The effect of dynamic lactic exercises on some biokinetic abilities and endurance of the compound front kick performance of Taekwondo players

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Abstract. Taekwondo is one of the sports that has its own peculiarity in terms of being affected by functional variables and sports training methods and techniques. The specificity of its impact is highlighted by the nature of the competition, as it is one of the games that have direct contact with the competitor, and this is an additional factor in the training burden on players and coaches. The research aims to identify the effect of the dynamic lactic style exercises on some of the biokinetic abilities and endurance of the compound front kick performance of the advanced Taekwondo players and for weights (54, 58, 63) kg, to achieve this goal, the researchers used the experimental method by designing two equal groups (control and experimental), then the research community was determined by the players of Al-Shurta and Al-Amana sport clubs in Taekwondo for the weights (54, 58, 63) kg, whose number is (15) players of them the researchers chose a sample of (12) players in a random manner. They were divided into two groups (control and experimental) six players per group, each of them performs (3) separate measurement attempts. The training program for dynamic lactic exercises was applied to the experimental group for a period of ten weeks, three units per week, and the researchers used statistical laws to extract the results. Among the results of the research:

- The proposed exercises had a positive impact on developing some biokinetic abilities and endurance of the compound front kick performance of Taekwondo players at weights (54, 58, 63) kg.

As for the recommendations that came out of the research:

- The need to pay attention to dynamic lactic exercises and include them in the training curricula for Taekwondo players because of their impact on improving skill and physical performance, especially endurance of the compound front kicking performance.

Keywords: compound front kick, biokinetic abilities, Taekwondo

1. Introduction to the research and its importance

The development of skill levels and achievement of international and Olympic medals, which we hear about achieving in various sports, especially the sport of Taekwondo came as a result of the trainers and specialists following the correct scientific methods in an attempt to invest human energy to its fullest.
In view of this development in Taekwondo, here it has become necessary for specialists, researchers, and experts of the game to develop scientific training thought for the various applied aspects and topics related to the nature of competition, it is not possible for the coach and player to overlook this development in levels by relying on traditional training methods, rather, relying on many facts from concepts, including (increasing the volume of competition, training on the nature of the competitive performance method, creating diverse and different training environments … etc. This multiplicity of facts led to adding a large burden in the training loads, which made it an imperative necessity by including it within the prepared training programs.

The contribution rate of the anaerobic energy system (lactic acid system) in Taekwondo is large according to the nature of the competition and the time of performance because this energy system is the dominant one for the requirements of the game, and some of the biokinetic capabilities have a great and influential role in developing performance and deciding the fight, especially since the Taekwondo competitions in the tournaments are somewhat long and there are several fights that the player performs until reaching the superior position.

The style of Taekwondo has differed recently in the level of fighting in fights according to the ongoing change of the law. The trend has become to focus on the front kick because of its advantages that comply with the law and the drip mechanism. The player who has a front kick and a high-level compound can lead the fight to win. By performing a compound fore kick, a player can accumulate 6-9 points or more in one technique. Therefore, the importance of the research is manifested in that the use of dynamic lactic exercises will contribute to the development of some biokinetic capabilities and endurance of the compound front kick performance of advanced Taekwondo players by developing exercises according to this method and knowing the effect in the study variables. Thus, this will be reflected in the improvement of achievement and the development of the Taekwondo applicants of the weights (54, 58 and 63) kg. As one of the researcher being a former Taekwondo player and a referee of many fights in local tournaments, he identifies the problem of the training programs pursued by Taekwondo coaches as a lack of interest in some of the biokinetic abilities, which affects the performance and endurance of the skillful performance, especially the compound front kick. This may not raise the players to a level that parallels the Arab and international achievement. From this point of view, he found a necessity of preparing and implementing exercises in a dynamic lactic manner to know their impact on developing some biokinetic capabilities and endurance of the compound front kick performance of the advanced Taekwondo players in weights (54, 58 and 63). Kg. Therefore, the aim of the research came as follows:

- Identifying the effect of dynamic lactic exercises on some biokinetic abilities and endurance of compound front kick performance for advanced Taekwondo players at weights (54, 58 and 63) kg.

Hence, the research hypothesis is that:
- there is an effect of dynamic lactic exercises on some biokinetic abilities, endurance, and compound front kick performance for advanced Taekwondo players at weights (54, 58 and 63) kg.

2. The Research methodology and field procedures

The researchers relied on the experimental approach by designing the two equal groups (control and experimental) as it fits with the nature of the problem. It is approved in the category of applicants, where their number reached (15) players. Then the researchers selected a sample from this community in a stratified random manner representing (12) players and distributed them into two equal groups of (6) players for each group by using lottery. Each of the (6) players performs (3) attempts. Thus, the number of the research samples is (18) attempts for each group. The researchers used the following means, tools, and devices:

- Questionnaire.
- Notations.
- Interviews.
- Testing and Measurement.
- Data registration form.
- iPhone 6 mobile for taking photographs
- HP electronic calculator.
- DVDs.
- Taekwondo Mats.
- Multiple height signs.
- bands and weights.
- Adhesive tape and stationery (papers and pens).
- Taekwondo dolls
- Kick rackets and 12 rings with a diameter of 60 cm.
- A (40 meters) measurement linen tape.
- whistles and (2) stopwatches.
- Medical injections, cotton, and sterile materials.
- Electronic shields with their own operating system
- Medical scale (1).
- Taekwondo suits.

2.1. Description of the tests used in the research:

- Strength distinguished with speed test:

The three test and the longitudinal stability: (Mohammed Sobhi Hassanein, p. 132)

**Purpose of the test:** To measure the speed characteristic of the legs muscles.

**Tools used:** A distance of not less than (9 meters) and a measurement tape.

**Performance specifications:** The player stands behind the starting line, then he leaps forward with both feet and for three consecutive dribbling sessions. Each player is given two attempts, the best of which is calculated.
**Recording:** The distance is measured from the starting point to the last footprint of the feet after the third jump (the distance of the three jumps).

- **Strength Endurance Test:**

The test of jumping to the top by bending and extending the knee within 60 seconds (Mohammed Sobhi Hassanein, 1989, p. 266)

**The purpose of the test:** To measure the strength endurance of the legs muscles.

**Tools used:** a stopwatch, a helping colleague, and a small playground.

**Test specifications:** From a standing position, bending and extending the knee joint and jumping up with the arms raised up and then returning to the initial position, this action is repeated as many times as possible.

**Registration:** The number of jumps in 60 seconds is an indicator of strength endurance.

**Note:** An attempt without test conditions will not be counted.

- **Using Paur method of agility test:**

**The purpose of the test:** to measure agility.

**Tools used:** a rectangular jogging field built on a solid ground, its length (4.75 m) and width (3 m), a stopwatch, five cones of no less than (30 cm) in length, as shown in the figure.

**Performance:** The player takes the standby position from the high start behind the starting line and when given the signal at the start he runs zigzag between the five legs and back to the start.

**Score Calculation:** Records the time it took the player to travel the distance from start to finish.

**Figure1: Using Paur method of agility test**

- **Compound Forward Kick Performance Test for (50) seconds in Taekwondo:**

**Test objective:** To measure the endurance performance of the compound front kick in Taekwondo.
**Tools used:** The following tools were used

- A person-shaped doll with a pivot base like the player's body, on which an electronic chest and head protector used in taekwondo tournaments is attached. The height of the doll is proportional to the length of the tested player through its distance from the ground.
- An electronic calculator and operating system for electronic protector in accordance with the law of the game.
- A registration Form.
- A taekwondo mat.
- A plasma screen to display the points.
- A tape, a whistle, and a stopwatch.

**Test conditions:** the test’s conditions are

- The compound front kick time is 50 seconds.
- The player has the right to use the preferred side he starts with for the compound front kick.
- The compound front kicking technique consists of three kicks performed in the form of one kinetic sentence and two agencies: (Dolio Jackie’s front kick with the forward leg of the player to the chest area + Dolio Jackie’s kick with the opposite leg for the face area + straight front kick Gekko Jackie for the head area and the same leg of the second kick)
- The technique is performed repeatedly without stopping until the time is up.
- The start of performance is stable.

**Method of performance:** The player stands in the position of preparation (taekwondo stand-up) in front of the test instrument after choosing his preferred side in which he will start the compound front kick, and at the signal the player begins to execute on the registration areas in the chest and head.

**Scoring:** The points collected by the tester are calculated from his performance of the compound front kick within 50 seconds, note that the chest area when touched scores two points and the head is three.

2.2. **Pre-tests:**

The researchers, with the help of the assistant work team, conducted pre-tests on the research sample for the two groups (control and experimental) related to the study variables (endurance to the performance of the compound front kick in Taekwondo, strength characterized by speed, endurance of strength and agility) and the adoption of three attempts for each player and for all study variables. The experiment conducted on Saturday September 4th, 2021, at four o'clock in the afternoon.

2.3. **Preparation and implementation of dynamic lactic exercises:**

The researchers prepared and organized dynamic lactic exercises based on their personal experience, as well as benefiting from the opinions of some experts and specialists obtained through personal interviews in the field of sports training science, physiology and Taekwondo, as he began applying dynamic lactic exercises to the experimental group from
September 9th, 2021 until November 17th, 2021, they took into account the components of the training load.

The details of the dynamic lactic exercises program are as follows:

- Preparing special exercises in the dynamic lactic method and implementing them on the experimental group.
- The duration of the training program for dynamic lactic exercises (10) weeks, with three training units per week, and the total number of training units for the entire training program was (30) training units.
- Training days were (Sunday, Tuesday, Thursday)
- The time of the training unit ranges from (25-40) minutes and for the main section only.
- The researchers used the method of interval training of high and medium intensity.

2.4. Post-tests:

The researchers, with the help of the assistant work team, conducted the post tests of the research sample after completing the application of the dynamic lactic exercises, and that was on Saturday November 20th, 2021 and in the same sequence of the pre-tests, where the researcher took into account the same conditions in which the pre-tests were conducted in terms of the sequence of tests.

2.5. The statistical methods used:

To achieve the research objective, the following statistical laws were used:

- Arithmetic mean.
- Mediator.
- Standard deviation.
- Skewness modulus.
- Pearson’s correlation coefficient.
- T-test for correlated samples.
- T-test for independent samples.
- Ka2.
- Standard error.

3. Presentation and discussion of the results:

3.1. Presenting the results of the pre-post tests of the experimental group.

Table (1) Shows the arithmetic means, standard deviations, the calculated (T-value) and the type of significance in the pre and post tests of the experimental group.
3.2. Presentation of the results of the pre and post-tests of the control group:

Table (2) shows the arithmetic means, standard deviations, the calculated (t-value) and the type of significance in the pre and post tests of the control group.

<table>
<thead>
<tr>
<th>Tests</th>
<th>Measure unit</th>
<th>Pre-test</th>
<th>Post-test</th>
<th>T-value</th>
<th>Sig type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A. means</td>
<td>S. aviation</td>
<td>A. means</td>
<td>S. aviation</td>
</tr>
<tr>
<td>Compound front kick performance</td>
<td>Degree</td>
<td>134.9</td>
<td>7.229</td>
<td>140.8</td>
<td>5.538</td>
</tr>
<tr>
<td>endurance</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strength distinguished with speed</td>
<td>Meter</td>
<td>7.19</td>
<td>0.246</td>
<td>7.63</td>
<td>0.308</td>
</tr>
<tr>
<td>for legs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bearing the strength of the legs</td>
<td>Number</td>
<td>40.2</td>
<td>3.898</td>
<td>48.5</td>
<td>3.213</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agility</td>
<td>Second</td>
<td>8.33</td>
<td>0.655</td>
<td>7.09</td>
<td>0.721</td>
</tr>
</tbody>
</table>

Tabular t-value = (2.11), significance level = (0.05) and degree of freedom = (17)

3.3. Presentation the post-tests results for the two groups (experimental and control).
Table (3) shows the arithmetic means, standard deviations and (T-value) calculated in the post-tests of the two experimental and control groups.

<table>
<thead>
<tr>
<th>Tests</th>
<th>Measur e unit</th>
<th>Control group</th>
<th>Experimental group</th>
<th>T-value</th>
<th>Sig type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A. means</td>
<td>S. aviation</td>
<td>A. means</td>
<td>S. aviation</td>
</tr>
<tr>
<td>Compound front kick performance endurance</td>
<td>Degree</td>
<td>140.8</td>
<td>5.538</td>
<td>145.4</td>
<td>4.918</td>
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<tr>
<td>speed-distinguishing strength test for legs</td>
<td>Meter</td>
<td>7.63</td>
<td>0.308</td>
<td>7.75</td>
<td>0.253</td>
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<tr>
<td>Bearing the strength of the legs</td>
<td>Numbe r</td>
<td>48.5</td>
<td>3.213</td>
<td>52.27</td>
<td>2.230</td>
</tr>
<tr>
<td>Agility</td>
<td>Second</td>
<td>7.09</td>
<td>0.721</td>
<td>6.77</td>
<td>0.308</td>
</tr>
</tbody>
</table>

Tabular t-value = (2.023), significance level = (0.05) and degree of freedom = (34)

3.4. Discussing the results:

We note through what was presented and analyzed in both tables (1 and 2) that there are significant differences in the pre and post tests for each of the control and experimental groups in the study variables. The researchers attribute that the reason for this improvement with regard to the experimental group is through the dynamic lactic exercises that the researchers used in designing the training program, where (Jabbar Rahima Al-Kaabi, 2007, p.225) confirms that “the physiological and chemical basis of dynamic lactate training is to manipulate the level of blood lactate production during training by deliberately increasing it and decreasing it at a lower intensity, which is reflected in physical and skill performance. Moreover, (Jamal Sabri Farag, 2019, p.90) states that “achievement and reaching the top of most sports requires at least two biokinetic abilities, and that the relationship between strength, speed and endurance generates and produces important qualities and forms of physical abilities”. This is what was targeted in the physical and skill exercises that were carried out in a dynamic lactic manner. This was confirmed by (Adel Abdel Basir, 2001, p.144) who states that “Each group of exercises must be prepared in a way that gives an effective effect in developing each of the special abilities in the practiced activity, and this is what was dealt with when preparing and implementing the exercises for the experimental group, which led to the improvement and development of the studied variables.

As for what was presented and analyzed in Table (3) regarding the post-tests for each of the control and experimental groups, it is noticed non-significant differences in the speed-
distinguishing strength test, and the reason for this is due to the equivalence of the exercises in both groups. While it is found that there are significant differences in (performance endurance and endurance strength and agility) in favor of the experimental group, and the researchers attribute the reason for this to the effectiveness of the dynamic lactic exercises that used. This was stated by (Saad Allah Abbas Rashid, GAMES) who indicates that “there should be harmony between the special exercises for the ability of specific and between the requirements and specificity of effectiveness to obtain the best physical and skill performance”.

4. Conclusions and Recommendations

4.1. Conclusions

The most important conclusions of the research was:

- The exercises carried out in a dynamic lactic manner contributed to the development of some biokinetic abilities and endurance performance of the compound front kick in Taekwondo.

4.2. Recommendations:

The researchers recommend that:

- Using the dynamic lactic method when designing training programs because of its impact on improving some biokinetic abilities and endurance performance of the compound front kick in Taekwondo.
- Conducting similar experiments and studies on different samples of Taekwondo players.

References