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**Original Research**

# Differences in the Effects of Two Combinations of Hold Relax Techniques on Gastrocnemius Muscle Pain Reduction

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**ABSTRACT**

***Background:*** *Pain in the gastrocnemius muscle is often experienced by garment factory workers due to repetitive standing and walking activities. Combination therapy techniques are an alternative to reduce pain and improve muscle function. This study aims to determine the difference in effectiveness between holding relax exercise with auto myofascial release technique and hold relax exercise with auto stretching in reducing gastrocnemius muscle pain in garment company employees.*

***Methods:*** *This study used a quasi-experimental design with a pre-post test control group. A sample of 40 employees with gastrocnemius muscle pain was selected using purposive sampling and divided into two intervention groups of 20 people each. The first group received hold relax exercise and auto myofascial release technique, while the second group received hold relax exercise and auto stretching. Pain was measured using the Visual Analog Scale (VAS). Data were analyzed using the Wilcoxon and Mann-Whitney tests.*

***Results:*** *Statistical testing using an independent t-test yielded a result of p=0.007 (p<0.05), which means that there was a difference between groups I and II, with a mean difference after treatment of 13.27 mm in group I and 3.53 mm in group II.*

***Conclusion:*** *Hold relax exercise with the Auto myofascial release technique is more effective in reducing gastrocnemius muscle pain than Hold relax exercise with Auto stretching in garment company employees.*

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## INTRODUCTION

With advances in science and technology, human life expectancy has increased. However, this increase in age raises the risk of developing various degenerative diseases, including osteoarthritis, which commonly affects the knee joints. This disease is characterized by damage to the joint cartilage structure, causing pain and motor function limitations that interfere with daily activities (Reece et al., 2012; Mora et al., 2018).

Muscle pain due to spasms, especially in the gastrocnemius muscle, is a significant problem for industrial workers such as garment factory employees who stand and walk for long periods during working hours. This disorder causes a significant decline in productivity and quality of life. Effective management of this pain is essential to reduce

the physical and psychological impact on workers (Cahyaningtyas, 2019; Kisner & Colby, 2016).

Various physical therapy techniques are used to address gastrocnemius muscle pain, including hold-relax exercises, myofascial release techniques, and stretching. Each method has its own mechanism of action that can help relax muscles and reduce spasms (Agung et al., 2018; Basu et al., 2020). However, there has been no research directly comparing the effectiveness of a combination of hold relax exercises with myofascial release versus a combination of hold relax exercises with auto stretching in a population of garment workers.

The novelty of this study lies in testing two different combinations of physical therapy in reducing gastrocnemius muscle pain in industrial workers, specifically using the garment sector population as the focus. This study aims to obtain empirical evidence regarding the more effective and efficient method to be applied clinically in industrial musculoskeletal rehabilitation (Hudaya, 2018).

This study seeks to contribute useful scientific information to physical therapy practitioners in designing appropriate therapy programs for workers with gastrocnemius muscle pain complaints, so that pain management becomes more targeted and based on the latest evidence. Thus, this study will help improve worker welfare and productivity in the workplace (Shahnawaz et al., 2014; Kisner & Colby, 2016).

## MATERIALS AND METHOD

This study used a quasi-experimental research design with a two-group pre- and post-test design. This design was chosen to directly compare the effectiveness of two therapeutic interventions on two different groups and to measure changes in gastrocnemius muscle pain before and after the intervention.

The research was conducted at the physiotherapy clinic of Mitra Plumbon Hospital, Cirebon. The study was conducted over four weeks, from October 18, 2022, to November 12, 2022, with a training schedule of three times a week. The location and time were chosen to provide a standardized intervention and facilitate supervision of the subjects' activities.

The study population consisted of garment factory employees experiencing gastrocnemius muscle pain. A sample of 40 people was selected using purposive sampling, divided into two groups of 20 people each. Inclusion criteria included employees with gastrocnemius muscle pain who were willing to participate, while exclusion criteria included a history of acute injury or other diseases that could affect the results of the therapy.

The research variable was the type of intervention, which was hold-relax exercise with auto myofascial release technique in the first group and hold-relax exercise with auto stretching in the second group. The dependent variable was the level of pain measured using the Visual Analog Scale (VAS). This instrument has been tested for validity and reliability in measuring pain intensity subjectively.

The data collection procedure began with measuring the VAS pain scale before the intervention, followed by administering therapy according to each group for four weeks, and then re-measuring pain after the intervention was completed. Data were analyzed using the Wilcoxon test to examine changes within groups and the Mann-Whitney test to compare between groups, with a significance level of 0.05. The research procedure was conducted while maintaining subject privacy, obtaining written informed consent, and

following ethical principles in health research to protect the rights and safety of research subjects.

## RESULTS

**Table 1. Respondent Characteristics Based on Age and Gender**

| Variable | Group 1 (n=20) | Group 2 (n=20) |
|---|---|---|
| Gender, n (%) | Male: 1 (5%)<br>Female: 19 (95%) | Male: 1 (5%)<br>Female: 19 (95%) |
| Age, Mean (years) | 54 ± 8.51 | 53 ± 8.07 |

Group 1 received an intervention consisting of hold-relax exercises combined with auto myofascial release techniques; while group 2 received hold-relax exercises combined with auto stretching. Table 1 shows that the majority of respondents were female (95%) in both groups. The average age of both groups was almost the same, namely 54 years for the experimental group and 53 years for the control group, indicating no significant demographic differences.

**Table 2.** Changes in VAS Pain Scores Before and After Therapy

| Variable | Group 1 (n=20) | Group 2 (n=20) |
|---|---|---|
| Initial VAS mean | 5 ± 1.32 | 5 ± 1.21 |
| Final VAS mean | 3 ± 1.01 | 4 ± 0.97 |
| Difference (Δ VAS) | 2 ± 0.31 | 1 ± 0.24 |

Table 2. After the intervention, both groups experienced a significant decrease in pain scores ($p < 0.05$). The greatest decrease occurred in the group that received training in auto myofascial release techniques, which was 2 points.

**Table 3. Statistical Significance Test for Changes in Mean Pain**

| Test | p-value | Conclusion |
|---|---|---|
| Wilcoxon Test | $p < 0.05$ | There is a significant effect in each group |
| Mann-Whitney test | $p = 0.021$ | There is a significant difference between the two groups |

Table 3 shows that the data are not normally distributed in the first group with a p-value of 0.01 in the Shapiro-Wilk test, so the analysis uses the non-parametric . Both interventions were proven to be effective in reducing pain with a p-value < 0.05 in the Wilcoxon test in each group. A comparison of effectiveness between groups using the Mann-Whitney test yielded a p-value of 0.021, indicating a significant difference between the combination of hold-relax exercise with auto myofascial release technique and the

combination of hold-relax exercise with auto stretching, with higher effectiveness in the first group.

## DISCUSSION

This study found that the combination of hold relax exercise with auto myofascial release technique was more effective in reducing gastrocnemius muscle pain in garment company employees than the combination of hold relax exercise with auto stretching. These results indicate that therapeutic methods involving myofascial tissue stimulation provide a more pronounced analgesic effect on muscles experiencing spasm or tension. This finding supports an approach that combines muscle relaxation techniques with the reduction of soft tissue adhesions for optimal therapeutic results (Basu et al., 2020).

Analysis of previous literature confirms that hold-relax exercises can enhance muscle relaxation through neuromuscular inhibition mechanisms that are effective in reducing muscle tension. Auto myofascial release adds to the therapeutic effect by improving circulation and soft tissue mobility, which is in line with the findings of Agung et al. (2018) and Xie et al. (2018). While passive stretching helps maintain flexibility, this method tends to be less effective in addressing tissue adhesions than myofascial release.

The implications of these research findings are highly relevant for rehabilitation programs for employees experiencing muscle pain due to repetitive and prolonged physical activities. The application of a combination of holding relax and myofascial release can accelerate pain reduction and improve work comfort, thereby increasing worker productivity and well-being. This therapy can be used as a standard protocol in industrial physiotherapy clinics to address common musculoskeletal complaints (Hudaya, 2018).

Methodologically, the limitations of this study include the small sample size and the short intervention duration of four weeks, making it impossible to confirm long-term effectiveness. The influence of external factors such as daily physical activity outside of therapy also cannot be fully controlled, which may affect pain measurement results. These shortcomings are important considerations in interpreting the data and planning further research with stricter controls (Susilawati et al., 2015).

Further research is recommended to use a larger sample with a randomized controlled trial design to obtain more valid and reliable results. An extended intervention duration and the addition of a control group will help measure the sustainability of the therapy's effects. The evaluation of other combination therapies may also develop intervention options for more effective muscle pain management (Ng et al., 2022).

## CONCLUSION

The combination of hold-relax exercise with auto myofascial release technique is an effective intervention for reducing gastrocnemius muscle pain in industrial workers, offering opportunities for improved function and quality of life. Therapists are advised to adopt this method in clinical practice and worker health maintenance ( ). These results support the development of better evidence-based occupational health programs in the future.

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