

Proximal Median Nerve Entrapment in a Manual Worker: A Case Report of Pronator Syndrome

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Abstract

Pronator syndrome is a rare entrapment neuropathy of the median nerve, characterized by recurrent pain in the wrist with distal radiation to the ipsilateral fingers and sensory deficits. We report the case of a 54-year-old operational assistant diagnosed with pronator syndrome after six months of progressive right wrist pain and hand paresthesia. Although electrophysiological studies were normal, clinical assessment and imaging supported the diagnosis. Conservative management—including physiotherapy and activity modification—was implemented. Considering the occupational nature of the condition and its relation with repetitive forearm pronation (e.g., ironing), the patient was reassigned to a role with lower biomechanical demands, avoiding repetitive pronation of the affected forearm. During follow-up, the patient adapted well, reporting symptomatic improvement and functional stability. This case underscores the importance of avoiding repetitive pronation at work and workplace adjustments in the management of pronator syndrome, with a favorable response to conservative treatment in most cases, as supported by recent systematic review data.

Keywords: Pronator syndrome; Occupational medicine; Professional risks; Prevention; Workplace adaptation

Introduction

Pronator syndrome is a relatively rare compression neuropathy of the upper limb that results from entrapment of the median nerve as it traverses the proximal forearm, specifically through or around the pronator teres muscle before the two heads of the muscle merge [1–5]. First described as a distinct clinical entity in the mid-20th century, this syndrome is now part of a broader group of proximal median nerve compressions, which includes anterior interosseous nerve syndrome and compression at the ligament of Struthers. Though less common than carpal tunnel syndrome, pronator syndrome is

clinically relevant due to its similar symptomatology and the diagnostic challenges it poses [1,3,4].

Anatomically, several sites within the proximal forearm can be responsible for the compression of the median nerve. These include the supracondylar process of the humerus with the ligament of Struthers, a thickened bicipital aponeurosis (lacertus fibrosus), the fibrous arch of the flexor digitorum superficialis, and most commonly, hypertrophy or fibrotic changes in the pronator teres muscle itself [2,3,5]. Inflammatory, neoplastic,

or iatrogenic factors may also contribute to nerve entrapment, including Schwannomas, scar tissue following trauma, or repetitive microtrauma in high-risk occupations [1,3].

In most cases, the etiology is associated with repetitive movements involving forearm pronation and supination, frequently observed in occupational activities such as construction work, cleaning, carpentry, and assembly line tasks. Athletes—especially tennis players, rowers, and weightlifters—may also be affected due to the repeated mechanical stress exerted on the forearm musculature [1,3,4,6]. Less commonly, pronator syndrome may occur following direct trauma, in the presence of space-occupying lesions, or in dialysis patients undergoing chronic anticoagulant therapy [1].

Epidemiological data suggest a higher prevalence in females, particularly between the ages of 40 and 50 years [2,3,5]. The clinical picture is often non-specific and includes pain or discomfort in the proximal volar forearm, frequently exacerbated by resisted pronation or elbow flexion. A positive Tinel sign at the proximal pronator teres insertion, as well as paresthesia or numbness in the distribution of the median nerve—particu-

larly affecting the thenar eminence, thumb, index, and middle fingers—are commonly reported [1,2,4]. These symptoms frequently mimic carpal tunnel syndrome, making accurate diagnosis more difficult and sometimes delayed [1,3,5].

Diagnosis is primarily clinical, based on history and physical examination. Provocative tests such as the pronator compression test and resisted pronation with elbow flexion are useful for reproducing symptoms [2,4,5]. However, electromyography often yields normal results, with detectable abnormalities in only around 10% of cases, which contributes to underdiagnosis [1–4]. In some cases, the Phalen test, typically used for carpal tunnel syndrome, may also be positive, adding to diagnostic confusion [1,4].

Treatment typically begins with conservative measures, especially in mild to moderate cases. This includes rest, avoidance or modification of aggravating activities, the use of Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), physiotherapy aimed at stretching and nerve gliding exercises, and local infiltrations with corticosteroids or anesthetics when appropriate [2–4]. Ergonomic adjustments in occupational settings may also be beneficial. If conservative therapy fails to achieve symptom resolution after a reasonable trial period—typically several weeks—surgical intervention may be indicated. Decompression surgery involves releasing the median nerve at all possible entrapment sites within the proximal forearm [1,2]. Postoperative outcomes are generally favorable, with symptom resolution occurring in most patients within 3 to 6 weeks after decompression [1,6].

Case Report

The patient is a 54-year-old female operational assistant employed since January 2014 at a social and parish center. For the first 10 years of her employment, she worked in the laundry department, primarily performing repetitive tasks as a clothes ironer.

She began attending orthopedic outpatient consultations in May 2024 due to complaints of pain in the right wrist with distal radiation to the fingers. The symptoms had been progressing for approximately six months. During the diagnostic work-up, an ultrasound examination revealed a radiocarpal synovial cyst measuring 9×4 mm, and another measuring 10×3 mm located in the extensor and flexor tendons, respectively. Additional findings included mild bulging of the carpal tunnel and early signs of rhizarthrosis.

To further investigate the etiology, an electromyographic (EMG) study was performed. The results showed no evidence of neuropathy of the median or ulnar nerves, and no signs of motor axonal damage involving the cervical roots.

On physical examination, the patient presented with a positive pronator compression test, accompanied by paresthesia in the right forearm and hand. Based on the clinical features, imaging results, and normal EMG findings, a diagnosis of Pronator Syndrome was established in November 2024. A course of physical rehabilitation was initiated, extending over a six-month period.

Following a workplace ergonomic assessment and in consideration of the patient's diagnosis, the occupational health team issued a conditional fitness status during a medical evaluation

in March 2023. It was recommended that the patient avoid tasks involving repetitive pronation of the right forearm, such as ironing. Consequently, she was reassigned to duties in the kitchen area.

During a follow-up occupational health evaluation in May 2025, the patient was found to be clinically stable and well adapted to her new role. Given the absence of complications and ongoing symptom control, it was recommended that she maintain her current job placement and continue to avoid repetitive pronation tasks to prevent symptom recurrence.

Discussion

The relevance of this clinical case lies in the opportunity to highlight the occupational and clinical implications of Pronator Syndrome, a relatively uncommon yet impactful condition that can significantly affect work capacity and quality of life. Although less prevalent than distal median nerve compressions such as carpal tunnel syndrome, pronator syndrome deserves attention due to its often-subtle presentation and the potential for misdiagnosis or delayed treatment [1,3,4,7].

This syndrome is characterized by pain, paresthesia, and sensory changes, particularly during repetitive pronation and supination movements of the forearm [1–4]. In occupational settings that involve repetitive upper limb activities—such as ironing, as in the present case—the risk of median nerve compression at the pronator teres increases considerably [1,3,4,6]. The restriction of repetitive pronation tasks and reassignment to roles with lower biomechanical demands on the forearm are essential strategies to promote symptom resolution, prevent exacerbation, and reduce the likelihood of chronicity [2–4,7].

A key aspect of managing pronator syndrome is distinguishing it from other compressive neuropathies, particularly carpal tunnel syndrome, which is more prevalent and often presents with overlapping symptoms. However, unlike carpal tunnel syndrome, pronator syndrome typically includes forearm pain and may affect the thenar eminence due to the lesion being proximal to the palmar cutaneous branch of the median nerve [1–3]. Therefore, a careful clinical examination, including tests such as the pronator compression test and evaluation of provocative maneuvers, remains fundamental for diagnosis, especially considering that electromyographic findings are often absent or inconclusive in up to 90% of cases [2,4,5].

This case reinforces the importance of a preventive and individualized approach in occupational health. Early detection through targeted physical examination and appropriate use of complementary diagnostic tools—such as ultrasound and EMG—can facilitate prompt diagnosis and differentiation from other peripheral neuropathies [1–4]. Furthermore, ergonomic adaptation of the workplace is a key component in both treatment and prevention, allowing affected individuals to maintain their professional roles without worsening their clinical condition [2,4].

In this context, occupational health assessments play a decisive role in identifying work-related risk factors and implementing timely job modifications. The patient in this case showed favorable evolution after being reassigned to less physically demanding tasks, supporting the literature that indicates good prognosis with conservative treatment when risk exposure is adequately controlled [1,6].

Conclusion

Pronator syndrome is an underdiagnosed entrapment neuropathy that may significantly impact functional capacity and work performance, particularly in occupations requiring repetitive forearm movements. In the present case, the patient presented with pain in the wrist and sensory symptoms radiating to the fingers, without electromyographic abnormalities, which highlights the diagnostic challenges commonly associated with this condition [1–5].

Avoiding repetitive pronation tasks and reassigning job duties—when clinically indicated—are crucial steps in reducing symptom burden and preventing disease progression [2–4]. This reinforces the importance of a thorough occupational assessment and an individualized, preventive approach to managing musculoskeletal disorders in the workplace.

The occupational physician plays a central role in identifying risk factors, facilitating early diagnosis through targeted clinical examination, and implementing job adaptations tailored to the worker's condition. Only through a rigorous and proactive approach can pronator syndrome be appropriately recognized, managed, and monitored, thereby reducing the risk of chronic impairment and preserving the individual's work capacity and well-being.

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