

- **Introduction and research problem:**

The development that the world is witnessing at the present time in various fields came in turn on the level of performance in various sports through the innovation of modern and advanced devices and tools that help in the processes of training, measurement and follow-up of the level of the athlete.

Abdulaziz Al-Nimr, Nariman Al-Khatib (٢٠٠٧) mentions that the performance in all sports activities depends on how the body moves. The muscles are the ones that control the movement of the body by contraction and relaxation to attract the limbs from one place to another. The stronger the muscles, the more effective these contractions are, and thus the movement is better. (٥٣:٣٥)

The long jump competition occupies a prominent place among the field competitions, and despite the ease of technical performance of this competition, it is considered one of the most difficult races in which the competitor can advance digitally due to the challenges he faces during the performance, as the competitor must, at the moment of ascent, shift the horizontal speed to the center Weight to a vertical speed and forward with the least possible loss in the speed gained from approaching, and this requires attention to explosive power because it is one of the most important elements of physical fitness in the long jump, especially the moment of ascent. (١:٥٣)

Steve Rubin (٢٠٠٠), Qassem Hassan and Eman Shaker (٢٠٠٥) indicate that approaching the long jump shows the great challenge for both the coach and the contestant, both in terms of the speed that must become perfect so that the jumper can reach the stage of ascent with the highest horizontal speed. On the other hand, accuracy must reach the highest level so that the jumper does not lose, as much as possible, any distance, even a small one, on the board, without failure when performing the attempt. Achieving the farthest possible horizontal distance is the goal. The basic jumper is to achieve the appropriate flight speed, which is the sum of its horizontal and vertical speeds. (٨٠: ٤٨٤), (٤٣: ١٩٨)

Muhammad Al-Disti (٢٠١٣) mentions that the kinematic factors that affect the long jump competition are the horizontal speed during the approach, and it may reach (٩,٥٥-١٠,١٥ m / s) for the players of the upper levels. The angle of ascent ranges between (٢٢° - ٢٥°), while some analytical studies indicated that the angle of ascent ranged between (١٨° -

22°) and the distance of the jump was also affected by the outcome of the speed of the center of gravity of the player's body during the flight phase, which may reach (10 m / s) approx. (166:40)

The vertimax device is one of the advanced devices to increase the ability and efficiency of the muscles to work, which helps in improving the speed of the legs and arms, as well as increasing the ability to jump. At the same time, which helps in developing the training efficiency of the players.

Carlson et al., (2009) argue that resistance-providing vertimax training as a strength-specific exercise to improve lower-body strength and vertical jump performance has the potential to generate power during jumping by creating resistance. (09)

- **Research problem :**

Sheppard et al (2008) Jumping ability is essential to achievement in jumping competitions. (09)

and whereas the level of achievement is the primary goal pursued by workers in the field of athletics in all competitions, including the long jump competition, it is clear that the level of achievement in competitions in general and the long jump competition in particular is low for all ages, which prompted the researcher to try to think about some of the reasons that might lead to this, including not developing training programs on a scientific basis and not introducing modern tools and devices in the training process that help in achieving maximum benefit from special physical characteristics such as muscular ability in the process of upgrading and acceleration in the process of approaching to keep pace with the global level. The vertimax device in the training process greatly helps to improve the level of performance due to its ability to provide resistance training in a manner similar to the nature of the performance.

- **research aim:**

The research aims to design a training program using a vertimax device and knowledge of its impact on:

1. Some physical variables of long jump juniors.
2. Some kinematic variables for long jump juniors.
3. Long Jump Junior Level.

- **Research hypotheses :**
 ١. There are significant statistical differences between the averages of pre-metrics and averages of post-metrics in some physical variables and in favor of averages of post-metrics.
 ٢. Significant statistical differences exist between the averages of pre-metrics and averages of post-metrics in some kinematic variables of the long jump in favor of averages of post-metrics.
 ٣. There are significant statistical differences between the average of the pre-measurement and the average of the post-measurement in the numerical level of the long jump in favor of the average of the post-measurement.
- **Search Procedures:**
 - **Research Methodology:**

The researcher used the experimental method, using the experimental design in the method of measurement (pre-post) for one experimental group, for its suitability and the nature of the research.
- **Research population and sample:**
 - **research population:**

The research community consists of the long jump juniors in the national project for young people in Benha, who number (٦) juniors.
 - **Research Sample:**

The research sample was chosen in a deliberate manner and the total sample size reached (٦) young people in the national project for young people in Benha, where the researcher applied the training program to (٥) young people as a basic sample and the exploratory study was applied to one young person.
- **Devices and tools used in the research:**

As reported by reviewing the studies and research related to the research topic and in accordance with its requirements, the researcher identified the devices related to the research topic as follows:

 ١. vertimax device
 ٢. Barriers and boxes of different heights
 ٣. Free weight and weight devices
 ٤. Recording the results of measurements.
 ٥. Athletics track
 ٦. Tape measure
 ٧. Control marks
 ٨. Stopwatch

- **forms:**
- **descriptive studies:**
 - Before starting of the training program, the researcher conducted (٧) exploratory studies on a player from the same research community and outside the basic research sample, and they were as follows:
 - **Preliminary survey:**
 - The first survey was conducted on Monday(١/٨/٢٠٢٢) Benha Sports Stadium.
 - **The second survey:**
 - The researcher conducted the second reconnaissance study on Saturday and Sunday(١٣, ١٤/٨/٢٠٢٢) on the same player of the initial reconnaissance study inside the Benha Club weightlift hall.
- **Baseline Study:**
 - The researcher applied the proposed training program in the period of special preparation for a period of (٨) weeks to the members of the research sample group from Saturday, ٢٠/٨/٢٠٢٢ AD to Thursday, ١٣/١٠/٢٠٢٢ inside the Benha Sports Stadium.
- **post-measurements:**
 - The post-measurement was carried out on the members of the research sample group using the same tools in the same way and in the same conditions as the pre-measurement, where the post-measurement was carried out on the members of the research sample group over three days.
- **first day measurements:**
 - Measurements of the first day were made on Saturday, ١٥/١٠/٢٠٢٢ at Benha Sports Stadium on the sample group under research on the physical abilities of the long jump competition.
- **second day measurements:**
 - The measurements of the second day were made on Sunday, ١٦/١٠/٢٠٢٢ Benha Club Gym on the sample group under research using the test (١RM) on both
- **third day measurements:**
 - Measurements of the third day were made at Benha Sports Stadium on Monday, ١٧/١٠/٢٠٢٢ at the long jump record.

- **statistics processing:**

The researcher used Spss software for statistical processing and Excel program, in order to find the appropriate statistical coefficients for the data of the research and after unpacking the data, the researcher used the following statistical treatments to interpret the results:

١. mean
٢. median
٣. standard deviation
٤. modulus of torsion
٥. Wilcoxon test
٦. Percentages of improvement

- **conclusions and recommendations:**

- **conclusions:**

The research objectives, assumptions and statistical treatments carried out by the researcher reached the results of the sample. The researcher reached the following:

١. The use of vertimax training programs led to the development of muscular strength in its various forms
٢. The training program on the vertimax led to the development of the record level of the sample under research
٣. Ability exercises in the direction of muscle work have improved the long jump record.

- **Recommendations:**

١. The necessity of using modern devices and tools in sports training operations
٢. Using the training program on the Vertimax device to develop strength training programs for long jumpers.
٣. The need for trainers to pay attention to strength training in the direction of muscular work because of its effective role in improving the level.
٤. Further studies on other jump competitions