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A LITERATURE REVIEW OF VARIOUS THERAPEUTIC EFFECTS ON CARPAL TUNNEL SYNDROME

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ABSTRACT

BACKGROUND:

In Carpal Tunnel Syndrome (CTS), compression and ischemia of the median nerve are causedeading to pain and paraesthesia as it courses through the hand. Neural tissue mobilization techniques help reduce pain and improve the functioning of the patient. The aim of this literature review is through recent studies to outline the effect of neural tissue mobilization techniques on pain and functioning in patients with median nerve entrapment in mild to moderate CTS.

RESULTS:

Out of 37 articles 23 articles shows that the results of this review show that neural tissue mobilization techniques have a significant positive effect on reducing pain and increasing functioning in patients with median nerve entrapment in mild to moderate CTS. Their application was studied in comparison with electrotherapy, with other techniques of manual therapy, with medication, with classical physiotherapy and in relation to placebo therapies. The interventions had a duration in all cases of 2-24 weeks, which is the time that is usually required in order to show progress in the carpal tunnel syndrome.

KEYWORDS:

Carpal tunnel syndrome, median nerve, manual therapy, neurodynamic techniques, mobilization.

CONCLUSION:

This literature review analysed the effects of various therapeutic effects on carpal tunnel syndrome .The majority reviews used to demonstrate various therapeutic effects on carpal tunnel syndrome can be choice of treatment for carpal tunnel syndrome and it is of prime importance to have evidence for these. The guidelines given in this review will help us to achieve higher quality results and to also determine the true effectiveness of therapeutic methods as treatment for carpal tunnel syndrome.

INTRODUCTION:

Carpal tunnel syndrome is the most common nerve entrapment syndrome in the upper extremity leading to the functional disability. The consequence of the entrapment is the poor health of the nerve conduction, mobility, and blood flow. Carpal tunnel syndrome is the most common peripheral nerve entrapment syndrome caused by compression of median nerve in carpal tunnel that runs from the forearm through a passage way in the wrist to the hand. [1]1 Anything that squeezes or irritates median nerve in the carpal tunnel leads to the carpal tunnel syndrome. Median nerve provides sensation to the palm side of the thumb and fingers except the little finger and also provides signals to the muscles around the base of the thumb. 2 CTS is generally common in women than compared to men that is due to carpal tunnel area is relatively smaller in women than in men. Its clinical features include nocturnal pain, sensory and motor deficit leading to the deformities in the later stages. Common symptoms is CTS are such as A). Hand and wrist pain B) Numbness in 1-4 digits.C)Tingling and burning sensation in 1-4 digits (thumb, index, middle and ring finger) * An electrical shock through the wrist and hand.D)[2]. Weakness is particularly on thumb E) Poor sleep due to tingling and numbness of the hand.3 Neural tissue mobilization*: It is a movement based intervention aimed at restoring the hemostasis in and around the nervous system. This is performed by applying light pressure directly on a compressed nerve to move it through the nerve sheath using the techniques called gliding and flossing. This restore the strength, flexible and increase the range of motion of the limb[3]. The profession plays a very important role in the appearance of CTS and for this reason in rural and industrial areas the frequency is much higher than in urban areas.4 During conservative treatment, within six weeks 80% of patients show signs of relief, but only 20% are free of symptoms after one

year. The rest of the patients have to be treated surgically.Physiotherapy has been proven to help treat the CTS with a range of interventions that reduce pain, make the patient functional and delay or postpone surgery[4]. The guidelines state the following steps: a. Nerve protection, b. Modification of activities and patient training, c. Mobilization f limited joints, connective tissue, nerves, muscles and tendons, d. Improvement of muscle performance and e. Functional independence[5].

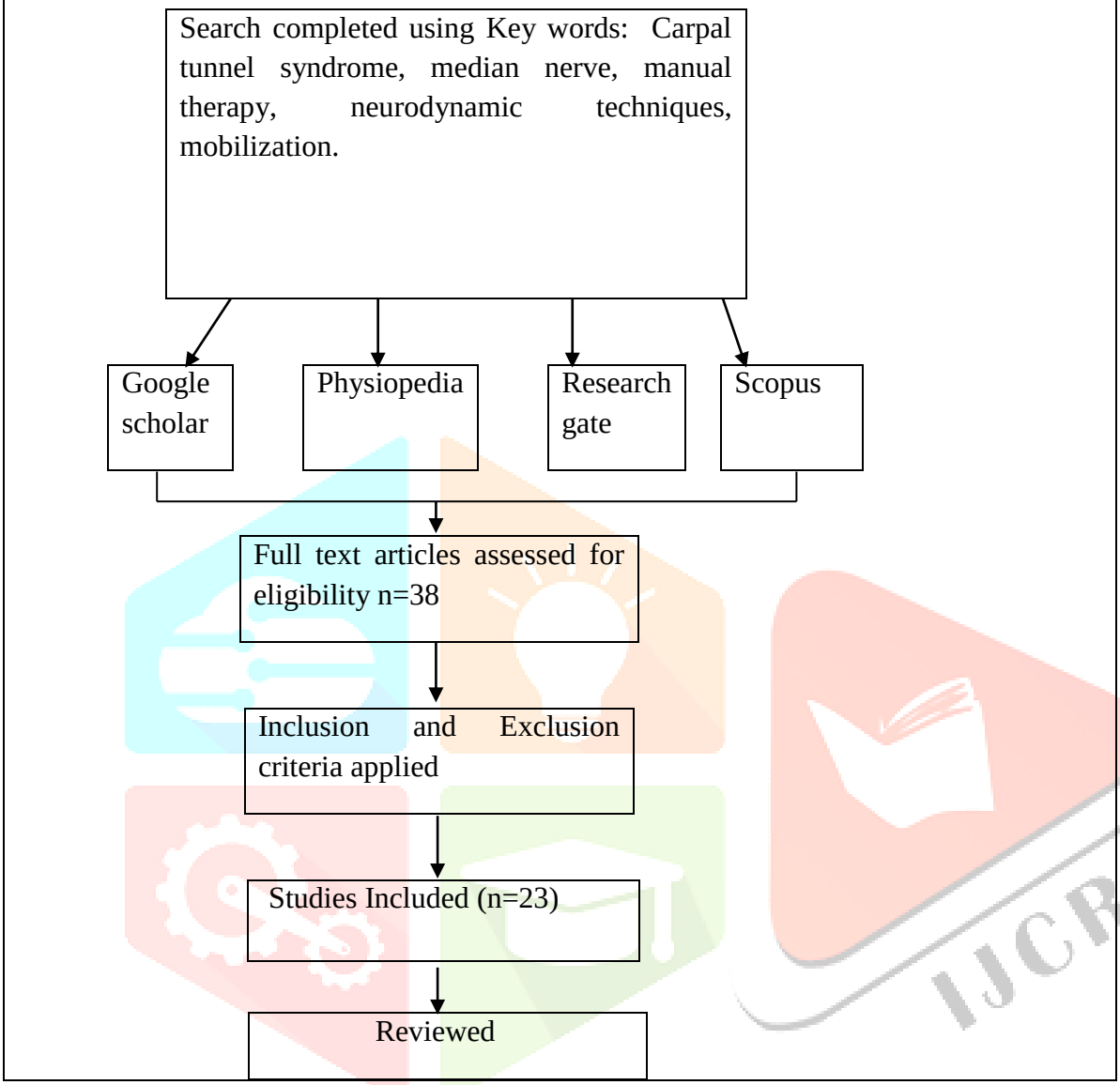
THE OBJECTIVE OF THE STUDY INCLUDES:

* To review the literature for finding the various therapeutic effects on carpal tunnel syndrome in decrease in pain.

* To review the literature for finding the various therapeutic effects on carpal tunnel syndrome in improving the ROM.

METHODOLODY

STUDY FLOW DIAGRAM



LITERATURE SEARCH METHODOLOGY:

Online search engines used to collect journals were Google Scholar, Pub Med, Research gate and Science direct. The authors identified articles based on the keywords. The articles were collected in full text. A total of 38 articles were identified, out of which 30 were selected for review.

STUDY SELECTION DATA EXTRACTION:

The data which was collected were tabulated based on the sample size, treatment given, outcome measures used, the results obtained were obtained in chronological order.

Inclusion criteria: 1. Published in English language only; 2. Manual therapy techniques; 3. published in peer review journals only; 4. Human participants were studied.

Exclusion criteria: 1. editorials expert opinion; 2. Other than English Language

Literature Evaluation: The results of the reasearch varied widely . Out of 38 original articles, 23 articles were eligible as per the inclusion criteria. There were no limitations applied to the review article. The studies were grouped into experimental, RCT's , comparitive, systemic and intervention research protocol.

REVIEW OF LITERATURE

Author, Year	Number of participants	Intervention duration	Intervention	Conclusions
Alam*et al* 2018	n = 48	4w	Comparison: Group 1 - neural mobilization and Group 2 - ultrasound therapy with a predetermined intensity.	Median nerve neurodynamic techniques are more beneficial than ultrasound therapy in reducing pain intensity and functional limitations due to CTS. [6]
De-la-Llave-Rincon *et a,l* 2012	n = 18	1w	Each received soft tissue mobilization and nerve slider neurodynamic technique directed at different anatomical sites of potential entrapment of the median nerve.	Soft tissue and neural mobilization techniques decreased the intensity of pain but did not change pressure pain sensitivity in this group of women with chronic CTS[7.]
Oskoueie*t al*., 2014	n = 20	12w	In both groups, patients followed the routine physiotherapy. Additionally, to the routine physiotherapy, patients in the treatment group followed neurodynamic techniques.	Neural mobilization, combined with routine physiotherapy shows more effective improvement in clinical findings than routine physiotherapy[8.]
Paquette *et al*., 2020	n = 14	4w	There was an assessment of pain and upper limb functional abilities by using standardized questionnaires. Quantification of the biological integrity and mechanical properties of the median nerve and the corticospinal excitability occurred by using musculoskeletal ultrasound imaging and transcranial magnetic stimulation, in retrospect.	The neural mobilization program seems to be a promising proposal regarding pain improvement and upper limb functional abilities in individuals with CTS[9].
Faten I Mohammad, Amal A	n=28	6week	There were divided into two groups where group1 consists of 18 members	. After 6 weeks of treatment and observation the CTS improved after

hussan et.al 2015			(n=18) and group 2 consists of 10 (n=10).Group 1 were undergone Neural tissue mobilization of the median nerve. Whereas Group 2 were undergone conventional medical treatment.	median nerve mobilization which is better than conventional medical treatment[10].
Andayani et al., 2020	N=30	2weeks	. Ultrasound and neural mobilization treatment and ultrasound and passive stretching	Combining ultrasound therapy and neural mobilization proved to be more efficient in reducing hand disability in patients with CTS[11].
Solanki et al., 2015	n = 30	6w	Subjects in the first group followed neural mobilization and in the second group followed carpal bone mobilization technique.	CTS patients who received neural mobilization seemed to improve better than those who received CBM[12].
Hamzeh*et al.*, 2020	n = 57	24w	Four sessions of neurodynamic techniques and exercise or home exercise therapy alone as a control. Blinded assessment was performed before treatment allocation, at treatment completion, and six months post-treatment.	Although both treatments led to positive outcomes, neural mobilization therapy was superior in improving function and strength and in decreasing pain[13].
Wolny and Linek, 2019	n = 103	10w	Neurodynamic techniques applied to the experimental group. Control group did not follow treatment.	Applying neurodynamic techniques in conservative treatment for mild to moderate forms of CTS has valuable therapeutic advantages[14].
Wolny and Linek, 2018	n = 250	10w	Neurodynamic techniques applied to the neurodynamic techniques group, and sham therapy applied to the placebo therapy group.	Applying neurodynamic techniques has a greater therapeutic result than placebo therapy in the treatment of mild and moderate forms of CTS[15].
Kurniawti and Hasbia, 2020	n = 20		Efficacy of neurodynamic techniques and Kinesio Taping.	Applying neural mobilization and Kinesio Taping showed effect toward changes in CTS with significant value of 0.004 and 0.011. Moreover, neural mobilization proved way more effective than

				Kinesio Taping in reducing the CTS pain[16].
Mohamed *et al*., 2016	n = 28	16w	18 patients underwent neural mobilization, and 10 patients underwent conventional medical treatment.	There was an improvement after neurodynamic techniques, which is better than conventional medical treatment. Manual therapy gives satisfactory results in conservative management of CTS[17].
Wolny and Linek, 2018 [11]	n = 189	10w	Applying manual therapy techniques, containing neurodynamic techniques and compared with no treatment on OHS.	Manual therapy, containing neurodynamic techniques, showed an optimal result of OHS in this group of patients with CTS[18].
Goyal et al., 2016	n = 30	3w	Comparison: conventional physiotherapy and neural mobilization.	Neural mobilization in the CTS patients advances the motor nerve conduction and functional status[19].
Talebi et al., 2018	n = 30	4w	First group received TENS and ultrasound therapy and second group manual therapy techniques for the median nerve.	Manual techniques were used in mechanical interface of the median nerve and neural mobilization contain more accurate and significant effects on hand difficulties than interventions in diabetic patients with CTS[20].
Kocjan, 2016	n = 36	21d	Group 1: Median nerve neuro=al mobilization. Group 2: Median nerve neural mobilization with mid-carpal distraction.	Both techniques had a really good impact on the treatment of CTS. Somewhat more important improvements for the second group with the neural[21.]
Wolny et al., 2017	n = 140	10w	Comparison: Applying neurodynamic techniques, functional massage, and carpal bone mobilization techniques (MT) with the electrophysical modalities (EM) as a conservative treatment for CTS.	Both treatments showed an optimal result of nerve conduction, pain reduction, functional status, and subjective symptoms in individuals with CTS. Nevertheless, when it comes to pain reduction, subjective symptoms, and functional status gave better results in the MT

				group[22].
Bartkowiak et al., 2019	n = 70	2w	Ultrasonography and low-level laser with nerve and tendon gliding exercises.	Ultrasound or low-level laser together with nerve and tendon exercises may be effective for the patients with mild to moderate CTS[23].
Ghadam Ali Talebi, PhD, PT, and KamyarGhab et.al 2011	n=20		(Totally 32 hands) were assigned two groups: treatment and control groups. In both groups, patients received the routine physiotherapy. In addition to the routine physiotherapy, patients in the treatment group received neuromobilization.	The symptoms severity scale, visual analogue scale, functional status scale, Phalen's sign, median nerve tension test, and median nerve distal sensory and motor latency were assessed[24].
Bonji et.al 2012	n=22	2weeks	22 CTS patients for 2 weeks. ie, Transverse massage - pulling on the wrist. Joints - joint mobilization by gliding on the carpal bones.	Conclusion: The combination of manual techniques improved CTS signs and symptoms with benefits[25.]
Burke et.al 2007	n=28	2weeks	A studies on28 CTS patients for 4weeks. Each group received soft tissue mobilization techniques either with the Graston method or by hand.	Conclusion :There were no differences between the groups. Both techniques proved to be equally effective in people with CTS[26].
Faten I Mohammad, Amal A hussan et.al 2015	n=28	6 weeks	group1 consists of 18 members (n=18) and group 2 consists of 10 (n=10).Group 1 were undergone Neural tissue mobilization of the median nerve. Whereas Group 2 were undergone conventional medical treatment. After 6 weeks of treatment and observation the CTS improved after median nerve mobilization which is better than conventional medical treatment.	Conclusion: observation of the CTS improved after median nerve mobilization which is better than conventional medical treatment[27].

Ali Talebi, PhD, PT, and KamyarGhab et.al	N=32	4 weeks	(totally 32 hands) were assigned two groups: treatment and control groups. In both groups, patients received the routine physiotherapy. In addition to the routine physiotherapy, patients in the treatment group received neuromobilization. The symptoms severity scale, visual analogue scale, functional status scale, Phalen's sign, median nerve tension test, and median nerve distal sensory and motor latency were assessed.	Conclusion :The treatment group showed better results than control group as the treatment group has received neuromobilization along with the routine physiotherapy[28].

RESULTS

Out of 37 articles 23 articles shows that The results of this review show that neural tissue mobilization techniques have a significant positive effect on reducing pain and increasing functioning in patients with median nerve entrapment in mild to moderate CTS. Their application was studied in comparison with electrotherapy, with other techniques of manual therapy, with medication, with classical physiotherapy and in relation to placebo therapies. The interventions had a duration in all cases of 2-4 weeks, which is the time that is usually required in order to show progress in the carpal tunnel syndrome.

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