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A Rehabilitation Program Accompanied by an (Hp. Laser) Device to Reduce Injury Pain and Increase Range of Motion (S.T.T) for Weightlifting Athletes with Disabilities

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Abstract: Inside the bustle of the city, all kinds of sounds fill the air, which interfere with each other like vying musicians. The brilliant neon lights of colossally tall buildings pierce the night sky. This bizarre glow blankets the city below them. A numbing crowd for pedestrian movement. In firecracker like succession, the smell of grilling food on street side mixes with the fumes of gaseous states. This all is a sort of overdosage from aroma saffron that lingers plenty long afterwards. For all this mayhem, there's an unmistakable vitality that flows through the city. It's a relentless heartbeat that pushes things into night. The researcher aims to: (1) Identify the effect of a rehabilitation program accompanied by a laser device on athletes with disabilities suffering from shoulder joint muscle injuries in weightlifting. (2) Identify the effect of the rehabilitation program accompanied by a laser device on increasing the range of motion of the muscles. (3) Identify the effect of the rehabilitation program accompanied by a laser device on reducing. The nature of the phenomenon addressed by the researcher determines the research methodology. Accordingly, the experimental method was adopted due to its suitability for the nature of the research problem and its objectives. The research population was intentionally selected and consisted of weightlifting athletes with disabilities suffering from shoulder joint muscle injuries from the Sub-Paralympic Committee in Al-Diwaniyah. Tests Used in the Research: (1) Shoulder Joint Range of Motion Test during Anterior Elevation (Akram Khattabiya, 1997, p. 67). This test aims to measure the range of motion of the shoulder joint during anterior elevation using a goniometer. (2) Pain Intensity Measurement Using the Visual Analogue Scale (V.A.S.) (2:42). The researcher adopted the Visual Analogue Scale (V.A.S.) to measure pain intensity. This scale is simple and effective for assessing pain severity and is widely used in motor rehabilitation programs. It provides a numerical rating ranging from 0 to 10, starting with “no pain” and ending with “very severe pain.” Conclusions is The prescribed rehabilitation exercises had a significant effect in reducing injury-related pain and increasing the range of motion among weightlifting athletes with disabilities.

Keywords: Hp. Laser, Range of Motion, Pain

Introduction

Decadent civilizations work to incorporate into every aspect of social, economic, and political life novel form, especially through the sports sector, which has become a very profitable niche area. Sport has penetrated every facet of the totality of life and has often been deemed a tool by which many communities pursue development and profit pockets. Athletes with injuries are looking to make a quick recovery back to the sports field to have achievements for which they have trained and worked hard for. Athletes live and breathe their ambitions and when a sports injury happens, they want to recover quickly and get back to what they love doing.

The conventional rehabilitation programs do not speed up the rehabilitation process towards the regular functional status as much as required. Eventually, those trends of the past century paved the way for new ways to heal and return healthy athletes to their respective sports faster and optimizing movements to strengthen the athletes in the future. One of such contemporary techniques which can be mentioned is use of laser instruments in sports rehabilitation. Laser therapy, with increasingly thermal levels to a muscle flexion and action rehabber therewith pain-reducing and deeper in a injured muscle gather is faster in pumping blood into the injured place to be continue.

The research sample selection are weightlifting athletes with disabilities, this is because the athletes with disabilities sex was often hit in sports injury in order to get in sport achievement. This aspiration often results in more training units and prolonging training time, which increases the risk of injury in training units. Shoulder joint injuries, as well as injuries to the muscles surrounding the shoulder joint, are some of the most common injuries when doing weightlifting. That is where a specialized therapist comes in, finding ways to minimize pain and recover quicker.

Sports rehabilitation constitutes physical exercises plus therapeutic modality (laser devices or other technologies with progressive thermal levels). They are able to penetrate the tissue, increasing blood circulation to the affected area, minimizing pain and stopping the injury from advancing and, therefore, helping to regain high performance. Rehabilitation is thus an important part of therapy and a more attractive option for athletes and coaches alike. Choosing the wrong style of rehabilitation regarding injury type and intensity will prolong the recovery time and delay the return to competition. Clinical observations demonstrate that resuming sports participation before the completion of an appropriate rehabilitation program can result in recurrent injuries at a later time (6:332).

Numerous devices used today like laser therapy and ultrasound devices are a result of the modern technologic era. Rehabilitation is the process of returning the injured body part to its previous state or condition before the injury (10:9). Athletes with disabilities are also a part of this segment in sports community and they too aim on getting competitive results. But, because of the limitations of their physical nature, not all exercise can be completed. Thus, for results regarding whether the researcher adopted modern rehabilitation devices that tend to return the injured part to normalcy and the normal state of the body before direct exposure to injury and its associated symptoms (pain, inflammation, reduced blood flow, and tissue warming) of muscles that contributed to tissue flexibility and mobility also exists in the other muscles.

Sports injuries were observed repeatedly through the researcher's review of training units and rehabilitation programs for Paralympic athletes, specifically within the area of weightlifting—particularly within shoulder joint injuries and injuries to surrounding muscles. These injuries impair functional and movement capacity and your ability to lift weights. Such conditions finally require the invention and establishment of rehabilitation programs based on state-of-the-art technology that can facilitate faster recoveries. The academic has linked the injuries occurring to athletes pushing themselves to lift more than their muscle strength, longer training sessions with no progression and not complying with principles of loading in a progressive manner.

Hence, the researcher implemented the two exercises paradigms in this study, by designing a rehabilitation program accompanied by modern technologies for the injured upper limb. The significance of this research is to establish this rehabilitation program with a multi-speed laser device in order to rehabilitate the injured area and facilitate athletes to practice sport-specific activities, to quickly return to normal activity and to achieve their athletic records.

Purpose of the Study

1. Identify the effect of a rehabilitation program accompanied by a laser device on shoulder joint muscle injuries among weightlifting athletes with disabilities.
2. Identify the effect of the rehabilitation program accompanied by a laser device on increasing muscular range of motion.
3. Identify the effect of the rehabilitation program accompanied by a laser device on reducing injury-related pain among the injured athletes.

Methodology

The nature of the phenomenon addressed by the researcher determined the research methodology. Accordingly, the experimental method was adopted due to its suitability for the research problem and objectives. The research population was intentionally selected and consisted of six male weightlifting athletes with disabilities suffering from shoulder joint muscle injuries from the Sub-Paralympic Committee in Al-Diwaniyah. After selecting the sample, homogeneity of the main research sample was established based on variables including age, height, weight, and injury duration, as shown in Table (1).

Table 1. Shows the homogeneity of the experimental group participants.

No.	Variables	Unit of Measurement	Mean	Standard Deviation	Median	Skewness	Significance
1	Injury duration	Year	2.000	1.741	4	0.335	Homogeneous
2	Chronological age	Year	19.232	1.465	20	0.374	Homogeneous
3	Weight	kg	68.784	2.182	67	0.732	Homogeneous
4	Height	cm	165.105	2.611	166	0.674	Homogeneous

The Main Experiment

The researcher selected the proper place, time, and procedures to make sure that the validity of pre-tests is on scientific basis. The values of these measurements and tests

adopted in the study were pre tested on Tuesday, 29/8/2024 with the help of the supporting research team. Tests were run in the following order:

1. Measurement of Pain Intensity Using the Visual Analogue Scale (V.A.S.) (2:42)

   For pain intensity measures, the researcher used the Visual Analogue Scale (V.A.S.). It is known as Pain intensity scale with just two dimensions which make this tool very easy to evaluate pain intensity and it is most commonly used scale in motor rehabilitation programs. The initial score ranges between 0 and 10 as "no pain" up to "very severe pain," indicating the worst pain ever. A VAS can provide a approximate number that can demonstrate how much the patient is suffering from pain, whether being less pain or no pain at all.

   The researcher used this test after presenting it to specialists in the field of sports injuries, and the test was approved as follows:

   - Test name: Measurement of shoulder joint pain intensity.
   - Purpose of the test: To measure the maximum degree of pain in the shoulder joint.
   - Method of application and measurement: The injured participant is asked to place a mark on the measurement line according to the level of pain he feels, after being theoretically instructed on how to indicate the perceived pain using a specific mark. This procedure is carried out after each range-of-motion test applied to measure the shoulder joint range of motion in all directions.
   - Recording: The highest pain value recorded on the pain scale is selected.

   The researcher indicates that the pain perception scale was applied more than once to the injured participants in order to assess each individual's condition and monitor progress throughout the rehabilitation program, given the sensitivity of the injury. These measurements were not subjected to statistical analysis except for the pre-test and post-test measurements.

2. Determination of the Normal Range of Motion of the Shoulder Joint

   In order to find out a range of motion of the shoulder joint, a questionnaire form as a means of finding out variables that agreed with the problem of research. Once the forms were gathered, the percentage of range of motion that could realistically be achieved based on the proposed rehabilitation program was determined by consensus. It consisted of re rehabilitation and treatment of the muscles acting on the shoulder joint and various other therapeutic and rehabilitative exercises specific to the injury.

   The level of agreement on their choice of variables was determined using Bloom's percentage criterion. A consensus facet will be chosen on a fraction of agreement rate equal to or more than 75% (Bloom et al. Below this percentage of agreement, variables are discarded. Hence, the researcher computed the level of agreement by using the percentage formula.

The Rehabilitation Program

The researcher began the application of the prepared rehabilitation program of therapeutic exercises and laser devices in order to eliminate pain and to return to sports activity as soon as possible to reach the sporting achievement. The program, which started 01/09/2024 at 3 PM. in fitness & bodybuilding gymnasium;

The rehabilitation program lasted 12 weeks, with three 40 min rehabilitation units per week. All rehabilitation units numbered 36. The rehabilitation unit in each was split into:

- Preparatory section: 15 minutes
- Main section: 20 minutes
- Concluding section: 5 minutes

Accordingly, the total duration of the rehabilitation units over 8 weeks amounted to 1,440 minutes. The preparatory section totaled 546 minutes, representing 38% of the total program time. The main section totaled 720 minutes, representing 50% of the program time. The concluding section totaled 180 minutes, representing 12% of the total rehabilitation program time.

Table 2. Shows the distribution of time allocation across the rehabilitation program units

No.	Rehabilitation Unit Sections	Duration of Each Section	Percentage of Each Section
1	Preparatory section	546 min	38%
2	Main section	720 min	50%
3	Concluding section	180 min	12%
	Total	**1440 min**	**100%**

After completing the rehabilitation program, the post-tests were conducted on the research sample on Sunday, 1/12/2024, following the same sequence as the pre-tests. The researcher ensured that the same conditions under which the pre-tests were administered were maintained, particularly with regard to the order of the tests.

Result and Discussion

Table 3. Shows the differences in mean values between the pre-test and post-test measurements.

No.	Muscle Type	Pre-Test	Post-Test	Difference Between Tests	Z Value	Significance
1	Deltoid	7.3	6.1	1.2	2.67	Significant
2	Pectoralis Major	6.8	5.4	1.4	3.23	Significant
3	Latissimus Dorsi	5.9	5.2	0.7	1.26	Not significant
4	Teres Major	6.6	5.3	1.3	2.87	Significant

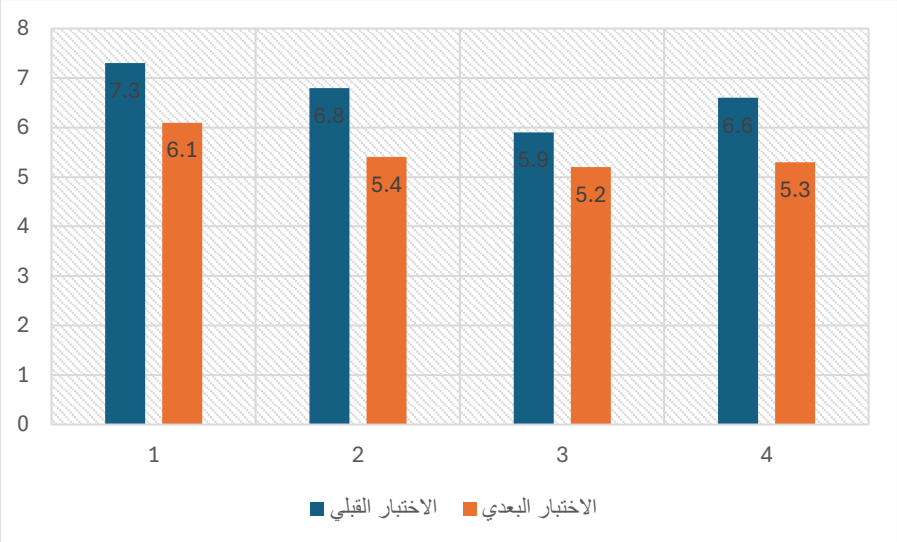
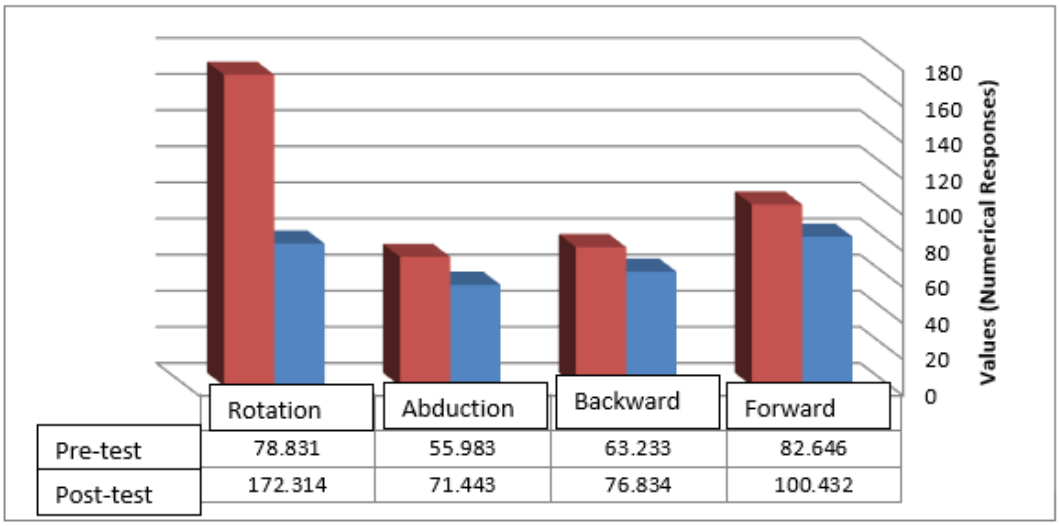


Figure 1. illustrates the differences between the pre-test and post-test results of the main research sample.

From the table above, the pre-test value for the deltoid muscle reached (7.3), while the post-test value reached (6.1), with a mean difference of (1.2). As for the pectoralis major muscle, the pre-test value was (6.8) and the post-test value was (5.4), with a difference of (1.4). In the case of the latissimus dorsi muscle, the pre-test value reached (5.9) and the post-test value was (5.2), with a mean difference of (0.7). Finally, the pre-test value for the teres major muscle was (6.6), while the post-test value reached (5.3), with a mean difference of (2.87).

Table 4. Shows the differences between the pre-test and post-test measurements in range of motion.

No.	Variables	Unit	Pre-Test Mean	Pre-Test SD	Post-Test Mean	Post-Test SD	Standard Error	Calculated t-value	p-value
1	Forward elevation	Degree	82.646	1.673	100.432	2.343	1.983	7.654	0.01
2	Backward elevation	Degree	63.233	1.034	76.834	1.772	1.564	12.453	0.01
3	Abduction	Degree	55.983	2.448	71.443	2.454	1.873	11.743	0.01
4	Rotation	Degree	78.831	1.263	172.314	2.495	1.984		



Discussion

The tables above indicate that the differences between the pre-test and post-test measurements were statistically significant for the deltoid, pectoralis major, and teres major muscles, as well as for range of motion. In contrast, the results for the latissimus dorsi muscle were not statistically significant. The researcher attributes these findings to the rehabilitative exercises accompanied by the laser device, which had a substantial effect on reducing pain severity and increasing the range of motion of the shoulder joint and the surrounding muscles among the injured participants.

These exercises were built on scientific guidelines as well as other opinions from specialists and experts. Such an attitude was positively reflected by the success of the rehabilitation program supported by the laser device. The exercises were customized to accommodate the capabilities of the injured subjects in relation to intensity, volume, and

rest intervals that were based on scientific principles of their respective classes of subjects. In the current study, this was adopted purposely. Keeping the intensity, volume and rest regulated is better for performance since it maintains the motivation and stimulation (7:330–333).

The physical drills act powerfully in enhancing the capacities of normal individuals and injured sportsmen through a prearranged program based upon one hand (on the characteristics of the both) and can purely basing on that in reliable way. Rehabilitation can be described as, "the process of restoring the injured component to its pre-injured state" (10:9). Physiotherapy the Key: It is a fast and safe way to get back together. Therapeutic exercises are grounded in the science of physiology, anatomy, and biomechanics and tailored specifically to the diagnosis and physical exam of the unique patient. They involve preparatory exercises for strength, endurance, speed, flexibility, balance, cardiorespiratory endurance, and proprioceptive training (5:90).

Physiotherapy is defined as the use of physical methods in the treatment of diseases (11:1). Some of these physical methods include electrical therapy, ultrasound, laser therapy, heat, cold, dry needling, and exercise. Electrical therapies are among the most important pain-relieving modalities in electrotherapy, and their effects on the body have been well known for a long time. In addition to pain relief and increased range of motion, they also contribute to muscle strengthening when currents of different frequencies are used.

Laser therapy has a stimulating effect on tissue growth during physiotherapy. It contributes to the removal of damaged tissues and initiates biological changes in the treated tissues, thereby stimulating the growth of new tissues. Laser therapy has been successfully applied in many medical fields for many years. Variations in exercises within the training dose contribute to training muscles under different physiological conditions, adding new physiological effects due to changes in muscle state when exercises are performed using varied and regular methods (3:196–197). Flexibility exercises have a direct effect on eliminating pain and adhesions and contribute to achieving the full range of joint motion (1:102).

Zaki Hassan (2004) emphasized that following rehabilitative exercise programs has a positive effect on reducing injury and alleviating pain. The use of exercises increases joint range of motion, removes muscle spasms, facilitates joint mobility, relieves pain, and promotes relaxation and activation of the associated muscles. He also indicated that strength and flexibility exercises are among the most important components that rehabilitation exercise programs should include due to their positive effect on reducing and alleviating injuries. These components were incorporated into the proposed rehabilitation exercise program, which explains the clear and effective positive impact observed in improving shoulder joint function (4:35).

With regard to the latissimus dorsi muscle, the results were not statistically significant. The researcher attributes this to the insufficiency of the rehabilitative exercises specifically designed for this muscle, which may not have been adequate to produce a significant effect.

Conclusion

1. The prescribed rehabilitative exercises had a significant effect in reducing injury pain severity and increasing the range of motion among weightlifting athletes with disabilities.
2. The prepared rehabilitation exercises demonstrated a substantial role in alleviating injury-related pain and improving range of motion in weightlifting athletes with disabilities.
3. Modern devices and methods, such as laser therapy, contribute to accelerating recovery and restoring the injured part to its normal condition in a shorter period of time.

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