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Comparison of Friction and Interference on Decreasing Pain in People with Myofascial Pain Syndrome

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Abstract

This study aimed at investigating the effect of friction and interference on decreasing pain of people with myofascial pain syndrome. The study was conducted at the Mabbulo Sibatang Clinic and Physio Health Care Clinic, involving 26 subjects who met the inclusion and exclusion criteria. Subjects were randomly assigned into two groups, intervention group 1 was given friction, and intervention group 2 was given interference. Both group were treated three times a week for two weeks. Measurements were performed using the numerical rating scale (NRS) for pain. results showed that there were significant differences ($p < 0.05$; CI = 95%) in terms of NRS score between the intervention group 1 and intervention group 2. The research result showed that friction is more effective on decreasing pain compared to interference.

Keywords: Myofascial Pain Syndrome; NRS; Friction; Interference.

1. Introduction

The human body consists of 60% of the musculoskeletal system, which continuously causes the emergence of mechanical movements of humans.

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One of them is the fascia, the rest muscles, ligaments, tendons and bones. Myofascial pain syndrome (MPS) is a pain condition that is commonly chronic, but it can be acute. MPS is often associated with myofascial trigger points (MTrPs) in muscle and connective tissue including fascia. Active MTrPs are one of the major peripheral pain generators for musculoskeletal pain conditions [1]. Myofascial pain syndrome (MPS) is characterized by muscle pain, tenderness, and spasm in areas of the body that are asymmetric or focal [2]. Myofascial pain syndrome may occur after the muscle contracts repeatedly, caused by repetitive motion used during work or hobbies or due to stress associated with muscle tension [3]. A muscle contracts very quickly, if the muscle cannot handle the load, reaching a full contraction state of approximately in 0.1 second for the average muscle. If given a load, the contraction velocity will decrease progressively as the load increases. Strong and prolonged muscle contractions result in a condition known as muscle fatigue [4]. MPS is a disease of muscle that produces local pain and referred pain, tightness, tenderness, clicking, stiffness and restriction of movement, autonomic phenomena, twitching responses to the muscles involved and weakness of the muscles without atrophy. Myofascial pain is not a fatal condition, but it can significantly lead to a reduced quality of life and the greatest cause of lost working time. In the case of acute musculoskeletal pain, pressure on the muscle, will increase pathophysiologically as a result of muscle pain. Interstitial swelling arises as a result of local muscle damage. At the same time, connective scar tissue / connective tissue fibrosis is formed. This myofibroses will gradually suppress a number of sensory nerves that contribute to the pain of referral in myofascial pain syndrome. Regardless of the real cause, chronic connective tissue fibrosis is detrimental, as it causes increased tissue stiffness and subsequent movement disorders [5]. The cause of myofascial pain syndrome is unknown. However, previous injuries, poor sleep patterns, stressful life situations, and depression are common conditions that may underlie and worsen the MPS. Such a risk factor can cause a change in the brain's ability to correctly process pain perception (called a pain processing center) [6]. The results of the Denmark study in 1504 randomly selected people, aged 30-60 years found 37% of men and 65% of women, had localized myofascial pain, while the results of a study in the United States, consisted of 100 men and 100 women of air force soldiers (average age is 19 years old) found 45% of men and 54% of women had tenderness in the neck region of a latent trigger point [7]. A study shows that latent type trigger point commonly found in the shoulder girdle muscle. Approximately 45 - 55% is asymptomatic in adults. Latent trigger points can develop into active trigger points as a result of psychological stress, muscle tension and physical factors such as bad posture habit [8]. To reduce pain, improve bio configuration and improve blood circulation system in muscle and fascia, one of the most commonly used treatment is myofascial manipulation using manual compression or friction, passive stretching, and interference. Friction aims to reduce crosslinks in collagen, as modulating pain by inhibiting nerve types IIIb, IV or delta and C and improving joint motion. Interference is given for stimulating the sensory nerve, stimulating the nerves types II and IIIA to inhibit the nociceptors. Passive stretching is a specific form of therapy with manual techniques used to improve connective tissue extensibility that is impaired by adhesion, contractures, and cicatrix tissue leading to functional limitations [9].

2. Materials and Methods

2.1. Description of the Study Area

The study was conducted at Mabbulo Sibatang Clinic and Physio Health Care Clinic in May to August 2016. The type of this research is experimental using Quasi Experimental design and using pre test and post test two-

group design method. The first group receive intervention treatment in the form of friction. The second group receive intervention treatment in the form of interference. Both of group receive passive stretching.

2.2. Population and Sample

The study population were all myofascial pain syndrome patients who received physiotherapy treatment at Mabbulo Sibatang Clinic and Physio Health Care Clinic. The sample in this study was taken by purposive sampling technique, base on inclusion and exclusion criteria as follows:

2.3. Inclusion Criteria

1. Male and female patients
2. Age 17 – 65 years
3. Experiencing myofascial pain syndrome in the shoulder and back area
4. Willing to be a sample in research until completion and willing to corporate until the study end.
5. Not contraindicated for the provision of friction or interference

2.4. Exclusion Criteria

Samples that do not follow the study until the specified time limit will be excluded

2.5. Sample

The sample was obtained by purposive sampling method, where the sample size was determined by the researcher in accordance with the inclusion and exclusion criteria that have been determined. The sample of research is based on the sample formula amounted to 26 people, but in this study the number of samples plus 15% to get better results. The study sample, divided into groups. the first treatment group as many as 15 people were given friction treatment while the second treatment group was given interference with the sample number of 15 people. both groups were given passive stretching treatment.

2.6. Collecting Data and Procedure Intervention

Data were obtained by measuring the value of pain using numerical rating scale. Data taken before and after treatment.

2.7. Study design

This study is using pre- and post-test with two groups design. Subjects were patients who came to the Mabbulo Sibatang Clinic and Physio Health Care Clinic with the chief complaint of myofascial pain syndrome. A total of 26 patients were enrolled to participate in this study. Patients are eligible to participate if they were diagnosed with MPS, experienced MPs at back and shoulder, and had no contraindication with friction, interference and passive stretching. Patients were excluded from the study if they have condition that interfere them to participate in the study. All patients signed an informed consent upon agreeing on participating in this study. Participants

were then randomised into two groups, intervention group 1 and intervention group 2, using sealed envelope. The intervention group 1 was given friction and passive stretching three times a week and the intervention group 2 was given interference and passive stretching. Numerating Rating Scale was used for measurement of pain. Measurements were made twice; at baseline and at week 2.

The statistical test used is Wilcoxon for pre- and post-treatment comparison. The Mann-Whitney Test was used to compare the difference between the groups. The analysis of the difference is considered significant if $p<0.005$.

2.8. Ethical consideration and clearance

Ethical approval for this study was obtained from The Ethics Committee, Health Polytechnics of Makassar, Department of Physiotherapy, Makassar, Indonesia.

3. Results

Based on the general characteristics of the study participants (Table 1), there was no significant difference between the intervention group 1 and the intervention group 2 in terms of age, gender, NRS score

Table 1: General characteristics of Participants

	Friction	Interference	p
Gender, female	100%	50%	ns
NPS Score	6,80 ± 1,373	7,47 ± 1,125	ns

(Table 2) showed that there are significant differences ($p<0.05$) between pre-test and post-test on pain in both groups. The Mann-Whitney test.

Table 2: Effect of Friction and interference on the reduction of pain.

	Pretest (Mean±SD)	Post Test (Mean±SD)	ρ*
Friction	6,80 ± 1,373	2,80 ±1.521	0.001*
Interference	7,47 ± 1,125	1,27 ±0,458	0.001*

* Wilcoxon test

(Table 3) showed that the changes of pain is significantly different ($p<0.05$) between the groups with intervention group 1 perform better than intervention group 2

Table 3: Differences in the effects of friction and interference on the reduction of pain

	Friction	Interference	ρ*
Pain	5,53	4,67	0,021

* Mann-Whitney test

4. Discussion

The friction effect directly stimulates the mechanoreceptor Aβ, which resides on all myofascial tissues. Through reflex inhibition, the receptor of the neural Aβ with a conduction velocity of 36-72 m/s, leads to lamina II and III in the gelatinous substance (GS) in the posterior horn cell through the neo-spinothalamic tract. The increased activity of the thick myelin nerve fibres of Aβ in GS stimulate the release of encephalin and interneuron encephalin found in many dorsal horn spinal cord. This neurotransmitter activates a blockade of magnesium voltage dependent to close the gate in GS. This leads to the inhibition of synaptic transmission of nerve fibres C by decreasing the excitability of T cells from transmitting pain impulses to the higher nervous system. In addition to inhibition at the spinal level, inhibitory effects also occur at the supra-spinal level. Increased nerve impulses Aβ reaches the brain, inhibiting the effectiveness of the hypothalamus and cortical previously stimulated by pain impulses from nerve fibres C through the relay station of the brain to control gate closure in the spinal cord by suppressing the continuous flow of pain impulses. This will cause the pain to decrease to a normal somatosensory state [10]. Piezo electrical effect is a physical phenomenon that will be mechanically stimulated by specific pressure (friction), which will create the surface into electrical polarization. Collagen fibres from myofascial tissue are a natural semicrystalline, biologically compressed and impulsive friction creating electrical polarization that affects the normalization of myofascial trigger points through regeneration of collagen in the area of secondary lesions [11]. Deep transverse friction massage, is a technique used by Cyriax and Russel to differ the musculoskeletal structures of the ligaments, tendons and muscles to provide movement therapy over a small area. Deep massage can provide effective stretching and mobilization in tense bands and also reduce pain and in myofascial pain [12]. When a muscle is stretched, the muscle spindle or stretch receptor in the skeletal muscle is stimulated and inhibits the nerve impulse of the afferent nerve fibres. It stimulates the supply of motor neurons in the muscle that increases the impulse (muscle contraction). At the same time, the mechanoreceptor of Golgi induces relaxation in the outstretched muscle so that the muscle tension occurring in the myofascial trigger point area decreases, followed by a decrease in pain [10]. Decreased flexibility due to stiffness in joints, muscles and tendons will reduce the range of motion. If mobility is limited, there is a decrease in potential force due to inhibition of motoneuron activity. Stretching can restore normal mobility through increased range of motion and flexibility so that the muscle potential force will also increase.

5. Conclussions

Intervention of friction may have a significant effect on decreasing pain in myofascial pain syndrome patients. Intervention of interference may have a significant effect on decreasing pain in myofascial pain syndrome patients. Intervention of friction is more effective in decreasing pain in myofascial pain syndrome patients compared to intervention of interference.

6. Abbreviations

MPS: Myofascial pain syndrome; NRS: numerical rating scale; MTrPs: myofascial trigger points.

7. Competing interest

The authors declare that they have no competing interest

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