7'TH INTERNATIONAL CONFERENCE
ON HEALTH PRACTISE AND RESEARCH
"Transforming Healtcare with Technology for Better Quality of Life""
Journal homepage: https://ojs.universitastelogorejo.ac.id/index.php/ichpr

Comparative Effectiveness of Ultrasound and Static Stretching versus Myofascial Release on Pain Intensity in Cervical Myofascial Pain Syndrome

Syurrahmi*
, *STIKES Kesdam IV/Diponegoro, Kota Semarang, Indonesia*

Corresponding Author
Email :syurrahmi@stikeskesdam4dip.ac.id

ARTICLE INFO

Article history:
Received 06 Desember 2025
Accepted 12 Desember 2025

Keywords:
Ultrasound, Static Stretching, Myofascial Release, Pain Intensity, Cervical Myofascial Paint Syndrome

ABSTRACT

Neck pain is one of the most common complaints found among the Indonesian population, particularly among workers with static neck postures. The frequent use of computers or mobile phones among office workers often leads to various health problems, one of which is Myofascial Pain Syndrome (MPS). MPS is a clinical condition categorized as a chronic musculoskeletal disorder, characterized by muscle pain originating from trigger points within muscle tissue or fascia. Interventions that can be administered include Ultrasound and Static Stretching combined with Myofascial Release. This study aims to determine the effectiveness of Ultrasound and Static Stretching compared to Myofascial Release on pain intensity in cervical Myofascial Pain Syndrome.

This quantitative study employed a quasi-experimental design using a two-group pre-test and post-test approach. A total of 32 respondents were recruited and divided into two groups, with 16 participants in each group. Data analysis was conducted using SPSS, including the Shapiro–Wilk test, Wilcoxon Signed Rank Test, and Mann–Whitney U Test for between-group differences. The results showed a significant difference in pain intensity between the Ultrasound and Static Stretching group and the Myofascial Release group. After treatment, the mean pain score in Group I was 39.98 ± 7.70, while in Group II it was 52.34 ± 7.86, with a p-value of 0.002 ($p < 0.05$).

The study concludes that the combination of Ultrasound and Static Stretching is more effective than Myofascial Release in reducing pain intensity. It is recommended that respondents maintain proper typing posture and adopt ergonomic neck positioning. Future studies are encouraged to increase the sample size and include additional variables.

INTRODUCTION

Neck pain is one of the most common complaints found in the Indonesian population, particularly among workers who maintain static neck postures. The use of computers or mobile phones by office workers often leads to various health problems. Incorrect posture that is sustained for extended periods can result in musculoskeletal disorders (Rahmanto, 2021). These disorders arise when improper posture and repetitive movements are maintained for several hours, increasing the risk of pain in the neck, shoulders, and lower back. Among the various musculoskeletal disorders, one of the most frequently encountered is Myofascial Pain Syndrome (MPS). The prevalence of neck pain in Indonesia reached 10% within a one-month period and 40% within one year in 2021 (Sunyiwara, 2021). Myofascial pain syndrome is a chronic muscle pain condition characterized by the presence of trigger points—hyperirritable spots located within taut bands of skeletal muscle (Dommerholt, 2018).

Myofascial Pain Syndrome (MPS) is a clinical condition categorized as a chronic musculoskeletal disorder, marked by muscle pain originating from trigger points found in muscle tissue or muscle fascia. Trigger points are small areas within muscles that exhibit high tension (taut bands), are hyperirritable, and when palpated, elicit local pain or pain radiating to other regions of the body. This musculoskeletal pain condition involves regional pain affecting muscles, fascia, or surrounding soft tissue associated with hyperirritable trigger points within taut muscle bands (Shah, 2023).

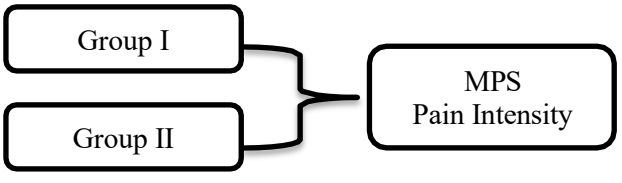
Therapeutic Ultrasound (TUS) is an electrotherapeutic modality that uses high-frequency sound waves (typically 0.75 to 3.0 MHz) to produce biological effects within body tissues. Ultrasound therapy has long been recognized in clinical practice as a non-invasive modality utilizing high-frequency sound waves (above 20,000 Hz) to produce real-time imaging of internal body structures. Although initially used primarily in obstetrics and general radiology, advancements in ultrasound technology over recent decades have significantly expanded its applications, particularly in musculoskeletal medicine and rehabilitation. The application of ultrasound to injured tissue promotes vasodilation, enhances antibody activity, and increases nutrient supply to soft tissues, facilitating the repair of damaged structures (Muawanah & Selviani, 2018).

Static Stretching is a technique that involves slowly elongating a muscle to its maximum stretch position and holding it for a designated duration, typically between 15 and 60 seconds (Behm et al., 2015). The primary goals of static stretching are to increase muscle length, improve flexibility, and reduce muscle tension. This technique is performed without movement and requires the muscle to remain in a fixed position throughout the stretching duration.

Meanwhile, Myofascial Release (MFR) is a manual therapy that can be applied to neck pain caused by upper trapezius muscle trigger points. The technique aims to stretch adhered muscle tissue, thereby reducing tension and alleviating pain associated with active trigger points (Lisa Ganfield, OTR/L, 2009; McKenney et al., 2013).

METHODS

This study employed a quantitative approach with a quasi-experimental design using a two-group pre-test and post-test design. Participants were randomly assigned into two groups. Group I received an intervention consisting of Ultrasound and Static Stretching, while Group II received Myofascial Release therapy. Pain intensity was measured using the Visual Analogue Scale (VAS) during both the pre-test and post-test assessments. Following the pre-test measurements, the interventions—Therapeutic Ultrasound and Static Stretching for Group I and Myofascial Release for Group II—were administered twice per week. After the intervention sessions, post-test measurements were conducted to determine the effectiveness of Ultrasound and Static Stretching compared to Myofascial Release in reducing pain intensity among individuals with Cervical Myofascial Pain Syndrome. The research design is illustrated in the diagram below:



The respondents in this study were housewives residing in Rejosari Village, East Semarang, Semarang City. A total of 32 participants were recruited, consisting of 16 individuals in Group I and 16 individuals in Group II.

Data analysis began with a normality test using the Shapiro–Wilk test. Since the results indicated that the data were not normally distributed ($p < 0.05$), non-parametric tests were performed. Differences between pre-test and post-test scores within each group were analyzed using the Wilcoxon Signed Rank Test, while differences between the two groups were analyzed using the Mann–Whitney U Test. The significance level of $p < 0.05$ was used for all statistical analyses.

RESULT AND DISCUSSION

Result

Normality Test

The results of the Shapiro–Wilk normality test before and after the interventions in both groups showed p-values greater than 0.05 ($p > 0.05$), indicating that the data were normally distributed.

Table 1. Normality Test

Parameter		***Shapiro-wilk test*(p)**		
		Ultrasound and *Static Stretching*	*Myofascial Release*	Interpretation
VAS	Pre	0,974	0,917	Normal
	Post	0,931	0.875	Normal

Homogeneity Test

Table 2. Homogeneity Test

Parameter	**Group**	**Mean ± SD**	**Levene's Test (p)**	**Interpretation**
Pain Score (Pre-test)	I	70.99 ± 6.66	**0.909**	Homogeneous
	II	69.65 ± 7.44		
Pain Score (Post-test)	I	39.98 ± 7.69	**0.871**	Homogeneous
	II	52.34 ± 7.86		
Pain Score Reduction	I	31.01 ± 2.74	**0.013**	Homogeneous
	II	17.31 ± 2.63		

The Levene's test results showed p-values of 0.909 for pre-test pain scores, 0.817 for post-test pain scores, and 0.013 for pain score reduction. Since all p-values were greater than 0.05, the data were considered homogeneous.

Pre–Post Test Analysis in Group I

Table 3. Pre–Post Comparison in Group I

Parameter	Pre-test (Mean ± SD)	Post-test (Mean ± SD)	Reduction	p-value	Interpretation
Pain Score (VAS)	70.99 ± 6.67	39.98 ± 7.70	31.01 ± 2.74	0.000	Significant

Pre–Post Test Analysis in Group II

Table 4. Pre–Post Comparison in Group II

Parameter	**Pre-test (Mean ± SD)**	**Post-test (Mean ± SD)**	**Reduction**	**p-value**	**Interpretation**
Pain Score (VAS)	69.65 ± 7.44	52.34 ± 7.86	17.31 ± 2.63	0.000	Significant

Between-Group Comparison (Group I vs. Group II)

Table 5. Between-Group Difference

Parameter	**Group I (Mean ± SD)**	**Group II (Mean ± SD)**	**p-value**	**Interpretation**
Pain Score (VAS)	39.98 ± 7.69	52.34 ± 7.86	**0.002**	Significant difference

There was a statistically significant difference in post-test pain scores between Group I and Group II ($p = 0.002$), indicating that Ultrasound and Static Stretching were more effective in reducing pain intensity than Myofascial Release.

Discussion

The results of this study demonstrate that both intervention groups experienced a reduction in pain intensity after receiving treatment for eight sessions

(twice weekly over four weeks). The Ultrasound and Static Stretching group showed a mean reduction of 31.01 ± 2.74, whereas the Myofascial Release group demonstrated a smaller reduction of 17.31 ± 2.63. The Independent Sample t-Test further confirmed a significant difference between the two groups ($p = 0.002$), indicating that Ultrasound combined with Static Stretching produced a greater therapeutic effect in reducing cervical myofascial pain.

Physiologically, this outcome can be explained through the mechanisms of each intervention. Therapeutic ultrasound increases tissue temperature, enhances blood circulation, and improves oxygen supply to affected musculature. These effects contribute to muscle relaxation, increased tissue extensibility, and reduced nociceptive sensitivity, all of which support pain reduction. When ultrasound is combined with static stretching, the therapeutic benefits are amplified, as stretching promotes lengthening of muscle fibers, reduces myofascial tightness, and improves flexibility of the cervical musculature.

These findings align with previous research by Alboneh and Ariyanto (2017), who reported a significant reduction in pain among individuals with myofascial pain syndrome following Myofascial Release therapy and a combined intervention of Myofascial Release and ultrasound. Similarly, Buana et al. (2017) explained that Myofascial Release reduces muscle adhesions and enhances local circulation, which contributes to decreased spasms and pain. However, the current study confirms that a multimodal approach—specifically the combination of ultrasound and stretching—results in greater improvements than manual therapy alone.

Taken together, the findings suggest that Ultrasound and Static Stretching offer a superior therapeutic benefit compared to Myofascial Release in reducing pain intensity among individuals with cervical myofascial pain syndrome. This supports the clinical relevance of incorporating modality-based interventions alongside stretching exercises for more optimal outcomes.

CONCLUSION

This study concludes that both Ultrasound with Static Stretching and Myofascial Release are effective in reducing pain intensity among individuals with cervical myofascial pain syndrome. However, Ultrasound combined with Static Stretching demonstrated significantly greater effectiveness compared to Myofascial Release alone. For individuals experiencing neck pain, it is recommended to be more attentive to musculoskeletal discomfort, as untreated myofascial pain may progress to a chronic stage and disrupt daily functional activities. Persistent pain may also lead to secondary conditions such as migraine and insomnia if not properly managed. For future researchers, the findings of this study may serve as a reference for developing more comprehensive investigations by incorporating additional intervention types, examining pain in other anatomical regions, or increasing the sample size to enhance generalizability. Further studies may also explore alternative combinations of therapeutic modalities to determine the most effective strategies for managing myofascial pain.

REFERENCES

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.

Behm, D. G., Blazevich, A. J., Kay, A. D., & McHugh, M. (2015). Acute effects of muscle stretching on physical performance, range of motion, and injury incidence in healthy active individuals: A systematic review. Applied Physiology, Nutrition and Metabolism, 41(1), 1–11. https://doi.org/10.1139/apnm-2015-0235

Buana, T.M.N, Purnawati, S, Sugijanto, Satriyasa, K, Sandi, N & Imron, A.M. (2017). Perbedaan

Kombinasi Myofascial Release Technique dengan Ultrasound dan Kombinasi Ischemic Compression Technique dengan Ultrasound dalam Meningkatkan Kekuatan Otot Leher Akibat

Rahmanto, dkk. (2021). Analisa Risiko Terajadinya Keluhan *Myofascial Pain Syndrome* Terhadap Otot *Upper Trapezius* Pada Pegawai Puskesmas Kendalsari – Kota Malang." Physiotherapy Health Science 3(1): 26–29

Sunyiwara, Arum Sekar, Mega Widya Putri, and Rifqi Sabita. 2021. "Pengaruh Myofacial Release Kombinasi Dengan Hold Relax Terhadap Myofacial Pain Syndrome." Jurnal Ilmiah Kesehatan 12(2): 582–87.

Dommerholt, Jan. 2018. "Chapter 35 *Myofascial Pain Syndrome*." (January 2010)

Shah, J. P. (2023). Myofascial Trigger Points Then and Now: A Historical and Scientific Perspective. In Genetika (Vol. 20, Issue 2, pp. 224–232). StatPearls Publishing. https://doi.org/10.1016/j.pmrj.2015.01.024.Myofascial.

Muawanah, Siti, and Iit Selviani. 2018. "Penambahan Neuromuscular Tapping Lebih Baik Dari Pada Ultrasoud Saja Untuk Menurunkan Nyeri Pada Kasus Plantar Fascitis." Jurnal Ilmiah Fisioterapi (JIF) Volume 1 nomor 02, Agustus 2018 1(2): 47–59.

McKenney, Kristin, Amanda Sinclair Elder, Craig Elder, and Andrea Hutchins. 2013. "Myofascial Release as a Treatment for Orthopaedic Conditions: A Systematic Review." Journal of Athletic Training 48(4): 522–2