

Special Exercises According to a Proposed Device to Develop the Length and Frequency of the Step for the Maximum Speed Stage and the Digital Level 100 M Sprint For People with Disabilities, Category (T36-T38) for Paralympics in Muthanna

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**Special Exercises According to a Proposed Device to Develop the Length and Frequency of the Step for the Maximum Speed Stage and the Digital Level 100 M Sprint For People with Disabilities, Category (T36-T38) for Paralympics in Muthanna**

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**Abstract**

The training process for people with disabilities is a complex process in terms of choosing the training method and choosing the appropriate means, tools and devices. In the past, the traditional method was based on the trainers focusing on teaching skills only without focusing on choosing the best training method and using assistive devices in the process of achieving the goal , where lies the importance of research in the use of a range of practical exercises in accordance with the proposed special device for the development of the length and frequency step for the relay of the maximum speed digital enemy level 100 m for people with disability category ) 36 T – T38 (for the Paralympics in Muthanna, who are trying to improve the overall speed rate for this category according to the muscular work mechanism of this method and in order to work to develop and raise the level of achievement of this activity for this category , and the problem of research was how to exceed the stability level of achievement for the effectiveness of 100 m for players with cerebral palsy for a category ) 36 T – T38Note that most of the players in this category have stability in the level of achievement (performance time), and this is an indication of a weakness in the rate of speed, which depends mainly on the length and frequency of the step, which is negatively reflected on the level of achievement for this activity, as the researcher intends to make a serious scientific attempt with numbers Special applied exercises according to a proposed device to develop the length and frequency of the step for the stage of maximum speed and the digital level, running 100 meters for people with disabilities ) category of ( 36 T – T38 (Of the Paralympic in Muthanna to contribute to overcoming the stability of the level they have and then raise their level of tournaments that are involved in the future , either the goals of research is the preparation of special exercises in accordance with the proposed device to develop the length and frequency step for the relay of speed maximum digital level enemy 100 m for people with disability category ) 36 T – T38)For the Paralympic Games in Muthanna , and the design of a proposed device to develop the length and frequency of the step for the maximum speed stage and the digital level, the 100-meter sprint for people with a disability category(36 T – T38)For the Paralympic Games in Muthanna , and to identify the effect of special exercises according to a proposed device to develop the length and

frequency of the step for the maximum speed stage and the digital level, the 100-meter sprint for people with a disability category(36 T – T38)For the Paralympic Games in Muthanna , and the research hypothesis was that there were significant statistically significant differences between the pre- and post-test in the development of the length and frequency of the step for the maximum speed stage and the digital level 100 m sprint for people with a disability category (36 T –T38 (Of the Paralympic in Muthanna , and the researcher used the **curriculum** experimental style one group and the researcher choose the **research community** purposively players 100 m for people with disability category ) 36 T – T38 (for the Paralympic Games in Muthanna , which numbered (3) players, who represent the original community by (100%), and the most important **conclusions were** that the exercises according to the proposed device had a positive impact on the most important variables (length and frequency of the step) for a 100-meter runner during the three stages of the race (increased speed, maximum speed, endurance of speed), and the most important recommendations were that the trainers should have full knowledge of the importance of the proposed device, how it works and the methods of its manufacture, and the necessity of training on the proposed device for the 100m and 200m runners and on other handicap categories.

## **1. Introduction**

### **1.1Introduction And Importance of The Research:**

The process of providing the requirements for each activity of life for its continuity and development is based on the use of knowledge and ideas with scientific foundations characterized by accuracy, in order to achieve the desired goal in this activity or others.

In the field of sports training, we note that researchers and coaches attach great importance and special attention to the changes and developments that occur during the training process, which lead to finding the best solutions for many sports problems with the aim of upgrading to a high level of performance using scientific methods and methods, modern technology, and field and laboratory studies in scientific research centers. .

The 100m event is one of the most important athletics events that have received the attention of specialists in the field of athletics training, and is considered one of the most important events that have achieved achievement at the level of the Paralympic Games for people with disabilities. Moreover, training process for people with disabilities is a complex process in terms of choosing the training method and choosing the appropriate means, tools and devices. In the past, the traditional method was based on the trainers focusing on teaching skills only without focusing on choosing the best training method and using auxiliary devices in the process of achieving The goal, and that the correct planning based on scientific foundations in sports training is what leads to the continuous rapid development in various activities and games, whether individual or team for people with disabilities, and the general and specific physical fitness of its components with all the broad base and backbone for the practice of sports activities in all age stages. For people with disabilities, from which the special physical fitness capabilities are separated, which means privacy in the form of sports for every sports person with a disability in terms of the direction of performance and the organic devices involved in performance to achieve sports achievements for people with disabilities.

## Special Exercises According to a Proposed Device to Develop the Length and Frequency of the Step for the Maximum Speed Stage and the Digital Level 100 M Sprint For People with Disabilities, Category (T36-T38) for Paralympics in Muthanna

The importance of the research lies in the use of a set of special applied exercises according to a proposed device to develop the length and frequency of the step for the maximum speed stage and the digital level of the 100-meter sprint for people with disabilities category) 36 T– T38 (for the Paralympics in Muthanna, who are trying to improve the overall speed rate for this category according to the muscular work mechanism of this method and in order to work on developing and raising the level of achievement of this activity for this category.

### 1.2. Research Significance

The methods and methods of sports training aim at developing the level of sports performance in order to achieve high levels of achievement in various sports. The effectiveness of athletics is one of the sporting events that have received great attention in the field of research and studies, which has helped to obtain many developments in training methods and methods, and to improve the numbers recorded in those competitions at the various international and global levels. For the 100m event for athletes with cerebral palsy, class ) 36 T – T38 Note that most of the players in this category have stability in the level of achievement (performance time), and this is an indication of a weakness in the rate of speed, which depends mainly on the length and frequency of the step, which is negatively reflected on the level of achievement for this activity, as the researcher intends to make a serious scientific attempt with numbers Special applied exercises according to a proposed device to develop the length and frequency of the step for the stage of maximum speed and the digital level, running 100 meters for people with disabilities (category of)36 T – T38 (for the Paralympic Games in Muthanna to contribute to overcoming the state of stability in their level and then raise their level in the tournaments in which they participate in the future.

### 1.3. Research Objectives

1. Preparing special exercises according to a proposed device to develop the length and frequency of the step for the stage of maximum speed and the digital level, sprinting 100 meters for people with disabilities (category of)36 T – T38 (for the Paralympic Games in Muthanna.
2. The design of a proposed device to develop the length and frequency of the step for the maximum speed stage and the digital level 100m sprint for people with disabilities category )36 T – T38 (for the Paralympic Games in Muthanna.
3. Identifying the effect of special exercises according to a proposed device to develop the length and frequency of the step for the maximum speed stage and the digital level of the 100m sprint for people with disabilities (category of)36 T – T38 (for the Paralympic Games in Muthanna.

### 1.4. Research Hypotheses

- There are significant statistically significant differences between the pre and post test in the development of the length and frequency of the step for the maximum speed stage and the digital level sprinting 100 m for people with a disability category )36 T – T38 (for the Paralympic Games in Muthanna.

## 1.5. Research Scope

**1.5.1. Human field** 100 :m players for people with disabilities, category ) 36 T – T38 (for the Paralympic Games in Muthanna.

**1.5.2. Temporal domain:** the period from 2021/1/5 to.2021/15/5

**1.5.3. Spatial domain :Al-Muthanna Stadium.**

## 2. Research Methodology and Procedures

### 2.1. Research Methodology:

The researcher used the experimental method in a one-group style to suit the problem to be researched to complete the research process.

### 2.2. Research Community

The researcher chose the research community in a deliberate way, and they represent the (100-meter) enemy players for people with disabilities, a category(T38-T36)For the Paralympic Committee in the Governorate of Al-Muthanna ,whose number is (3) players , who represent the original community by (100.( %

### 2.3. Sample homogeneity:

In order to avoid the influences that may affect the results of the research for the individual differences that exist with the players and to reach a single and equal level for the sample, some measurements have been determined for the purpose of ensuring their homogeneity and their statistical description in those variables that are influential in the experiment and that must be controlled. Therefore, statistical means were used by means of the mean, standard deviation ,and coefficient of variation for morphological measurements to find out the reality of the difference or not.

### 2.4. Research Means and Tools Utilized

#### 2.4.1. Means of collecting information:

- Arab And Foreign Sources .
- Personal Interviews .
- Experimentation .
- Test And Measurement.
- Analysis.

#### 2.4.2. Tools And Equipment Used:

*A tape measures* .

- type video camera *Panasonic* Japanese-made, with a frequency of 300 images / sec.
- type video camera *Panasonic* (Japanese-made with a frequency of 25 images / sec.
- Whistle - made Japanese.
- Medical balance .
- Hand calculator CASIO Japanese made.
- type laptop computer ( hp Ci7) American made.

Special Exercises According to a Proposed Device to Develop the Length and Frequency of the Step for the Maximum Speed Stage and the Digital Level 100 M Sprint For People with Disabilities, Category (T36-T38) for Paralympics in Muthanna

- Laser discs (DVD)number. 2
- Legal running track.
- electronic stopwatch type Casio Number. (4)

#### 2.4.2.1. Device Proposed:

**First: Specifications of the device :**It is an iron structure that resembles the work of the pneumatic wheel, but it is fixed and rests on the ground by means of a front and rear support base. The length of the device is (1) meters and its height is (1.5) meters, and the length and height can be increased by 0.25 meters.

**Second: The purpose of the device :**works to tighten the muscles and joints of the lower limbs and increase the speed of motor rotation of the edges lower through the diameter of the rotational movement of control (20 cm) and can increase the radius of rotational motion to (30 cm), the increase in the radius of rotational motion develops The range of motion of the lower extremities (the pelvic joint and the knee joint) will take wide ranges of motion and greater angles, and these are important factors in developing the length of the 100-meter performance stride for runners.(T38-T36)In the case of reducing the radius, the motor circular speed of the lower limbs will increase to the maximum possible, and this works to develop the reciprocating speed of the lower limbs , in addition to that, the work of the device on different motor paths according to the nature of the design mechanism of the device, such as the process of abduction and approximation of the handles of the hands affects the angles of curvature of the trunk to Front and back, with multiple angles ,as well as lowering and raising the armrests affects the motor paths.

As well as can be controlledand the degree of difficulty of movement circular for the most amusing lower through the tool of resistance control and the speed of the machine, in addition to the presence of rubber cords in the rear base and connected Band feet that increase resistance to some exercise, according to the training target prepared for him.

Three components of the device:

- 1- electronic control unit:
- 2- steering wheel:
- 3- Pulse sensor:
- 4- Steering wheel height control switch:
- 5- Steering wheel length control switch:
- 6- Steering wheel holder:
- 7- Resistance control switch:
- 8- Iron wheel:
- 9- Iron spring to absorb vibration:
- 10-Steering wheel distance control switch:
- 11-the seat:
- 12-backrest:
- 13-Backrest control knob:
- 14-seat holder:
- 15-rubber ropes:
- 16-Balance adjustment rule:

17-Control knob, pedal / belt:

## **2-5. The method of calculating the length and frequency of steps during (acceleration stage, maximum speed stage, speed endurance stage):**

The basic factors to achieve the required speed during sprinting are determined by the following:

- 1- Step Length.
- 2- Step Frequency

To increase the speed of jogging should develop one or both working together, Veldrash mechanic of running dynamically we cannot defragment the movement separately as a result of mechanical thread since preparedness while achieving maximum speed . ([1])

### **2.5.1. Step length calculation method**

The length of the step is extracted from the moment of contact of the instep of one foot with the instep of the other foot during running and between them the distance is measured by the analysis program(Kenova).

## **2-5- 2. Method of Calculating The Frequency Step**

The step frequency depends on time according to the rate law, which is detailed below: ([2])

Average velocity = average stride length x average stride frequency

6- 2exploratory experiments:

First exploratory experience:

Has conducted a researcher exploratory experiment on Sunday corresponding to 21/10/2021 at five pm in the stadium Muthanna on the players enemy (100 m) of the Commission Paralympics Muthanna Branch's (3 players) as they search the community and the purpose of this experience to know the negative aspects and variables that will face Work as well to ensure the following :

$$\begin{aligned} \textit{Speed Average} &= \textit{Space/Time} \\ \textit{Speed Average} &= \textit{Space/1} \times \textit{1/time} \\ \textit{Speed Average} &= \textit{Space/ Steps Numbers} \times \textit{Steps Numbers/1} \end{aligned}$$

## **2-6 Experimental Experiments:**

### **First exploratory experience:**

The researcher conducted the reconnaissance experiment on Sunday 10/1/2021 at five in the afternoon in Muthanna Stadium on enemy players (100 m) for the Paralympic Committee, Muthanna Branch, which numbered (3 players) and they are the research community. The purpose of this experiment is to know the negative aspects and the variables that will face the work Also, to verify the following:

- 1- *Knowing the appropriate tools and equipment to perform these tests.*

Special Exercises According to a Proposed Device to Develop the Length and Frequency of the Step for the Maximum Speed Stage and the Digital Level 100 M Sprint For People with Disabilities, Category (T36-T38) for Paralympics in Muthanna

- 2- *Knowing the appropriate time and place to conduct it.*
- 3- *Ensuring the adequacy of the auxiliary staff*
- 4- *Knowing the distances and heights at which cameras should be placed*
- 5- *Defining the assistant staff on how to apply these tests.*
- 6- *Knowing the difficulties and problems facing the researcher in applying these tests before applying them in the main experiment.*

**Second Pilot Experiment:**

The second exploratory experiment was conducted on Monday, 11/1/2021 at five in the afternoon in Al-Muthanna Stadium on the research sample, and some special exercises were applied for the purpose of the following:

1. Codify those exercises and find their load components (intensity, volume and comfort).
2. Knowing the extent of the sample's ability to apply those exercises.
3. Know the time required to apply these exercises.
4. The knowledge of the assistant staff and the trainer on how to apply these exercises because the researcher does not have the right to apply them himself because it is considered a currency bias.
5. Knowing the difficulties and problems facing the researcher in applying these exercises before applying them in the main experiment

**7-2 Field research procedures**

**2-7-2 Special Exercises According to A Device:**

The researcher reviewed the modern sources and references related to sports training to obtain exercises with effective effect on the proposed device that are compatible with the requirements of the research. In the Athletics Federation of the Iraqi Paralympic Committee and specialists in the field of sports training in speed events. 2-7- 2exercises special according to the device :

The researcher reviewed the modern sources and references related to sports training to obtain exercises with effective impact on the proposed device that fit the requirements of the research, and in order for this information to enrich the researcher, understand and apply it correctly, the researcher used one of the scientific research tools, which is the personal interview with the officially accredited trainers in In the Athletics Federation of the Iraqi Paralympic Committee and specialists in the field of sports training in speed events.As an application exercise began on Thursday 2021 /1 /21 , until on Thursday 2021 /3 /18 , for a period of eight weeks, three training units per week, Sunday - Tuesday - Thursday Here are some clarifications on the special exercises:

- 1- The duration of the special exercises is two months (eight weeks).
- 2- The number of training units per week is three units.
- 3- The number of training units in the curriculum (24) training units.
- 4- Training days (Sunday - Tuesday - Thursday).
- 5- Taking part of the main section of the training unit to apply the exercises to the device.
- 6- The training method used - the method of low and high-intensity interval training.
- 7- Adoption of the principle of gradual pregnancy through intensity by repetition and time.

- 8- The use of corrugation 1-2 in pregnancy.
- 9- The process of adjusting the training volumes was carried out in the second reconnaissance experiment to determine the training level and work on the device.
1. 10 - Taking into account the scientific foundations in training and the relationship between the components of the training load, taking into account the requirements of this category, in line with their abilities and the nature of the handicap.

### 2-7-3 Post-Tests of The Research Sample:

The post-test of the research sample was conducted on Sunday, 21/3/2021 in Al-Muthanna Stadium, after the completion of the application period, which took (8) weeks, and the researcher was keen to provide the same conditions for the tribal tests.

### 2.8. Statistical Methods:

The researcher used the statistical methods that helped in processing the results and testing the research hypotheses through the use of the statistical package) IBM SPSS Statistics 24 (which are:

- *Arithmetic Mean.*
- *Standard Deviation.*
- *Coefficient Of Difference.*
- *Pearson Correlation Coefficient.*
- *A Test (T) For Correlated Samples.*
- *Percentage.*

### 3-1 Presentation and analysis of the results of step length and step frequency for the maximum speed stage of the pre and post tests of the research group:

**Table( 1 ) shows the values of the arithmetic means, standard deviations, the calculated (T) value, and the (sig) value of the step length and frequency values, and the average velocity for the maximum velocity stage of the pre and posttest for the research group.**

| Variables      | Measuring Unit | Pre-test |       | Post-test |       | Calculated T- Value | Sig.  | Result |
|----------------|----------------|----------|-------|-----------|-------|---------------------|-------|--------|
|                |                | P        | S     | P         | S     |                     |       |        |
|                |                |          |       |           |       | 6.181               | 0.003 | Valid  |
| Step Length    | Ns             | 1.636    | 0.032 | 1.773     | 0.020 | 3.959               | 0.017 | Valid  |
| Step Frequency | X / Th         | 4.070    | 0.060 | 4.250     | 0.050 | 9,697               | 0.001 | Valid  |
| Speed Rate     | M/S            | 7.923    | 0.025 | 8.243     | 0.051 | 6.181               | 0.003 | Valid  |

The values of the step length, frequency, and average speed were extracted for the maximum speed stage, and the results appeared for the pre and posttests of the research group as shown in Table (3). The variables were presented and analyzed as follows. The arithmetic mean of the step length in the maximum speed stage in the pre-test was (1.636) with a standard deviation of (0.032) while the arithmetic mean in the post-test was (1.773) and with a standard deviation of (0.020). )



Special Exercises According to a Proposed Device to Develop the Length and Frequency of the Step for the Maximum Speed Stage and the Digital Level 100 M Sprint For People with Disabilities, Category (T36-T38) for Paralympics in Muthanna

(6,181) and at a level of significance (0.003). The arithmetic mean of the step frequency in the maximum velocity stage in the pre-test was (4.070) with a standard deviation of (0.060), while the arithmetic mean in the post-test was (4.250) and with a standard deviation of (0.050). ) (3.959) and at a level of significance (0.017). The arithmetic mean of the step frequency in the maximum velocity stage in the pre-test was (4.070) with a standard deviation of (0.060), while the arithmetic mean in the post-test was (4.250) and with a standard deviation of (0.050). ) (3.959) and at a level of significance (0.017).

**3-2 Presentation and analysis of the results of the digital level of the 100-meter sprinter for the pre and posttests of the research group:**

Table (6) It shows the values of the arithmetic means, standard deviations, the calculated (T) value and the (sig) value of the digital level of the 100-meter sprint for the pre and post test for the research group

| Variables   | Measuring Unit | Pre-test |       | Post-test |       | Calculated T- Value | Sig.  | Result |
|-------------|----------------|----------|-------|-----------|-------|---------------------|-------|--------|
|             |                | P        | S     | P         | S     |                     |       |        |
| Step Length | Tha            | 15,773   | 0.386 | 14.516    | 0.422 | 3.801               | 0.019 | Valid  |

The value of the digital level was extracted for the 100-meter sprint ,and the results appeared for the pre and post tests of the research group ,as shown in Table .( 6 ) The variables were presented and analyzed as follows.

The arithmetic mean reached the numerical level of enemy 100 in the **pre -test ( 15.773 )** with a standard deviation of ( **0.386** ) while the arithmetic mean in the post-test was ( **14.516** ) with a standard deviation of ( **0.422** ) and when conducting a test(T)Samples of the Mturab Plan appeared that the value of(T) ( **3.801** )and at a level of significance. ( **0.019** )

**3 - 3. Discussing the results of the length of step and its frequency and the rate of speed at maximum speed stage:**

There were significant differences in the variables (step length, frequency, and rate of speed) in favor of the post test. The researcher attributes this development as a result of the effect of special exercises according to the proposed device, as it led to an increase in the speed rate and maintaining the ideal step length at that stage, which affected the variable (step frequency) The researcher attributed the reason for the decrease in the rate (step frequency) at this stage due to the stability of the speed rate of the runner or the runner reaching his maximum speed and maintaining the length of his stride, which led to a decrease in (step frequency) as a result of the runner’s progress in the distance, corresponding to an increase in the length of the steps in the same distance, because the more The greater the length of the step, the less its frequency, and this was confirmed by (Sareeh Abdul Karim Al-Fadhli, 2010) . ([3]) This reflected the development in the length of the step through exercises according to the device from standing and increasing the radius of the rotational movement so that it takes a larger motor path, which increases the time of one cycle for the lower limbs so that

the runner is standing and leaning on the arms holding the handles and his center of gravity Unstable during performance, as it was found that through these exercises according to the device and the rubber cords attached to the foot pedals, the muscles of the legs that worked in fixed training conditions with accompanying changes in the movement pattern and speed difference stimulated them the largest number of muscle fibers that were affected by the type of exercises used on the device as well These exercises develop the mechanical aspects associated with performing the running steps at the maximum speed and automatically.

Also, results appeared in the variables (number of steps and digital level) significant differences in favor of the post test, as the research sample achieved a time of (15.77) seconds and an average of (58,51) steps in the pre-test, while they achieved in the post test a time of (14.51) seconds and at an average of (56,33) steps along the racing distance of one meter after the total steps taken by the runner in this distance and the values of both the length and frequency of the step were identified. This leads to a weakness in the rate of speed and overall achievement. The researcher attributes this development to the special exercises according to the device with submaxillary and extremity stress.

By performing motor speed exercises for the lower extremities, and thus helped to increase the number and strength of the working muscles, which led to an increase in the number of steps, due to the stimulation of some non-working muscle fibers to the working muscle fibers as a result of the moving style with resistance to the device and rubber ropes, and the greater the number of working fibers, this led to Increasing muscle speed, which is reflected in an increase in body speed because the human body is closely linked to its movement on the muscles in the body, especially the muscles of the legs that worked in special training conditions with accompanying changes in the movement pattern and its forms that lead to the development of the level of digital achievement .The researcher also attributes the reasons for these differences to the effectiveness of the exercises prepared according to the device, in which the researcher took into account the scientific bases in terms of the intensity of the exercise, training volumes and rest periods in a manner consistent with the capabilities and abilities of the research personnel, which confirms the correct planning of these exercises in achieving the goals and duties set for it. The 100-meter effectiveness training for the disabled is characterized by planning, organization and continuity on scientific bases, which ensures a positive impact on the skill level of the player and the continuity of his progress in various aspects such as the principle of gradualness in the height of the loads and the correct timing of its repetition in line with the requirements of their movement and abilities as they are characteristics. ([4])

In summary, the aim of identifying and knowing the variables of the research under study in each stage of the race is a serious scientific attempt to improve the technical performance stages and the rate of speed in an ideal and exemplary manner, which is a basic necessity in achieving the achievement.

## 4. Conclusions and recommendations

### 4.1. Conclusions

Based on the findings of the research results, and the accompanying statistical treatments, discussion and extrapolation within the limits and nature of the research sample, the researcher was able to reach the following conclusions:

- 1- The exercise device according to the proposed positive impact of the most important variables (length and frequency step) for the rider enemy 100 meters through the stages of speed maximum.
- 2-The results of the tests showed a positive development in the research sample at the digital level (performance time), because the innovative device had a positive effect on the development of the maximum transitional speed.
- 3- The mechanism works Baha device is resistant rubber cords installed in the foot handles allowed the runner to earn a distinctive power of the speed of the two men through the acceleration and this has had a positive impact in the evolution of the amount of traffic and reduce the time of contact with the foot flattened and thus increased the speed motor for the parties to the lower.
- 4- The exercises used according to the device also had an effective effect in expanding the ranges and motor paths as a result of increasing the radius of the rotational movement, which would improve the length of the step.

### 4.2. Recommendations:

- 1- It is preferable for trainers to fully know the importance of the proposed device, how it works, and how to manufacture it.
- 2- The necessity of training on the proposed device for the 100m and 200m runners and for other handicap categories
- 3- Modification of the device by linking with it other means of movement of the arms and at the correct angles for performance.
- 4- Put other exercises for the upper limbs on the proposed device.
- 5- Modification of the device and placing an electronic controller for it to control its own speed to suit all other categories of obstacles.
- 6- Conducting similar studies on different samples for effectiveness.
- 7- Conducting similar studies on other activities that depend mainly on the maximum transitional velocity.

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