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Giving nerve and tendon gliding exercises to reduce pain in carpal tunnel syndrome

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ABSTRACT

Background: Physical activity in blacksmith workers, which involves repetitive use of hand and wrist muscles, grasping tools, and forging iron, can cause symptoms of carpal tunnel syndrome (CTS), including pain that affects functional activities. This study aimed to determine whether giving Nerve Tendon Gliding Exercise can reduce pain in patients with CTS.
Methods: This study used a randomized control trial design. The intervention group received the nerve gliding and tendon gliding exercises, while the control group received the nerve gliding exercise only. Sampling in this study was conducted using non-probability sampling techniques with a purposive sampling model, a sampling technique with specific considerations. The sample of this study involved respondents aged between 25 and 40 years. Furthermore, the data obtained were analyzed using the Wilcoxon and Mann-Whitney tests.
Results: Analysis of the results of the effect test using the Wilcoxon Test the results p <0.05 that shows an influence on the treatment group given nerve and gliding exercise with the control group given nerve gliding exercise to reduce pain. Furthermore, the analysis using the Mann-Whitney test obtained the results of the Z value = -2.757 with a p-value of 0.006 <0.05, which means it shows a significant difference in influence.
Conclusion: Giving Nerve Tendon Gliding Exercise shows a significant difference in the effect on the treatment group given nerve gliding exercise with the addition of tendon gliding exercise and the control group given nerve gliding exercise to reduce pain.

Keywords: CTS, exercise, nerve tendon gliding, pain.
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INTRODUCTION

Carpal Tunnel Syndrome (CTS) is a pinched condition of the median nerve in the carpal tunnel of the hand and wrist.[1] CTS cases are more common in women than men.[2] CTS occurs due to repetitive or continuous movements that will impact productivity and functional activities. In this case, interventions that can be applied are nerve and tendon gliding exercises, a program that performs several movements xon the hand and wrist. Nerve and tendon gliding exercise provides effectiveness, namely accelerating activity improvement in hand function, daily functional activities, and improving the quality of life for CTS sufferers.[3,4] So, from previous researchers, nerve, and tendon gliding exercises in CTS cases show the results of improvements in functional activities and can improve the quality of life of sufferers.[3]

The prevalence of CTS in the general population is estimated to be 5% in women and 0.6% in men. CTS is the most commonly encountered type of entrapment neuropathy. This CTS syndrome is unilateral in 42% of cases (29% right, 13% left) and 58% bilateral. The incidence of carpal tunnel syndrome in the population is estimated at 3% in women and 2% in men, with the highest prevalence in women aged < 55 years.[5]

Nerve and tendon gliding exercises provide effectiveness, namely accelerating activity improvement in hand function, daily functional activities, and improving quality of life for CTS sufferers.[6,7] So, according to previous researchers, nerve, and tendon gliding exercises in CTS cases show improvements in functional activities and can improve the quality of life of sufferers.[4] Giving nerve gliding exercises can improve recovery in CTS, accelerate rehabilitation, and avoid surgical intervention.[8]

Tendon gliding exercise can reduce adhesions in the carpal tunnel, reduce tenosynovial edema, increase the venous return from the nerves, and reduce pressure in the carpal tunnel to prevent adhesions to the tendons.[9,10] Judging from the knowledge in this carpal tunnel syndrome case, there is still a lack of knowledge about the carpal tunnel syndrome case.

METHODS

This study used a randomized control trial design. Sampling in this study utilized a non-probability sampling technique with a purposive sampling model. The study population comprised all patients diagnosed with wrist pain based on standard physiotherapy assessment. The access population for this study was patients with wrist pain and disabilities who visited the physiotherapy clinic. Thus, the total sample size was 30 respondents and randomized into the intervention and control groups. The intervention group received the nerve gliding and tendon gliding exercises, while the control group received the nerve gliding exercise only.

The inclusion criteria were respondents who came to the physiotherapy clinic with complaints of disability or pain in the wrist and the results of the Phalen test, Tinel Sign elevation test, and scratch collapse test were positive, aged between 25 and 40 years, male and female, and were able to communicate effectively with physiotherapists, and were willing to participate in this study. Exclusion criteria included subjects who withdrew from the study and had a history of dislocation, traumatic injury, malignant tumor, and osteoarthritis. Data analysis was performed using SPSS, and the data obtained were analyzed using the Mann-Whitney test.

RESULTS

Based on Table 1 below, it is known that the results of the effect test using the Wilcoxon Test result p <0.05 that shows that there is an influence on the treatment group given nerve gliding exercise with the addition of tendon gliding exercise and control group given nerve gliding exercise to reduce pain.

Based on Table 2, it is known that the results of the Mann-Whitney test showed a value of Z = -2.757 with a p-value of 0.006 <0.05, which means that there is a significant difference in the effect of reducing pain in batik workers between the treatment group given nerve gliding exercise with the addition of tendon gliding exercise and the control group given nerve gliding exercise.

Table 2 states that the results of the effect test using the Mann-Whitney test the result is 0.005, which means *p* <0.05, which means it shows a significant difference in the effect on the treatment group given nerve gliding exercise with the addition of tendon gliding exercise and the control group given nerve gliding exercise to reduce pain.

Nerve gliding exercise has the potential to affect nerves both mechanically and physiologically.[11] In nerve gliding exercise, movements can increase nerve movement, reducing adhesions and symptoms by allowing the courage to move freely.[12] The addition of tendon gliding exercise can provide a very influential effect because tendon gliding exercise theoretically increases differential motion between tissues, reduces oedema, and increases axonal and vascular supply to the vasa nervorum.[13]

Table 1. Results of Wilcoxon test on the pain level in the pre- and post-test of the intervention and control groups

Group	Mean	SD	*P*-Value
Treatment Group	2.80	0.532	0.004
Control Group	3.60	0.682	0.007

SD, standard deviation

Table 2. Results of Mann-Whitney test on the pain level between the change scores of the intervention and control groups

Group	Z	*P*-value	α
Treatment Group vs. Control Group	-2.856	0.005	0.05

DISCUSSION

Carpal tunnel syndrome in workers occurs because workers maintain a posture more often during work time, which can cause reduced blood supply, lactic acid accumulation, inflammation, pressure on the muscles, and mechanical trauma due to continuous workload without getting a chance to relax, the medianus nerve is compressed between the carpal tunnel which reduces the function of the nerve.[14,15] Other causes of cts are caused by fractures of the distal radius, directly or through post-traumatic arthritis, and heredity carpal tunnel with a small size can change the contour of the tunnel.[16] Intrinsic factors are due to tumors and lesions in the nerve that increase the volume occupied in the tunnel.[17] Neuropathic factors such as; diabetes, alcoholism, poisoning or vitamin deficiencies, and exposure to toxins can give rise to CTS symptoms.[18,19] Nerve and tendon gliding exercises are given in the form of (straight, hook, fist, tabletop, and straight fist), this exercise is performed with the patient in a sitting position that varies according to the patient's ability to relax the proximal muscles; Straight, the exercise starts with the wrist in a neutral position (0 degrees), fingers and thumb in a full flexion position.[20,21] Based on Table 2, it is known that the results of the Mann-Whitney test obtained the value of Z = -2.757 with a p-value of 0.006 <0.05, which means it shows a significant difference in influence on pain reduction. Table 2 states that the results of the effect test using the Mann-Whitney test the result is 0.005, which means p <0.05, which means it shows a significant difference in the effect on the treatment group given nerve gliding exercise with the addition of tendon gliding exercise.[22,23]

This study has several limitations to be considered in interpreting the results. Using a non-probability sampling technique with a purposive sampling model may result in a non-randomly representative sample from the wider population, reducing the ability to generalize the findings of this study. In addition, the age restriction of the study subjects between 25 and 40 years may limit the relevance of the findings to that age group only, not reflecting the effectiveness of nerve tendon gliding exercises in a wider age range population. Subject selection based on specific tests such as the Phalent test, Tinel Sign elevation test, and scratch collapse test may also not be sensitive or specific enough to identify all cases of carpal tunnel syndrome. Therefore, it is important to consider these limitations thoroughly in future studies.

CONCLUSION

Based on the study results, the addition of tendon gliding on the nerve gliding exercises had significantly a higher effect to reduce pain level than the nerve gliding only among the workers.

ETHICAL CLEARANCE

The Research Ethics Commission, Aisyiyah University Yogyakarta, stated that this research was ethically feasible with registration number: 1787/UN13.0.1.V.13/LT/2023.

CONFLICT OF INTEREST

This study has no conflicts of interest.

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AUTHOR CONTRIBUTIONS

RW designed the research, gathered and analyzed the data, and wrote the script, AA interpreted the analysis data and wrote the script

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