sci., 2018, 7(1):126-132.

17. Mohammed Nader Shalaby, Mona Mostafa Abdo Sakoury, Omar Ali Hussein Mohammed, Shaimaa Elsaid Ebrahim Elgamal. (2017). "Effect of PNF Stretching Training on Stem Cells and Growth Factors in Performance Soccer Players", International Journal of Pharmaceutical and Phytopharmacological Research, 7(2), pp:12-17.

18. Mohammed Nader Shalaby. (2018). "Study of Markers behavior in Myocardial Infarction". Int.J. Pharm. Res. AlliedSci., 2017, 6(2):138-148.

19. Mohammed Nader Shalaby, Mona Mostafa Abdo Sakoury. Effect of different exercise intensities on CD34+ stem cells and physiological variables parameters. Life Sci J 2017;14(1):104-110.

20. Mohammed Nader Shalaby, Nawaf Elshemary, Ezz El-Din Mohamed Ahmed, Mona Mostafa Abdo Sakoury. Sport College Students Uses and Perceptions of Social Networking Sites of Sport Doping Information. J Am Sci 2018;14(2):20-66

21. Mohammed Nader Shalaby, Jin Yu Liu, Hussein Heshmat, Nader M. Shalaby, Mohammed Salah Zaeid, Ahmed Ibrahim Shalgham, Maged Elazazy, Samy Akar, Hossam Elaraby, Mohammed Abdelrazik Taha, Wael Elfiel.. The Effect of Aerobic and Anaerobic Exercise Bouts on CD34+ Stem Cells and Some Physiological Parameters. Life Sci J 2012;9(2):1037-1043

22. Shalaby, Mohammed & Saad, Mohammed & Akar, Samy & Reda, Mubarak & Shalgham, Ahmed. (2012). The Role of Aerobic and Anaerobic Training Programs on CD34+ Stem Cells and Chosen Physiological Variables. Journal of Human Kinetics. 35. 69-79. 10.2478/v10078-012-0080-y.

23. Mohammed Nader Shalaby, Jin Yu Liu, Mohamed Saad and Hossam Elaraby. Impacts of Different Exercise Intensities on Hematopoietic Stem Cells and Certain Physiological Parameters on Handball Players and Non-Athletes. Life Sci J 2012;9(3):2100-2105.

24. Mohammed Nader Shalaby, Jin Yu Liu, Mona Mahmoud Kassem, Mohammed Saad. Circulating Hematopoietic Stem Cell and Some Physiological Parameters in Different Training Programs. Life Sci J 2012; 9(1):965-971.

25. Mohammed Nader Shalaby, Jin Yu Liu, Hussein Heshmat, Nader M. Shalaby, Mohammed Salah Zaeid, Ahmed Ibrahim Shalgham, Maged Elazazy, Samy Akar, Hossam Elaraby, Mohammed Abdelrazik Taha, Wael Elfiel.. The Effect of Aerobic and Anaerobic Exercise Bouts on CD34+ Stem Cells and Some Physiological Parameters. Life Sci J 2012;9(2):1037-1043.

26. Mohammed Nader Shalaby, Mona Mostafa AbdouSakoury and Marwa Ahmed Kholif, Mona FathiRizk.Assessment of the muscular power index using infrared technology.Life Sci J2019;16(12):20-31

27. Shalaby, M. N. (2020). The effectiveness of a water sports program on the level of poly unsaturated fatty acids and the severity of the disease in children with Autism spectrum disorder. Medical Science, 24(101), 143–164.

28. Rowe, R. M., & McKenna, F. P. (2001). Skilled anticipation in real-world tasks: Measurement of attentional demands in the domain of tennis. Journal of Experimental Psychology: Applied, 7(1), 60.

29. Schwab, S., & Memmert, D. (2012). The impact of a sports vision training program in youth field hockey players. Journal of sports science & medicine, 11(4), 624.

30. Williams, A. M., Davids, K., & Williams, J. G. P. (2000). Visual perception and action in sport, Routledge New York.