Jurnal Keterapian Fisik
Vol. 9, No. 1, May 2024
https://doi.org/10.37341/jkf.v9i1.414

Original Research

The Effectiveness of Myofascial Release Technique and Self Exercise in Reducing Pain & Disability in Elderly with Myofascial Pain Syndrome

Putu Ayu Sita Saraswati[1*], Sayu Aryantari Putri Thanaya[2], Govinda Vittala[3]

[1,2,3] Physiotherapy Department, Faculty of Medicine, Universitas Udayana, Indonesia

ABSTRACT

Background*: Neck pain is a major public health problem, especially for the elderly. One cause of neck pain is myofascial pain syndrome. Myofascial pain syndrome is characterized by the presence of trigger points that arise from the junction bands of muscle fibers. Three studies found that the prevalence of neck pain in the elderly was between 8.8% and 11.6%. Chronic neck pain causes increased muscle tone, decreased joint range of motion, functional impairment and activities of daily living, and decreased quality of life in the elderly. This study aimed to compare the effectiveness of combining myofascial release technique and ultrasound with self-exercise and ultrasound in reducing pain and neck disability for the elderly.*

Methods: *This experimental study used a randomized pre- and post-test control group design. The variables in this study were pain and neck disability. The participants were 24 people who were divided into Group 1 with myofascial release technique (n = 12) and Group 2 with self-exercise (n = 12). The intervention was given 3 times per week for 4 weeks.*

Results: *The results showed that neck disability significantly decreased before and after the intervention in both groups (p<0.001). There was also a significant difference between the two groups.*

Conclusion: *Myofascial release technique and self-exercise are effective in reducing neck pain and disability in the elderly with myofascial pain syndrome. However, the combination of ultrasound and myofascial release technique is more effective than ultrasound and self-exercise in reducing neck pain and disability in the elderly with myofascial pain syndrome.*

ARTICLE HISTORY
Received: November 14th, 2023
Accepted: August 29th, 2024

KEYWORDS
disability, elderly, myofascial, neck, pain;

CONTACT
Putu Ayu Sita Saraswati
✉
sitasaraswati@unud.ac.id
Physiotherapy Department, Faculty of Medicine, Universitas Udayana. Bukit Campus, Jl. Raya Campus of Udayana University Jimbaran, Kec. Kuta Sel., Badung Regency, Bali, Indonesia 80361.

Cite this as: Saraswati, P. A. S., Thanaya, S. A. P. ., & Vittala, G. . (2024). The The Effectiveness of Myofascial Release Technique and Self Exercise in Reducing Pain & Disability in Elderly with Myofascial Pain Syndrome . *Jurnal Keterapian Fisik*, *9*(1), 39–46. https://doi.org/10.37341/jkf.v9i1.414

INTRODUCTION

Neck pain is a common health problem with a lifetime prevalence of 14.2% to 71% in the adult population and is considered a major public health problem. One of the causes of neck pain is myofascial pain syndrome. Myofascial pain syndrome is a very common and significant musculoskeletal disorder that causes chronic pain in several parts of the body in the elderly, one of which is the neck area (Kim et al., 2016).

A study found that musculoskeletal pain in the neck area in the community for 1 year was 40%. This condition is also found to be higher in women. The prevalence of neck pain is high in the elderly population; it was found to be approximately 33% and 40% in men and women (Quek et al., 2014). The prevalence of chronic neck pain in the elderly in Iran was found to be 15.34%, respectively (Noormohammadpour et al., 2017).

A study showed that elderly people with neck pain had a poorer balance due to a reduced ability to recruit the muscle proprioceptive system, thus relying more on the vestibular system for postural stability (Quek et al., 2014). Appropriate management of neck pain is very important because chronic neck pain causes increased muscle tone, decreased joint range of motion, functional impairment and activities of daily living, and decreased quality of life (Shin et al., 2020).

Physiotherapists usually provide ultrasound as standard physiotherapy intervention for myofascial pain syndrome. Other physiotherapy treatments that can be given for neck pain due to myofascial pain syndrome in the elderly are myofascial release technique and self-exercise. Self-exercise seems beneficial for the elderly in this case. It is a cheap and efficient treatment, but there is still a lack of evidence of the effectiveness of self-exercise in the elderly population who have myofascial pain syndrome.

In the current study, we wanted to compare the effectiveness of combining the myofascial release technique and ultrasound with self-exercise and ultrasound in reducing pain and neck disability for the elderly. Both groups received ultrasound as a standard treatment.

MATERIALS AND METHOD

This was an experimental study with a randomized pre- and post-test control group design. The research was carried out in private physiotherapy practices in Denpasar and Badung, Bali, from June to July 2023.

The inclusion criteria of this study included: a) male or female subjects aged 60 years or over; b) subjects experiencing non-specific neck pain and limited mobility in the neck based on the assessment; c) subjects with no neurological disorders; d) those willing to be research subjects from the beginning to the end of the research by signing informed consent; and e) those who were able to communicate well and cooperatively.

The exclusion criteria in this study were patients who: a) underwent trigger point myofascial injection, intramuscular stimulation, or dry needling in the last six months; b) underwent neck and/or shoulder surgery in the last year; c) took narcotic medication within 1 month before this study; d) had symptoms and signs that met the 1990 American College of Rheumatology (ACR) criteria for fibromyalgia; e) had a diagnosis of cervical radiculopathy (in the commonly defined sense) or myelopathy; f) suffered from severe cardiovascular or respiratory disease; g) had evidence of cognitive deficits or communication difficulties; and h) exhibited inadequate cooperation.

The dropout criteria included: a) the patient did not come back during the study, b) the patient's condition worsened after being given therapy; and c) the patient withdrew from the study.

Sampling was carried out through a physiotherapy assessment process, and the results of a doctor's referral stated that the patient had myofascial pain syndrome in the upper trapezius muscle. According to the sample size calculation, the number of subjects needed in this study was 24, who were divided into two treatment groups. The

independent variables in this study were myofascial release technique and self-exercise, and the dependent variables were neck pain and disability.

The research procedure started with carrying out the licensing process at the institution. The research was conducted based on research ethics number 1803/UN14.2.2.VII.14/LT/2023. The authors made an informed consent that must be signed by the subject and approved by the physiotherapy supervisor, which stated that the subject is willing to be a sample of this research until it is completed.

The authors provided education to the subjects regarding the objective, benefit, importance, and procedure of this study. After the examination, the subjects were allocated into two groups (Group 1 and Group 2). Subjects in Group 1 were given myofascial release technique combined with ultrasound, while Group 2 received self-exercise combined with ultrasound.

Before carrying out the intervention, measurements will be taken on the respondent to determine neck pain and disability. The interventions in both groups were provided by physiotherapists who worked in private clinics and acted as field research assistants. Self-exercise at home for 10 minutes every day and record their exercise in a diary. MRT was given 3 times a week for a period of 1 month. One intervention takes 10 minutes.

Before and after the intervention, pain was measured in both groups using the Visual Analogue Scale (VAS), and disability was measured using the Neck Disability Index (NDI). Data were analyzed using the Statistical Program for Social Science (SPSS). The paired sample t-tests were used to compare the pre-test and post-test mean values of pain and disability variables of each group. The independent t-test was then used to compare the between-group mean values of pain and disability variables. A p-value of <0.05 was considered significant.

RESULTS

Data in Table 1 shows that subjects in Group I had an average age of 63.08±1.8 and Group 2 had an average age of 62.67±1.9. In Group 1, there were more females (58.3%) than males (41.7%). Likewise, there were also more females (66.7%) than males (33.3%) in Group 2. It can be concluded that there were more female subjects than males in both Group 1 and Group 2.

Table 1. Characteristic of Sample

Characteristic	Group1 (n=12)	Group 2 (n=12)
Age (year)*	63.08±1.8	62,67 ±1,9
Gender**:		
Male	5 (41.7)	4 (33.3)
Female	7 (58.3)	8 (66.7)

*Presented as mean ± SD, tested with independent t-test
**Presented in n(%), tested with chi-square test

The results of the normality test of NDI and VAS (Table 2) show that the probability value of NDI for Groups 1 and 2 was p > 0.05, which indicates that the data for Group 1 and Group 2 were normally distributed before and after treatment. The pain scores assessed using VAS were also normally distributed in both groups before treatment and after treatment (p > 0.05).

Table 2. Normality Test for NDI dan VAS Pre & Post Intervention.

Data	*Shapiro Wilk-Test*	
	Group 1 (p-value)	**Group 2 (p-value)**
NDI Pre Intervention	0.137	0.133
NDI Post Intervention	0.160	0.487
VAS Pre Intervention	0.311	0.470
VAS Post Intervention	0.139	0.301

Based on Table 3, the results of the homogeneity test using Levene's test showed that the probability value for the NDI before treatment and after treatment in both groups were homogeneous (all $p > 0.05$). The probability value for pain based on VAS results before treatment and after treatment showed a p-value > 0.05 in both groups, which means that the VAS data values before and after treatment in both groups were homogeneous. So, based on the results of the normality test and homogeneity test, the appropriate test to be used for hypothesis testing is the parametric statistical test.

Table 3. Homogeneity test for NDI and VAS Pre & Post Intervention

Data	Levene's Test (p value)
NDI Pre Intervention	0,725
NDI Post Intervention	0,824
VAS Pre Intervention	0,936
VAS Post Intervention	0,740

Table 4 displays the results of the paired t-test to determine the within-group difference in the NDI and VAS scores before and after treatment in both groups. Both groups showed significant within-group differences in the mean NDI score ($p<0.001$ in both groups) and the mean VAS score ($p<0.001$ in both groups) before and after treatment. This shows that both the combination of myofascial release technique and ultrasound as well as the combination of self-exercise with ultrasound can improve neck disability and pain.

The independent t-test was then used to compare the between-group mean NDI and pain scores. Significant differences were found in both NDI and VAS between the two groups ($p<0.001$ in NDI and $p<0.001$ in VAS). It can be concluded that the myofascial release technique with ultrasound was more effective in reducing neck disability and pain than self-exercise with ultrasound.

Table 4. Effect of Intervention on Reducing Neck Disability and Pain for Elderly with Myofascial Pain Syndrome

Data	Group	Pre	Post	Difference	p
NDI (%)	1	21.17±1.99	10.67±1.77	10.50±1.24	<0.001
	2	20.83±1.80	16.17±2.17	4.67±1.97	<0.001
	p value**	0.671	<0.001		
VAS	1	4.77±0.53	2.26 ±0.29	2.44±0.34	<0.001
	2	4.74±0.49	3.36±0.96	1.38±0.34	<0.001
	p value**	0.844	<0.001		

** Paired T-Test*

** *Independent T-Test*

DISCUSSION

This study found that the myofascial release technique with ultrasound was more effective in reducing neck disability and pain than self-exercise with ultrasound in the elderly with myofascial pain syndrome, as shown by the significant differences found in NDI and VAS values before and after treatment between Group 1 and Group 2. Providing ultrasound as a standard physiotherapy intervention can increase muscle elasticity produced by the cavitation and microstreaming effects of ultrasound.

This is in line with the theory of the mechanical effects of ultrasound put forward by Prentice in his book entitled Therapeutic Modalities in Rehabilitation (James W. Bellew et al., 2016), where cavitation and microstreaming will stimulate an increase in plasma fluid flow as well as an increase in the permeability of cell membranes, especially to calcium and sodium ions, thereby stimulating the process of physiological inflammation. Increasing the amount of calcium will stimulate transport from mast cells and histamine, which aims to clean debris and stimulate monocytes to release chemotactic agents and growth factors to stimulate endothelial cells and fibroblasts, which will stimulate the formation of collagen, which is rich in vascularization and tissue substances to speed up the tissue repair process (James W. Bellew et al., 2016).

Myofascial release technique intervention has been applied as a rehabilitative treatment for musculoskeletal cases such as neck pain. Providing myofascial release technique helps fibrous tissue reduce adhesiveness, restore fascia tension to normal conditions (Saraswati et al., 2022), reduce pain, increase functional ability, and help reduce symptoms in acute or chronic connective tissue complaints (Chen et al., 2021). In addition, the myofascial release technique helps restore the joint range of motion, thereby reducing muscle pain, stiffness, or excessive fatigue to a certain degree (Chen et al., 2021; Saraswati et al., 2022).

The myofascial release technique is a combination of the patient's active movements and the physiotherapist's passive movements. The physical therapist may use knuckles, elbows, or other tools to gently apply pressure, or kilogrammes of force, to the fascia in an attempt to stretch the fascia. The physiotherapist will instruct the patient to do stretching movements of the neck muscles that have trigger points while the physiotherapist applies pressure slowly in the opposite direction to the direction of the targeted muscle fibers. The patient's active movements are carried out slowly, followed by gentle physiotherapist pressure, and progress according to the patient's tolerance so that the attached fascia "automatically relaxes" (Chen et al., 2021).

The myofascial release technique also activates the central nervous system to produce a multisystem stretch response that plays a role in increasing flexibility so as to reduce limitations in the range of motion of joints (Sarin et al., 2018; Saraswati et al., 2022). At trigger points, there is deposition of lactic acid as a result of activity and the results of anaerobic metabolism. Physiologically, the myofascial release technique eliminates obstruction and lactic acid in the inner fascia and around muscle fibres, thereby improving fluid circulation around the tissue, strengthening the venous and lymphatic systems, and cleaning areas of fluid accumulation (Chen et al., 2021).

Based on the current study, the myofascial release technique is able to reduce neck disability and pain in myofascial pain syndrome in the neck of the elderly. The results of this study are supported by research conducted by Arguisuelasa et al. (2019), which examined the myofascial release technique on non-specific chronic lower back

pain. Their research proves that the myofascial release technique is able to overcome chronic pain, increase the range of motion of the joints, and increase the functionality of the lower back erector spinal muscles with the duration of the intervention of 40 minutes for 2 weeks ($p<0.05$) (Arguisuelas et al., 2019).

Based on Greenman's theory of peristalsis, explaining changes in fascia structure and the effects of myofascial release technique is almost the same as peristalsis (DeStefano et al., 2011). In the process of stretching the fascia myofascial release technique, the tension in the tissue is reduced, and heat will escape from tissue deformation, causing energy loss. Under ideal conditions, the fascial matrix should have a gel-like consistency to be absorbed into the tissue, so that the shortening of the muscle fibres (trigger points) is released and the matrix changes, thereby promoting substantial repair of the tissue (Chen et al., 2021).

For the elderly, the risk of experiencing secondary problems due to trigger points or neck pain is very high; therefore, intervention is needed that is safe and has a low risk of causing new problems. The myofascial release technique has been proven to have a low level of risk of endangering the condition of the elderly (Chen et al., 2021). In applying the myofascial release technique, it applies a minimal range of joint movement so that it does not force the elderly to have high flexibility. Apart from that, the myofascial release technique does not pose a risk of putting pressure or compression on the body.

In the current study, the self-exercise intervention given to Group 2 showed a significant difference in reducing neck disability and pain before and after the intervention. Self-exercise in this study took the form of providing exercises using a ball; the ball was placed in the trigger point area, then the emphasis was placed on that area, and after that stretching movements were given to the neck muscle region. Applying pressure using a ball to the trigger point area that is adjusted and sustained can provide mechanical stimulation, causing excitation of mechanoreceptors and fusimotor neurons, which has the potential to cause changes in local fluid dynamics and tissue viscosity (Seo, 2020).

Apart from giving pressure, the combination of pressure accompanied by circular movements is also able to release pressure/tension on the nerves and increase lymph flow by stimulating the superficial lymph (Seo, 2020). In research on forward head posture in the elderly, which compared the application of manual therapy to self-exercise carried out for 30 minutes, it showed that in the elderly, self-exercise was effective in reducing forward head posture, stress, and pain levels (Sim et al., 2023). Self-exercise carried out by the subject actively is able to cause motor control through active muscle contractions, thereby stimulating the activation of muscle fibers in muscles that have trigger points (Sim et al., 2023).

According to Lee's theory, active intervention is more effective than passive intervention (Sim et al., 2023). Apart from that, the reduction in pain in the elderly due to self-exercise in this study was also supported by research conducted by Seo, which stated that self-exercise in elderly women with obesity resulted in a reduction in stress and pain (Seo, 2020). Based on previous research, which examined self-exercise as a therapeutic method for elderly patients with myofascial pain syndrome, it was stated that self-exercise was able to reduce myofascial hypersensitivity and increase tissue flexibility after being given intervention twice a week for four weeks (Kim et al., 2016).

Self-exercise is also able to have an influence on reducing stress, a positive impact on the body's physiology, and rapid recovery in the elderly (Sim et al., 2023). However,

based on the current study, administering the myofascial release technique is more effective than self-exercise. Many factors could have influenced the results of the current study, namely the flexibility and strength abilities of the elderly, which of course could influence the self-exercise intervention.

In the self-exercise group, seniors are required to do the exercise independently and rely on hand strength to press the ball on the trigger point area. Weak-quality ball pressure is certainly less effective than providing more optimal pressure in the process of stretching the trigger point. Meanwhile, in the myofascial release technique group, subjects tended to be passive even though there was minimal active contribution from the subjects.

CONCLUSION

Myofascial release technique and self-exercise are effective in reducing neck disability in patients with neck pain due to myofascial pain syndrome. However, the myofascial release technique is more effective than self-exercise in reducing neck pain and disability in patients with neck pain due to myofascial pain syndrome. Implications of this research through myofascial release technique and self-exercise interventions in addition to standard physiotherapy interventions so that disability decreases and the data obtained is useful for researchers, samples, and the progress of the Indonesian nation.

ACKNOWLEDGEMENT

The authors would like to show their greatest gratitude to Lembaga Penelitian dan Pengabdian Masyarakat (LPPM) Universitas Udayana for funding this research.

REFERENCES

Arguisuelas, M. D., Lisón, J. F., Doménech-Fernández, J., Martínez-Hurtado, I., Salvador Coloma, P., & Sánchez-Zuriaga, D. (2019). Effects of myofascial release in erector spinae myoelectric activity and lumbar spine kinematics in non-specific chronic low back pain: Randomized controlled trial. *Clinical Biomechanics*. https://doi.org/10.1016/j.clinbiomech.2019.02.009

Chen, Z., Wu, J., Wang, X., Wu, J., & Ren, Z. (2021). The effects of myofascial release technique for patients with low back pain: A systematic review and meta-analysis. In *Complementary Therapies in Medicine* (Vol. 59). https://doi.org/10.1016/j.ctim.2021.102737

DeStefano, L., goleman, daniel; boyatzis, Richard; Mckee, A., & Perdana. (2011). Greenman's Principles of Manual Medicine. In *Journal of Chemical Information and Modeling* (Vol. 53, Issue 9).

James w. bellew et al. (2016). Modalities for Therapeutic Intervention SIXTH EDITION. In *Journal of Chemical Information and Modeling* (Vol. 53, Issue 9).

Kim, M., Lee, M., Kim, Y., Oh, S., Lee, D., & Yoon, B. (2016). Myofascial Pain Syndrome in the Elderly and Self-Exercise: A Single-Blind, Randomized, Controlled Trial. *Journal of Alternative and Complementary Medicine*, *22*(3). https://doi.org/10.1089/acm.2015.0205

Noormohammadpour, P., Mansournia, M. A., Koohpayehzadeh, J., Asgari, F., Rostami, M., Rafei, A., & Kordi, R. (2017). Prevalence of chronic neck pain, low back pain, and knee pain and their related factors in community-dwelling adults in Iran: A population-based national study. *Clinical Journal of Pain*, *33*(2). https://doi.org/10.1097/AJP.0000000000000396

Quek, J., Brauer, S. G., Clark, R., & Treleaven, J. (2014). New insights into neck-pain-related postural control using measures of signal frequency and complexity in older adults. *Gait and Posture*, *39*(4). https://doi.org/10.1016/j.gaitpost.2014.01.009

Saraswati, P., Thanaya, S., & Nugraha, M. (2022). The Effectiveness Of Dry Needling Versus Muscle Energy Technique Combined With Ultrasound Therapy In Reducing Disability Due To Tennis Elbow. *Jurnal Keterapian Fisik*, *7*(2), 80–87.

Sarin, A., s, J., & Michael. (2018). To Study the Effectiveness of Cyriax Manual Therapy Vs. Muscle Energy Technique in Subjects with Tennis Elbow on Pain, Grip Strength and Functional Disability. *Journal of Physiotherapy & Physical Rehabilitation*, *03*(03). https://doi.org/10.4172/2573-0312.1000159

Seo, Y.-H. (2020). Effects of Lifestyle-Related Risk Factors and External Stress on α-amylase in Middle-aged Obese Women Participating in Jumping Exercise. *Korean Journal of Sports Science*, *29*(1). https://doi.org/10.35159/kjss.2020.02.29.1.707

Shin, H. J., Kim, S. H., Hahm, S. C., & Cho, H. Y. (2020). Thermotherapy plus neck stabilization exercise for chronic nonspecific neck pain in elderly: A single-blinded randomized controlled trial. *International Journal of Environmental Research and Public Health*, *17*(15). https://doi.org/10.3390/ijerph17155572

Sim, G., Kim, D., & Jeon, H. (2023). Comparing the Effects of Manual and Self-exercise Therapy for Improving Forward Head Posture. *Physical Therapy Korea*, *30*(3). https://doi.org/10.12674/ptk.2023.30.3.184