

The Effect of Giving Tens and Tendon Glidess Exercise on Increasing Hand Functional Ability in Carpal Tunnel Syndrome Sufferers at RSU Nurussyifa Kudus

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ABSTRACT

Keywords:

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Carpal tunnel syndrome is a wrist disorder caused by compression of the median nerve in the carpal tunnel. This disorder is characterized by hand pain at night, paralysis of the fingers, and weakness and atrophy of the thenar muscles innervated by the middle nerve. The physiotherapy measures given for CTS problems in this study were TENS and tendon glides exercise. This action aims to restore functional activity of the hand, reduce edema, and reduce pain. This type of research is a one group pre-test and post-test design consisting of 30 respondents with a purposive sampling method. The first observation was a special examination of CTS sufferers using wrist and hand disability index data forms. Second, provide a treatment program using the TENS (transcutaneous electrical nerves stimulation) method and tendon glides exercise. The sample for this research consisted of 30 respondents. From the results of the hypothesis test, it was obtained that $0.000 < 0.05$. So the results of this therapy show a significant increase in hand functional ability between before and after therapy. Based on these results, the intervention given was TENS and tendon glides exercise to improve the functional ability of the sufferer's hands.

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1. INTRODUCTION

Activities at work, work, and attitudes towards work are factors that are often complained of as the root causes of work disorders [1]. Carpal Tunnel Syndrome (CTS) is one of these work-related disorders [2]. Compression of the median nerve in the carpal tunnel of the wrist is the cause of CTS, a disorder characterized by tingling and pain that radiates to the hand and fingers innervated by the median nerve [3]. Other symptoms include numbness, stiffness, weakness, and possible muscle atrophy [4].

Numerous studies on carpal tunnel syndrome (CTS) have demonstrated variables that contribute to the development of CTS in the workplace [5]. The following are risk factors for CTS: hand movements, repetitive movements, aging, and poor posture while working [6]. Three elements are responsible for CTS: intrinsic factors, hand use factors (which influence hobbies and work), and trauma factors [7].

Based on 2018 Basic Health Research (Riskesdas) statistics, Indonesia has a prevalence of joint disease of 7.3% and an injury rate of 9.2%, with the upper limbs (including the upper arms, forearms, back of the hands, palms and fingers) accounts for up to 32.7% of all injuries. A class of conditions known as musculoskeletal diseases (MSDs) affects muscles, tendons, and nerves. Examples of these conditions include carpal tunnel syndrome (CTS), tendinitis, thoracic outlet syndrome, and tension neck syndrome [4].

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Currently, to prevent occupational diseases, especially CTS, it is very important to pay more attention to the implementation of occupational safety and health (K3) in work environments that are dominated by hand movements [8]. Especially the work of the patients at Nurussyifa Hospital, most of whom work as cigarette factory workers (rolling/rolling) and traders, so there is a high possibility of experiencing the risk of CTS.

At RSU Nurussyifa Kudus the number of new patients diagnosed with carpal tunnel syndrome (CTS) continues to increase. In 2022 the number of CTS sufferers will reach 216 people. This shows that CTS cases in this hospital are quite high. Carpal tunnel syndrome (CTS) is a relatively common chronic pressure neuropathy of the median nerve in the carpal tunnel at the wrist [9]. It is characterized by hand pain at night, paralysis of the fingers, and weakness and atrophy of the thenar muscles innervated by the nerve middle [10].

Transcutaneous electrical nerve stimulation (TENS) is a device that produces an electric current and works by stimulating nerves to reduce pain. The signal from TENS functions to interfere with pain signals, affecting the nerves and cutting off pain signals, sufferers feel the pain is reduced and the range of motion of the joints increases [11].

Tendon glides as a therapeutic modality which is a mechanically based treatment that seeks to stimulate soft tissue healing and increase vascularization of the median nerve in the carpal tunnel [12]. Tendon glidess exercise can reduce edema, increase median nerve mobility and reduce adhesions in the surrounding connective tissue [13]. The physiotherapy treatment given to CTS cases in research at RSU Nurussyifa Kudus is by administering TENS and tendon glidess exercises to increase the functional capacity of the hands in carpal tunnel syndrome patients.

2. METHOD

This research is an experimental study with a one group pre-test and post-test design method which was carried out at the Physiotherapy Polyclinic RSU Nurussyifa Kudus from July to August 2023. The population of this study consisted of 60 respondents with CTS cases using a sampling technique in the form of purposive sampling. There were 30 respondents, namely patients at RSU Nurussyifa Kudus. The inclusion criteria included age 20 to 50 years, having functional limitations in the hands, and being willing to become a research subject by signing an informed consent. Exclusion criteria include patients with a history of fractures, previous surgery on the wrist area, and complications from other diseases such as tumors and Parkinson's. The criteria for patients dropping out include the respondent not attending the research procedure twice in a row and the respondent not completing the research procedure.

Providing physiotherapy intervention using the Transcutaneous Electric Nerve Stimulation (TENS) modality is a type of therapy that uses electrical currents with certain frequencies, characteristics and amplitudes which are then delivered through the skin via electrode pads. Place 2 electrode pads on the painful wrist area and place them around the anterior and posterior of the hand. Next, tendon glides exercises are given, which is a method of exercise therapy for the hands using both active and passive body movements to maintain and improve strength, cardiovascular endurance and ability, mobility and flexibility, stability, relaxation, coordination, balance and functional ability. The various movements are as follows: Finger down position by slowly bending the fingers down until each finger is bent and the fingertips touch the pad at the base of the finger, hold this position for 3 seconds and then return to the initial open hand position, rest for 5 seconds, repeat the movement for 10 repetitions. First position by moving your hands from the initial open hand position, clench your hands slowly and squeeze gently, hold this position for 3 seconds and then return to the initial open hand position, rest for 5 seconds, repeat the movement for 10 repetitions. 'L' Position slowly bend the fingers forward, but make sure the fingers remain straight, only the joint where the fingers meet the hand should be bent, the hand should now be in an "L" shape, hold this position for 3 seconds and then return to the initial open hand position, rest 5 seconds, repeat the movement for 10 repetitions. Fingers to palm position by pointing fingers to palm position, bend fingers only at the first and middle joints, fingertips should rest gently on palm, hold position for 3 seconds and then return to initial open hand position, rest 5 seconds, repeat movement 10 repetitions.

The measuring instrument for this research uses the Wrist Hand Disability Index (WHDI) scale which is used to measure functional abilities in wrist and hand disorders such as CTS with an index of 10 questions and a score of 0 to 5. Data management is carried out using quantitative research with data analysis using the Wilcoxon test rank test. This research has gone through the research ethics committee issued by IIK STRADA with number 3975/KEPK/X/2023

3. RESULTS AND DISCUSSION

The respondents in this study were 30 women who were CTS patients at RSU Nurussyifa Kudus from 1 October to 31 October 2023. Respondent characteristics included age and gender. Following are the differences before and after treatment.

Table 1. General data

No		N	%
1.	Gender :		
	Female	30	100%
2.	Age :		
	25 – 30 Year	6	20,0%
	31 – 35 Year	3	10,0%
	36 – 40 Year	8	26,7%
	41 – 45 Year	7	23,3%
	46 – 50 Year	16	53,3%
	Total	30	100,0%

Table 2. Distribution of Increased Hand Functional Ability in CTS Patients Using TENS and Tendon Glides Modalities (Wilcoxon Test Results)

Hand functional capabilities	N	Sd	Mean	Median (Min – Max)	P
Pre Intervention	30	2.884	36.60	36 (31 – 43)	0.000
Post Intervention	30	3.156	29.80	29 (25 – 41)	

From the general data above, 100% of respondents are women. In accordance with research conducted by [14] found that most of the respondents who suffered from carpal tunnel syndrome (CTS) were women. Age also has an influence on the prevalence of CTS, which is illustrated by the average age of respondents being 25 years and the highest age being 50 years. The prevalence of CTS in the general population is estimated at 1-5%, while in the working population it is 5-21% [15].

TENS is an electrical stimulation modality with various modifications and special devices that influence receptors to produce therapeutic effects that are expected to reduce pain. This is in accordance with research conducted by [16] regarding the effect of TENS on the activity abilities of CTS patients, with a total of 50 respondents, TENS intervention was carried out 2 times a week and evaluated for 4 weeks. At the end of the study, it was found that the group that received TENS treatment experienced a significant increase in hand functional ability [17].

Tendon glides exercise is an effective manual therapy intervention given to CTS sufferers to reduce pain, improve nerve conduction and improve functional status in people affected by CTS [18]. Tendon glides exercise can reduce edema, increase median nerve mobility and reduce adhesions in the surrounding connective tissue [19].

In research on tendon glides exercise in CTS patients in increasing functional activity, it was also researched by [20] that among the 50 respondents studied, after receiving tendon glides exercise intervention there was a reduction in CTS symptoms caused by compression of the median nerve in the carpal tunnel so that it could improve ability functional hand [21].

It can be concluded that TENS works by stimulating the autonomic nervous system, which in turn triggers a reaction known as vasomotor stimulation, which changes tissue chemistry so that it can reduce the pain of CTS and tendon glides exercise [7]. Physiotherapy often uses tendon glides as a

therapeutic modality which is a mechanically based treatment. which seeks to stimulate soft tissue healing and increase vascularization of the median nerve in the carpal tunnel [22]. Tendon glidess exercise can reduce edema, increase median nerve mobility and reduce adhesions in the surrounding connective tissue [19].

The research results show that TENS and tendon glides exercise have significant results. Thus, giving TENS and tendon glides exercise to CTS patients is considered to have a positive and significant effect in increasing the functional ability of the hand as measured using the wrist-hand disability index (WHDI).

4. CONCLUSION

In research with 30 respondents (100%), it can be concluded that TENS and tendon glides exercise consistently provide an increase in hand functional ability in CTS sufferers, based on using the WHD (wrist-hand disability) parameter where there are variations in improvement.

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