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Research Article

Medium Nerve Compression: A Challenge for Physiotherapists in the Treatment of Carpal Tunnel Syndrome

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Abstract

Present work is about of compression of the median nerve: challenge to physical therapists in treatment of carpal tunnel syndrome. Treatment success begin knowing the neuromuscular system, identifying a compression of the median nerve, and its different locations of compression, among a common, carpal tunnel syndrome. This name is given to formation of carpal bones who is located in the wrist. Women's between 40 a 60 years old are more commonly effect. However, several causes, explain its pathogenesis as neuromusculoskeletal, endocrines dysfunction, metabolic, postures and occupational habits. Still can submit over a local compression complicating diagnosis and treatment. Thus, the importance of this work, to improve the practice of physical therapy for a broader view and not just at the site of injury.

Keyword: *Median Nerve Compression; Carpal Tunnel Syndrome; Local Different Compression; Syndrome Double Compression*

Introduction

Physical therapy is the part of science that studies, diagnoses prevents treats the disturbances of biomechanics and functionality organs and body structures, seeking regain mobility of body segments.

In this sense, there is a great need for scientific deepening in the present physiotherapy in relation to the issues of the functioning of peripheral nerves. Since the movement of the whole organism is a reflex, the Anatomy-Physiology of the central nervous system and peripheral.

Ambrogio and Roth [1], described that the central nervous system is continually subjected to afferent impulses coming from countless transmitting stations that are the receptors found throughout the body.

The function of the nerves is to transmit an order given by the brain to the rest of the body. Afferent nerves conduct sensory signals (from the skin or organs of the senses) to the central nervous system, itineraries to nerves efferent conduct themselves stimulatory of the central nervous system for effectors organs, such as muscles and glands.

As Netter [2] the Peripheral nervous system makes a pathway of connection between the organs of the skeletal muscle system to the central nervous system. Consists of 12 pairs of nerves cranial and 31 pairs of spinal nerves that are grouped in pairs: 8 cervical, 12 thoracic, 5 lumbar, 5 Sacral and 1 coccygeal.

Spinal nerves are mixed nerves, i.e. consisting of motor fibers, sensitive and autonomous. Sensitive impulses come From the periphery in the axons that end in cellular bodies (neurons) in the dorsal root ganglia. The lower motor neurons are located on the ventral tip of the spinal cord, their axons come out of the medulla espinal as ventral roots that bind to the dorsal root ganglia and then continue as mixed spinal nerve roots. In the cervical and lumbosacral regions, the roots of the spinal nerves are grouped as a plexus, which form the peripheral nerves.

However Pardini [3] focused on his work that the brachial plexus is formed by the roots of the last four nerves cervicais and the first thoracic C5, C6, C7, C8 and T1. After the exit by the vertebral vertebrae, the roots enter through the intermuscular space of the anterior and middle scalene muscles. The branches unite and form the trunks: Superior (C5, C6 and C4 fibers); Medium (C7) and lower (C8, T1 and T2 fibers). The trunks represent the supraclavicular portion of the brachial plexus. Each of the three trunks is divided into a previous portion and a posterior.

Still Pardini [3] followed describing that the division of anterior upper torso uniting with the anterior division or branch of the middle trunk and constitutes the lateral volume, the anterior division of the lower torso constitutes the medial volume, and the Union of the three posterior divisions from the upper, middle and The bottom result is the later instalment. The three booklets are given the name according to their relationship with the axillary artery, they are divided to form the main branches of the brachial plexus: branches of the lateral and medial issues form the median nerve; the remainder of the lateral volume constitutes the musculocutaneous nerve, the remnant of the medial volume will constitute the ulnar nerve, and the posterior volume is divided to become the radial and caret nerves. Many smaller nerves arise from several parts of the plexus and to substantiate neuro physiology-muscle of the upper limbs, Netter [2], described that the median nerve enters the forearm between the humeral and ulnar heads of the round Pronador and follows inferior to the superficial flexor muscle of the fingers. The remainder of the median nerve innervate all the necklaces muscles of the forearm, Except the ulnar half of the deep flexor of the fingers (fourth and fifth fingers).

With regard to the various pathologies related to the upper limbs, it can be said that some are affected by compression of the median nerve, however there is a large incidence of this compression occurs in the carpal tunnel. The compression sites may eventually occur leading to signs and similar symptoms may difficulted the actual site of the lesion.

The interest in conducting a study on the compression of the median nerve in treatment of carpal tunnel syndrome, was motivated to have numerous cases attended in private and public physiotherapeutic offices that did not present improvements significant. So he instigated the conducting an investigation that could clarify why these patients did not present recovery. Patients affected by these pathologies suffer progressive limitations, and can evolve into permanent, occasionally fatal sequelae, if poorly diagnosed.

Smith [4], conceptualized the carpal tunnel as a bony channel with palp margins Levels. The scaphoid tubercle is the bone prominence at the base of the Tênar eminence, a little to the fold of the distal handle and the Carpal radial tendon seems to attach itself to this prominence when it is palpable fletindo the counter resistance handle. The tubercle of the scaphoid and the crest of the trapezoid, in turn they form the radial boundary of the carpal tunnel.

Soon Corrigan and Maitland [5], defined the carpal tunnel syndrome as being the compression of the median nerve in the handle can affect one or both hands, being more common in the dominant hand and in middle-aged women.

Among the structures that form the tunnel, there is a space vulnerable to abnormalities inflammatory, sunset Edema and increased pressure In the tunnel.

Given the importance of the exposed content, the subject of this study, it deals with the theoretical deepening on the compression of the median nerve and the carpal tunnel syndrome that influences the performance of physiotherapy.

Given the prospect of a scientific study the question-problem to be investigated will be:

- How can physiotherapists improve their clinical conduct in the treatment of patients with carpal tunnel syndrome?

Other questions, a priori, should be deepened, such as:

- What are the possible causes of the syndrome Carpal tunnel?
- What are the locations of differential diagnoses of carpal tunnel syndrome?

These are the following listed objectives for this investigation:

- To raise in bibliographical study on which places of compression of the median nerve.
- Analyze the signs and symptoms caused by the compression of the median nerve described in bibliographic sources.
- Identify os treatments Physiotherapeutic existing and the differentiated for carpal tunnel syndrome due to median nerve compression.

The development of this study can contribute to teaching improving the understanding of physiotherapists and Occupational therapy on C tunnel syndrome and compression of the median nerve can also contribute to professional practice, improving the diagnose evaluation and the early treatment of this syndrome. In order to minimize complications and for research, disclosure in electronic media may be a reference to new studies.

Methodology

It is a bibliographic research that seeks to focus on physical treatment in patients with carpal tunnel syndrome.

According to Severino [6], the bibliographical research involves available records, from previous research current, such as: printed books, articles, theses and others. Deer., *et al.* [7], supplemented that bibliographic research when it is carried out For the purpose of gathering data and prior knowledge of a promotor to get answers, or of a hypothesis raised to the problem, is part of the descriptive or experimental research.

It is believed that it is through the collection of information in books and articles on the subject, that one can find answers to the goals mapped. For although carpal tunnel syndrome is a common pathology, it is necessary to investigate possible complications that affect the compression sites of the upper limb, making this study of interest to the scientific community.

This research still fits as an exploratory descriptive research of qualitative character.

According to Deer., *et al.* [7], exploratory research performs detailed descriptions of the situation and seeks to understand the component elements of the relationships. This type of research requires flexible planning to enable the most diverse aspects of a problem or situation.

This is a qualitative study that discusses carpal tunnel syndrome, because after reading and interpreting books and scientific articles, allied to practical experience can be described judiciously on the pathology of compression of the median nerve that it sometimes culminates in carpal tunnel syndrome or other neuromuscular disorders.

Second Brevidelli and Sertorius [8], is characterized also as qualitative research, one where certain research problems cannot be carried out in a quantitative way, when there is the intention of finding meanings and interpreting them from of a context of its own.

The temporal clipping determined in this study covers bibliographic references of the last 10 years, i.e. between 2003 to 2013. During the search for references on the thematic it was perceived the existence of few bibliographies National. In the last five years, where it has been necessary to broaden the research period for the last 10 years.

To maintain the credibility of the authors on the study, textbooks were used and Bibliographic references of articles Scientific in ScieloScientific Electronic Online Library and Vhl Virtual Health Library. Having been found the following: 12 Books 220 Scientific articles Medline in Which, 52 articles Scientific are the SCielo and 169 Articles Scientific are the VHL. For the search for scientific articles the descriptors were used: carpal tunnel, compression of the median nerve, physiotherapy. However, only 12 books and 3 articles were of interest to the study.

The criterion of exclusion of literary references were as follows: outside of the temporal clipping, articles of incomplete texts (abstract) and foreign publications.

After the selection of books and scientific articles, analysis and critical thinking about the context of references to the development of discussions was made possible.

Results and Discussions

Raise in bibliographical study on which places of compression of the median nerve.	Smith [4] Didini (2006) Nicer (2006) Lech [9]
Analyze the signs and symptoms caused by compression of the median nerve described in bibliographic sources	Schroder [10] Kisner and Colby [11] Smith [4] Nicer (2006) Kouyoumdjian [12]
What are the possible causes of carpal tunnel syndrome	Lech [9] Goodman and Snyder [13]
Quote the Locations Differential Diagnostics Carpal tunnel syndrome	Barbosa Dantas., *et al*. [14] Oliveira [15] Campos Mastrocola., *et al.* [16]
Identify os Treatments Physiotherapeutics existing and the Differentiated For carpal tunnel syndrome due to the compression of the median nerve.	Saints and Pereira [17] Lech [9] Kisner and Colby [11]

The median nerve, follows a path coming out of the Love intervertebral to the hand, its path passes through several anatomical compartments with reduced spaces, any imbalance of these structures can entail the nerve compression. As a result of other sites compression, can take a similar signs and symptoms and the difficulty to diagnose the injury, so tt is necessary to consider all the local possible to identify the exact location.

Smith [4] described as being Consequence the median nerve compression sites the carpal tunnel syndrome, round pronador syndrome and Syndrome interossei the previous.

Of the same idea, Pardini [3] added referring to as common places in addition to those cited, that the median nerve compression can occur the cervical region, thoracic output, and rarely in the region of the read posting of struthers.

In the practice of physiotherapy, one can perceive that most cases even did so are diagnosed as C tunnel syndrome. However, with the intention of seeking the best treatment and recovery of the patient, it is in the hands of physiotherapists to investigate through the history, the history of pathology as well as the changes during the treatment period, adjusting the conduct according to the evolution of the treatment.

Netter [2] complete says endo that the trapping of the nerve can still occur in the Supracondylar process of the anomalous humerus and the bicipital fascia, round pronador and the superficial flexor of the fingers and the carpal tunnel. And having as differential diagnosis includes cervical radiculopathy C6, ul nerve incarceration wrist and arthrosis of the handle permanent.

Agreeing COM Smith [4], Pardini [3] and Netter [2], Lech [9] cited that the patient may be suffering nerve compression more proximally, in the cervical spine, in the thoracic gorge or elbow. Under these circumstances there is lower pressure at the wrist level so that symptoms of the syndrome are produced, called double crush syndrome or double crush.

In our experience, cad one of the compression sites need to be examined to exclude or determine if any of them is the cause of the median nerve symptoms. Decompression of the carpal tunnel can alleviate the patient's symptoms without having to decompress the other sites, but the involvement of the cervical root may lead to persistent symptoms even after surgical decompression of the handle.

As Schroder [10], the affected hand "falls asleep" during the night. Associated with the feeling of numbness and tingling in the area of median nerve innervation. Still able to feel burning and fragility in performing hold function.

According to Kisner and Colby [11], carpal tunnel syndrome causes sensory changes and progressive weakness of the muscles innerved by the median distally to the hilt. Common compromises are increased pain in the hand, weakness leading to atrophy of Tênares and Lumbricals, retraction of thumb adductor muscles and extrinsic extenders of thumb and fingers 2° and 3°. Irritability or sensitive loss in the median nerve path. Possible decrease of joint mobility in the wrist and metacarpophalangeal joints of thumb and fingers 2° and 3° and sympathetic changes.

Smith [4] reports as compression symptoms being pain, sensory disorders (tingling and paresthesia), motor loss the sensitivity and inordinacies.

In agreement with the other authors cited Netter [2] It says that the symptoms include pain and paresthesia, and it may be observed weakness in the distilled muscles. Displaced motor and sensory deficits to the compression area.

Kouyoumdjian [12], says symptomatic complex of carpal tunnel syndrome depends on two mechanisms: rapid reversible alteration of nerve fibers, related to ischemia, or also called rapidly reversible physiological blockage; the study of nervous driving at this stage is normal due to the absence of structural abnormalities in the nerve. And the structural normality that develops slowly in the nerve fibers as a result of the pressure below the retinaculum flexor (transverse ligament of the carpal). The study of the nerve conduction reveals focal Lentificação by demyelination segmenter located; Secondarily there may be axonal degeneration, particularly in cases of compression more Ace Margaret and extended time.

As Lech [9], the causes of compression are numerous, such as: sequelae of fractures, rheumatoid polyarthritis, gout, acromegaly, myxedema, lesions of sheaths Tenosinovitis Carpiano, or Microtraumas by repetitive movements of flexion-extension of fingers with dorsal flexion of the wrist and flexion and forced extension of the fingers and hand.

Goodman and Snyder [13], complement saying that causes go beyond a variety of conditions systemic and Neuromusculoesquelé but especially in certain endocrine and metabolic disorders.

Having number causes of C tunnel syndrome, can take to a late diagnosis and incompletion the can calling lead sequels review sieves and fatal. Occasionally fatal if of the failure to treat and the progression of symptoms, which lead to the physical and emotional fatigue of the patient them to an exhaustive Search by healing, creating A deped physical ndência and disorders psychic as (Depression, change of sleep, physical disability, distance from social interaction and etc).

Gary Dallas [14], held a study that it handles the diagnosis of Syndrome Tunnel Carpo, a subject always relevant to the uncertainty and the presence of quantity Non-negligible of false positive and false negative diagnoses in daily practice. To our the diagnostic criterion for Syndrome Tunnel Carpo it is a problem still to be defined.

Oliveira [15] researched that these are non-physiological studies more regarded as better. In the case of doubt, patients should receive a more Minucioso. The use of many diagnostic parameters raises the number of false-positive cases. The consequences of false-positive diagnoses are more serious than those of false-negative diagnoses, as they can lead to unnecessary surgeries and disability.

Fields Mastrocola., *et al.* [16] in his study, reported that the Ince that Brain., *et al.* (1947) and Phalen (1951) described the main symptoms of compression of the median nerve in the carpal, and since this set of symptoms has been given the name of carpal tunnel syndrome, this syndrome has been used in identify clinical action of patients with this compression of the median nerve in the carpal. In some publications, the Carpal Tunnel syndrome it is used as a synonym for such compression. However, other disorders such as radiculopathy, Plexopathies, polyneuropathy, osteo-articular lesions, cortical lesions, and compressions of the median nerve itself in other places are cited in the literature as possible causes of the same symptoms Should be considered in the differential diagnosis. This makes the median nerve compression diagnosis in the carpal, based solely on clinical signs and symptoms, not fully reliable, and the physical examination is considered an instrument of utmost importance in its confirmation and the diagnosis differentiates.

With the time of experience in rehabilitation, we meet with countless frustrated patients who have not obtained Ram the Cure. I believe that several factors contribute to a false-positive diagnosis, such as: emotional factor, preliminary exams and period of emotional and endocrine stress. The risk to the professional who receives this patient from a specialized service is that he/she feels comfortable with the diagnosis, leaving to research other possible causes.

Regarding treatment, Saints and Pereira [17], in their study describe the conservative treatment beginning with the Identification and elimination of conditions that create pain, such as PR Inflammatory Osseo, Muscle spasm, Antalgics postures, functional changes and Structures of the muscular system, among others, they contribute to the efficiency of rehabilitation. for rehabilitation Functional carpal tunnel syndrome The FIS measures to therapeutics are fundamental for provides reem relief of pain, reducing the use of medicines, decreased inflammation, muscle relaxation, prevention of Deformities, rehabilitation of the function Motor and reduction of tissue suffering. The main therapeutic resources used in the treatment of Carpal Tunnel syndrome are: Laser, Tens, Thermotherapy and Kinesiotherapy.

Lech [9] states como treatment: Edema control, scar care, joint mobility exercises, strengthening and desensitization activities may also include analgesic and anti-inflammatory therapy, thermotherapy or cryotherapy, and massage stimulation.

Differentiating treatment, Kisner and Colby [11], describe as conservative measures, the Nerve protection, (use of bracing), modification of activities and education of the patient, (Identifying the bad postures and activities of fist and upper limb), mobility (joint mobilization, tendon slip exercises and median nerve mobilization). Including additional techniques of mobilization of the median nerve, throughout the upper and cervical limb.

Confined with the above mentioned authors, como treatment physiotherapeutic of compression, the source of irritation needs to be removed by examining and treating all possible nerve compression sites, such as guiding potions be in the environment of work, as well as daily habits and sleeping position, for this, an orthotic can be applied to immobilize the handle, thus reducing the magnitude of the Flexor budgets, ProProtect the nerve, modify daily activities, mobilize joints, tissues, muscles and tendons that are limited (Neural mobilization techniques, cervical traction and tendon sliding) can and should be used, improve muscular performance and progress to functional independence. Como the physiotherapist has a time greater of contact with the patient, the ducts must be adjusted according to every need and progression of the treatment. Multi-disciplinary integration during the rehabilitation period if necessary, for the EU can define the most appropriate therapeutic and monitor the evolution of the clinical picture and modify the conduct if necessary.

Think of the best for the patient is always the right choice. In this way the chance of an improvement of the algic framework without a need for a surgical intervention increases. Trying to prevent surgery is to avoid complications of post-operative and relapse. And most importantly, offer a better quality of life to the patient.

Conclusion

In this work we discuss the subject of nerve compression Mahmood and carpal tunnel syndrome Which is the most common place of compression of this nerve. The challenge Physical treatment is due to the existence of different compression sites to the long Path of the nerve, qEU goes from the cervical region from where it comes out of the marrow with the name of brachial plexus and it splits into the nerves peripherals that end in hand: Median, ulnar and Radial.

With IRRi Sustainability of the nerve, is still Possible to develop what is known as double-compression syndrome so that the nerve develops symptoms in other areas along its path as well as in the primary site.

We conclude that half to so many causes of hand injury. Several clinical findings are not unique to this disease and the distinction of other conditions is fundamental for determining the therapeutics to be adopted. With this the importance of Make a mapping of the entire patient's life history, physical, laboratory and image scans of the entire nerve path in places of possible compression, to detect a possible alteration of the entire adjacent structure.

We fulfill all the objectives of the work, citing the compression sites, the signs and symptoms caused by compression, possible causes of compression, diagnose Differential, treatment and Procedures Differentiated physiotherapeutic to improve and complement Treats him of this pathology.

The deepening of this theme beneficial a better understanding of the complex system neuro-muscular, perfecting the physiotherapeutic conduct to cover the area to be treated, without focusing only on the site of pain but the possibility of treating other possible places of injury, that is, to treat from the region cervical at it's the hand. Each patient is unique, their symptoms and responses to TR may differ from the other, thus the conduct must be indicated and dosed individually, employing more than one therapeutic resource in order to complement the treatment.

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