



Management Physiotherapy for Carpal Tunnel Syndrome: A Case Report

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ABSTRACT

Introduction: Carpal Tunnel Syndrome is a peripheral neuropathy in which there is increased pressure around the median nerve which causes various symptoms such as tingling, wrist pain, paresthesia, and a burning sensation in the hands. Various factors have been speculated to contribute to the occurrence of CTS, including hereditary neuropathy, trauma to the forearm, repetitive motion work on the wrist, inflammation of the tendons, metabolic and endocrine diseases, malignancy to degenerative diseases. To reduce pain when the patient is at home, physiotherapists provide independent exercises that can be done at home with modified myofascial stretching. Kinesio tapping is an adjunctive treatment method that is suggested to be effective in regulating normal tissue function and supporting wound healing mechanisms. It has been found to be effective in muscle problems for pain relief by reducing pressure on pain receptors and supporting and protecting muscle tissue. Kinesio tapping is also known to be effective in the conservative treatment of CTS either alone or in combination with other therapeutic agents. To determine the effect of exercise therapy and kinesio tapping given to CTS patients. This study uses a case study. measurement of pain using the Numeric Rating Scale (NRS), measurement of muscle strength using Manual Muscle Testing (MMT), Goniometer to measure the Range of Joint Motion (ROM), Evaluation of Functional Ability with the Buston Questionnaire Carpal Tunnel Syndrome (BQCTS) is a measuring tool to measure functional ability in CTS. After 3 physiotherapy interventions, results were obtained which showed a decrease in pain. Silent pain from 1 to 0, tenderness from 5 to 2, and motion pain from 6 to 2. For muscle strength, there was an increase in the wrist flexor muscle group from 3+ to 4. For the range of motion of the joints, there was no significant increase due to the time of intervention very limited. As well as found an increase in functional activity and a decrease in the degree of pain. Exercise therapy and Kinesio Taping are effective for reducing pain, increasing muscle strength, and increasing range of motion resulting in increased functional ability.

Keywords: Carpal Tunnel Syndrome, Exercise Therapy, Kinesio Tapping

ABSTRAK

Pendahuluan: Sindrom lorong karpal (*Carpal Tunnel Syndrome*) adalah neuropati perifer di mana terjadi peningkatan tekanan di sekitar saraf median yang menyebabkan berbagai gejala seperti kesemutan, nyeri pergelangan tangan, parestesia, dan rasa terbakar di tangan. Berbagai faktor telah dispekulasikan berkontribusi terhadap terjadinya CTS, termasuk neuropati herediter, trauma pada lengan bawah, pekerjaan gerak berulang pada pergelangan tangan, peradangan pada tendon, penyakit metabolik dan endokrin, keganasan hingga penyakit degeneratif. Untuk mengurangi rasa nyeri saat pasien berada di rumah, fisioterapis memberikan latihan mandiri yang dapat dilakukan di rumah dengan peregangan myofascial yang telah dimodifikasi. Kinesio tapping adalah metode pengobatan tambahan yang disarankan untuk efektif dalam mengatur fungsi jaringan normal dan mendukung mekanisme penyembuhan luka. Telah terbukti efektif dalam masalah otot untuk meredakan nyeri dengan mengurangi tekanan pada reseptor nyeri dan mendukung serta melindungi jaringan otot. Kinesio tapping juga dikenal efektif dalam pengobatan konservatif CTS baik secara sendiri maupun dalam kombinasi dengan agen terapi lainnya. Untuk mengetahui efek terapi latihan dan kinesio tapping yang diberikan kepada pasien CTS. Penelitian ini menggunakan studi kasus. pengukuran nyeri menggunakan Numeric Rating Scale (NRS), pengukuran kekuatan otot menggunakan *Manual Muscle Testing (MMT)*, Goniometer untuk mengukur Range of Motion (ROM), Evaluasi Kemampuan Fungsional dengan *Buston Questionnaire Carpal Tunnel Syndrome (BQCTS)* merupakan alat ukur untuk mengukur kemampuan fungsional pada CTS. Setelah dilakukan 3 kali intervensi fisioterapi, didapatkan hasil yang menunjukkan adanya penurunan nyeri. Nyeri diam dari 1 menjadi 0, nyeri tekan dari 5 menjadi 2, dan nyeri gerak dari 6 menjadi 2. Untuk kekuatan otot terjadi peningkatan pada grup otot fleksor wrist dari 3+ menjadi 4. Untuk lingkup gerak sendi, tidak terjadi peningkatan yang signifikan dikarenakan waktu intervensi yang sangat terbatas. Serta

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didapatkan peningkatan aktivitas fungsional dan penurunan derajat nyeri. Terapi latihan dan Kinesio Taping efektif untuk mengurangi nyeri, meningkatkan kekuatan otot, dan meningkatkan lingkup gerak sendi sehingga terjadi peningkatan kemampuan fungsional.

Kata Kunci: Sindrom Lorong Karpal, Terapi Latihan, Kinesio Tapping

INTRODUCTION

Carpal Tunnel Syndrome is a peripheral neuropathy in which there is increased pressure around the median nerve which causes various symptoms such as tingling, wrist pain, paresthesia, to a burning sensation in the hands (Sheereen et al., 2022). Various factors have been speculated to contribute to the occurrence of CTS, including hereditary neuropathy, trauma to the forearm, work that uses repetitive movements of the wrist, inflammation of the tendons, metabolic and endocrine diseases, malignancy to degenerative diseases (Shem et al., 2020).

With a prevalence of approximately 10%, the median nerve is the most common nerve in entrapment syndrome worldwide and accounts for up to 90% of all nerve compression syndromes. Risk factors include diabetes mellitus, hypothyroidism, advanced age, obesity, pregnancy in women, rheumatoid arthritis and repetitive wrist work. Clinically, there is hyperesthesia or paresthesia in the sensory distribution of the median nerve in the hand, and in severe cases, intrinsic weakness in the muscles of the hand supplied by the median nerve (Erickson et al., 2019).

Physiotherapists perform manual therapy, directed at the cervical spine and upper extremities, for individuals with mild to moderate CTS (Utomo et al., 2020). Within the physiotherapy profession, manual therapy is defined as a clinical approach, including diagnosis and treatment, directed at the joint structures and soft tissues. The most prominent forms of manual therapy are joint manipulation, joint and soft tissue mobilization, and massage. Neurodynamic techniques are a relatively new development in physical therapy, and are mostly treated as part of manual therapy (Mao et al., 2018).

Kinesio tapping is an adjunctive treatment method that is suggested to be effective in regulating normal tissue function and supporting wound healing mechanisms. It has been found to be effective in muscle problems for pain relief by reducing pressure on pain receptors and supporting and protecting muscle tissue. Kinesio tapping is also known to be effective in the conservative treatment of CTS either alone or in combination with other therapeutic agents (Wilkins, 2016). The aims to determine the effect of exercise therapy and kinesio tapping given to CTS patients.

METHODS

The research method used is a case report (case study) which is reporting a case. This research was conducted directly on patients with a diagnosis of Carpal Tunnel Syndrome (CTS) at the Katno Wonogiri Physiotherapy clinic in a patient Mrs. S, who works as a cashew entrepreneur and is Muslim, in November 2022. At first the patient's complaint was in the form of pain radiating to the fingers of his right hand which caused discomfort both when he was silent and during activity. Complaints are more pronounced at night so that the patient has difficulty sleeping. At the time the complaint recurred at the same time the patient felt a decrease in sensation in the first to third fingers. The patient's complaints will decrease when the patient the patient rests and shakes his hand.

To reduce pain when the patient is at home, physiotherapists provide independent exercises that can be done at home with modified myofascial stretching (Ijaz et al., 2022). These modifications are made so that patients can stretch independently / independently, without the involvement of a therapist. Each participant was instructed to extend his wrist at 90° to the wall and gently pull the thumb (thenar) in the contralateral direction. The next exercise is that the patient holds the hand perpendicularly and massages the back of the wrist lightly (Mohammadi et al., 2019).

Another therapeutic manual that can be applied to CTS patients is the neurodynamic mobilization technique. Neurodynamic mobilization techniques are a subset of manual therapy that focuses on the diagnosis and treatment of certain disorders, including the peripheral nervous system. These techniques are widely used in the management of CTS (Martins & Siqueira, 2017). Recent clinical trials demonstrated the long-term effectiveness of NMT in improving pain intensity,

grip strength and functional status (Güner et al., 2018).

For installation Kinesio-tape attached to the wrist with 30° degree extension, supination of the forearm, elbow extension with moderate stretch across the nerves of the second and third metacarpophalangeal joints to a distance of 5 cm below the medial epicondyles (Wolny & Linek,2019). This method is accomplished by applying the bonding technique with strip 1 to the volar surface of the wrist (Mao et al., 2018).

RESULTS

In this case report study, physiotherapy provided interventions in the form of exercise therapy and kinesio tapping which were given during 3 physiotherapy meetings. Based on the evaluation carried out, the results obtained were a decrease in pain, an increase in the range of motion of the joints, an increase in muscle strength, and an increase in functional activity (Cheung et al., 2020).

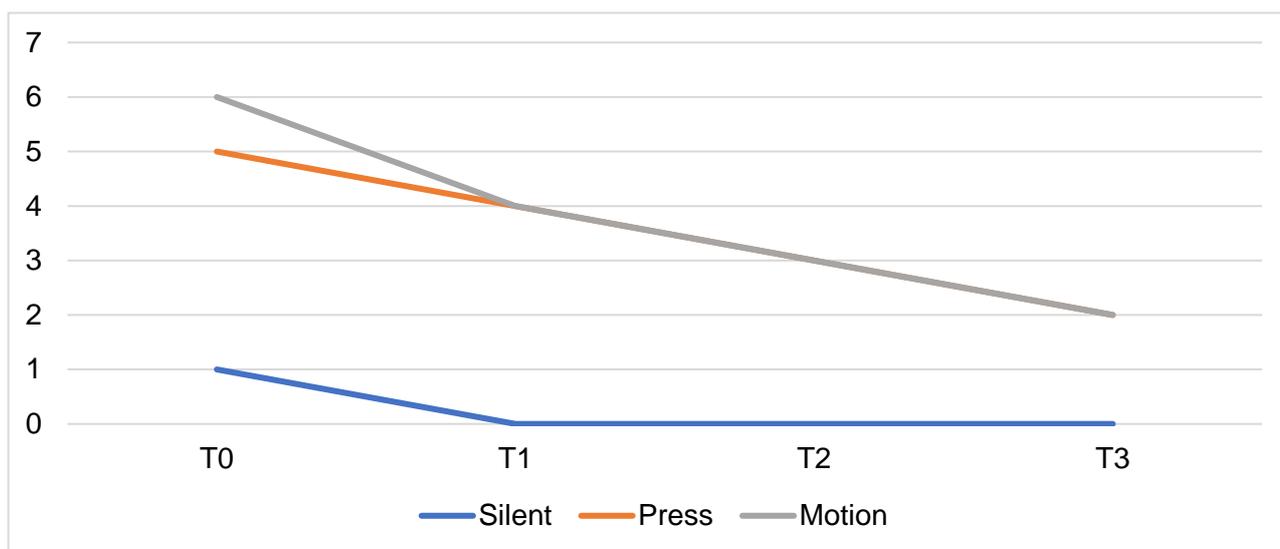


Figure 1. Pain Evaluation Results

Figure 1 showed a decrease in pain after doing 3 times of therapy. The results of measurements of silent pain at T0 = 1 becomes T3 = 0. Tenderness at T0 = 5 becomes T3 = 2. Movement pain T0 = 6 becomes T3 = 2.

Table 2. Evaluation Result MMT

Examined Muscles	T0	T1	T2	T3
Flexor Wrist : (m. Flexor carpi radialis, m. Flexor carpi ulnaris, m. palmaris longus, m. flexor digitorum superficialis, m. flexor digitorum profundus)	3+	3+	4	4
Extensor Wrist : (m. extensor carpi radialis longus dan brevis, m. extensor carpi ulnaris, m. extensor digitorum)	4	4	4	4
Radial Deviator Wrist : (m. flexor carpi radialis dan m. extensor carpi radialis)	4	4	4	4
Ulnar Deviator Wrist : (m. flexor carpi ulnaris dan m. extensor carpi ulnaris)	4	4	4	4

Tabel 2 shows an increase in the value of muscle strength in the extensor wrist dextra,

namely T0 = 3+ to T3 = 4 which means that it is able to move with full ROM against gravity but cannot yet fight maximum resistance.

Table 3. Evaluation Result ROM

WRIST		
T0 : dextra		
Active Motion	Passive motion	Normal
S : 40°-0°-50°	S : 45°-0°-60°	S : 50°-0°-60°
F : 20°-0°-30°	F : 20°-0°-30°	F : 20°-0°-30°
T1 : Dextra		
S : 45°-0°-55°	S : 50°-0°-60°	S : 50°-0°-60°
F : 20°-0°-30°	F : 20°-0°-30°	F : 20°-0°-30°
T2 : Dextra		
S : 45°-0°-55°	S : 50°-0°-60°	S : 50°-0°-60°
F : 20°-0°-30°	F : 20°-0°-30°	F : 20°-0°-30°
T3 : Dextra		
S : 50°-0°-55°	S : 50°-0°-60°	S : 50°-0°-60°
F : 20°-0°-30°	F : 20°-0°-30°	F : 20°-0°-30°

Tabel 3 showed an increase in ROM in both active and passive movements. An increase in ROM is associated with a decrease in pain felt by the patient. Pain is quite influential on ROM. In active motion of palmar-dorsal flexion T0 = S 40°-0°-50° becomes T3 = S 50°-0°-55° while in passive motion T0 = S 45°-0°-60° becomes T3 = S 50° -0°-60°.

Table 4. Results Evaluation of functional activity *Buston Questionnaire Carpal Tunnel Syndrome* (BQCTS)

No	Activity	T0	T1	T2	T3
1	Writing	4	3	2	2
2	Buttoning a shirt	3	2	2	1
3	Holding a book while reading	2	2	1	1
4	Holding a telephone receiver	3	2	2	1
5	Opening a bottle	2	2	2	1
6	Housework	3	2	2	2
7	Carrying a grocery basket	2	2	2	2
8	Bathing and dressing	3	2	2	1

Table 4 showed that the results of measuring functional ability decreased after being given 3 times physiotherapy found an increase in functional ability and a decrease in the degree of pain according to the type of questionnaire in the Buston Questionnaire Carpal Tunnel Syndrome.

DISCUSSION

In this study, the level of pain has decreased but has not completely disappeared because the training time given is only 3 sessions. The reduction in pain was less significant due to the patient's activity as a cashew nut entrepreneur. Where daily activities are carried out in the form of peeling the cashew seeds from the skin, this is done repeatedly and monotonously and takes quite a long time.

The results of measurements of silent pain at T0 = 1 becomes T3 = 0. Tenderness at T0 = 5 becomes T3 = 2. Motion pain T0 = 6 becomes T3 = 2. There is an increase in the value of muscle strength in the extensor wrist dextra, namely T0 = 3+ becomes T3 = 4 which means it is able to move with full ROM against gravity but has not been able to fight maximum resistance. There is an increase in ROM in active and passive movements. Increased ROM associated with decreased pain felt by the patient. In active motion of palmar-dorsal flexion T0 = S 40°-0°-50° becomes T3 = S 50°-0°-55° while in passive motion T0 = S 45°-0°-60° becomes T3 = S 50° -0°-60°. The results of measuring functional ability showed a decrease after being given 3 times physiotherapy, it was found that there was an increase in functional ability and a decrease in the degree of pain according to the type of questionnaire in the Buston Questionnaire Carpal Tunnel Syndrome (Sim et al.,

2019).

To reduce pain when the patient is at home, physiotherapists provide independent exercises that can be done at home with modified myofascial stretching (Teyhen & Robertson, 2019). Recent clinical trials demonstrated the long-term effectiveness of NMT in improving pain intensity, grip strength and functional status (Page et al., 2012).

CONCLUSION

Based on case studies that have been conducted with a diagnosis of Carpal Tunnel Syndrome, it can be concluded that providing exercise therapy can increase the range of motion of the joints and functional abilities (activity and participation) (Aziefafa & Perdana, 2022) and installing kinesio tapping on the patient's wrist can provide a sense of comfort and relaxation so as to reduce pain perception (Beddaa et al., 2022).

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