

# **The Effect of Educational Tools Exercises on Certain Joints' Angles in Javelin Performance and Achievement**

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## **Abstract**

The study included a number of axes that concentrated on selecting the exercises used in the educational process by the physical education professors and mixing them using wires and plastic nets. These methods help achieving the goals of the educational exercises. The educational exercises included all the technical stages of the Javelin, and have simultaneously concentrated on its difficult aspects, since some of the stages require more than spears and medical balls, but rather tools that help the students learn the initial applications from holding the javelin to the release step, and help the students be precise with the track of the spear through the movement of the plastic, spear-like sticks in certain measurements through parallel-fixed wires, and curved-fixed as well. These tracks will help the students focus on how to perform in the technical stages without much thinking about carrying the tools or the gravity, and concentrate on struggling with steering the spear while running. After mastering the fixed tracks, the Javelin is now performed on the plastic nets. Then, the student do the Javelin using the legal tools on the legal field. The educational exercises along the helping tools were applied on the experiment group for four weeks, an average of two educational units per week. Then it was compared with the original group, and as the statistics show, the experimental group has exceeded the original group.

**Key words:** Educational Exercises, Educational Tools, Kinetic Variables, Learning to perform

## **Introduction**

The general concept of sports has become a science as well as an art that has its distinctive rules from other sciences, since it depends on physics, chemistry, and medicine<sup>(1)</sup>. The importance of the modern educational tools not only lies in these tools by themselves, but they rather achieve behavioral goals, the lessons' objectives, problem solution, and an increase in the students' acceptance of the educational process and the educational material. The reliance of any educational system on the educational tools is no more a luxury, but a necessity to ensure a successful educational process and it is now an integral part of its system<sup>(2)</sup>. The educational tools are anything that is used in the educational process that helps the students reach the study objectives with high precision<sup>(3)</sup>. The educational tool is everything that is used to facilitate and improve the learning process. Some learning materials are used as educational tools<sup>(4)</sup>. Exercises are of great importance in educating the students physically and mentally in the different sports, each sport aside. The exercise is defined as the smallest learning unit and the sum of these units is the learning program, and consequently, the curriculum<sup>(5)</sup>. The bio-mechanics is concerned with applying the mechanical principles on the bio-systems, or it is a science that describes the calmness and movement conditions under the effect of certain forces<sup>(6)</sup>. Athletics are considered the most common sports in the world. Around 180

countries belong to the International Amateur Athletics Organization, which is the international organization that administrates the games and organizes the events. Returning to the general history and the sports history, it is clear that these games were developed thousands of years ago. The first man practiced these games since the beginning of the human race and he used it in his hit-and-run, climbing and jumping over the obstacles, running and throwing stones and javelin defending himself in order to adapt to his life. The Javelin activity should be in sync with the various regulations that rules the activity which are similar to the Discus Throw, which are: speed, height, release angle, and the air resistance factor that affects the spear<sup>(7)</sup>.

## **The Practical Part**

### **Procedures of Field Research**

The two researchers adopted the experimental method using two equal groups (The original and the experimental). The experimental are concerned with what will happen when the researcher changes some variables<sup>(8)</sup>. The researcher chooses the sample from the study community, then he/she designs the results he performed on the sample to the community from which the sample was chosen<sup>(9)</sup>. On this basis, the researchers chose (40) students, a sample from the first-year students of the Dept. of Physical Education and sports sciences, Faculty of Education for Girls, Kufa University. The other sample was (20) students chosen randomly, and divided into two groups of (10), one group is an experimental one, and the other is an original one (The experimental undergoes the researcher's exercises, and the original undergoes the professor's exercises). Then the special experimental tools were prepared, such as 60m wires of 0.25Inch diameter, plastic nets (4m×5m), 20 spears weighing 600g each. The experiments and measurements were the Performance Evaluation Form, two Japanese Sony Video Camera with arm set (200 Frames/Sec), two Made-in-China HP Laptops.

### **The Experiments**

#### **The Javelin Experiment**

**The experiment objective:** Recording the experiment for evaluation and extracting the studied Kinetic variables, as well as the achievement measurement.

**The used tools:** One spear weighing 600g, with a 30m measurement tape.

**Registration Method:** The distance between the spear's tip point and the inner border of the throw arch, but the measurement tape should be extended to the running area center, approximately 8m from the throw arch. The whole performance is video-recorded, and each student is given three attempts.

#### **Recording Procedures**

Two camera were used in order to record the studied kinetic changes. One camera was put 10m to the pitcher's right, 1.2m height so that it will be vertically positioned on the virtual running area, covering the distance from junction stage to three meters after the throw is performed. The camera is useful in determining the variables such as the shoulder angle and the wrist angle at junction stage, and the release variables of the javelin.

However, the second camera is put 10m on the right, 1.06m height so that it will be vertically positioned on the virtual running area, covering the distance from approximate running process to the junction. The second camera is used to determining the shoulder and the wrist angles while running normally, and the direction of the javelin.

#### **Preliminary Experiments and Measurements**

The preliminary experiments and measurements were performed on 20<sup>th</sup> of October, 2016, which included the technical performance of the Javelin and its achievement, and the studied kinetic variables.

#### **Educational Units**

Eight educational units were applied on both of the study groups, two units each week. The exercises using the wires and plastic nets were used for the experimental group, whereas the exercises of the professor were performed by the original group.

### The Helping Methods

**First: The Wires.** The two researchers prepared 0.25 Inches-thick wires that can be fixed from both ends, putting through them a javelin open from both sides. The students learn holding, carrying, and running with the javelin in the wire and on certain levels between the two ends in this learning stage, and in the second, the javelin throwing is performed while the javelin is still in the wire, and is on the approximately perfect inclination release angle.

**Second: The Nets.** After giving the students enough time learning the perfect launch inclination and position of the javelin, The student starts throwing out of the wire after fixing two plastic pieces on the javelin at both ends,, knowing that the nets have fixed corks on certain, studied heights. Provided that the nets are fixed with corks circles with studied heights in order to help the student direct the javelin towards the proposed angle.

**Third: The regular javelin.** After preparing the student in previous stages, she will be ready to use the real javelin in the regular field and making the needed corrections.

### The Posty Experiments

The posty experiments were conducted on the 18<sup>th</sup> of December, 2016, including all the variables that has been included in the preliminary experiments.

### The Statistical Methods

The SPSS Statistical program was used.

### The Results and Discussion

After unloading the data collected by the two researchers and statistically processing them, and in order to validate the hypothesis, the results of both groups in learning the technical performance and achieving the digital level according to certain kinetic variables in the Javelin and according to the experimental design of the study were out. Then, the data were statistically analyzed using the statistical package (SPSS) in order to compare the average of the preliminary and posty experiments for both groups using the T. test for the related and independent samples in order to know the significance of the variations of the arithmetic means between the two groups. And checking the effect of the helping tools of the technical performance learning process of the Javelin. The researchers have had enough data on the field experiment which was performed on the experimental group. The results showed a great difference in spirit between the preliminary and posty experiments of the study variables. The study showed a great progress for the experimental group.

**Table 1**

**Shows the arithmetic means, the standard deviation, calculated and morale T value, and the statistical results of the research variables.**

The Variable	Measurement Unit	Experimental GRP		Original GRP		T Value	Sig.	Statistical Result
Shoulder angle while running	Degree	78	2.33	67	2.91	3.02	0.039	Morale
Wrist angle while running	Degree	79	3.11	54	2.54	2.96	0.042	Morale

javelin Direction angle while running	Degree	16	0.65	25	1.02	3.21	0.033	Morale
Shoulder angle at the junction	Degree	69	2.23	58	1.89	3.34	0.03	Morale
Wrist angle at the junction	Degree	163	1.78	134	2.44	4.07	0.021	Morale
javelin Direction angle when Junction	Degree	41	1.03	46	1.56	2.88	0.046	Morale
javelin Direction angle at the Throwing	Degree	33	0.98	28	1.12	2.94	0.044	Morale
Technical Performance	Degree	80.40	3.04	73.80	3.42	3.22	0.012	Morale
Achievement	Meter	19.75	1.63	17.46	1.32	3	0.041	Morale

The table (1) shows that the statistical difference is morale between the results of the two groups in the posty experiments favoring the experimental group. It is because the morale value is less than the proposed (0.05).

This difference is due to application of the exercises using the wires and nets because these wires helped the students become familiar with the proper holding and lurching angles of the javelin above the lurching arm at a close angle from the right angle, with an almost similar angle at the wrist joint. Fixing these angles forces the student to raise their hands at that level controlling the arm lowering while running in the first approaching stage. These applications were done using the one level wire between the two ends from the fixed. Whereas the applications on the inclined wire between the two ends ( $35^{\circ}$  -  $40^{\circ}$ ) for the junction stage<sup>(10)</sup>. The student apply holding the javelin inside the wire and repeats the junctions, then the process of throwing the javelin inside the wire. Fixing the javelin direction is done through this stage because most of the students have various differences in the angle of direction because the concentration in the junction stage is on the legs and how to run sideways which ultimately loosens the focus on the javelin angle which greatly affects the proper angle of spear's direction as well as not being able to plant the javelin in the ground... etc<sup>(11)</sup>. The application on the nets inside the gym gave the students a great chance to perform all the previous technical levels out of the wire on certain areas inside the nets in order to help them steer the javelin to the proper angle. These applications are easy and helps the students focus on the technical levels along lurching the javelin without focusing on the throw distance. This process gave us a feedback and decreased the time and effort needed to the learning process, as well as helping preventing injury in the shoulder and wrist<sup>(12)</sup>. The arm should be lifted to certain level from the shoulder when the spear is fluctuating to the front, in order to increase the vertical speed of the javelin<sup>(13)</sup>. The study follows the direction of the javelin from the first approximate run, through the junction stage, and to the throwing and after the throwing has great role in directing the javelin according to proper release angles. This was achieved by the experimental group when compared to the original group.

## Conclusion

Using the determined tracks for the technical stages enhances the Javelin skills for learners and gives better results. Using the wires and plastic nets as helping tools helped achieving the objectives of the educational exercises. Using the kinetic analysis of performance helped determining the points of strength and weakness for the learners.

## Recommendations

The helping tools that achieves the objectives of the educational exercises should be used. The Kinetic analysis of the performance, exercises, and tools should also be used in order to scientifically and accurately determine the technical error and the repairing tools. Using the studied tools with another sample of beginners and with advanced enhances the technical performance of the Javelin Sport.

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