

DEFINITION

1. **Carpal tunnel syndrome** (CTS) is a compression neuropathy caused by constriction of the median nerve where it passes beneath the flexor retinaculum of the wrist. It is a common condition. The crude incidence rate in the UK of about one per thousand person-years in hospital-diagnosed patients and twice that in primary care.

CLINICAL MANIFESTATIONS

2. The symptoms, which are often bilateral, are sensory and motor with:
 - 2.1. Tingling (*paraesthesia*), numbness, or discomfort in the thumb, index and middle fingers. Distressing tingling is often prominent by night, and the patient may need to exercise the fingers or shake the hand in attempt to gain relief.
 - 2.2. Weakness and/or clumsiness of the hand, particularly in carrying out fine movements such as those concerned in writing, typing, sewing and other tasks necessitating pinch grip.
 - 2.3. There is often forearm or elbow pain, aching in nature, poorly localised and exacerbated by activity. Some patients have shoulder pain. In advanced cases of median nerve entrapment, there is impaired sensation and thenar atrophy.
3. Carpal tunnel syndrome is commoner in women, with a female to male prevalence in a ratio of about 3:1. Amongst women, occurrence peaks in middle age; about half of the patients are between 40 and 60 years of age. The condition may, albeit rarely, occur in infancy.
4. The diagnosis is usually made on clinical grounds alone, aided by the signs described by Tinel, Phalen and Durkan. In doubtful cases, nerve conduction tests may be used. The symptoms, signs and nerve conduction abnormalities can arise separately or in combination. Some authorities adopt a critical diagnostic standard, necessitating the presence of all three. Differing diagnostic criteria make it difficult to compare the results of various studies of incidence, prevalence and ratios.
5. Where there is a temporary underlying cause, treatment with corticosteroid injections or even by simple splinting may succeed. NSAID's or diuretics are sometimes helpful. However, surgical release becomes necessary in many cases.

AETIOLOGY

6. Carpal tunnel syndrome usually presents as an isolated phenomenon but it is often associated with other conditions especially where there is fluid retention or inflammation. These include, diabetes mellitus (where it may be due to diabetic mono-neuropathy rather than compression), the prolonged use of oral contraceptives, pregnancy, Colles' or scaphoid fractures, other direct trauma, electric shock, tenosynovitis, rheumatoid disease, osteoarthritis and gout. Obesity and short stature are independent risk factors.

7. Less commonly, CTS can accompany other systemic disorders including congestive heart failure, myelomatosis, systemic lupus erythematosus, rubella, amyloidosis, tuberculosis, acromegaly and chronic haemodialysis.

8. Occupational Factors

The prevalence of CTS between different occupational groups has been found to vary from 0.6% to 61%, with particular high prevalence in foresters, grinders, grocery store workers, frozen food factory workers and platers.

8.1. Repetitive and forceful gripping are major risk factors. It has been found that, in comparison with low force-low repetition jobs, the use of high force gripping increases the risk of CTS with an odds ratio of 1.8 and high frequency of repetitive gripping gave a ratio of 2.7. The combination of high force and high frequency results in an odds ratio of more than 15.

8.2. In case control studies, the strongest occupational associations found are with the use of vibrating tools and activities involving frequent flexion and extension or twisting of the wrist. The use of vibrating tools for more than ten hours weekly increases the risk of developing CTS with an odds ratio of about 14. The proportion of this increased risk attributable to vibration is debatable, as forceful grip is necessary in the use of such tools.

9. Smoking

Cigarette smoking has been identified in most studies as a risk factor for CTS, especially in women of childbearing age.

CONCLUSION

10. **Carpal tunnel syndrome** is a common disabling condition affecting the wrist. There are various causal conditions, listed above, mostly involving fluid retention, inflammation or trauma. In many cases, however, an obvious cause cannot be found and it is then termed *idiopathic*.

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