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Quantitative Research Article

# Effect of Upper Trapezius Myofascial Release Therapy on Neck Functional Ability in Teachers Aged 30-60 Years at Smpn 41 Bekasi City in 2024

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## Abstract

**Background/ problem:** Teachers are often at risk of musculoskeletal disorders, particularly myofascial pain syndrome (MPS) in the upper trapezius muscle. This condition is characterized by pain in the neck muscles caused by trigger points in tense muscles. MPS usually arises due to excessive muscle workload, resulting in tension and pain in the affected area. Studies have shown that individuals between the ages of 27 and 50 are particularly prone to this disorder, with women being more affected (54%) compared to men (45%)

**Objective/ purpose:** This study aims to determine the effectiveness of Myofascial Release on the upper trapezius in relieving pain and improving overall neck function in a group of teachers aged 30-60 years at SMPN 41 Bekasi City.

**Design and Methodology:** This research uses a quasi-experimental design, specifically a pre-experimental method with a one-group pre-test and post-test format. The study involved 19 respondents and was conducted over 2 weeks, during which myofascial release therapy was administered for 5 minutes.

**Results:** The results of the paired sample t-test showed a p-value of 0.000 (<0.05), indicating a significant effect of myofascial release on myofascial pain syndrome in the upper trapezius muscle among teachers aged 30-60 years at SMPN 41 Bekasi City in 2024**.**

**Conclusion and Implications:** Myofascial release therapy has proven effective in reducing neck pain and improving neck functional ability in teachers at SMPN 41 Bekasi City.

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## Introduction

Work posture is a key factor in assessing work effectiveness, particularly in the teaching profession. **because** Unergonomic work postures can lead to physical disorders such as pain, fatigue and musculoskeletal disorders (MSDs), which reduce work effectiveness. Teachers are prone to these problems due to varied physical activities such as prolonged standing, writing or sitting, affecting their ability to teach and interact with students. Teachers have a high risk of developing musculoskeletal disorders (MSDs) due to long work duration, non-ergonomic work postures, and lack of supporting infrastructure. Based on a meta-analysis, the prevalence of MSDs in teachers reached 68%, with neck and low back pain as the main complaints. Contributing risk factors include age, gender (especially female), obesity and mental health (Tesfaye et al., 2023) (Patel et al, 2022).

A good working posture, determined by body movement while working, can be categorized into sitting and standing postures. Prolonged sitting can cause the abdominal muscles to weaken and the spine to curve, leading to fatigue (Rahman, 2021). **According to Baker et al. (2018) dan Wennberg et al. (2016),** prolonged sitting can cause physical and cognitive fatigue. These studies show that long sitting durations increase physical discomfort, such as pain in the lower back and hips, and decrease creative thinking capacity. This condition is exacerbated by poor posture, reduced blood flow, and pressure on certain muscles.

Standing while teaching also has its benefits and drawbacks. Standing provides health and cognitive benefits, such as improved focus, reduced sedentary behavior and increased engagement in the classroom. However, it can also pose challenges such as physical fatigue, musculoskeletal discomfort and the need for ergonomic adjustments. Balancing standing with moving and occasional sitting is essential to maximize the benefits and minimize the disadvantages (Rahman, 2021)(Mehta et al., 2015)

Poor work posture can increase the risk of neck pain. In Indonesia, the incidence of neck pain is on the rise, with approximately 16.6% of adults experiencing cervical discomfort and 0.6% experiencing severe pain (Satria Nugraha et al., 2020). Neck pain typically affects individuals aged 20–69, with a higher prevalence in women than in men (1.67:1). This pain is often caused by repetitive movements of the upper extremities, impacting muscles, ligaments, nerves, tendons, and joints.

The Myofascial Release technique is an effective therapy for neck pain due to Myofascial Pain Syndrome (MPS). This technique works by manipulating soft tissue, including muscles and fascia, to alleviate pain and enhance neck function (Nur Hidayati & Wardana, 2023). A survey found that musculoskeletal issues, such as wrist, waist, and neck pain, are prevalent among teachers, including those at SMPN 41 Bekasi City. This study, titled “The Effect of Upper Trapezius Myofascial Release Therapy on Improving Neck Functional Ability in Teachers Aged 30–60 Years at SMPN X Bekasi City,” aims to fulfill the requirements of a final project and offers solutions to improve teachers' quality of life and occupational health.

## Literature Review

### Theoretical Background

Myofascial Pain Syndrome (MPS) is a painful condition originating from muscles and the surrounding fascial tissues, primarily caused by sensitive points in the muscles known as Myofascial Trigger Points (MTrPs). When these points are pressed or irritated, they can produce localized or diffuse pain, with patterns varying based on the affected muscle. MPS is a chronic condition commonly affecting the musculoskeletal system and is characterized by taut bands or tight muscle fibers, often accompanied by fascial constriction, resulting in localized and referred pain in other body regions.

Although the pathophysiology of MPS is not fully understood, it is thought that sensitization of nociceptors in muscles and fascia plays a significant role in the experience of pain. Taut bands form due to adhesions between muscle fibers and fascia, increasing the muscle's susceptibility to tension and stiffness. This frequently occurs in muscles like the upper trapezius, which are prone to strain from overexertion or poor posture. Treating MPS generally requires a multidisciplinary approach, including physical therapy, trigger point injections, manual therapy, and complementary therapies, all aimed at reducing pain, releasing muscle tension, and improving functional mobility. It is important to distinguish MPS from other similar conditions, such as fibromyalgia, as despite similar symptoms, these conditions require different treatment approaches.

The prevalence of MPS varies within the general population. Approximately 85% of patients with musculoskeletal pain are diagnosed with MPS, with the condition most commonly seen in individuals aged 27 to 50 years (Tantanip & Chang, 2023). Some studies suggest that MPS is more prevalent in women than men. In the United States, the incidence of MPS is estimated at 85% to 90%, with approximately 84% of trigger points occurring in the upper trapezius muscle (Jaleha et al., 2020). **The** prevalence of neck pain in Indonesia varies depending on the duration of the reported period. Research indicates that approximately 19% of individuals experience neck pain within one month, while the prevalence rises to around 40% within one year (Sunyiwara et al., 2021).

MPS is a complex condition involving multiple mechanisms, including muscle dysfunction, peripheral and central nerve sensitization, and autonomic nerve dysfunction. Repetitive or prolonged activity can overload muscle fibers, leading to hypoxia and ischemia within the muscles. Dysfunction in the intracellular calcium pump, often due to energy depletion, increases calcium levels, resulting in sustained muscle contraction and the formation of taut bands (Tantanip & Chang, 2023).

Trigger points are sensitive areas located in tense muscles or taut bands. MPS can be triggered by excessive muscle tension, trauma, or overuse, leading to sustained muscle contraction. This contributes to spasms, stiffness, adhesions, poor circulation, and the formation of trigger points (Sunyiwara et al., 2021). The upper trapezius muscle, classified as a type I or tonic muscle and responsible for postural support, is especially susceptible to strain. When this muscle remains over-contracted due to poor posture, the tension phase exceeds the relaxation phase, leading to quicker fatigue and a heightened risk of pain.

## Research Variables

**The Myofascial Release (MFR) technique** is a proven therapy for alleviating pain caused by **Myofascial Pain Syndrome (MPS),** including neck pain linked to **Myofascial Trigger Points (MTrPs).** Research published in *Sports and Exercise Medicine* highlights that MFR enhances neck function by inducing a relaxation effect on tense muscles, promoting elasticity and optimal function. Additional studies by **Agarwal (2023)** and **Alboneh (2017)** support the effectiveness of MFR in reducing neck pain, improving comfort, and increasing the range of motion.

With this scientific evidence, MFR emerges as a reliable approach to managing neck pain and improving patient quality of life. Its primary mechanism is stretching and releasing adhesions between fascia, skin, muscles, and bones, thereby reducing pain, enhancing mobility, and optimizing muscle function.

Research shows that the primary mechanism of MFR involves applying consistent pressure to a stiff fascial area for 90-120 seconds, allowing for histologic changes in tissue length. Once the tissue barrier in one area is released, the practitioner continues this process to the next barrier, working until

the myofascial tissue becomes pliable. As the fascia returns to its normal length, pressure on surrounding structures decreases, improving joint mobility and alignment (Suresh & Sudhan, 2020).

Additionally, MFR operates through a pain inhibition mechanism, where stimulation of fascial tissue activates large-diameter nerves. These nerves transmit signals to the substantia gelatinosa in the spinal cord, which functions as a pain inhibitor. When activated, the substantia gelatinosa "closes" the pain gate, preventing pain signals from reaching the brain and thereby reducing the perception of pain.

Some common MFR techniques for treating trigger points include:

- **Ischemic Compression**: This technique involves applying sustained pressure on a trigger point to temporarily reduce blood flow. Pressure is gradually applied over 60 seconds, then slowly released, easing muscle tension and pain (Kaprail et al., 2019).
- **Friction Movement**: In this technique, the practitioner moves tissue in alignment with muscle fibers to relieve trigger points. This increases local blood flow, decreases nerve sensitivity, and promotes normal movement of muscle fibers (Kaprail et al., 2019).

Overall, MFR techniques offer multiple benefits, from pain relief to improved mobility, tissue flexibility, and enhanced recovery of muscle and joint function.

## Research Hypotheses

The hypothesis in this study regarding the effect of Myofascial Release on neck functional ability in teachers at SMPN X Bekasi City can be formulated as follows:

**Alternative Hypothesis (Ha)**: There is an effect of Myofascial Release on the functional ability of the neck in teachers at SMPN X Bekasi City.

**Null Hypothesis (Ho)**: There is no effect of Myofascial Release on the functional ability of the neck in teachers at SMPN X Bekasi City.

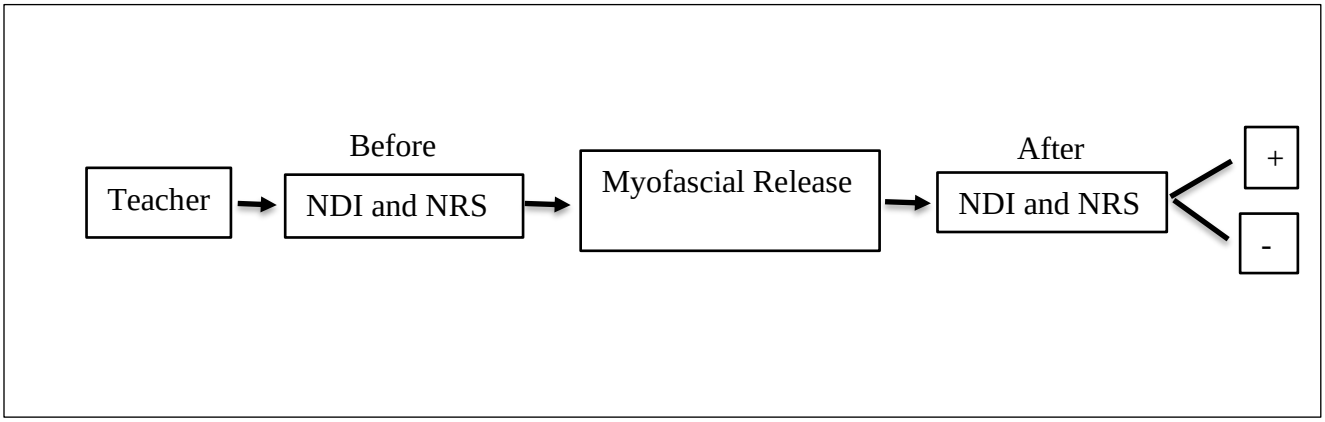
This hypothesis can be tested through statistical analysis based on data obtained from measuring neck functionality before and after Myofascial Release intervention.

## Conceptual Framework

In this study, respondents were teachers who underwent an initial interview using the Neck Disability Index (NDI) functional ability questionnaire and the Numeric Rating Scale (NRS) for pain assessment. Following this, respondents received an intervention consisting of myofascial release

**Figure 1**

*Proposed Conceptual Framework*



*Note.* + :Influenced; - : Settle

## Methods

### Research Design

This research employs a quantitative method with a pre-experimental one-group pre-test and post-test design. The study aims to measure changes or differences in outcomes before and after treatment within a single group, without a control group for comparison.

### Research Setting

The research was conducted at SMPN X located in BEKASI CITY.

### Participants/ Sample

The population for this study consisted of teachers at SMPN X Bekasi City who are over 30 years old. The sample was determined using a random sampling method, which involves randomly selecting participants from the available population, adhering to the inclusion, exclusion, and potential dropout criteria established by the researcher.

### Sampling and Sample Procedures

The research sample was selected based on the following inclusion, exclusion, and dropout criteria:

- **Inclusion Criteria:**
  - Female teachers at SMPN X Bekasi City
  - Willing to participate as respondents
  - Attend the intervention program regularly for six meetings
  - Over 30 years old
  - Neck Disability Index (NDI) score greater than 0%
  - Numeric Rating Scale (NRS) result above 1
- **Exclusion Criteria:**
  - Participants who were uncooperative during the intervention
  - Individuals with a history of cervical fractures
- **Dropout Criteria:**
  - Participants who missed more than three intervention sessions
  - Those who experienced injury or illness during the study
  - Individuals who did not complete the intervention program

### Instruments

This research instrument for the dependent variable uses the Neck Disability Index (NDI) and Numeric Rating Scale (NRS).

### Procedure

Approval for the selected topic was obtained from the Respati Indonesia Health Research Ethics Committee. Consent was obtained from participants, who were also informed about the study and its procedures. Participants were screened according to inclusion and exclusion criteria, with the study sample determined based on these criteria. Inclusion criteria included female teachers at SMPN X Bekasi City who were willing to participate, could follow the intervention program regularly, were over 30 years old, had Neck Disability Index (NDI) scores greater than 0%, and Numeric Rating Scale (NRS) results above 1.

A total of 19 respondents were selected and assigned to a single group receiving intervention through myofascial release using friction techniques and ischemic compression techniques.Respondents were initially assessed for functional ability and neck pain using the NDI and NRS questionnaires. After assessment, the intervention program was implemented. The myofascial release was performed with participants seated upright, with the therapist positioned behind them. The therapist placed their thumb on the upper trapezius muscle and applied a circular motion along the muscle fibers. The therapist then applied ischemic compression to the trigger point in the upper trapezius for 60 seconds. Myofascial release was administered over a period of two weeks, with a frequency of three times per week, totaling six sessions. Each session lasted between 5–10 minutes.

### Ethical Considerations

The research entitled "The Effect of Upper Trapezius Myofascial Release Therapy on Neck Functional Ability in Teachers at Smpn 41 Bekasi City in 2024" has gone through ethical review procedures and is declared feasible to carry out and passes the code of ethics with number 383 / SK.KEPK / UNR / VI / 2024.

## Results

### Sample Characteristics

The sample size for this study consisted of 19 respondents, all of whom were female, in accordance with the inclusion criteria established by the researcher. According to the frequency distribution, the majority of respondents (47%) were in the age range of 30-40 years. Other age groups included those aged 51-60 years (37%) and 41-50 years (16%). This data indicates that the 30-40 age group predominates the research sample, while the 51-60 age group still makes a significant contribution. Although the 41-50 age group has the fewest respondents, it remains representative within the study.

### Descriptive Results

**Upper Trapezius Myofascial Pain Syndrome Examination Results Before Intervention (Pre-test)**

Based on Table 1, it can be concluded that the assessment of pain using the Numeric Rating Scale (NRS) before the intervention yielded an average score of 5.89, with a standard deviation of 0.937. In contrast, the assessment of functional ability using the Neck Disability Index (NDI) prior to the intervention showed an average score of 33.89, with a standard deviation of 5.227.

**Table 1**

*Upper Trapezius Myofascial Pain Syndrome Examination Results Before Intervention (Pre-test)*

| | Pain | Functional Ability |
|---|---|---|
| *Mean± SD* | 5,89±0,937 | 33,89±5,227 |

**Upper Trapezius Myofascial Pain Syndrome Examination Results before Intervention (Post-test)**

Based on Table 2, the results of the examination following the intervention indicated that the average pain score was 2.21, with a standard deviation of 0.631. Meanwhile, the average functional ability score after the intervention was 21.58, with a standard deviation of 1.835. These results demonstrate a significant decrease in pain levels and an improvement in functional ability following the intervention.

**Tabel 2**

*Upper Trapezius Myofascial Pain Syndrome Examination Results Before Intervention (Post-test)*

| | Pain | Functional Ability |
|---|---|---|
| *Mean* | 2,21 | 21,58 |
| *SD* | 0,631 | 1,835 |

**Normality Test Results of Research Data**

Normality test using Shapiro-Wilk with criteria P < 0.05 indicates that the data distribution is not normal, while P > 0.05 indicates normal data distribution. Based on the normality test results listed in Table 3, the data distribution for NRS assessment before and after the intervention showed abnormal distribution (P < 0.05). Similarly, the results of the NDI assessment before and after the intervention also showed abnormal distribution (P < 0.005). Since both study variables showed non-normal distribution (non-parametric data), bivariate analysis was performed using the Wilcoxon test to compare differences in results before and after the intervention.

Tabel 3

*Normality Test Results of Research Data*

| | **Result P Value** | **Description** |
|---|---|---|
| Pre-Test NRS | 0.010 | Abnormal Distribution |
| Pos-Test NRS | 0.001 | Abnormal Distribution |
| Pre-Test NDI | 0.009 | Abnormal Distribution |
| Pos-Test NDI | 0.001 | Abnormal Distribution |

**Hypothesis Testing Results**

The Wilcoxon test results indicate that the Asymp. Sig. (2-tailed) for the comparison of Pre-Test NDI and Post-Test NDI is 0.001, while for Pre-Test NRS and Post-Test NRS, it is 0.000, both of which are less than 0.05. This signifies that myofascial release has a significant effect on improving neck functional ability and reducing pain in teachers at SMPN 41 Bekasi City.

Additionally, the Asymp. Sig. (2-tailed) value for Pre-Test NRS compared to Post-Test NRS is also 0.000. Since this value is smaller than 0.05, we accept the hypothesis, indicating that myofascial release significantly reduces neck motion pain and enha nces neck functional ability. Consequently, the null hypothesis (Ho) is rejected, and the alternative hypothesis (Ha) is accepted.

Tabel 4

*Hypothesis Testing Results*

| | N | Z Score | Asymp. Sig. (2-Tailed) |
|---|---|---|---|
| Pre-Test NDI – Post-Test NDI | 11 | -3,207 | 0,001 |
| Pre-Test NRS – Post-Test NRS | 19 | -3,905 | 0,000 |

## Discussion and Conclusion

### Discussion of Main Results

This study demonstrates that the application of the Myofascial Release (MFR) technique significantly reduces neck disability and pain intensity in participants. The data show a decrease in the mean Neck Disability Index (NDI) score from 33.89 pre-intervention to 21.58 post-intervention, and a reduction in the mean Numeric Rating Scale (NRS) score from 5.89 to 2.21. These substantial decreases indicate that MFR positively impacts neck disability and pain intensity.

These findings align with previous studies. For instance, Agarwal et al. (2023) found significant reductions in neck disability in groups receiving Instrumented Soft Tissue Assist™ (IASTM) and Manual Fascial Manipulation (MFR), with improvements in pain levels and range of motion. Similarly, research by Kaprail et al. (2019) reported that combining manual and MFR techniques—such as cold compression, friction massage, and muscle stretching—improved neck flexion, extension, and reduced NDI and pain as measured by the Visual Analogue Scale (VAS). This supports MFR's effectiveness, particularly when combined with complementary techniques.

The findings are also supported by Pawaria and Kalra (2015), who showed that both MFR and muscle stretching enhanced the range of motion (ROM) and reduced neck disability index scores. While both methods were effective, MFR was seen as superior for managing neck pain and disability. In terms of pain reduction, found that MFR alone or in combination with ultrasound significantly alleviated pain in myofascial pain syndrome affecting the upper trapezius muscle, with the combined approach offering added benefits from ultrasound therapy. This underscores MFR's efficacy as both a standalone and combined therapy.

Additionally, research by Sunyiwara et al. (2021) found that MFR combined with hold-relax techniques significantly reduced myofascial pain in the upper trapezius muscle among garment industry workers, while increasing blood flow to help reduce pain intensity. (Ashok & Karthi, 2018) further confirmed that MFR can reduce pain by targeting myofascial trigger points, which are associated with continuous muscle fiber depolarization and chronic pain.

In conclusion, this study supports MFR as an effective method to enhance neck function and alleviate pain in myofascial pain syndrome. The technique works by increasing blood flow, enhancing fascia fluid quality, and reducing tissue adhesion. The Gate Control Theory, which posits that pressure stimulation can inhibit pain signal transmission to the brain, supports MFR's effectiveness in managing musculoskeletal pain. Overall, MFR is a valuable intervention in pain management, especially for myofascial pain syndrome, with the potential to significantly enhance patient quality of life and neck function.

### Limitations

This study has several limitations that should be considered. First, the research focuses exclusively on neck functional ability among teachers, leaving out other factors that may affect neck function, such as overall physical condition, stress, and work environment factors. Second, data collection through questionnaires presents potential challenges, as the responses may not always reflect participants' true opinions or situations. Discrepancies in perspective between researchers and respondents, along with honesty in completing questionnaires, can impact data validity, potentially influencing the analysis and study conclusions.

Acknowledging these limitations, future research could address these issues by incorporating additional relevant factors and employing more effective data collection methods to obtain more valid and reliable information.

### Implications for Behavioral Science

This study focuses solely on the functional ability of the neck in teachers, although many other factors could affect neck function impairment. During data collection, responses provided through questionnaires may not always reflect respondents' true opinions. This can result from differences in interpretation as well as factors such as honesty in completing the questionnaire.

## Conclusion

Myofascial release therapy has proven effective in reducing neck pain and improving neck functional ability in teachers at SMPN 41 Bekasi City. The findings of this study align with previous research, which also indicates that this therapy is more effective than other techniques for addressing neck musculoskeletal disorders. Myofascial release therapy has a significant impact on increasing neck range of motion and decreasing levels of neck pain and disability.

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**Declarations**

***Conflicts of Interest:*** "The authors declare no conflicts of interest."

***Ethical Approval Statement:*** Authors need to add "The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board (or Ethics Committee) of Universitas Respati Indonesia (protocol code 383 / SK.KEPK / UNR / VI / 2024. and 27 June 2024)" for studies involving humans.

## References

Agarwal, Shweta, Nilima Bedekar, Ashok Shyam, and Parag Sancheti. 2023. "Comparison between Effects of Instrument-Assisted Soft Tissue Mobilization and Manual Myofascial Release on Pain, Range of Motion and Function in Myofascial Pain Syndrome of Upper Trapezius - A Randomized Controlled Trial." *Hong Kong Physiotherapy Journal* 44(1):57–67. doi: 10.1142/S1013702524500069.

Alboneh, Razany Fauzia. 2017. "Pengaruh Penambahan Ultrasound Pada Myofascial Release Terhadap Penurunan Nyeri Pada Myofascial Syndrome Otot Upper Trapezius." *Jurnal Fisioterapi Indonesia* 8(1):6–17.

Arifin, Moh Adi Bayu, Yohanes Deo Fau, Fransisca Xaveria Hargiani, and Sartoyo Sartoyo. 2023. "Pengaruh Myofascial Release Dan Ultrasound Terhadap Penurunan Nyeri Myofascial Syndrome Upper Trapezius Pada Pasien Rumah Sakit Semen Gresik." *Jurnal Keperawatan Muhammadiyah* 8(1). doi: 10.30651/jkm.v8i1.16205.

Arta Agustina, Mellenia, and Rini Widarti. 2023. "Pengaruh Muscle Energy Technique Terhadap Penurunan Myofascial Pain Syndrome Pada Otot Upper Trapezius Pekerja Penggilingan Padi." *Physio Journal* 3(1):15–22. doi: 10.30787/phyjou.v3i1.959.

Ashok, N., & Karthi, M. C. (2018). Immediate Effect of Myofascial Trigger Point Release on Chronic Neck Pain among Visual Display Terminal Operators. *International Journal of Research and Scientific Innovation (IJRSI), V*(I), 95–97.

Jaleha, B., Gede Adiatmika, I. P., Sugijanto, S., Muliarta, I. M., Tirtayasa, K., & Krisna Dinata, I. M. (2020). McKENZIE NECK EXERCISE LEBIH BAIK DALAM MENURUNKAN DISABILITAS LEHER DARIPADA DYNAMIC NECK EXERCISE PADA PENJAHIT DENGAN MYOFASCIAL PAIN SYNDROME OTOT UPPER TRAPEZIUS. *Sport and Fitness Journal*, *8*(2), 41. https://doi.org/10.24843/spj.2020.v08.i02.p05

Kaprail, M., Jetly, S., Sarin, A., & Kaur, P. (2019). To Study the Effect of Myofascial Trigger Point Release in Upper Trapezius Muscle Causing Neck Disability in Patients with Chronic Periarthritis Shoulder. *Sports and Exercise Medicine – Open Journal*, *5*(1), 1–4.

https://doi.org/10.17140/semoj-5-167
Mehta, R. K., Shortz, A. E., & Benden, M. E. (2015). *Standing Up for Learning : A Pilot Investigation on the Neurocognitive Benefits of Stand-Biased School Desks*. https://doi.org/10.3390/ijerph13010059
Nur Hidayati, N. P., & Wardana, A. P. (2023). Myofascial Pain Syndrome Of The Upper Trapezius Muscle: Different Effects Of Myofascial Release And Stretching On Pain. *Jurnal Keperawatan Dan Fisioterapi (Jkf)*, *5*(2), 287–294. https://doi.org/10.35451/jkf.v5i2.1576
Rahman, I. (2021). Hubungan Postur Kerja dan Sikap Kerja Terhadap Myofascial Trigger Point Syndrome Pada Guru SMP Ar Rahman Medan. *Jurnal STIKes Siti Hajar*, *3*(2), 54–61. http://jurnal.stikes-sitihajar.ac.id/index.php/jhsp
Satria Nugraha, M. H., Antari, N. K. A. J., & Saraswati, N. L. P. G. K. (2020). the Efficacy of Muscle Energy Technique in Individuals With Mechanical Neck Pain: a Systematic Review. *Sport and Fitness Journal*, *8*(2), 91. https://doi.org/10.24843/spj.2020.v08.i02.p12
Sunyiwara, A. S., Putri, M. W., & Sabita, R. (2021). Pengaruh Myofacial Release Kombinasi dengan Hold Relax terhadap Myofacial Pain Syndrome. *Jurnal Ilmiah Kesehatan*, *12*(2), 582–587. https://doi.org/10.48144/jiks.v12i2.173
Suresh, A., & Sudhan, S. (2020). A Literature Review to Analyse the Outcome of Myofascial Release for Myofascial Pain Syndrome. *Journal of Clinical and Diagnostic Research*, 1–5. https://doi.org/10.7860/jcdr/2020/44370.13799
Tesfaye, A. H., Abere, G., Mekonnen, T. H., Jara, A. G., & Aragaw, F. M. (2023). A systematic review and meta-analysis of low back pain and its associated factors among school teachers in Africa. *BMC Musculoskeletal Disorders*, *24*(1), 1–14. https://doi.org/10.1186/s12891-023-06633-1
Patel, N., Zaveri, N., & Kumar, G. P. (2022). Work Related Musculoskeletal Disorders in School Teachers: A Review. *Current Overview on Disease and Health Research Vol. 4*, 1–13.