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It Workers' Rehabilitation Manual for Carpal Tunnel Syndrome: A Case Study

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ABSTRACT

A group of symptoms known as carpal tunnel syndrome (CTS) are brought on by compression of the median nerve in the carpal tunnel of the wrist. The primary signs and symptoms of CTS are numbness, pain, and tingling in the radial side of the ring finger as well as the first three fingers. Pain also causes nocturnal awakenings and impairs fine motor control due to hand weakness. Thus far, research findings pertaining to the use of conservative approaches in the management of CTS have been inconsistent. Exercises, splints, laser therapy, ultrasound therapy, manual therapy, neurodynamic methods, functional massage, and more are all part of CTS rehabilitation. Acupuncture, massages, and Chinese cupping massage are some alternative therapies for CTS.

Keywords: CTS, Physical Therapy, Neuromobilisation

INTRODUCTION

Carpal tunnel syndrome (CTS) is a common medical condition, which causes pain, numbness, and tingling in the hand and arm of the affected individual. CTS occurs when the median nerve is squeezed or compressed as it travels through the wrist. Risk factors for CTS include obesity, monotonous wrist activity, pregnancy, genetic heredity, and rheumatoid inflammation[1]. The symptoms for CTS may vary across patients. As such, they are classified differently into mild, moderate, and severe. The syndrome is characterized by pain in the hand, numbness, and tingling in the distribution of the median nerve. These sensations may be felt in the thumb, index finger, middle finger, and the radial side of the ring finger[2]. The painful feelings may result in a reduction in grip strength and hand function. The occurrence of CTS over a long time may also result in the muscles at the base of the thumb wasting away. An estimated 4% and 5% of people suffer from CTS worldwide, with the most susceptible population being elderly individuals aged between 40 and 60 years. CTS is also more prevalent amongst women as compared to men. For instance, the UK General Practice Research Database in 2000 evaluated that CTS prevalence was 88 per 100,000 in males, while in women, the incidence was 193 per 100,000[2]. More frequent evaluations of the incidence of CTS notes its occurrence to be higher for women aged between 45 and 54 years, while the risk is higher for men aged between 75 and 84 years[4]. CTS is a musculoskeletal disorder associated with work activity in the affected individuals, which is caused by strain and repetitive activity, making it a common problem across manual laborers. As such, CTS can also be associated with increased absences from work and further healthcare risks. This review article discusses the anatomy, epidemiology, risk factors, pathophysiology, stages, diagnosis, and management options of CTS. The most prevalent

entrapment condition, CTS, affects one or more peripheral nerves, causing the affected body organ to become numb or weak. CTS is present in at least 3.8% of patients who report hand pain, numbness, and itching on average. Medical evaluations and electrophysiological tests are used to diagnose CTS, albeit the most common diagnosis for individuals exhibiting these symptoms is idiopathic CTS. Even though CTS is an idiopathic syndrome, there are risk factors that are still connected to the occurrence of this illness. Prolonged postures with excessive wrist flexion or extension, repetitive flexor muscle activity, and vibration exposure are notable ecological risk factors. Medical risk factors for CTS are categorized into four groups, in contrast to environmental influences. These include extrinsic causes that cause the tunnel's volume to rise on either side of the nerve, intrinsic factors that do the same, extrinsic factors that change the tunnel's shape, and neuropathic factors. Physical therapy encompasses a range of techniques and variables that impact the body's biological functions. It is commonly used, reasonably priced, non-invasive, and simple to use. Patients with carpal tunnel syndrome are also treated with physiotherapy (CTS). This illness, which causes severe impairment, is the most prevalent upper limb compressive mononeuropathy. As a result, when it is successfully treated, the patient and society gain a great deal. For these patients, there is no set protocol for using physical therapy.

CASE REPORT

D.O.A - 7/02/2024

Demographic Data:

Name: xxxxx

Age/ Gender- 33 Years / Male

Subjective Assessment:

Chief Complaint- Pain, Numbness and Tingling sensation in right hand fingers

History of:

Present Illness – Patient was apparently alright 5 years back when he first started having tingling sensation in right hand. Tingling sensation generally appears in night and during performing ADL's

Past History – No Past History

Medical / Surgical / Physiotherapy History – No H/O TB / T_2DM / Asthma / Thyroid
No H/O Surgery or Physiotherapy

Personal History –

- Sleeping pattern- Altered
- Diet – Mixed Indian Diet
- Appetite – Normal
- Bowel and Bladder – Normal
- No Addiction of Smoking or Alcoholism

Family History – No relevant History

Socioeconomic History – Middle Class

Observation –

M.O.A	Walking Independently
Body Built	Mesomorphic
Breathing Pattern	Thoraco – abdominal breathing

GAIT Pattern	Normal

Palpation –

- Tenderness – Present over Rt. Wrist (Grade: III)
- Edema – Absent

Examination –

Reflex Examination-

REFLEXES	GRADES
Biceps	*+2*
Triceps	*+2*
Supination	*+2*
Knee	*+2*
Ankle	*+2*

- No Dermatomes involved
- Normal muscle tone

Manual Muscle Testing-

Movements	*Right*	*Left*
Flexion	*3*	*3+*
Extension	*3*	*3+*
Radial Deviation	*3+*	*4-*
Ulnar Deviation	*3+*	*4-*

Range of Motion Assessment-

Range of Motion	AROM	PROM
Flexion	*38°*	*Full*
Extension	*40°*	*Full*
Radial Deviation	*28°*	*Full*
Ulnar Deviation	*35°*	*Full*

Pain Assessment-

- Nature: Dull Aching and Radiating
- Numbness in Fingers
- Type: Continuous
- Severity: Moderate
- Intensity: NPRS- 5/10
- Aggravating factor: Grasping Objects
- Relieving factor: Wearing Splint
- Tingling/Numbness: Present

Special Test-

- Carpal Compression Test: +Ve
- Phalen's Test: +Ve
- Reverse Phalen's Test: +Ve
- ULTT 1: +Ve

INTERVENTION

	MODALITY	DOSIMETRY
WEEK 1	*Cryotherapy*	*8 minutes*
	Ultrasound therapy	*12 minutes X 1.8 MHz (Continuous Mode)*
	Stretching Exercises of Wrist Flexors and Wrist Extensors	*15 sec X 3 reps X 2 sets*
	Median Nerve Gliding	*15 sec X 3 reps X 2 sets*
	Gripping Exercise with Towel	*6 reps X 3 sets with 1 min rest time in between*
	Thumb Touches	*6 reps X 3 sets with 1 min rest time in between*
	Ball Squeezes	*6 reps X 3 sets with 1 min rest time in between*
	Wrist Curls	*6 reps X 3 sets with 1 min rest time in between*
	Taping	*Applied*
	Splint Advise	*Advised.*
WEEK-2	*Cryotherapy*	*8 minutes*
	Ultrasound therapy	*8 minutes X 1.8 MHz (Continuous Mode)*
	Stretching Exercises of Wrist Flexors and Wrist Extensors	*20 sec X 3 reps X 2 sets*
	Median Nerve Gliding	*20 sec X 3 reps X 2 sets*
	Gripping Exercise with Towel	*10 reps X 3 sets with 1 min rest time in between*

	Thumb Touches	*8 reps X 3 sets with 1 min rest time in between*
	Ball Squeezes	*8 reps X 3 sets with 1 min rest time in between*
	Wrist Curls	*8 reps X 3 sets with 1 min rest time in between*
	Taping	*Removed and reapplied after a 2 day break.*
	Splint Advise	*Advised.*
WEEK-3	*Cryotherapy*	*8 minutes*
	LASER	*6 minutes X 632nm twice a week*
	Stretching Exercises of Wrist Flexors and Wrist Extensors	*25 sec X 3 reps X 2 sets*
	Median Nerve Gliding	*25 sec X 3 reps X 2 sets*
	Gripping Exercise with Towel	*10 reps X 3 sets with 1 min rest time in between*
	Thumb Touches	*10 reps X 3 sets with 1 min rest time in between*
	Ball Squeezes	*10 reps X 3 sets with 1 min rest time in between*
	Wrist Curls	*10 reps X 3 sets with 1 min rest time in between*
	Taping	*Applied*
	Splint Advise	*Advised.*
WEEK-4	*Cryotherapy*	*8 minutes*
	LASER	*6 minutes X 632nm twice a week*
	Stretching Exercises of Wrist Flexors and Wrist Extensors	*30 sec X 3 reps X 2 sets*
	Median Nerve Gliding	*30 sec X 3 reps X 2 sets*

	Gripping Exercise with Towel	*15 reps X 3 sets with 1 min rest time in between*
	Thumb Touches	*15 reps X 3 sets with 1 min rest time in between*
	Ball Squeezes	*15 reps X 3 sets with 1 min rest time in between*
	Wrist Curls	*15 reps X 3 sets with 1 min rest time in between*
	Taping	*Removed and reapplied after a 2 day break.*
	Splint Advise	*Advised.*

DISCUSSION

The authors of every study that was evaluated hypothesized that the study subjects' longitudinal and transverse nerve range (mobility) had decreased. The mobility is being limited by a system that starts behind the flexor retinaculum, where pressure is applied to the venous and arterial vessels in addition to the median nerve. This compression lessens the ability of nearby tissues to move together by causing edema and scarring of the tissue as a result. The flexor muscles of the fingers have a similar condition due to inflammation in their tendons. Consequently, the median nerve adheres to the adjacent tissues and even the wrist's transverse ligament. It is important to note that the state of patients was only assessed in the papers by Pratelli et al. (2015) and Mordalii Bongi et al. (2013) many weeks after the end of therapeutic procedures. They were able to verify that manual therapy and fascial manipulation treatments exhibit long-term efficacy and produce long-lasting health benefits. In his research, Pratelli et al. (2015) also demonstrated that the therapeutic impact of laser treatment (LLLT) was discontinued three months after the intervention's conclusion. All physiotherapeutic research should incorporate the aforementioned long-term efficacy criterion since it permits further inferences about the success of rehabilitation. In all the studies it was observed that the duration and frequency of treatments varied.

CONCLUSION

We conclude that physical therapy is a reliable approach in the treatment of CTS and that it should be administered in such patients.

AUTHORSHIP STATEMENT

Aishwarya Rai and Jasmine Anandabai designed the treatment protocol. Jasmine Anandabai counselled the patient for the treatment. Vaibhav Vashisth helped in the treatment sessions by being a valuable member of the team. Aishwarya Rai and Vaibhav Vashisth prepared the manuscript for publication. No research funding was applied for the study. The manuscript was revised by all authors and approved for the final document.

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