

THE OCCUPATIONAL APPROACH OF THE CARPAL TUNNEL SYNDROME

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SHORT COMMUNICATION

Abstract Once the writer François Mauriac (1885-1970), he said that, "the man who works with his hands is considered a worker, with his hands and mind, a craftsman, with his hands, his mind and his heart, he is an artist". Common element of all three, the use of their hands, the organ that nature adapted evolutionarily, so that we and the other primates can hold, grasp and create. The clinical condition results due to entrapment of the middle nerve of the hand, is referred to as "carpal tunnel syndrome" and it is recognized as a purely professional syndrome, with all that this entails for health and safety policies at work and the corresponding legislation.

The human hand has 27 bones, with a complexity in its structure and function, both mechanically and sensorily. Hands also have an important role in body language and sign language and we use them for our writing and expression. The use of our hands as tools now in the performance of our work, has followed all social-labor changes, over time in the course of man, from the position of hunter, farmer, worker and professional of the previous and current 4th Industrial Revolution. What has been shown over the years that working conditions have changed, is that the hand continues to dominate use and endure abuse. The consequences of the technological developments, have changed the way each purpose can be achieved and for example, when in the past, thousands of pages used to be written holding firmly with a precision handle on the fingertips a feather or a pencil, they are now rapidly reflected by repeated finger movements on the "ergonomic" keyboards.

Much more localized, on the wrist of the hand, pass various elements through a specific small sectional area called the carpal tunnel. This rigid tube is formed by the first row of the wrist bones and by a strong ligament (transverse). Of the elements passing through the tube, the greatest interest is the middle nerve and the 8 tendons of the deep and superficial radius flexors of the fingers, as well as the small flexor of the thumb.

Overuse and/or mechanical stress of these myotendinous elements, results in irritation and inflammation, which as it progresses, tends to reduce the available space and compress what passes through the tube, leading to the entrapment of the middle nerve. When the middle nerve is trapped inside the carpal tunnel, various distinct symptoms may occur. The set of signs and symptoms of a clinical condition is referred to as "syndrome" and the specific picture of entrapment of the middle nerve, is referred to as "carpal tunnel syndrome" (CTS). The middle nerve, like all the peripheral nerves of man, has an aesthetic and motor branch and thus controls the movement of the thumb and the first three fingers, while at the same time providing them with aesthesis. So, when pressed and depending on the progression of pressure, it can cause from tingling, numbness, even pain in the hand and inability to grip and hold, with apparent atrophy of the thenar muscles (1st finger area) and the palm.

The diagnosis will be made by the specialist on the basis of clinical signs and symptoms and in any case with the history and reference to any profession associated with the use of hands and can be documented by neurophysiological control (electromyogram), during which we will have the full picture of the conductivity of the nerve. Light cases (1st stage) of CTS are treated with anti-inflammatory drugs, Physiotherapy and splints. Medium-gravity cases (2nd stage) are treated with the above and also by injection of Cortisone, while severe cases (3rd stage) require surgery to open the transverse ligament.

From the first mention of the syndrome in 1853 by J. Paget, until the 1970s, there have been intense controversies and many studies, so that in the end the CTS is recognized as a purely professional syndrome, with all that this entails for health and safety policies at work and the corresponding legislation. As a clinical entity, we also find it in the everyday life of people who do not work manually, with a ratio in favour of women to men (9% Vs 0.65%).

In the workplace, however, things are clearer in terms of the cause of manifestation and are linked to factors or actions such as:

- The wrong movement of the hand against a resistance
- Transmission of vibrations from tool to hand
- Extreme prolonged positions of the hand in distension
- Prolonged excessive restraint of the tool
- Clumsy placement of the hand when using the tool
- Repeated movement of the hand and fingers
- Inadequate design of hand tools

Our studies in simulations in the laboratory as well as field interventions in tasks and activities with overuse of hands, have shown that by impacting on each of the above factors, loads decrease and the risk of CTS can be reduced or disappeared. In the workplace, employers should ensure appropriate risk assessment procedures, which could potentially lead to the CTS and provide the means and ergonomic aids to prevent the strain on workers.

Many of the so-called "ergonomic devices" (wrist support system, mouse pad, etc.), we have seen them contradict proper biomechanics and efficient use, with ultimately negative results. They are rightly classified as ergonomic, based on their design and objectives of use, but based on their choice

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they should be individualised. The selection and use of such devices, as well as other tools in various tasks, should also be weighed against the user's anthropometric data (e.g. a large palm, requires a larger mouse size, as vice versa, otherwise the hand will be placed and operate awkwardly).

On an individual level, each of us and more employees whose activity strains hands with what we described, should adopt some practices to relieve our hands and prevent CTS.

- We should pause the work and stretch the forearm muscles for a few seconds, repeating a few times and combine it with hand abrupt shakes, which will restore blood circulation in the hand.
- Choose the appropriate tools that will help us to do our job effectively and will not cause us discomfort during their use
- The choice of tools and aids has to be made, based on our anthropometric dimensions and ratios.

As the hands are for many of us the main "tool" for carrying out our work, our concern should be to maintain their integrity with the minimum possible strain. In the choices of aids, we should take into account the degree and the conditions of use of our hands and combine the best possible performance.