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A literature review on manual therapy in carpal tunnel syndrome among computer professionals

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Abstract
Background: Carpal tunnel syndrome (CTS) is a common medical condition and one of the most frequently reported forms of median nerve compression. CTS occurs when the median nerve is squeezed or compressed as it travels through the wrist. The syndrome is characterized by hand pain, numbness, and tingling in the distribution of the median nerve. Risk factors for CTS include obesity, repetitive wrist activity, pregnancy, genetic predisposition, and rheumatoid inflammation.
Aim: This study aims to review relevant literature and synthesize knowledge regarding the effectiveness of manual therapy in treating carpal tunnel syndrome among computer professionals.
Search Method: The databases used for searching articles included Pub Med, Research Gate, Google Scholar, Science Direct, and Cochrane. A total of 80 articles from the past 10 years were collected.
Selection Criteria: Selection criteria included studies on patients with carpal tunnel syndrome, focusing on the effectiveness of manual therapy in terms of pain relief, improvement in range of motion, and visual analog scale measurements.
Results: Four studies met the inclusion criteria and were included in the review. The methods used in these studies primarily involved neurodynamics.
Conclusion: This systematic review concludes that manual therapy is more effective than surgical procedures in providing pain relief and improving range of motion within a short duration. However, the current evidence on the effectiveness of manual therapy for carpal tunnel syndrome among computer professionals is limited. Consequently, it is not possible to offer clear evidence-based recommendations due to the limited available evidence.

Key Words: Manual therapy, carpal tunnel syndrome

Introduction

Computers have become an essential tool for modern work environments. The World Health Organization estimates that 150 million computers are in use worldwide. Consequently, the increasing use of computers has raised concerns about potential health hazards. Work-related musculoskeletal disorders (WMSDs) account for approximately one-third of all lost workday illnesses. Among these, WMSDs affecting the wrist and hand are associated with prolonged absences from work, leading to productivity loss.

Carpal tunnel syndrome (CTS) is caused by the compression of the median nerve within the carpal tunnel, leading to mechanical compression and local ischemia. Contrary to popular belief, CTS is not solely a modern disorder related to excessive computer use; medical literature has documented cases since the early 20th century.

CTS is a common neuropathy affecting both men and women. The prevalence in the general population is reported as 3-5.8% in females and 0.6-2.0% in males. Risk factors include diabetes mellitus, rheumatoid arthritis, acromegaly, hypothyroidism, wrist trauma, pregnancy, and tenosynovitis. The use of vibrating instruments in offices and industries further contributes to CTS. Among office workers, repetitive wrist movements, such as typing, increase the risk of CTS due to prolonged awkward wrist positions.

The visual analog scale (VAS) is used to quantify pain intensity, with scores ranging from 0 to 10. Additionally, the Tinel sign is used to detect irritated nerves. Manual therapy in physiotherapy is a clinical approach that includes diagnosis and treatment focused on joint structures and soft tissues. Neurodynamic techniques are a notable form of manual therapy, primarily used for treating carpal tunnel syndrome. Manual therapy in physiotherapy is a clinical approach that includes diagnosis and treatment focused on joint structures and soft tissues. Neurodynamic techniques are a notable form of manual therapy, primarily used for treating carpal tunnel syndrome.

Methodology

Study Design

This systematic review is based on PRISMA (preferred reporting items for systemic reviews and meta- analysis) guidelines.

Search Method and Eligibility Criteria

The databases used for searching articles included Google, PEDro, PubMed, EMBASE, and the Cochrane Review. Articles published in the last 10 years were considered. Keywords such as "carpal tunnel syndrome" and "manual therapy" were used. Relevant papers were identified based on their titles, abstracts, and full texts. Citations and references of relevant articles were also reviewed to identify additional studies.

Sample Size

Sample size of 80 was obtained after searching in databases using following keywords: carpal tunnel syndrome, manual therapy. Based on inclusion and exclusion criteria and year of publication, further articles were scrutinized and finally 4 appropriate articles were obtained for this systemic review.

Inclusion criteria

- Articles which included carpal tunnel syndrome.
- Articles which included patients above 18 years.
- Articles in which range of motion and visual analog scale used as outcome measures were found out.
- Articles published between the years of 2011-2020.
- Articles with full text.
- Articles with English language.
- Articles with cross sectional type of experimental study design and randomized control trial.

Exclusion criteria

- Articles which were published before 2011.
- Articles which are mentioned about surgical interventions.
- Articles which included patients below 18 years were excluded.
- Articles in which are not included range of motion and visual analog scale.
- Articles which included cancer patients.

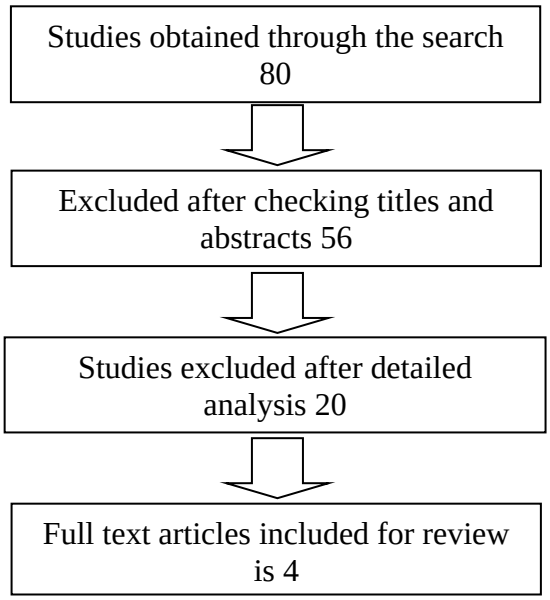

Fig.1 Search methods

Selection of inclusion and exclusion criteria

Based on inclusion and exclusion criteria, 4 articles were selected. Study design of all 4 articles was cross sectional study design, randomized control trial. Articles with English language were selected so that proper analyses of articles can be done. English being preferable and favorable language, chances of occurrence of error in analyses of these articles can be reduced. Considering articles with Non-English language might have led to improper understanding, improper analyses and gathering of inappropriate information. Hence, articles with English language and with proper analyses appropriate interpretation, analyses of data can be done and correct information can be stated in this review. Articles published between the years 2011-2020 were included for this review, so that scenario of carpal tunnel syndrome patients for last one decade in terms of pain and restricted range of motion which are treated by manual therapy can be known. Articles before 2011 were excluded. Articles with full texts were selected so that through information from these articles can be gathered. Articles which did not contain the outcome measures such as visual analog scale and range of motion were excluded. Scope of this study is regarding the manual therapy for carpal tunnel syndrome and hence articles containing no relevant information regarding the mentioned scope of this study were not considered.

Procedure

Neurodynamics mobilization technique (median nerve mobilization technique) in relieving signs and symptoms of CTS when compared with conventional medical treatment. Neurodynamics mobilization includes nerve gliding exercise and upper limb tension test 2a mobilization of median nerve for 20 minutes. The order of upper limb tension test 2a was standardized as slight glenohumeral abduction. All movement was taken to the end of the available range or to the point where the finest symptoms were produced.

Results

A total of 80 articles were initially identified through the database search. After screening the titles and abstracts, 56 articles were excluded due to irrelevance. Following a detailed analysis of the remaining 24 articles, 20 were excluded for not meeting the inclusion criteria. Finally, four articles were selected based on their relevance and methodological quality.

The selected four articles specifically assessed the impact of manual therapy on carpal tunnel syndrome using standard outcome measures such as pain relief (measured via VAS) and improvement in range of motion (measured via goniometry). The studies demonstrated positive effects of manual therapy in alleviating CTS symptoms, supporting its potential as an effective non-surgical treatment option.

Findings of these 4 articles are summarized in table below.

S. No	Name of the author	Year of Publication	Mode of intervention	Result
1	Amal.a. Hassan et.al [6]	2015	Manual therapy – median nerve mobilization and medical treatment	On comparing the NCS result of group 1 who undergo neurodynamics mobilization techniques with group 2 who receive medical treatment for 6 weeks. Significant difference observed in group 1 who received neurodynamics mobilization in ROM and pain relief.
2	Dr. P. Swarnakumari	2013	Physical rehabilitation intervention programme -relaxation exercise Mitchell method of exercise wrist and free exercise.	This study includes 38 subjects were identified as participants for the study. Group A has significsnt improvement than group B.
3	Dr. Tomosz Wolny Ph. D	2017	Manual therapy-neurodynamic technique	This study includes 70 patients for manual therapy. It has result in pain reduction and ROM improvement
4	Jolanta Zooliska Et.al	2018	Conservative management	One year after the end of the therapy, the subjects experienced a significant improvement in all assessed parameters with symptom reduction and pain relief.

Assessment of outcome measures

There are numerous articles with different outcome measures, but we have selected four articles that utilized standard assessment tools. Among these, the majority used the Visual Analog Scale (VAS) for pain assessment and range of motion (ROM) measurements.

1. **Visual Analog Scale (VAS):** The VAS is a commonly used tool to measure pain intensity. It consists of a 10 cm horizontal line where patients mark the severity of their pain, with one end representing no pain and the other representing severe pain.

2. **Range of Motion (ROM):** ROM was assessed using a goniometer to measure wrist flexion and extension. The patient was seated with the forearm resting on a stable surface, and the goniometer was aligned with the wrist joint to ensure accurate readings.

These tools provide reliable and quantifiable data to assess the effectiveness of manual therapy interventions in treating carpal tunnel syndrome.

Discussion

Several studies have investigated the efficacy of manual therapy in the management of carpal tunnel syndrome. Faten I. Mohammed *et al*. reported significant improvement in clinical symptoms and functional status of CTS patients undergoing neural mobilization. P. Swarnakumari proposed that relaxation exercises and ergonomic advice can be incorporated as treatment tools for computer professionals during their working hours. Tomasz Wolny Ph.D. *et al*. evaluated the efficacy of manual therapy on CTS and concluded that therapeutic effects were obtained through neurodynamic mobilization. Jolanta Zwolinska *et al*. highlighted that comprehensive physical therapy interventions provided sustained symptom relief lasting at least one-year post-treatment.

These findings collectively support the role of manual therapy in alleviating CTS symptoms, particularly among computer professionals who are at high risk due to prolonged repetitive hand and wrist movements. However, variations in methodologies and sample sizes among studies indicate the need for further high-quality research to establish standardized protocols and recommendations for clinical practice.

Limitations

1. We are able to screen only 80 articles as these many relevant articles are only available in the databases. Appropriate articles obtained were 4 out of 80. This shows only limited studies had showed the manual therapy for carpal tunnel syndrome.
2. Additionally, it must be noted that the review considered articles that were written in English only.
3. Non-availability of articles with cohort study design.

Strength

1. We were able to provide accurate information about the manual therapy for carpal tunnel syndrome and the risk of bias was very minimal due to less number of articles being included for this review.
2. This systematic review has shown more scope of research to analyze manual therapy for carpal tunnel syndrome.

Conclusion

In this systematic review we conclude that manual therapy is more effective than therapeutic modalities in providing pain relief and improvement in ROM within a short during of time. Current evidence data that. Effectiveness of manual therapy for the carpal tunnel syndrome is however very limited. Consequently, it is not possible to offer clear evidence-based recommendation due to available limited evidence. Carpal tunnel syndrome (CTS) is the most peripheral neuropathy caused by compression of the median Nerve in the carpal tunnel. CTS can be treated both manually and surgically. Surgical involvement of treatment results in discomfort of the patient. Therefore, manual therapy Will be more effective than any other interventions like electrotherapy modalities and surgical management for treating patients with carpal tunnel syndrome.

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Conflict of Interest: None

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