# WHEN SPORTS BECOME HARMFUL-A CASE STUDY

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**Abstract**

*This study presents the case of a 27-year-old man who presented with progressive fatigue and discomfort in both hands, symptoms that led to the diagnosis of bilateral carpal tunnel syndrome. Exclusion of secondary causes and the absence of professional exposure to repetitive movements allowed for attributing the etiology to mechanical stress, resulting from a prolonged history of joint overuse associated with weightlifting. The aim of this study is to highlight a possible connection between excessive engagement in sports activities and the development of carpal tunnel syndrome. In recent years, awareness of the importance of physical activity has significantly increased, which is a positive aspect; however, even a beneficial activity like sports must be balanced, as excess can have repercussions.*

***Keywords: sports, carpal tunnel syndrome, tennis elbow, overuse, mechanical stress, Brazilian jiu-jitsu.***

## INTRODUCTION

Among the most frequently encountered neuropathies worldwide, carpal tunnel syndrome is caused by compression of the median nerve at the level of the carpal tunnel, an anatomical structure through which the nerve passes to the distal innervation territory. The symptoms can range from pain to paresthesia and even functional impairment. The symptoms are usually triggered by sustained or repetitive hand activities, such as holding a book or typing, and are alleviated by rest, shaking hands, placing them under a stream of cold water, or using a brace. In the absence of treatment, paresthesia may become constant, followed by the development of muscle weakness and atrophy of the muscles in the thenar eminence, innervated by the median nerve. Modifying activities involving the use of hands may lead to symptom improvement or remission, but there is a risk of future recurrence (Padua L, 2016) (MH., 2017).The most common cause of carpal tunnel syndrome is long-term overuse of the wrist through repetitive movements. Acute cases have also been documented, in which median nerve compression occurs due to trauma (Gillig JD, 2016). However, it can also occur secondarily, serving as an early indicator of systemic conditions such as diabetes, amyloidosis, hypothyroidism, or rheumatoid arthritis, among others, though much less frequently. Most commonly, it occurs unilaterally in individuals with professional exposure (Osiak K, 2021).

The diagnosis is usually suspected based on the medical history and clinical examination, and is confirmed through electromyography (EMG), which enables the assessment of the impulse conduction velocity along the median nerve (Sonoo M, 2018) (MH., 2017).

Treatment options include ultrasound therapy, laser therapy, and electromagnetic fields. These are performed as part of a rehabilitation program alongside re-education of the patient regarding wrist engagement in daily movements and physical therapy. In advanced cases that have not been fully treated by the aforementioned methods, surgery for median nerve decompression may be performed (Gräf JK, 2022) (Wipperman J, 2006) (Kim PT, 2014). In the Journal of Sports and Orthopedic Physiotherapy, it was noted in 2019 that more than half of patients diagnosed and treated with conservative methods eventually undergo surgery within the first year after diagnosis (Therapy,

2019). However, in younger patients, the outcomes of the intervention are more unpredictable (HOBBY JL, 2005).

The impact of carpal tunnel syndrome on the patient's life is significant, affecting both professional activities and daily life. This condition may require substantial adjustments to the daily routine, and in severe cases, it may even require a career change (Padua L, 2023) (Çupi B, 2023) (E. Polykandriotis, 2007).

## METHODOLOGY

This study was conducted following the informed consent of the patient and the evaluation of the study protocol by the Ethics Committee of "Dunărea de Jos" University in Galați. Terms such as "carpal tunnel syndrome," "lateral epicondylitis," and "peripheral nerve injuries in sports" were used to analyze current evidence and knowledge in the specialized literature. After presenting the clinical case, a comparison was made between its particularities and the results highlighted in available studies to identify clinically and scientifically relevant similarities and differences. Figure 1 illustrates an anatomical image depicting the compression of the median nerve in carpal tunnel syndrome.

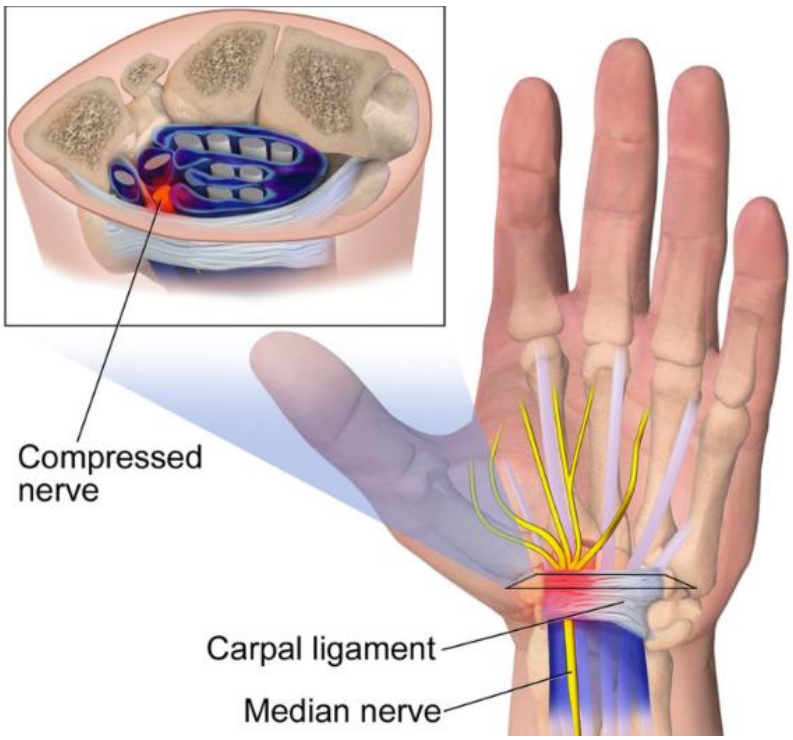



*Figure 13 Median nerve compression. (10.7759/cureus.27053) (Joshi, 2022)*

**Case presentation**

A 27-year-old male patient presents with a sensation of fatigue and discomfort in his right hand while writing. The symptoms also occur in the left hand when typing on a laptop. The onset was insidious, occurring approximately 3 months ago, with a gradual decrease in the threshold for symptom appearance. In the family history, there is a history of breast neoplasm in the maternal grandmother and renal neoplasm in the paternal grandmother, both treated and in remission for over 15 years. In the personal medical history, the patient underwent an appendectomy at the age of 20. The patient states that he is a doctor and has no professional exposure to repetitive movements. He also denies tobacco and alcohol use and practices various sports, with bodybuilding being the most consistent for approximately 15 years and Brazilian jiu-jitsu for about 5 years.

On clinical examination, calluses are noted on the palmar surfaces of the metacarpophalangeal joints bilaterally alongside hypertrophy of the right thenar eminence, with normal mobility and no traumatic marks (Figure 2). During the Phalen test, the patient reports the onset of bilateral paresthesias.

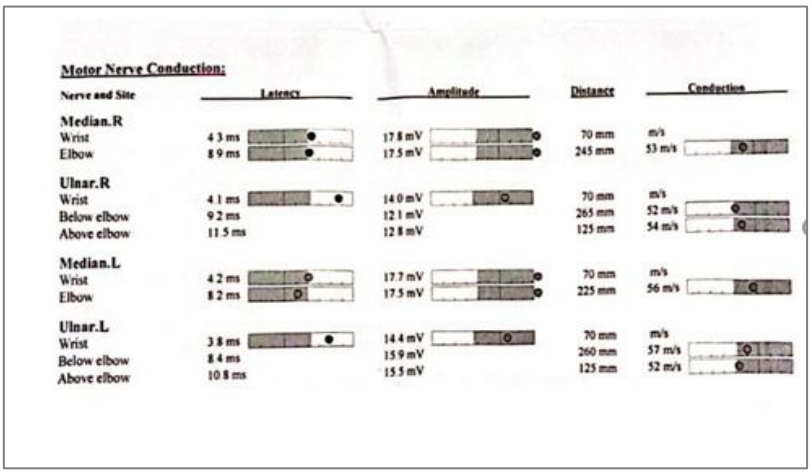
*Figure 14 Clinical examination (from personal archive)*

A musculoskeletal ultrasound (EMS) was performed, which revealed an enlarged median nerve proximal to the flexor retinaculum on the right hand, for which electromyography (EMG) was recommended. Additionally, during the ultrasound evaluation of the hand and finger extensor tendons, edema, microcalcifications, and microvascularity were noted upon Power Doppler interrogation, particularly at the

insertion sites on the lateral epicondyle, suggesting a diagnosis of lateral epicondylitis (Figure 3). The same changes were observed in the left arm, but to a lesser extent.


*Figure 15 Musculoskeletal ultrasound. Edema at the insertion of the extensor muscles of the hand and fingers. (From personal archive)*

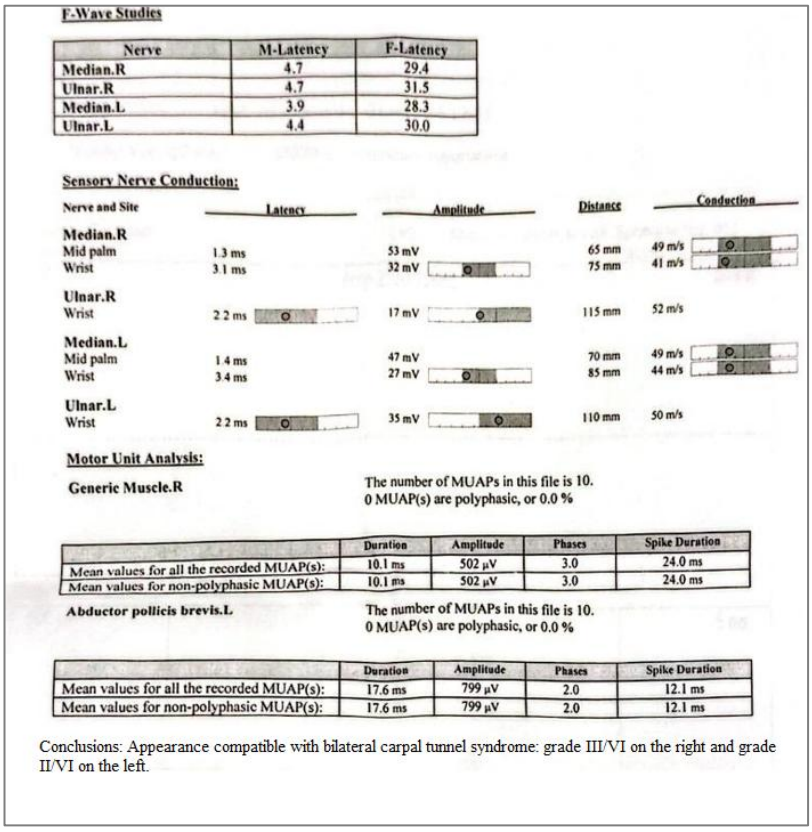
Given the reproducibility of the paresthesias during the clinical examination and the findings from the EMS, an EMG was recommended, which led to the diagnosis of bilateral carpal tunnel syndrome, grade III/V on the right hand and grade II/V on the left hand (Figures 4 and 5).



**Motor Nerve Conduction:**

| Nerve and Site | Latency | Amplitude | Distance | Conduction |
|---|---|---|---|---|
| **Median.R** | | | | |
| Wrist | 4.3 ms | 17.8 mV | 70 mm | m/s |
| Elbow | 8.9 ms | 17.5 mV | 245 mm | 53 m/s |
| **Ulnar.R** | | | | |
| Wrist | 4.1 ms | 14.0 mV | 70 mm | m/s |
| Below elbow | 9.2 ms | 12.1 mV | 265 mm | 52 m/s |
| Above elbow | 11.5 ms | 12.8 mV | 125 mm | 54 m/s |
| **Median.L** | | | | |
| Wrist | 4.2 ms | 17.7 mV | 70 mm | m/s |
| Elbow | 8.2 ms | 17.5 mV | 225 mm | 56 m/s |
| **Ulnar.L** | | | | |
| Wrist | 3.8 ms | 14.4 mV | 70 mm | m/s |
| Below elbow | 8.4 ms | 15.9 mV | 260 mm | 57 m/s |
| Above elbow | 10.8 ms | 15.5 mV | 125 mm | 52 m/s |

*Figure 16 Electromyographic study page 1/2 (From personal archive)*



**F-Wave Studies**

| Nerve | M-Latency | F-Latency |
|---|---|---|
| Median.R | 4.7 | 29.4 |
| Ulnar.R | 4.7 | 31.5 |
| Median.L | 3.9 | 28.3 |
| Ulnar.L | 4.4 | 30.0 |

**Sensory Nerve Conduction:**

| Nerve and Site | Latency | Amplitude | Distance | Conduction |
|---|---|---|---|---|
| Median.R | | | | |
| Mid palm | 1.3 ms | 53 mV | 65 mm | 49 m/s |
| Wrist | 3.1 ms | 32 mV | 75 mm | 41 m/s |
| Ulnar.R | | | | |
| Wrist | 2.2 ms | 17 mV | 115 mm | 52 m/s |
| Median.L | | | | |
| Mid palm | 1.4 ms | 47 mV | 70 mm | 49 m/s |
| Wrist | 3.4 ms | 27 mV | 85 mm | 44 m/s |
| Ulnar.L | | | | |
| Wrist | 2.2 ms | 35 mV | 110 mm | 50 m/s |

**Motor Unit Analysis:**

**Generic Muscle.R**

The number of MUAPs in this file is 10.
0 MUAP(s) are polyphasic, or 0.0 %

| | Duration | Amplitude | Phases | Spike Duration |
|---|---|---|---|---|
| Mean values for all the recorded MUAP(s): | 10.1 ms | 502 µV | 3.0 | 24.0 ms |
| Mean values for non-polyphasic MUAP(s): | 10.1 ms | 502 µV | 3.0 | 24.0 ms |

**Abductor pollicis brevis.L**

The number of MUAPs in this file is 10.
0 MUAP(s) are polyphasic, or 0.0 %

| | Duration | Amplitude | Phases | Spike Duration |
|---|---|---|---|---|
| Mean values for all the recorded MUAP(s): | 17.6 ms | 799 µV | 2.0 | 12.1 ms |
| Mean values for non-polyphasic MUAP(s): | 17.6 ms | 799 µV | 2.0 | 12.1 ms |

Conclusions: Appearance compatible with bilateral carpal tunnel syndrome: grade III/VI on the right and grade II/VI on the left.

*Figure 17 Electromyographic study page 2/2 (From personal archive)*

The patient had a recent set of blood tests performed in an outpatient setting, which did not show any pathological values. Additionally, the patient underwent an electrocardiogram (ECG) and a transthoracic echocardiogram, both of which were recommended following a presentation four months ago due to a lower respiratory tract infection. These tests also showed no modifications suggestive of a systemic disease that could present with bilateral carpal tunnel syndrome at onset. Figures 6, 7, and 8 present the following: the electrocardiogram showing sinus rhythm at 71/minute, a slight right QRS axis deviation, and incomplete right bundle branch block; the transthoracic echocardiogram in the parasternal long axis view; and the transthoracic echocardiogram in the parasternal long axis, with blood flow assessed through color Doppler examination. Figure 8 shows a slight functional mitral regurgitation jet, resulting from a mild mitral valve prolapse.

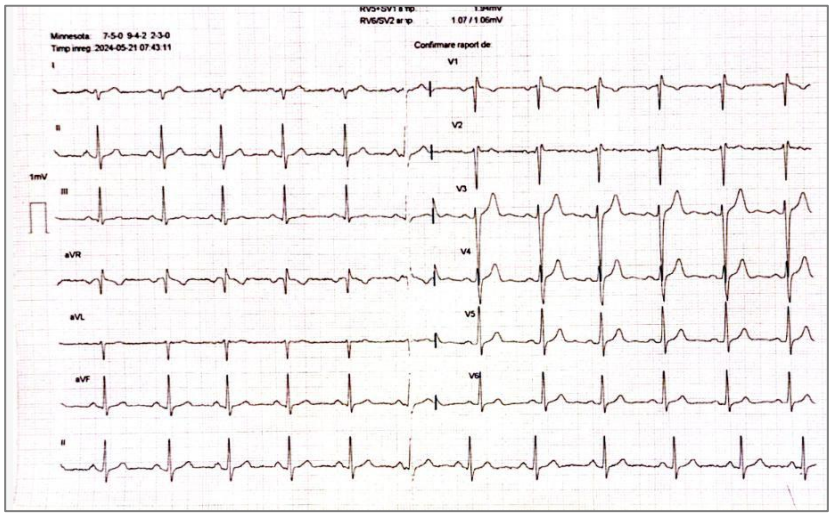



*Figure 18 Electrocardiogram: Sinus rhythm, 71/min, mild right QRS axis deviation, incomplete right bundle branch block (From personal archive)*


*Figure 19 Transesophageal echocardiography, parasternal long axis view (From personal archive)*

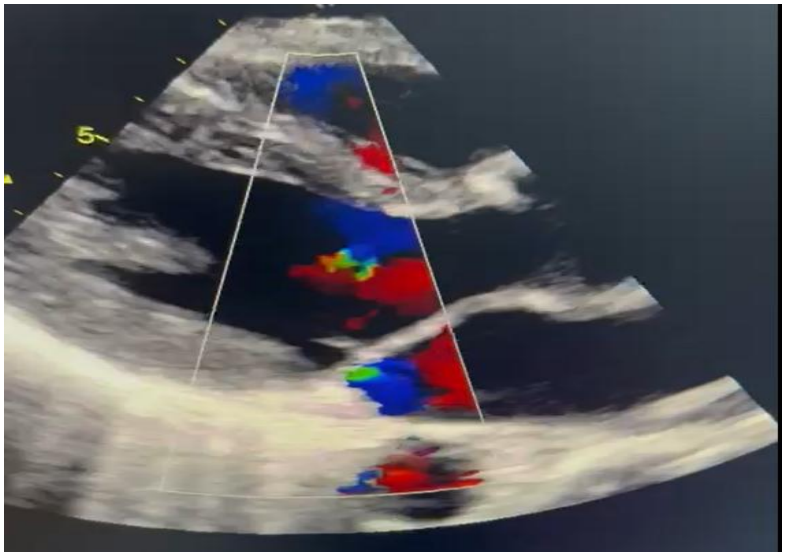



*Figure 20 Transthoracic echocardiography, parasternal long axis, blood flow interrogation using color Doppler. An eccentric jet of mild functional mitral regurgitation is observed, caused by a slight mitral valve prolapse. (From personal archive)*

## DISCUSSIONS

The differential diagnoses considered included diabetes mellitus, amyloidosis, hypothyroidism, and repetitive strain injuries. Multiple sets of tests, conducted periodically in the outpatient setting, indicated the absence of hyperglycemia and thyroid hormone alterations, excluding diabetes and hypothyroidism. Amyloidosis was also ruled out based on the electrocardiogram and transthoracic echocardiogram performed about four months ago. Although further investigations, such as synovial biopsy, could be necessary to exclude conditions like amyloidosis, they were not indicated at present due to their invasive nature and the higher likelihood that the symptoms were related to intense physical activity. The clinical decision was thus oriented toward assessing and managing the most likely underlying cause (Bäcker HC, 2022). The only plausible etiology identified was repetitive mechanical stress. In the absence of professional exposure to risk factors, the history of intense sports training was considered the main contributing factor, especially given the associated diagnosis of lateral epicondylitis.

Bodybuilding and martial arts involve repetitive flexion-extension movements, particularly under load, which can increase pressure within the carpal tunnel. Chronic overuse can lead to hypertrophy of the muscles around the median nerve, contributing to symptom onset through compression. Specific characteristics related to both the type of training and the individual may influence the onset or progression of the syndrome.

A review by Mitchell et al. (2014) highlighted a significant prevalence of peripheral neuropathies among elite athletes, often underdiagnosed. The authors emphasized that symptoms are frequently attributed to other more common conditions, which contributes to delayed identification of neurological issues. Remarkably, neuropathic changes were detected using magnetic resonance imaging (MRI) even in subclinical stages, before the onset of overt clinical manifestations (Charles H. Mitchell, 2014). This underscores, on one hand, the importance of advanced screening among athletes for early diagnosis of these conditions and, on the other, that the prevalence of neuropathies may be even higher than estimated (Busche, 2008). The exact incidence of peripheral nerve injuries is not well known due to the lack of recent epidemiological studies (Tettenborn B, 2016).

An older study by Mauer UM, published in 1991, assessed 30 bodybuilders and noted a correlation between training duration and the onset of carpal tunnel syndrome induced by mechanical stress (Mauer UM, 1991). Even in athletes less expected to experience such conditions, like elite shooters, it appears that after six months of regular training, they develop peripheral nerve conduction disorders, including carpal tunnel syndrome (Rajczewski et al., 2023). These changes were attributed to a combination of recoil from the weapon and prolonged positions during shooting, highlighting the need for preventive measures, such as longer intervals between training sessions and the use of ergonomic equipment.

Studies comparing strength and mobility of the wrist between individuals with and without lateral epicondylitis have shown a significant reduction in the strength of extensor muscles and range of motion, along with decreased radial deviation of the hand (Kim, 2024) (Chourasia AO, 2012).

Although the history of physical activity was initially considered a beneficial factor, investigations gradually ruling out potential causes led to a detailed reassessment of the type and intensity of training. Upon further questioning, the patient admitted to overexerting himself during both weightlifting and Brazilian jiu-jitsu training.

The patient was educated regarding hand ergonomics, rest, and modification of training techniques and intensity. Additionally, a referral for Physical Medicine and Rehabilitation was made to initiate specialized treatment: ultrasound therapy, laser therapy, electromagnetic field therapy, and physiotherapy.

Given the moderate severity of the condition, median nerve decompression surgery was not indicated at this stage, although it could become necessary in the future without adequate recovery.

A notable feature of this case is the concomitant presence of bilateral epicondylitis, also known as "tennis elbow," a condition also caused by repetitive mechanical stress common to many sports activities (Ahmed AF, 2023) (Johns N, 2020). This further supports the hypothesis that the etiology of the patient's symptoms is linked to excessive physical training.

Although pain in the forearms was not one of the initial presenting complaints, upon more detailed history taking, the patient acknowledged experiencing pain,

although less bothersome compared to the fatigue felt at the wrist during activities. Moreover, the patient mentioned that forearm pain developed gradually, around the same time as symptoms in the wrist.

This raises questions about a potential link between epicondylitis and carpal tunnel syndrome, as well as the possibility that one condition may influence the onset or progression of the other. The localized edema at the insertion and course of the extensor muscles could, in theory, extend distally toward the carpal tunnel, generating compressive phenomena (Stephen S. Bao, 2016). Further studies are needed to investigate the potential significant association between these two pathologies, especially considering that they share common risk factors, such as repetitive mechanical overuse.

## CONCLUSIONS

This case highlights the potential of high-intensity sports training in the early development of carpal tunnel syndrome, even in the absence of traditional risk factors. While physical activity is undertaken to maintain optimal health, it must be performed in a balanced manner, and the principle "the more, the better" does not always apply. This is especially relevant in the context of the significant increase in public interest in physical activity. Often, the general recommendation is to encourage movement, considering the prevalence of sedentary lifestyles. However, for individuals already engaging in non-competitive sports, it is essential to adopt a balanced approach to avoid tipping the scale toward negative effects. Sport is indeed beneficial, but educational programs should also be implemented to guide a calculated and balanced practice of it.

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