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Rehabilitation Program for Males Aged 20-30 with Myofascial Pain Syndrome

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Abstract

Myofascial pain syndrome is a widespread disorder within musculoskeletal system, characterized by hypersensitive muscle points that lead to localized and widespread pain, accompanied by reduced mobility. Despite availability of various treatment approaches, there remains a lack of integrated rehabilitation programs that combine physical therapy and structured mobility interventions within a clear empirical framework. This study aims to design a rehabilitation program combined with shortwave diathermy and to verify its effectiveness in reducing pain intensity and improving range of motion in patients with myofascial pain syndrome. Study adopted an experimental approach using a single-group, repeated-measures design (pre-medium-post). Sample included 20 male participants who underwent an 8-week rehabilitation program, divided into three progressive phases that included physical intervention and functional rehabilitation exercises. Data were analyzed using SPSS software to test significance of differences between measurements. Results of statistical analysis showed a significant improvement in pain and range of motion indices between pre- and post-measurements, reflecting effectiveness of rehabilitation program in improving participants' functional status. Concluded proposed rehabilitation program, combined with shortwave diathermy, is an effective intervention in reducing pain and improving motor function in patients with myofascial pain syndrome and is recommended for inclusion in evidence-based rehabilitation treatment programs.

Keywords: Myofascial Pain Syndrome, Trigger Points, Kinetic Rehabilitation, Shortwave Therapy, Chronic Myalgia.

Introduction

Rapid changes in modern lifestyles, particularly increasing reliance on technology for daily and professional activities, have led to prevalence of unhealthy movement patterns characterized by prolonged periods of inactivity and poor posture. This has negatively impacted efficiency of musculoskeletal system and contributed to an increase in incidence of muscle disorders, most notably myofascial pain syndrome, especially in upper back and shoulder area.

Recent literature in musculoskeletal medicine and rehabilitation indicates that limited range of motion associated with this syndrome cannot be explained as a simple mechanical defect, but rather results from a complex interaction between subtle changes in muscular environment, fascial tissue characteristics, and disturbances in central nervous system's motor control. Clinical studies have also demonstrated a clear correlation between muscle trigger point activity and reduced active range of motion, particularly in abduction and external rotation movements of shoulder joint, with significant improvement following therapeutic interventions that directly target musculoskeletal tissue.

Given importance of early and effective intervention in preventing worsening of this condition, there is a clear need to adopt scientifically based rehabilitation programs aimed at restoring motor function, reducing pain, and improving muscle performance. Shortwave diathermy is an effective physical therapy that has proven efficient in reducing muscle pain and stimulating recovery processes, especially when combined with targeted rehabilitation exercises. Current study focuses on designing a comprehensive rehabilitation program that combines shortwave diathermy with rehabilitation exercises to improve range of motion and reduce pain in patients with myofascial pain syndrome in upper back, thereby contributing to restoration of functional activity and preventing recurrence.

Myofascial pain syndrome is a common health problem that directly affects motor function and quality of life, especially among those who experience continuous muscle strain or adopt unhealthy movement patterns. Field observations conducted by the researcher at rehabilitation centers in Al-Kut revealed a significant increase in number of patients suffering from symptoms of this syndrome, particularly in upper back and shoulder area, accompanied by chronic pain and restricted range of motion. Despite use of various treatment methods, their results are often inconsistent, indicating need for more integrated rehabilitation programs based on clear scientific principles that combine physical therapy with structured exercise training. Current study problem is defined as investigating effectiveness of a rehabilitation program combined with shortwave diathermy in alleviating symptoms of myofascial pain syndrome in upper back, improving range of motion of those affected, contributing to restoration of their functional capacity, and reducing recurrence of injury.

Research objectives to designing an integrated rehabilitation program combined with use of Shortwave Diathermy device to rehabilitate patients with myofascial pain syndrome in upper back area. Verifying effect of rehabilitation program in improving functional variables of study sample, in particular reducing intensity of pain and increasing range of motion of affected joint.

Research Hypotheses there are statistically significant differences between pre-, middle, and post-measurements in pain intensity variable in favor of post-measurements. There are statistically significant differences between pre-, middle, and post-measurements in motor range variable in favor of post-measurements.

Materials and Methods

Study Design

This study adopted experimental method using a single-group repeated measures design, as it is suitable for the study in evaluating effectiveness of rehabilitation programs. Design included conducting three types of measurements pre-intermediate-post, with aim of determining amount of change in variables, which are pain intensity and range of motion. In the first stage sample underwent a pre-test to determine initial level, followed by application of therapeutic sessions using Shortwave Diathermy device in conjunction with guided rehabilitation exercises. In middle of program, an intermediate test was conducted to measure extent of phased improvement resulting from therapeutic intervention. Rehabilitation exercises continued to be applied according to prepared plan, and program concluded with a post-test, which represents final indicator for evaluating effectiveness of rehabilitation program in achieving objectives. Experimental design can be represented as follows:

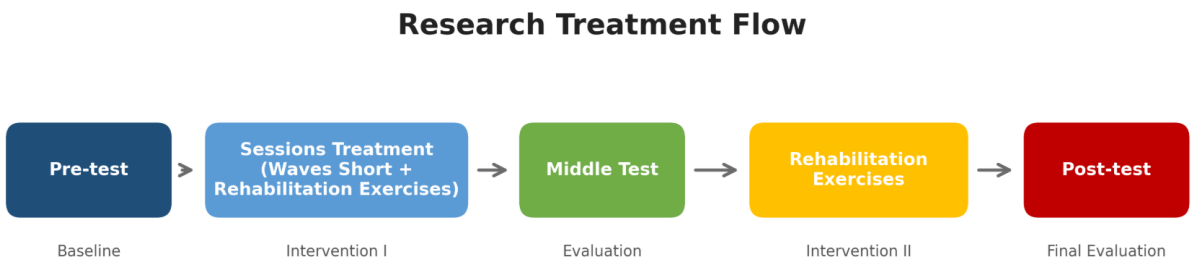

Figure 1. Flowchart of the Pre-test, Treatment, Middle Test, and Post-test Procedures

Study community consisted of patients diagnosed with myofascial pain syndrome in upper back region who were attending rehabilitation center for disabled in Al-Kut. Sample was selected purposively among patients it must be ensured that patient is free of any metal implants in thoracic vertebrae area, as short waves interact with metals, which is an ethical and professional standard in research. Myalgia syndrome Lobes in upper back, in people aged 20-30 Male year who meet participation requirements, and sample size was 20 patients who come to rehabilitation center for recovered in Al-Kut and are clinically diagnosed with syndrome after they have been examined by specialist doctor.

Sample selecting reasons

A set of conditions was established for selecting sample members to ensure its homogeneity and accuracy of results, and these conditions were as follows: must be suffering from myofascial pain syndrome in upper back region, clinically diagnosed by a specialist physician, and experiencing chronic muscle pain for more than 3 months with presence of muscle trigger points, age should be between 20-30 years and that participant will be subject to other training programs during the research period, participant must be free from injuries and illnesses, extreme nervousness and modern surgical procedures that may affect results of rehabilitation program.

Tools used

Elastic ropes of varying resistance. Dumbbells of different weights 250– 500 g. 8 Medicine balls. 8 Tennis balls. 8 Basketball balls. 8Volleyballs. Shortwave therapy device, American made. Dynamometer.

Tests used

Pain Intensity Test Visual Analog Scale (VAS): Test objective to measure severity of the pain for those with degree. Tools used: A form for collecting data. A seat for patient, technique for fibromyalgia in several positions, wrapper. Data recording: Score is recorded for situations identified in measurement form. Shoulder joint range of motion test: Range of motion of shoulder joint was measured in different movements, namely:

Dimensional Angle Test: Objective to measure angle by observing distance of injured person's arm about midline of body. Description: injured person is sitting in a chair with their arm at their side. towards ground and axis of action is under other shoulder bone on lateral side of fixed and pointed arm towards ground, which works move it backwards and upwards, and in sagittal plane, while maintaining straightness while moving arm. Recording: Record angle of joint and compare it with normal angle of joint 180 - 0 degrees.

Inward rotation angle test: Objective to measure angle of shoulder joint in position of inward rotation of arm. Description: patient sits on bench with elbow joint aligned and straight with shoulder joint, hand grip should be upwards. Axis of action is along bony prominence of elbow, aligned with upper ulna. With arm held in place along midline of body, injured person then moves their arm inward along ulna bone. Recording: Record angle and compare it with natural angle of joint 60-0 degrees.

Outward rotation angle test: Objective to measure angle by moving the injured person's arm outwards. Description: patient sits on bench with elbow joint aligned and straight with shoulder joint, with fist facing downwards, and axis of action along elbow prominence, arm is positioned along midline of body, and a signal is given to patient by rotating forearm bone to outside. Recording: Record angle and compare it with natural angle of joint 80-0 degrees.

Pilot study

Pilot study was conducted on Saturday, November 25, 2025 On a sample of 5 patients with myofascial pain syndrome at upper of back, excluding selected research sample.

Pre-tests

Pre-tests were conducted on 11/30/2025 on 20 patients with fibromyalgia. Bandage is located in upper back at rehabilitation center for disabled in Al-Kut. Results were recorded with establishing special conditions, this is done to create similar conditions when conducting intermediate and post-tests.

Main study

On 2025/12/2, main study began and lasted for eight weeks. Rehabilitation program included use of shortwave therapy, followed by rehabilitation exercises, which continued throughout program, with two sessions in first three weeks after physical therapy sessions Saturday and Wednesday, and three sessions for other weeks Saturday, Monday and Wednesday, and duration of each unit depends on type and nature of exercises included in rehabilitation program, program was implemented in three phases as follows:

First stage lasts for 3 weeks: It focused on reducing pain. Improving blood circulation muscle relaxation through, sessions using a shortwave therapy device. Number of sessions: 8–12 sessions, duration : 20–30 minutes. Frequency: 3 times per week.

Intermediate test: intermediate test was carried out on Thursday, December 21, 2025, under same conditions and sequence as pre-test, in order to identify extent of progress in level of sample, and to confirm disappearance of pain and inflammation in affected area and extent of improvement in range of motion.

Second stage lasts for 3 weeks: after completion of first stage, which included: Moderate-intensity stretching exercises for injured muscles aim to improve muscle flexibility to improve range of motion and neuromuscular coordination, principle of gradual load and consideration of individual differences among sample group have been taken into account.

Third stage lasts for two weeks: This included performing rehabilitation exercises consisting of exercises of relatively different intensity and resistance for seventh week. For eighth week, with three units each week Saturday, Monday, and Wednesday, the goal was to restore efficiency and improve range of motion of joint.

Post- tests

Post -tests were conducted on 2025/1/25 under certain circumstances similar to pre-tests and intermediate tests.

Statistical methods

Statistical system (SPSS) was used to extract results.

Results

Displaying results of pre-, intermediate, and post-tests for pain score variable:

Table 1. Mean, standard deviation, means of differences and deviations, calculated t-value, significance level, and significance of difference in pain score test pre-test

Test	Measurement unit	Pre-test		Middle-test		MD	SD_d	Calculated (t) Value	Sig. level	Sig. type
		M.	St.d	M.	St.d					
Rest pain	Degree	0.84	0.41	0.16	0.41	0.68	0.52	3.20	0.024	Sig.
Pressure pain	Degree	1.01	0.00	0.32	0.52	0.69	0.52	3.25	0.023	Sig.
Angle pain	Degree	2.84	0.41	1.82	0.41	1.02	0.63	3.97	0.011	Sig.

Table 2. Mean, standard deviation, means of differences and deviations, calculated t-value, significance level, and significance of difference in pain score test middle and post

Test	Measurement unit	Middle-test		Post-test		MD	SD_d	Calculated (t) Value	Sig. level	Sig. type
		M.	St.d	M.	St.d					
Rest pain	Degree	0.16	0.41	0.00	0.00	0.16	0.41	0.96	0.383	Insig.
Pressure pain	Degree	0.32	0.52	0.17	0.41	0.15	0.41	0.90	0.411	Insig.
Angle pain	Degree	1.82	0.41	0.50	0.55	1.32	0.52	6.22	0.002	Sig.

Discussion

The findings of this study indicate that the rehabilitation program combined with shortwave diathermy was effective in reducing pain intensity among males with myofascial pain syndrome. The significant reduction in pain from pre-test to middle-test suggests that shortwave diathermy contributed to early pain relief by increasing blood circulation, reducing muscle tension, and improving tissue relaxation.

This finding is consistent with the explanation of Cameron (2018), who stated that physical agents such as shortwave diathermy may support rehabilitation by producing thermal effects that increase tissue extensibility and reduce pain. Similarly, Forster and Palastanga explained that electrotherapy modalities can be useful when applied appropriately as part of a broader rehabilitation plan.

The reduction in pain may also be explained by the improvement of local circulation around the affected muscles. Increased blood flow helps reduce tissue hypoxia and remove metabolic waste products that may contribute to trigger-point sensitivity. This supports the view of Donnelly et al. (2019), who emphasized that myofascial trigger points are closely associated with local tenderness, restricted movement, and altered muscle function.

The improvement in shoulder range of motion also confirms the positive effect of the rehabilitation program. Significant increases in abduction, internal rotation, and external rotation indicate that the program successfully improved flexibility and functional mobility. Kisner and Colby (2017) stated that therapeutic exercise is essential for restoring flexibility, strength, and movement control after musculoskeletal dysfunction.

The use of shortwave diathermy before exercise may have prepared the soft tissues for movement. Deep heating can reduce tissue stiffness and increase collagen extensibility, making stretching and mobility exercises more effective. This may explain why the participants showed progressive improvement throughout the program.

The findings are also in line with previous rehabilitation studies which reported that structured exercise programs can reduce pain and improve movement capacity in patients with shoulder and myofascial problems. Ali Badiwi and Samer Katea

(2023) also reported that rehabilitation programs have a positive effect on reducing pain by increasing blood flow to the working muscles. In addition, Abdel Salam Atito (2016) emphasized that integrated rehabilitation therapy may improve muscle relaxation, circulation, pain relief, and psychological comfort.

Overall, the results suggest that myofascial pain syndrome should be treated through an integrated approach. Shortwave diathermy helps create a favorable physiological condition, while rehabilitation exercises restore movement function and reduce the possibility of recurrence. Therefore, combining both interventions appears more effective than relying on passive treatment alone.

Discussion

Discussion of pain score variable results

Tables show that there are statistically significant differences in favor of middle test for pain score variable pain at rest, pain at pressure, pain at angle, with a noticeable improvement in middle measurement compared to pre-test, and this improvement continued in post-test. Although differences in pain at rest and pain at pressure were not statistically significant in middle measurement compared to post-test, However, angle pain showed strong statistical significance with a decrease in average pain according to values in Table (3) compared to pre-test, followed by development and increase in pain relief leading to full recovery, as evidenced by post-test results. Recent studies indicate that integrated rehabilitation programs, including rehabilitation exercises and fascia release techniques, physical therapy it is considered one of the most effective interventions for improving myofascial function and reducing associated pain. Link between rehabilitation program and Short Wave device represents an integrated relationship.

Device creates a physiological environment reducing pain and increasing flexibility, while rehabilitation program resets motor function and prevents recurrence of injury. This improvement is linked to improved blood flow and reduced hypoxia within fascia, which reduces hypersensitivity of nerves. This is what Ali Badiwi and Samer Katea (2023) indicated: "Rehabilitation program has an effective impact on pain relief in the first stage of rehabilitation because it works to increase blood flow to working muscles and thus increase blood supply."

This leads to enhanced muscle flexibility and strength, with continued improvement until post-test, shortwave device also plays a role during initial phase, as its effectiveness, especially continuous wave (SWD) type, depends on its high ability to penetrate deep tissues and convert electromagnetic energy into energy. This As confirmed by Abdul Halim Al-Husseini (2009), "Using shortwave therapy at the beginning of program has a significant effect in eliminating tears, debris, and damaged cells, and leads to a reduction in swelling and inflammation resulting from injury, thus eliminating pain and allowing patient to return to their normal life."This was confirmed by (Abd al-Salam Atito, 2016) "that integrated rehabilitation therapy positively affects strengthening and relaxation of tense muscles, stimulates blood circulation, improves muscle tone, relieves pain, and improves psychological condition." Displaying results of pre-, middle, and post-tests for motor range variable

Table 3. Mean, standard deviation, means of differences and deviations, calculated t-value, significance level, and significance of difference in motor range pre-test and middle

Test	ea surement unit	Pre-test		Middle-test		D	M	SD_d	Calculated (t) Value	Sig. level	Sig. type
		M.	St.d	M.	St.d						
Abduction	Degree	51.40	5.36	92.33	5.92	-40.93		5.19	-19.27	0.000	Sig.
Internal Rotation	Degree	38.00	2.83	60.50	4.51	-22.50		2.43	-23.69	0.000	Sig.
External Rotation	Degree	23.70	3.83	62.00	5.83	-38.30		8.66	-10.84	0.000	Sig.

* Significant when error rate is less than significance level 0.05

Table 4. Mean, standard deviation, means of differences and deviations, calculated t-value, significance level, and significance of difference in motor range test middle and post-test

Test	Measurement unit	Middle-test		Post-test		MD	SD_d	Calculated (t) Value	Sig. level	Sig. type
		M.	St.d	M.	St.d					
Abduction	Degree	92.40	5.92	166.17	6.88	-73.77	8.18	-22.11	0.000	Sig.
Internal Rotation	Degree	60.55	4.51	85.83	1.72	-25.28	4.23	-14.67	0.000	Sig.
External Rotation	Degree	63.00	5.83	81.67	4.41	-18.67	5.50	-8.76	0.000	Sig.

* Significant when error rate is less than significance level 0.05

Discussion of motor range variable results

Positive results indicate approved rehabilitation program, which combined therapeutic effects of shortwave therapy with targeted exercises, significantly contributed to improving function of muscular fascia in upper back and reducing pain intensity. This aligns with recent studies that have confirmed effectiveness of fascia release techniques and rehabilitation exercises in reducing trigger points and improving range of motion.

This led to greater improvement in pain and function compared to traditional treatment, as a result of improved blood flow, regulation of nerve activity, and reduction of central over-excitability. Integration of physiotherapy with rehabilitation exercises enhanced positive outcomes of rehabilitation program. Use of a shortwave device helps improve blood circulation, as deep heat dilates blood vessels, increasing blood flow to trigger points in aortic muscles of upper back. This helps flush out metabolic waste and provide oxygen necessary for recovery. This underscores multifactorial nature of fascia pain and need for comprehensive and integrated rehabilitation programs. It also helps reduce viscosity of connective tissue, as aortic region in MPS suffers from stiffness in muscle fascia.

Deep heat increases collagen elasticity, and device does not operate in isolation from rehabilitation program, but rather represents a "thermal preparation" phase. This recent studies have confirmed that using SWD before stretching and strengthening exercises achieves faster results. Breaking loop (pain - spasm - pain) Increased range of motion ROM of shoulder and scapula joint. This is observed by examining pre-test, intermediate, and post-test results, as shown in Tables (4-3) and (4-4). Significant differences were observed, favoring intermediate test over pre-test and post - test over middle test for range of motion variable after rehabilitation program.

Results indicate that continuous muscle tension alters mechanical properties of muscle tissue and limits its functional efficiency. This points to role of myofascial fascia in transmitting mechanical tension through motor chains. The increase in viscosity of fascial matrix, coupled with a decrease in ability to glide between its layers, leads to overall mechanical resistance that affects efficiency of joint movement. This interpretation aligns with modern fascial chain model, which demonstrates that any disruption in a part of chain can affect overall movement of upper limb, with a significant decrease in number of painful points in post-test measurements compared to the pre-test.

The researcher attributes this to prepared rehabilitation program, including type and timing of exercises and duration of rehabilitation program, which provided adaptation and instilled flexibility when performing rehabilitation exercises. This was confirmed by (Abdullah Al-Lami, 2010), who stated that "it is possible for rehabilitation program to produce permanent changes and adaptations in flexibility, especially if it exceeds a period of 6 weeks. Improvement of myofascial tissue is not solely mechanical; it also involves regulating autonomic nervous system (ANS), reducing nerve over-excitation, and improving neuromuscular coordination.

The researcher also attributes this to positive impact of rehabilitation program exercises in alleviating pain and allowing for a wider range of motion. As Braunstein (2016) indicated, "Rehabilitation exercises play a significant role in increasing joint's range of motion, thus reducing pain intensity." This was confirmed by Mohamed Adel Rashdi (2017), who stated "Exercises can improve shoulder pain in individuals with injuries, particularly when performing a range of motion, whether maximum or minimum.

Repetition in performing exercises improves joint flexibility, according to what was mentioned by (Naif Mufdi, 2006) "Repeating physical exercises 3-4 times for each muscle exercise contributes to restoring flexibility efficiency.It is well-established that rehabilitation exercises improve, increase, and develop muscle strength, flexibility, and range of motion. The researcher believes that anyone lacking sufficient flexibility in their tendons and muscles is more susceptible to injury, whether in muscles or joints. This was confirmed by (Mohammed Othman, 2018) "When flexibility is present, injuries to muscles, ligaments, and cartilage are reduced." Variety in rehabilitation program had a clear impact on achieving sufficient flexibility, which contributed to reducing muscle spasms and improving blood circulation.

It also enhanced muscle flexibility and strength, prevented recurrence of spasms, which explains continued improvement up to post-test and reduction of pain in early stages. And to alleviate severity of pain associated with myofascial pain syndrome in upper back area , to have an effect Integration between short waves and rehabilitation exercises since short waves have a superior ability to penetrate deep tissues, raising their temperature, such as rhomboid muscles, this facilitates relaxation of myofascial trigger points. This explains why program excels in reaching anatomical depth of aortic muscles.

Once this deep heating occurs, tissue viscosity decreases and fiber elasticity increases, preparing muscle to respond to exercises. Applying heat before stretching exercises contributes to reducing sensitivity of muscle spindles and improves ability of connective tissue within myofascial unit to stretch and elongate. This preparatory effect of device is what makes stretching and strengthening exercises in rehabilitation program more effective; since exercising on elastic, blood-permeable tissue reduces chances of irritation, and this approach creates a synergistic effect significantly accelerates recovery process in chronic musculoskeletal conditions. From this it appears that combining devices with exercises is optimal solution to ensure sustainability of results and prevent recurrence of injury.

Conclusions

This study concluded that a rehabilitation program combined with shortwave diathermy had a positive effect on reducing pain intensity and improving shoulder range of motion among males aged 20–30 years with upper-back myofascial pain syndrome.

The program was effective because it combined pain-relieving physical therapy with progressive rehabilitation exercises. Shortwave diathermy helped reduce pain and muscle tension, while stretching, mobility, and strengthening exercises improved flexibility and functional movement. Therefore, this combined approach can be recommended as a practical rehabilitation method for patients with myofascial pain syndrome.

There is a positive effect Rehabilitation exercises and use of Shortwave device led to a significant decrease in pain intensity and muscle trigger points in rehabilitation of syndrome injuries. Muscle pain wrap Ages 20-30 male year in aorta, and according to variables of degree of pain. Improvement in range of motion and functional performance in properties of muscle fascia flexibility, elongation after rehabilitation program. Combination of Short wave device and rehabilitation program is the most effective method.

Recommendations

Adopting integrated rehabilitation programs with continued exercise after end of treatment. Emphasis is placed on using treatment sessions with Short wave device. Within rehabilitation programs for pain Myofascial pain syndrome. Urging researchers to conduct studies and research to identify specific characteristics of each injury and to develop rehabilitation programs tailored to different age groups And studying effect of other types of therapeutic devices, need to spread health awareness among members of society and its institutions in order to prevent various injuries.

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