

The Effect of *Myofascial Release* on Pain Levels in the Condition of *Myofascial Pain Syndrome* in the *Upper Trapezius Muscle* in Students of *Stikes Kesdam IV/Diponegoro Semarang*

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Abstract. Working position when typing is closely related to ergonomics or comfort issues, especially in the areas of design, position and proper body posture. MTrPs is a condition describing acute or chronic soft tissue pain, which occurs in muscles or muscle fascia. MTrPs cause contraction of knots or nodes that can form in a muscle band junction which is a source of pain. Pain or discomfort in the form of a prickling, throbbing, cutting and burning sensation in the loose connective tissue that covers the trapezius muscle due to trigger points. Data on computer workers in the Pedurungan Wetan area is 24 workers. This research method is a pre-experimental one group pre and post test design and sampling using purposive sampling technique. The population of this research is rental workers who work in Tlogosari Wetan, Pedurungan, Semarang City. The research instrument uses VAS (Visual Analog Skill). The research stages consist of preparation, implementation and processing of research data. The steps taken at the preparation stage are literature study, field survey, outreach to rental workers. The implementation stage is carried out by collecting data. The results of this study showed that there was a relationship between typing time and the occurrence of MTrPs in the Upper Trapezius Muscle.

Keywords: *Myofascial Release, Myofascial Pain Syndrome Pain, Upper Trapezius Muscle.*

BACKGROUND

Working on a computer for a long time causes chronic trauma, which in the long term causes *Myofascial trigger point syndrome* (MTrPs). MTrPs is a painful condition that occurs in the muscle fascia. Pain or discomfort in the form of a prickling, throbbing, cutting and burning sensation in the loose connective tissue that covers the muscles. MTrPs occur more often in the upper extremity muscles with the greatest intensity occurring in the Upper Trapezius muscle.

The neck is an anatomical part of the body that has bones, muscles, tendons, *ligaments*, blood vessels and nerves that are interconnected with each other. If the neck muscles are weak, loose and untrained, it will cause the muscles to be easily injured if they are loaded in the wrong posture. Typing position with the neck leaning forward with the elbows causes the shoulders to not relax causing the neck muscles to hold heavy loads for a long time. Trauma that occurs to muscles can be direct trauma and indirect trauma which causes muscle tension. This can cause discomfort or ongoing pain (Talesu, 2009).

According to The International Association for the Study of Pain, pain is a form of unpleasant sensory and emotional experience that is associated with tissue damage or a tendency for tissue damage to occur or a condition that indicates tissue damage. Myofascial pain syndrome is a condition of muscle or fascial pain, acute or chronic, involving sensory, motor or autonomic function associated with myofascial trigger points (MTrPs). The terms

myofascial pain and musculoskeletal pain are often confused and overlap with each other, even though musculoskeletal pain is any type of pain that occurs in the muscles, while myofascial pain refers to a specific syndrome caused by trigger points (TrPs) in the muscles or fascia (Lavelle, 2007).

Trauma over a long period of time will result in obstruction of tissue function, resulting in the formation of tight bands in the muscles. Link bands accompanied by trigger points start from latent or acute trigger points that do not cause pain, but the sequence of events can cause active or secondary trigger points from trigger points in the long term (Delaune, V. 2011).

Myofascial pain syndrome is a condition that causes prolonged pain in your muscles and fascia (muscle covering tissue). Myo means muscle and fascial means tissue covering muscles. Sufferers of myofascial pain syndrome (MPS) will have areas that are more sensitive to pain, known as trigger points. When pressure is applied to these trigger points, pain can occur in parts of the body. Muscle pain caused by MPS can attack anyone, both men and women, at any time where the exact trigger point cannot be determined. As much as 30 – 85% of bone and muscle pain experienced by a person is caused by MPS. Although it can be experienced by various age groups, most MPS sufferers are aged 27 – 50 years. The trigger points in question are a hypersensitive or hyperirritable point or place in the muscle or fascia structure that tightens and causes local pain if pressed, and if hyperirritable enough can cause radiating pain and autonomic phenomena. MTrPs are often found around the neck and back area. MTrPs can be divided into two clinically, namely active or latent. Active MTrPs will cause spontaneous pain if provoked, thereby preventing maximal muscle lengthening, weakening the muscle, mediating a local twitch response when stimulated, and causing referred pain in the area of pain in question. Active MTrPs can cause impaired joint range of motion and weakness. Active MTrPs are associated with myofascial pain syndrome. Latent MTrPs are usually asymptomatic, do not cause pain during daily activities, but sometimes pain can occur when given external stimulation, such as palpation, and can be activated if the muscles are tense, tired, or injured. Latent MTrPs can have clinical symptoms like active MTrPs, but the quality is milder, so it can be said to be the pre-clinical phase of myofascial pain syndrome. It is important to identify latent MTrPs correctly to prevent them from turning into active MTrPs (Alexander, D. 2007)

Multiple manifestations nerve from MTrPs that clear related to reflexes spinal cord causes a twitch reflex local related to existence integration center at level spinal cord. Role from nerve peripheral on neuromuscular junction and its connection with cell anterior function in *ucopolysaccharidosis* (MPS). Myofascial pain syndrome is a significant health problem, with 85% of the general population experiencing myofascial pain at some time in their lives with an

annual prevalence of approximately 46%. The incidence between men and women is almost the same, namely 54% occurs in women and 45% in men. One study found that TrPs were the source of pain in 30% of patients who presented with complaints of pain to primary care, and were the cause of 85% of patients with complaints of pain visiting tertiary care. Myofascial pain syndrome was also diagnosed in 21% of patients attending orthopedic clinics and 30% of patients visiting internists. Previous studies found myofascial pain syndrome to be the most common cause of pain in clinic populations, and responsible for 54.6% of chronic head and neck pain, 85% of back pain.

LITERATURE REVIEW

Rental worker

Rental workers are workers who use computers in a sitting position. By doing work for 8-10 hours. Typing position in static conditions on the arms and neck. This is related to health problems. Health problems can include nervous disorders, vision problems, muscle and wrist injuries. This disorder is usually caused by a lack of blood flow and tension in certain parts of the body continuously and repeatedly. This can last for years before the disorder emerges as a serious injury. The science that discusses the problem of work accidents is ergonomics.



Figure 1. Typing position of rental workers

Myofascial trigger point syndrome (MTrPs)

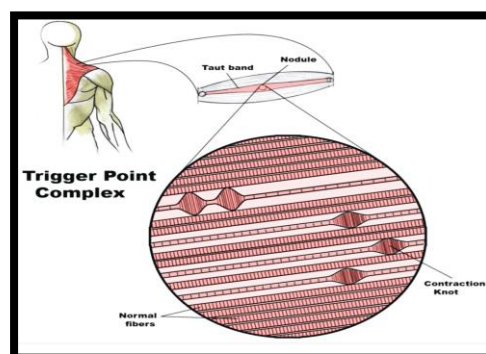


Figure 2. MTrPs in the *Upper Trapezius* muscle

Myofascial trigger point is a painful condition that occurs due to a trigger or spam in the muscles. *Trigger Points* are local pain trigger points characterized by irritation, inflammation and swelling. When pressure is applied, it will cause hypersensitive pain. Excessive muscle work causes local ischemia, local ischemia is capillary compression resulting from within the junction band. Vasodilation occurs and substance P is inhibited due to capillary inflammation and ongoing ischemia.

In general, the mechanism of local pain is the phenomenon of *local release of neurotransmitters* , hydrogen ions, potassium ions, and *segmental nociceptive nerve cytokines*. The role of the sympathetic nerve is the most important concept because it maintains abnormal electrical activity at the trigger point. A *postsynaptic dysfunction* of muscle that increases *intracellular calcium* concentrations via *ryanodine calcium receptor* channels on the *sarcoplasmic reticulum membrane* , or via a second *adrenergic* mediated system involving *protein kinase C* and a *denozin monophosphate Cyclic AMP (AMP)*, initiating *actin-myosin interactions* , can also result in neuromuscular contraction. This significantly suggests that calcium channel activity is important in the generation of trigger point triggers (Nguyen, 2012)

Trigger points that occur start with trauma and injury to the muscles usually immediately result in *active trigger points* . Unergonomic posture, repetitive muscle use, nerve root irritation, or any other factor can also form *active trigger points* . *Latent trigger points* can develop gradually without going through an *active process*. *Latent trigger point* conditions usually arise without realizing it, they can easily be converted into *active trigger points* . *Active trigger points* it may at some point stop causing pain and become latent. However, *Latent trigger points* can easily become active again, which can cause new problems as people age who are more susceptible to developing new trigger points initiated by impacts to the muscles (Lestari. 2009) .

Trigger points are usually differentiated from tender points; there are some reviews that refer to them as part of a clinical spectrum. The main reported difference is that trigger points produce patterned pain, whereas tender points produce pain at the site of palpation. Trigger points are further classified as active and latent. Latent trigger points cause painful sensations only with direct compression. Active trigger points produce pain spontaneously and also with compression. It can also be summarized as referred pain and is a descriptive term used to define acute or chronic musculoskeletal pain conditions. Characterization was performed by sensory, motor, and autonomic findings associated with myofascial trigger points (MTrPs). This syndrome eventually occurs after repeated muscle contractions that may be caused by repetitive movements before work or hobbies or by stress-related muscle tension. Often involves the neck

and back. The experience of pain is a multidimensional process that includes sensory and perceptual components and can lead to unpleasant behavior, all of which involve the activation of various areas of the central and peripheral nervous system. While most of us experience muscle tension, the associated discomfort. With myofascial pain syndrome only persists or worsens the situation (Bron, C. *et al.*, 2011).

Upper Trapezius Muscle

The trapezius muscle is the largest muscle and is located superficially in the upper back area. The trapezius muscle covers the neck, specifically posterolateral to the occiput, extending laterally across the scapula and ending in the superior part of the latissimus dorsi muscle. This muscle is innervated by the C5-T1 nerve roots. According to the direction of the fibers, the trapezius muscle is divided into three parts, namely: upper fiber, middle fiber, and lower fiber. The function of the upper trapezius muscle is during elevation and abduction movements of the scapula. When this muscle performs a concentric contraction together with the levator scapula muscle, a scapula elevation movement will occur. If the upper trapezius muscle contracts unilaterally, a lateral flexion of the neck will occur, whereas if it is done bilaterally, it will produce a head extension movement (Vizniak, 2010)

upper *trapezius* muscle is a Type I muscle (*slow twitch*) or tonic muscle, also called *red muscle*, functions to maintain posture, contains a lot of *hemoglobin* and *mitochondria* (long resistance to resistance), this type of muscle disorder tends to be tense and shortened. Sibby (2009), stated that MTrPs tend to occur more often in type 1 muscles.

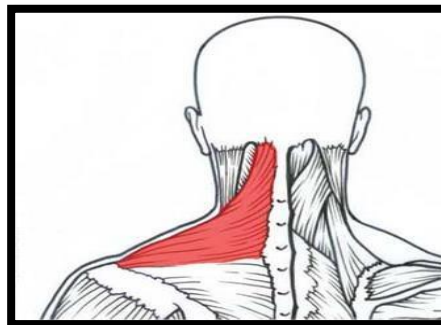
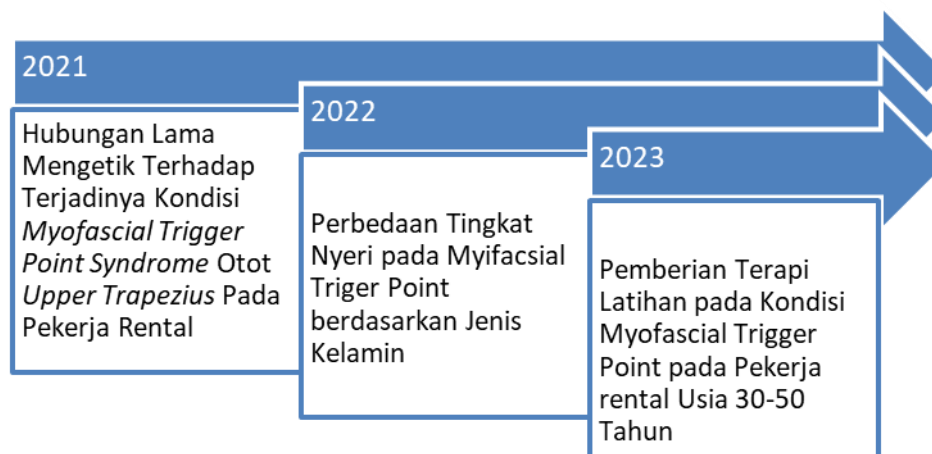


Figure 3. *Upper Trapezius Muscle*

This is because the *upper trapezius muscle* is an aerobic muscle, which requires a lot of oxygen and nutrients. MTrPs occurs in muscles *Upper trapezius* in computer rental workers is caused by an imbalance between compression or tension and relaxation, resulting in continuous muscle contractions which cause mechanical stress on the *myofascial tissue* for a long time. This condition causes the *nociceptors* in the muscles and tendons to be stimulated. Excessive muscle contractions while working can cause macro and micro trauma to the muscles. Macro

trauma is caused by direct injury to muscle tissue. The macro trauma that occurs causes an inflammatory process which leads to the formation of new, irregular collagen tissue. This tissue is what will trigger pain due to the presence of Myofascial Trigger Points in the muscles. Meanwhile, micro trauma is caused by repeated injuries to the muscles (repetitive injury) due to continuous work. The workload received continuously stimulates the formation of new collagen tissue and leads to the formation of fibrous tissue. This is what triggers the development of trigger points in the muscles. The more frequently and strongly *the nociceptors* are stimulated, the stronger the reflex activity of *the upper trapezius muscle tension will be* , which causes *viscous circles*. *The viscous circle* condition results in areas in the tissue in the form of *band junctions* that experience local ischemia, resulting in disruption of tissue *microcirculation* which causes a lack of nutrients and oxygen as well as an accumulation of metabolic waste substances resulting in pain (Rogers , 2012).

The following is the road map for the Chief Researcher from 2021 to 2023, which is as follows:



RESEARCH METHODS

Research Phase

Design This research is qualitative research with a total sample *design* , the research stages consist of:

1. Research preparation stage

Research preparation begins with a field survey and research permits.

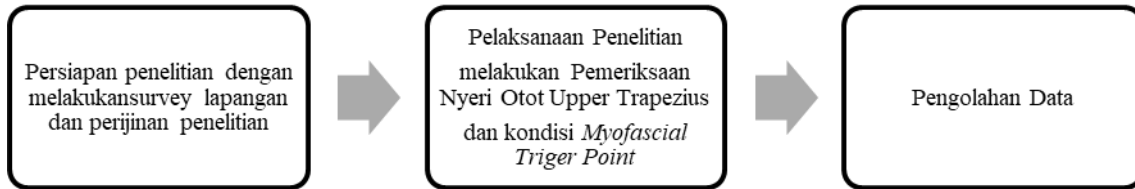
2. Research implementation stage

The research was carried out by conducting socialization and pain examination with a sample size of 26 people who had filled out a consent form to be a sample in the study followed by examining the condition of the *Myofascial Trigger Point*. in the *upper*

trapezius muscle. To determine the sample that will be involved in the research. Pain measurement was carried out using a VAS measuring instrument.

3. Research data processing stage

Data processing is carried out after the research data has been collected Data analysis was carried out using statistical tests



RESEARCH RESULT

Results of research regarding the relationship between typing time and the occurrence of *Myofascial Trigger Point Syndrome in the Upper Trapezius Muscle* in Rental Workers in Tlogosari Wetan, Pedurungan, Semarang City. This research involved 26 rental workers.

Working Time/Hours	Frequency	Percentage (%)
12	1	1.8
11	16	72.9
10	4	6.5
9	2	4.3
8	2	4.5
7	1	1.9
Amount	26	100.0

Table 1.1 Sample Frequency Distribution based on Working Time

Based on the table above, it shows that the number of respondents with a working time of 12 hours is 1 respondent with a percentage of (1.8%), respondents with a working time of 11 hours are 11 respondents with a percentage of (72.9%), respondents with a working time of 10 hours are 4 people with a percentage of (4.3%), 2 respondents with a working time of 8 hours with a percentage of (4.5%), and 1 respondent with a working time of 7 hours with a percentage of (1.9%) .

Work Period (Months)	Frequency	Percentage (%)
9 months	7	26.8
10 months	8	27.3
11 Months	9	29.4
12 months	2	15.7
Amount	26	100.0

Table 4.1.2 Table based on working mass

Based on the table above, it shows that of the 26 respondents who had a working mass of 9 months, 7 people (26.8%), a working mass of 10 months were 8 people (27.3%), and a working mass of 11 months were 9 people (29.4%). , 12 months of work mass there were 2 respondents (15.7%).

Score	Category	Frequency	Percentage (%)
0-3	Light	3	16.7
4-6	Currently	4	21.4
7-10	Tall	19	61.9
Amount		26	100.0

4.1.3 Table Based on Pain Level using VAS

Based on the table above, it shows that the frequency of respondents based on measuring the level of pain using VAS is 3 people with mild pain with a percentage (16.7%), 4 respondents with moderate pain with a percentage (21%), and 19 respondents with high or severe pain with a percentage (61%).

Length of Working Time	MTrPs		p
	YES	NO	
Low Risk	3 (19.7%)	3 (34.6%)	0,000
Medium Risk	4 (21.9 %)	3 (34.6%)	
High risk	12 (86.7 %)	1 (8.9%)	
Amount	19 (84.7 %)	7 (16.3%)	

4.1.3 Table of Relationship between Typing Time and the Occurrence of Upper Trapezius

MTrPs

The results of the research after carrying out the Chi Square Test obtained a value of $p=0.000$, which means $p \leq 0.05$, thus showing that there is a significant relationship between the relationship between typing time and the occurrence of *Myofascial Trigger Point Syndrome* in the *Upper Trapezius Muscle* . Rental Worker at Tlogosari Wetan, Pedurungan, Semarang City.

DISCUSSION

The results of the research state that there is a relationship between typing time and the occurrence of Myopascial Triger Point in the *Upper Trapezius muscle* . This is in line with research conducted by Hoyle, (2013) which states that musculoskeletal complaints are pain that occurs continuously beyond physical capabilities in computer workers who are carried out for a long time , in the form of static conditions when typing, causing muscle weakness, causing the need for oxygen to increase for sustaining muscle contraction continuously causes *hypoxia* which ultimately results in *microtrauma*. Such *microtrauma* is followed by a local inflammatory response that is believed to play an important role in the sensitive pain response.

Extending working time beyond the worker's capabilities results in work not being accompanied by optimal work efficiency, effectiveness and productivity, and even causes a decrease in work quality and results. Working for a long time will increase lactic acid and decrease sugar levels in the body, which can lead to fatigue, metabolic disorders, and susceptibility to muscle tightness and myofascial pain syndrome.

Other research conducted by Ervina (2012) stated that MTrPs occur in muscles *Upper trapezius* in computer rental workers is caused by an imbalance between compression or tension and relaxation, resulting in continuous muscle contractions which cause mechanical stress on the *myofascial tissue* for a long time. This condition causes *the nociceptors* in the muscles and tendons to be stimulated. The more frequently and strongly the *nociceptors* are stimulated, the stronger the reflex activity of *the upper trapezius muscle tension will be* , which causes *viscous circles*. *The viscous circle* condition results in areas in the tissue in the form of *band junctions* that experience local ischemia, resulting in disruption of tissue *microcirculation* which causes a lack of nutrition and oxygen as well as an accumulation of metabolic waste substances resulting in pain.

CONCLUSIONS AND RECOMMENDATIONS

The conclusion in this research was that there was a relationship between typing time and the occurrence of *Myofascial Trigger Point Syndrome, Upper Trapezius Muscle Condition* in Rental Workers.

Suggestions for further research can be differentiated based on gender . This is based on hormonal changes, such as a decrease in the amount of estrogen in a woman's body, which can cause symptoms such as anxiety, depression and difficulty sleeping. Low thyroid function and decreased levels of thyroid hormone, as well as the hormones estrogen and progesterone, can cause muscle pain, fatigue, mood swings, and more anxiety in women than in men .

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