

## Research Article

# The Difference Between the Effects of the McKenzie Neck Exercise and Contract-Relax Stretching on Neck Function of Onion Peelers with Myofascial Pain Syndrome

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**ORCID**Zidni Imanurrohmah Lubis: <https://orcid.org/0000-0002-5325-1909>**Abstract.**

Many jobs have health risks caused by unergonomic posture while working for a long time. One of the disorders that often occurs is myofascial pain syndrome. If ignored, there will be a disruption in neck function. Contract-relax stretching can reduce the pain and spasm in neck muscles, while the McKenzie neck exercise can restore the cervical intervertebral disc to its normal position and reduce neck disability. This research aimed to determine the difference in the effect of contract-relax stretching and the McKenzie neck exercise on the neck's function in onion peelers with myofascial pain syndrome. The study was quasi-experimental with two groups: pre-test and post-test design. The population was onion peelers at CV. Anita Jaya Sukses, Sidoarjo. The sample was 18 respondents who met the inclusion criteria. Data were analyzed using the Independent Sample T-test. Based on the test, contract-relax stretching and McKenzie neck exercise obtained a significant value of 0.011 ( $p < 0.05$ ), so  $H_0$  is rejected and  $H_1$  is accepted. The study concluded that there was a difference in the effect of contract-relax stretching and McKenzie neck exercise on neck function in onion peelers with myofascial pain syndrome.

**Keywords:** Contract-relax stretching, McKenzie neck exercise, myofascial pain syndrome

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## 1. INTRODUCTION

Myofascial Pain Syndrome is pain that appears in the muscle that begins with a pain point or trigger point in a sensitive area in the link band. Myofascial pain syndrome occurs when the Upper trapezius muscle works heavily due to improper posture or trauma when carrying out activities for a long time, resulting in a stress and tension phase that is longer than the relaxation phase so that this situation causes the muscles to experience rapid fatigue (1).

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One type of work that is at risk for musculoskeletal disorders is peeling onions. Onion peeling workers are jobs where the workers are in charge of peeling the dry skin of onions and removing the roots which are then distributed to food companies. The working position of the onion peeling worker is sitting statically and the head is bent towards the hand that peels the onion which lasts for a long time, so it is often found that the work position becomes bad, such as sitting hunched over and the head tends to bend forward (forward head). The long-lasting non-ergonomic work position is the cause of musculoskeletal complaints (2).

Myofascial pain syndrome causes various disorders to appear such as pain, spasm, muscle stiffness and limitation of motion (1). As a result of the disorders that arise due to myofascial pain syndrome, the functional ability of the neck is disrupted and neck disabilities occur which include body impairment, activity limitation and participation restriction. According to WHO, impairment is a problem with body function and body structure, activity limitation is defined as an individual's difficulty in carrying out activities, and participation restriction is a problem for individuals to be involved in situations in life.

Interventions such as contract relax stretching and mc. kenzie neck exercise can be used to treat myofascial pain syndrome. Contract relax stretching is a PNF technique and a stretching technique which is a combination of two stretching techniques, namely isometric stretching and passive stretching. This is because the contract relax stretching technique provides isometric tension on the part of the muscle that is experiencing shortening and then continues by relaxing and stretching the muscle (3). The contract relax stretching intervention was performed in 3 sets with 3 repetitions/set with a 30 second interval per session. The intervention was given for 2 times a week (4).

Mc.Kenzie neck exercise is an exercise technique by stretching the spine and muscles during exercise with specified repetitions. Mc.Kenzie neck exercise is useful for improving posture disorders due to static activity, changing the alignment of the neck to return to normal, reducing stiffness due to spasms and giving muscle elongation effects (5). The mc.kenzie neck exercise technique is given 6-8 repetitions per movement, 2 times a day for 3 times a week with five movements consisting of head retraction in sitting, neck extension in sitting, side bending of neck, neck rotation, and neck flexion. in sitting (6).

Based on previous research, it was found that functional impairment of the neck due to myofascial pain syndrome in the upper trapezius muscle can be treated with the intervention of contract relax stretching and mc.kenzie neck exercise. This is evidenced by research (7), where contract relax stretching can restore shortened muscle length

back to normal and increase muscle flexibility. The mc.kenzie neck exercise according to (5) states that the mc.kenzie neck exercise affects the repair of the intervertebral disc back in so that pain due to compression of the nerve roots decreases. This exercise focuses on mechanical deformities and limitations so that patients can feel their functional abilities will greatly improve.

However, no one has compared the contract relax stretching and mc.kenzie neck exercise interventions to the functional ability of the neck. So that researchers are interested in conducting the following research with the aim of getting a comparison of contract relax stretching and mc.kenzie neck exercise on the functional ability of the neck in peeling onion workers with myofascial pain syndrome.

## 2. MATERIALS AND METHODS

The method used in the following research is quasi-experimental with a two group pre-test and post-test approach to examine the two treatment groups that were given the intervention of contract relax stretching and mc.kenzie neck exercise to see the effect of the intervention given on the functional ability of the neck. on onion peeling workers with myofascial pain syndrome. Sampling technique with purposive sampling. The sample used as many as 18 respondents who have met the following inclusion criteria: working as an onion peeler at CV. Anita Jaya Sukses; minimum 1 year working period; working duration 6-8 hours/day; in productive age; have myofascial pain syndrome; subjects are willing to be used as subjects in the study.

Research data collection was carried out within a period of 1 month. The data collection tool used an NDI (Neck Disability Index) questionnaire to obtain data for measuring neck functional abilities. The normality test in this study used the saphiro wilk, the effect test used the paired t-test, and the comparison test used the independent sample t-test.

## 3. RESULTS

### 3.1. Characteristics of Respondents

In Table 1. it can be seen that the age group of respondents is divided into four groups based on age group according to the Ministry of Health of the Republic of Indonesia. Most of the respondents were in the age group of 17 to 25 years, where the age group was the late adolescent age group with a total of 6 workers (33%). Based on their gender,

the respondents to the onion peeling workers at CV. Anita Jaya Sukses is mostly female with a total of 12 workers (67%), beside the male respondents are 6 workers (33%). For the working period of most respondents is less than 5 years, which amounted to 12 workers (67%), while based on the duration of work, the most duration of work carried out by respondents was 6 hours with a total of 11 workers (61%).

The results of the study based on the average of neck functional ability of respondents can be seen in Table 2. From the comparison of the difference in averages values, it can be seen that the decrease in neck disability index in mc.kenzie exercise group was higher which means neck functional ability better than another group.

TABLE 1: Characteristics of Respondents.

Characteristics	N	Type	Percentage
Age	18	Late Teens Early Adulthood	33% 28%
		Late Adulthood Early Elderly	28% 11%
Sex	18	Female Male	67% 33%
Work duration	18	6 Hours 8 Hours	39% 61%
Work period	18	<5 years	33%
		>5 years	67%

TABLE 2: The Average of Neck Functional Ability in Contract Relax and Mc. Kenzie Exercise Group.

Group	N	Pre	Post	Difference
Contract Relax	9	13,556	11,667	1,889
Mc. Kenzie Exercise	9	12,444	5,778	6,667

### 3.2. Corelation Analysis

Based on the results of the paired t-test, the significance value both of the Contract Relax Stretching and Mc. Kenzie Exercise group is 0,00 ( $p < 0,05$ ), which means that there is an effect of both interventions on increasing neck funtional ability of Peeling Onion Workers with Myofacial Pain Syndrome. From the comparison test, we got p value 0.011 ( $p < 0.05$ ) which means that there is a difference in the effect of Contract Relax Stretching and Mc. Kenzie Exercise on increasing neck funtional ability of Peeling Onion Workers with Myofacial Pain Syndrome.

TABLE 3: Results of the Effect of Neck Functional Ability in Contract Relax and Mc. Kenzie Exercise Group.

Group	N	$\alpha$	p
Contract Relax Stretching	9	0,05	0,000*
Mc. Kenzie Exercise	9	0,05	0,000*

TABLE 4: Comparative Results of the Effect of Contract Relax Stretching and Mc. Kenzie Exercise for Increased Neck Functional Ability.

Group	N	$\alpha$	p
Contract Relax Stretching	9	0,05	0,011*
Mc. Kenzie Exercise	9		

## 4. DISCUSSION

### 4.1. Effect of Contract Relax Stretching on Neck Functional Ability in Peeling Workers

According to the results of research conducted on onion peeling workers, it was found that there was an effect of the contract relax stretching intervention on the functional ability of the neck of the onion peeling workers, which means that there was an increase in the functional activity of the neck of the onion peeling workers with myofascial pain syndrome.

The results of this study are supported by Saputri(7), where myofascial pain syndrome can occur due to poor posture with a long duration that causes muscles working in that position to experience excessive loading. Complaints of myofascial pain syndrome can be treated with a contract relax stretching intervention which is an intervention that combines passive stretching and isometric contraction, namely by giving isometric contractions of shortened muscles accompanied by inspiration followed by relaxation and stretching of the muscles. As a result, the length of the muscle that was originally shortened returns to normal and also increases muscle flexibility, so that the problem of neck disability caused by myofascial pain syndrome can be reduced.

Research conducted by Irianto (8) stated that giving a contract relax stretching intervention will cause the motor unit of the entire muscle fiber to be activated due to isometric contraction accompanied by maximum inspiration. The Golgi tendon is also stimulated and helps the muscle relax after contraction so that the muscle releases. Strong contraction of the muscles facilitates pumping action so that the metabolic process improves due to vasodilation and relaxation after maximal muscle contraction. Transport waste from metabolism and acetabolic produced from the inflammatory process to run smoothly which causes pain complaints that cause limitations to carry out daily activities to be reduced.

Giving contract relax stretching in conventional therapy has been shown to reduce neck disability. Giving isometric contractions accompanied by maximal inspiration can activate the motor unit in all muscle fibers and stimulate the Golgi tendon which helps

relax the muscle after contraction so that the adhesion release occurs in the muscle. Giving strong contractions to muscles can facilitate the pumping action mechanism that affects metabolic processes and local circulation goes well because of vasodilation and relaxation after maximal muscle contraction is given, blood circulation also goes well due to vasodilation and relaxation of muscles. The transportation of metabolic wastes from the inflammatory process also runs smoothly and pain decreases. A stretching component that can restore muscle length by activating the golgi tendon until relaxation can be achieved because pain caused by muscle tension can be reduced and the viscous circle chain can be broken. The decrease in pain and the return of muscle length due to contract relax stretching affects the decrease in neck disability in myofascial pain syndrome m.upper trapezius, because the patient no longer complains of sudden pain that interferes with daily activities. The return of shortened muscle length and decreased muscle tension can affect neck movement to become free again without any limitations that hinder daily work (9).

#### **4.2. The Effect of Mc.Kenzie Exercise on Neck Functional Ability in Peeling Onion Workers**

According to the results of research conducted on onion peeling workers, it was found that there was an effect of the mc.kenzie neck exercise intervention on the functional ability of the onion peeling workers' neck, which means that there was an increase in neck functional activity in onion peeling workers with myofascial pain syndrome.

The results of this study are supported by Jaleha's research (5), which states that myofascial pain syndrome in the upper trapezius muscle is caused by the use of muscles in a long static position, pressure on the muscles and poor working mechanisms in the neck and shoulders so that the muscles will spasm and shorten. Mc.kenzie neck exercise is an intervention that can be done as a treatment for myofascial pain syndrome in the upper trapezius muscle, the exercise is carried out by providing stretching of the spine and muscles along the movement. The study explained that giving the mc.kenzie neck exercise intervention affects the repair of the disc and pushes the intervertebral disc back into which causes the pressure on the nerve roots to decrease and is followed by decreased pain. Pain is reduced starting from the distal and then to the proximal part which is finally centered in the neck, the concentration of pain is called the centralization phenomenon. This exercise focuses on mechanical deformities and limitations, so that patients can feel their functional abilities will improve very well.

Nurhidayanti's research (10) explains that the movements in the Mc. Kenzie neck exercise each have an effect. The first movement in the Mc. Kenzie exercise is head retraction which is useful for reducing neck pain. The second movement is neck extension used to prevent pain. The third movement is a special side bending of the neck to reduce pain on one side of the neck that hurts more than the other side. Then in the fourth movement, namely neck rotation, it is good to reduce stiffness in the neck. The last or fifth movement is neck flexion, which can be useful for reducing headaches and neck pain and neck muscle stiffness. The principle of stretching the muscles in the mc. kenzie exercise movements can restore the length of the shortened soft tissue, so that the flexibility of motion can increase. Mc.Kenzie exercises can help restore normal neck alignment and reduce stiffness in the intervertebral joints due to sustained muscle spasm due to incorrect posture during activities, as well as giving the effect of muscle elongation or shortening of muscles. So that the functional ability of the neck can be increased and disability decreased.

Mc.Kenzie's exercise in the form of stretching has the aim of correcting the wrong posture due to both static and dynamic activities and returning the neck alignment back to normal. According to research by Sugijanto (5), exercises to correct posture are considered to have a good effect on reducing neck disability in cases of myofascial pain syndrome m. upper trapezius. Poor posture such as forward head where the head falls forward and the shoulders are prone to flexion causes the upper trapezius muscle to become tense continuously which can cause disability. Exercises that are useful for correcting posture are carried out with the aim of reducing excessive muscle work due to wrong posture when doing work, so that muscle work is back in balance and muscles work optimally without limitations.

Practically, the McKenzie Neck Exercise has a principle in terms of which target muscles are activated, consisting of the sternocleidomastoid muscle, deepest cervical flexor, erector spine, scapula retractor, suboccipital muscle group, chest muscle, and levator scapula muscle. The activation of the synergism of these muscles will produce strong impulses in the muscle spindle (MS) and golgi tendon organs (GTO). MS is a receptor in the muscle that receives direct stimulation from muscle contraction, while GTO is a stretch receptor located in the muscle tendon and reacts to excessive stretching of the muscle. MS and GTO work together to control and detect all tension during muscle contraction. MS works to maintain a constant muscle length by providing feedback on changes in contraction, where MS stops nerve impulses that increase tension in the antagonist muscle to prevent overstretching. This event results in relaxation of the antagonist muscle, also known as reciprocal inhibition. Meanwhile, sensory nerve

impulses from the GTO enter the dorsal spinal cord and meet with inhibitory motor neurons. This process prevents further contraction of the agonist muscle from occurring, accompanied by a decrease in muscle tone, resulting in a relaxation of the agonist muscle known as post-isometric relaxation. The Mc. Kenzie neck exercise produces a balanced proportion of motion by

### **4.3. Comparison of Contract Relax Stretching and Mc.Kenzie Neck Exercise on Neck Functional Ability**

The results showed that there was a difference in the effect of the contract relax exercise and mc.kenzie neck exercise interventions on the functional ability of the neck of peeling onion workers with myofascial pain syndrome. The difference in the mean scores between the two interventions is clearly a significant difference. The comparison results using independent t-test showed a significant value (p-value) of 0.011, which is less than 0.05, which means that there is a significant difference in the effect between the contract relax stretching and mc.kenzie neck exercise interventions on the functional ability of the neck of the peeling onion workers with myofascial pain syndrome. As explained in the theoretical review, both interventions theoretically have the same result as producing the effect of reducing pain and increasing the functional ability of the neck. However, the two interventions have different techniques, mechanisms of action and other effects.

Prianthara's research (9) states that contract relax stretching focuses on the Golgi tendon which can be stimulated because there is an isometric contraction accompanied by maximum inspiration which activates all muscle fibers. The stimulated Golgi tendon will help the realization of muscle relaxation after contraction so that the release of adhesions in the muscle occurs. Muscle contraction also facilitates the pumping action mechanism which results in good metabolic and circulation processes due to vasodilation and muscle relaxation. Also the transportation of metabolic waste (p substance) and acetabolic from the inflammatory process can run smoothly and pain will be reduced. The stretching component can also restore muscle length by activating the Golgi tendon so as to achieve relaxation because muscle tension drops and the viscous circle chain breaks (8).

The results of the study on the effect of mc.kenzie neck exercise prove that there is a difference in the value of the functional ability of the neck before and after the intervention is given. These results are in accordance with Jaleha's research (5) which states that the influence of mc.kenzie neck exercise can affect disc repair by encouraging the



disc to re-enter, so that the pressure on the nerve roots is reduced and the pain felt will be reduced. The mc.kenzie neck exercise technique aims at mechanical deformities and limitations that are useful so that patients can feel an increase in functional ability. This exercise also provides benefits for restoring normal neck alignment and relieving stiffness in the intervertebral joints due to sustained muscle spasm. The administration of mc.kenzie also provides a muscle relaxation effect after maximal contraction which causes an inhibitory effect on muscles experiencing spasm (10).

Contract relax exercise and mc.kenzie neck exercise interventions can both affect the functional ability of the neck. However, the mc.kenzie neck exercise proved to be more effective in improving the functional ability of the neck. This is because the mc.kenzie neck exercise does not only focus on stretching techniques, giving contractions and relaxation such as contract relax stretching. But also as a useful exercise to improve posture and neck alignment and repair the disc to return to normal. While contract relax stretching is more dominant in reducing pain by focusing on the Golgi tendon and related muscle stretching. So it can be concluded that the two interventions are equally influential, but from the results of research conducted and from the supporting literature, the mc.kenzie neck exercise intervention is more supportive of increasing the functional activity of the neck region.

## 5. CONCLUSION

According to the results obtained from the study entitled "Comparison of Contract Relax Stretching and Mc.Kenzie Neck Exercise on the Functional Ability of the Neck of Peeling Onion Workers with Myofascial Pain Syndrome" it can be concluded that (1) The contract relax stretching intervention has an effect on increasing the functional ability of the neck of the onion peeling worker with myofascial pain syndrome; (2) Mc.kenzie neck exercise intervention has the effect of increasing the functional ability of the neck in onion peel workers with myofascial pain syndrome; and (3) Tthe mc.kenzie neck exercise intervention is better in improving the functional ability of the neck in onion peel workers with myofascial pain syndrome compared to the intervention contract relax stretching.

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