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**Wisam Yaseen Burhan**  
Assistance Professor, Open  
Educational College, Iraq

**Majid Abdulhameed Rasheed**  
Assistance Professor, Faculty  
of Physical Education and  
Sports Sciences, University of  
Al-Qadisiyah, Iraq

## Effect of specialized training with and without dandelion herb on testosterone and numerical achievement in paralympic weightlifters

**Wisam Yaseen Burhan and Majid Abdulhameed Rasheed**

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### Abstract

The purpose of this paper is to identify the effect of specialized training with and without dandelion herb on the testosterone hormone and the digital achievement of Paralympic weightlifters. The researchers used the experimental method using the two equal groups method, and the research community was determined as weightlifters in the Paralympic Sub-Committee in Diwaniyah, Al-Qadisiyah Governorate, numbering (12) players from different weight categories and ages ranging from (20-27) years. They were divided into two experimental groups, each group (6) players. The researchers applied specialized training with and without dandelion herb to identify the extent of this effect on the testosterone hormone and achievement. The implementation of the training took a period of (4) weeks, with (6) training units per week. As for the most important conclusions reached by the researchers specialized training with dandelion herb has the greatest effect in improving testosterone levels, which increased the digital achievement of Paralympic weightlifters.

**Keywords:** Specialized, dandelion, testosterone, achievement, paralympic weightlifting

### Introduction

What distinguishes the training process is that it always seeks modernity and development in all fields, whether physiological, biomechanical or psychological, to raise the levels of players, whether in team or individual games, within the context of solid scientific research through research, investigation, identifying the causes and developing effective solutions.

Paralympic weightlifting is one of the sporting events that specializes in players with special needs who have injuries in the lower limb, whether paralysis or amputation. It is considered one of the strenuous sporting events that require lifting high weights from a lying position on the bench, and training is done with high loads throughout the year, so it requires a high effort from the players, so it requires compensating the body's cells from damage and producing energy by taking advantage of vitamins for the body to perform its functions properly. "Dandelion is a herbaceous plant that belongs to the Asteraceae family, known as chicory, which includes 30-57 species. This plant is widespread in the regions of America, Europe, Asia, India and Africa. Iraq is also one of the countries where the plant grows, especially in the central regions of Iraq" (Ali, and Jakra. 1988) [1]. Therefore, it is considered one of the important medicinal plants that can be consumed, as "the drugs extracted from medicinal plants are the basic materials for making a mixture that is taken in the form of a boiled extract or an unboiled infusion" (Sajid Awda Muhammad). Also, "Dandelion is a good digestive, as it helps the liver in the digestion process. Dandelion is a rich source of vitamins (A, C, B, E), and it is also rich in minerals such as (iron, magnesium, calcium, potassium). This herb works to activate and strengthen the body, as it is useful for treating anemia and low blood sugar, purifying the blood of impurities, increasing endurance and eliminating fatigue". Combining training with taking nutritional supplements, whether natural or synthetic, has positive returns, as Paralympic weightlifters train throughout the year, as there are national, Asian and international championships and events, as well as Paralympic Games, which increases the body's ability to prevent a decline in their level and loss of the ability to lift weights, which affects the testosterone hormone responsible for strength and muscle building, red blood cell production and maintaining the distribution of

**Corresponding Author:**  
**Wisam Yaseen Burhan**  
Assistance Professor, Open  
Educational College, Iraq

fat in the body. The development of this hormone gives an increase and improvement in the achievement of Paralympic weightlifting, which is the basis of this competition. Through the personal experience of one of the researchers, as he is a weightlifting coach accredited by the Iraqi National Paralympic Committee, he found that the problem of the study lies in being careful about using medical drugs, vitamins and synthetic nutritional supplements, as most of their origins are unknown and may contain internationally banned substances, which players avoid using. Therefore, the researchers found that the use of vitamins and nutritional supplements could be taken naturally and not synthetically with the specialized training set by the coach and knowing their effect in the future through research and study. Therefore, the importance of the research lies in setting specialized training with the intake of dandelion herb. Knowing its effect on the testosterone hormone, as well as the weightlifting achievement of the players of the Paralympic Sub-Committee in Diwaniyah, due to its positive impact in improving the players' numbers in the best way.

### Research objective

- Identify the effect of specialized training with and without dandelion herb on testosterone and digital achievement in Paralympic weightlifting on the research sample.
- Identify the superiority of the two groups in the post-test in testosterone and digital achievement in Paralympic weightlifting.

### Method and procedures

The researchers used the experimental method in the style of two equal groups to suit the nature of the study, and the researchers defined their research community as players of the Diwaniya Committee in Paralympic weightlifting, numbering (12) players from different weight categories and ages (16-24) years, and they were randomly divided into two control groups and an experimental group, each group (6) players, and homogeneity and equivalence were conducted for the two groups, and it was found that the two groups were homogeneous and equivalent according to the table below.

**Table 1:** Homogeneity and equivalence of the research sample

Variables	Measuring unit	Control group			Skewness	Experimental group			T value calculated	Sig
		Arithmetic mean	Standard deviation	Skewness		Arithmetic mean	Standard deviation	Skewness		
Mass	kg	73.33	13.50	0.43	78.50	11.50	0.89	0.47	0.71	
Age	year	26.33	4.93	0.03	28.33	5.16	0.27	0.51	0.69	
Training Age	year	7.00	3.22	0.17	6.50	2.59	0.09	0.93	0.10	
Testosterone	ng/ml	3.22	0.57	0.93	3.32	0.61	0.95	0.29	0.78	
Numeric Achievement	kg	114.17	28.88	0.49	121.6	28.40	0.11	0.66	0.45	

### Testosterone test

A simple blood sample of (5 cm<sup>3</sup>) is taken from each player with the aim of measuring the level of testosterone during rest with the help of a chemist specialized in this field working in the country's laboratory in the center of Diwaniyah city.

### Numerical achievement test in weightlifting

The Paralympic achievement test is conducted by giving each player three attempts as per the international law of weightlifting and the largest weight lifted is chosen for a successful attempt.

### Main experiment

The pre-test was conducted on Saturday and Sunday 18-19/11/2023 at two o'clock in the afternoon for the control and experimental groups in the weight hall at the Housing Youth Sports Forum in Al-Qadisiyah Governorate. The testosterone test was conducted on the first day, while the achievement test was conducted on the second day for the members of the two groups with the technical and medical assistant team. Then the researchers prepared specialized training for the two groups because he is a trainer and has the experience that qualifies him to design training during the special preparation period. These trainings included maximum strength exercises for the muscles involved in the performance as well as constructive exercises for the muscles of the body as a whole. The researchers took into account the training load in setting the training exercises, as the intensity of the exercises ranged from (75 - 90%) of

(1RM) with repetitions of (6 - 2) and sets of (5 - 3) and with rest periods ranging from (2 - 5) minutes. The researchers also took into account the undulation in giving training intensities with the diversity of exercises to eliminate the factor of boredom. The implementation of the exercises took (8) weeks, with a total of (3) Training units, where the first experimental group received specialized training only, while the second experimental group, in addition to the specialized training, received dandelion herb. The curriculum period lasted from Friday, 24/11/2023, until Tuesday, 16/1/2024. The method of consuming dandelion herb is to use the wild leafy type, which is in the form of leaves similar to tea leaves. After that, one liter of water was boiled for (10) minutes, and an amount of (100) grams of dandelion herb was placed and left for (15) minutes of boiling and left for a full hour. This was after reviewing the studies and nutrition books and conducting a medical examination of the research sample to ensure the safety of the circulatory, respiratory and digestive systems and the ability to use the herb. Personal interviews were also conducted with experts and specialists (see appendix 2). Each player was given a cup of the drink in the amount of (100) milliliters in (3) doses per week and an hour before the training unit. After completing the specialized training with and without consuming dandelion herb, the researchers conducted the post-test on Friday and Saturday 19-20/1/2024 at two o'clock in the afternoon for the two experimental groups in the same place, taking into account the same conditions in the pre-test and for the two groups.



Fig 1: Shows the dandelion herb

**Results**

**Table 2:** Shows the differences in the testosterone hormone test and achievement in the pre- and post-tests for the first experimental group

Tests	Measuring unit	Pre-test		Post-test		T value calculated	Sig	Evolution rate
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Testosterone	Ng/ml	3.22	0.57	4.52	0.69	2.77	0.04	%40.37
Achievement	kg	114.17	28.88	120.83	22.89	1.66	0.16	%5.83

**Table 3:** Shows the differences in the testosterone hormone test and achievement in the pre- and post-tests for the second experimental group

Tests	Measuring unit	Pre-test		Post-test		T value calculated	Sig	Evolution rate
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Testosterone	Ng/ml	3.32	0.61	5.87	0.67	11.35	0.00	76.80%
Achievement	kg	121.6	28.40	130.83	20.84	5.53	0.00	7.59%

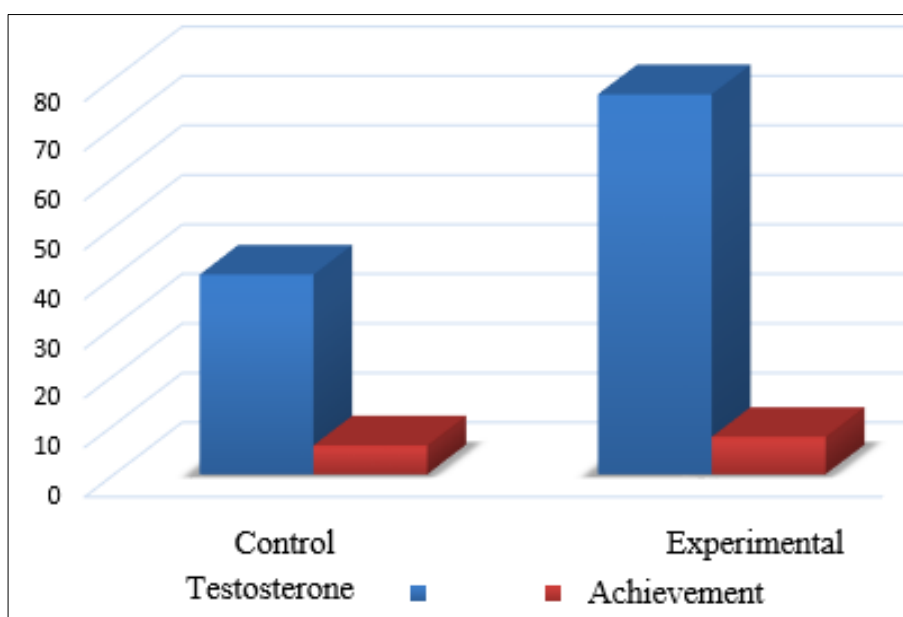


Fig 2: Shows the rate of Evolution of the studied variables

**Table 4:** Shows the differences in the testosterone hormone test and achievement in the two post-tests for the two experimental groups

Tests	Measuring unit	First Experimental		Second Experimental		T value calculated	Sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation		
Testosterone	Ng/ml	4.52	0.69	5.87	0.67	3.43	0.01
Achievement	kg	120.83	22.89	130.83	20.84	0.90	0.39

### Discussion of the results

Tables (2, 3) show significant differences in the results of the testosterone hormone variable in the post-test for the control and experimental groups, and a significant difference appeared in the achievement variable in the second experimental group only. This indicates that the specialized training prepared by the researchers achieved the desired goal of increasing the concentration of the testosterone hormone, and that the training period lasted (8) weeks, which was sufficient for this development to occur, as "each training causes changes that appear clearly in the process of energy representation, and most of the changes resulting from training are in movement, chemical changes, or nerve units connected to the muscles. Also, the repetition of performance of a specific motor skill is related to the strength of performance, which contributes greatly to developing or improving the level of performance" (Hussein Ali and Amer Fakher. 2010) [4]. Hence, specialized training had an important and positive role in targeting the muscles involved in performance in particular, and this is part of the principles of sports training (training specificity), and this agrees that "the successful coach must plan his training methods in a way that develops the characteristics required by the type of specialized activity for the player and focuses on developing the working energy system and the working muscle groups involved in performance" (Muhammad Hassan Alawi, Abu Al-Ala Ahmed Abdel Fattah. 2000) [5]. The increase in the concentration of the hormone testosterone as a result of the muscle strength training included in the specialized training and with high loads gave great strength in lifting high weights, which increased the achievement variable, especially for the second experimental group. Table (4) also shows significant differences in the results of the testosterone hormone variable in the post-test for the second experimental group, while no significant differences appeared in the achievement variable, but there was a slight development in the arithmetic means in favor of the second experimental group. The researchers attribute the lack of significant development in the achievement variable to two reasons:

1. Specialized training (maximum strength training) contributed to reducing the differences between the two groups, and the development was simple to the point of not rising to statistical significance.
2. The development of advanced players, especially in activities that require lifting high weights, is simple, unlike the younger age groups.

As for the testosterone hormone variable, the development is noticeable and in favor of the second experimental group that used dandelion herb in addition to specialized training, as the gradual increase in training loads in a scientifically sound manner plays a role in the functional systems' acceptance of the given training, as "the gradual use of exercises and their difficulty works to adapt the body and increase its physiological, physical and skill adaptation processes, and this in turn works to raise the level, and the gradual increase in the training unit exercises creates a state

of continuous increase in the physiological and physical adaptation processes and thus raises the level of performance" (Nayef Mufdi Al-Jabour. 2011) [6].

The researchers also attribute this development in the testosterone variable and the improvement in achievement for the second experimental group that used dandelion in addition to specialized training compared to the first experimental group to the fact that "dandelion is a rich source of a variety of active substances and compounds including beta-carotene, carotenoids, xanthophyll, chlorophyll, vitamins C, D, B, E, A, choline, minerals such as iron, silicon, magnesium, sodium, potassium, zinc, manganese, copper, phosphorus, and the presence of natural compounds of phenols, flavonoids, inulin, lactones, and glycosides. The high content of minerals, fibers, vitamins, and essential fatty acids makes it a preferred food source" (Asadi-Samanni *et al*, 2015) [7]. The dandelion herb contains this large amount of vitamins and minerals, which was directly reflected on the testosterone hormone, in addition to specialized training with weights and free weights, which had a major role in this development that occurred in the individuals of the second experimental research sample, as "the use of training that is consistent in the nature of its performance with the general form of performing specialized skills leads to better results in acquiring variables" (Abu Al-Ala and Ahmed Nasr, 1993) [8].

Therefore, dandelion herb is a nutritional supplement rich in vitamins and minerals and has a direct effect on increasing the concentration of the testosterone hormone. It has a great benefit for athletes and is "a completely non-toxic and edible plant, and its aerial parts and roots are used in various food components" (Martinez *et al*, 2015) [9].

### Conclusion

1. Specialized training had a major role in increasing the concentration of testosterone hormone as well as improving the achievement of the first experimental group sample
2. Specialized training with dandelion herb had a major role in increasing the concentration of testosterone hormone and developing the achievement of the second experimental group sample
3. Specialized training and what it contained of maximum muscle strength exercises contributed to increasing the testosterone hormone for the first experimental group sample
4. The presence of vitamins and minerals in abundance in dandelion herb contributed significantly to increasing the testosterone hormone for the second experimental group in addition to specialized training for the second experimental group sample
5. The second experimental group outperformed the first experimental group in the testosterone hormone and the digital achievement of the research sample.

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#### Appendix (1)

##### Shows a sample of the training unit

- **Training unit:** First
- **Exercise intensity:** 75%
- **Total exercise time:** 24 minutes
- **Exercise objective:** Developing muscle strength

Exercise name	Intensity	Repetition	Performance time / sec	sets	Rest between		Total performance time
					sets	exercises	
Bench press level	75%	8	20	4	2.30 minute	3.30 minute	1.20 minute
Dumbbell pullover sleeper		10	25				1.40 minute
Seated dumbbell triceps		10	25				1.40 minute
Forearm		12	20				1.20 minute

#### Appendix (2)

##### Experts and specialists

- Dr. Hassan Abbas Joda: Nutritionist - Al-Hussein Specialized Hospital in Al-Qadisiyah Governorate
- Dr. Janan Jawad Al-Awadi: Nutritionist - Al-Diwaniyah General Hospital in Al-Qadisiyah Governorate
- Hamid Jawad Mahdi: Herbalist - Najaf Al-Ashraf - Imam Al-Sadiq Street (peace be upon him)
- Hassanein Al-Najfi: Herbalist - Najaf Al-Ashraf - Al-Amir neighborhood