

## Carpal Tunnel Syndrome

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**CME** This clinical content conforms to AAFP criteria for continuing medical education (CME). See CME Quiz Questions on page 791.

Author disclosure: Nigel L. Ashworth is coauthor of a systematic review referenced in this review.

Carpal tunnel syndrome (CTS) is a collection of clinical symptoms and signs caused by compression of the median nerve within the carpal tunnel.

- Classic symptoms include numbness, tingling, burning, or pain in at least two of the three digits supplied by the median nerve (i.e., the thumb and the index and middle fingers).
- Symptoms can resolve within six months in about one-third of persons, particularly younger persons, whereas poor prognosis is often indicated by bilateral symptoms and a positive Phalen test. However, the severity of symptoms and signs does not often correlate well with the extent of nerve compression.

Local corticosteroid injections seem beneficial in treating CTS compared with placebo.

- Risks associated with local corticosteroid injections into the carpal tunnel include tendon rupture and injection into the median nerve.

We do not know whether diuretics or nonsteroidal anti-inflammatory drugs are effective in treating CTS because the randomized controlled trials identified have been too small to draw reliable conclusions.

We do not know whether therapeutic ultrasound or wrist splints are effective in relieving symptoms of CTS.

We found insufficient randomized controlled trial evidence to assess whether surgery is more effective than no treatment. However, there is consensus that surgery is more effective than no treatment, but a trial of surgery vs. sham surgery would be unethical.

- Surgery may improve clinical outcomes compared with wrist splints.
- We do not know whether surgery is as effective as local corticosteroid injections in treating CTS.

- Both endoscopic and open carpal tunnel release seem to improve symptoms, although the data are unclear as to which is more beneficial. Both may be associated with several adverse effects.

### Definition

CTS is a collection of clinical symptoms and signs caused by compression of the median nerve within the carpal tunnel. Classic symptoms of CTS include numbness, tingling, burning, or pain in at least two of the three digits supplied by the median nerve (i.e., the thumb and the index and middle fingers). The American Academy of Neurology has described diagnostic criteria that rely on a combination of symptoms and physical examination findings. Other diagnostic criteria include results from electrophysiologic studies.

### Incidence and Prevalence

A general population survey in Rochester, Minn., found the age-adjusted incidence of CTS to be 105 cases (95% confidence interval [CI], 99 to 112) per 100,000 person-years. Age-adjusted incidence rates were 52 cases (95% CI, 45 to 59) per 100,000 person-years for men and 149 cases (95% CI, 138 to 159) per 100,000 person-years for women. The study found that incidence rates increased from 88 cases (95% CI, 75 to 101) per 100,000 person-years between 1961 and 1965 to 125 cases (95% CI, 112 to 138) per 100,000 person-years between 1976 and 1980. Incidence rates of CTS increased with age for men, whereas for women they peaked between the ages of 45 and 54 years. A general population survey in the Netherlands found prevalence to be 1% for men and 7% for women. A more comprehensive study in southern Sweden found that the general population prevalence for CTS was

3% (95% CI, 2% to 3%). As in other studies, the overall prevalence in women was higher than in men (male-to-female ratio of 1.0:1.4); however, among older persons, the prevalence in women was almost four times that in men (age group 65 to 74 years: men 1% [95% CI, 0% to 4%]; women 5% [95% CI, 3% to 8%]).

More than 50% of pregnant women developed symptoms of CTS. However, many trials exclude pregnant women, and we did not identify any randomized controlled trials assessing the treatment of pregnancy-induced CTS. The pathophysiology of idiopathic and pregnancy-induced CTS is likely to differ, with one key consideration in pregnancy-induced CTS being fluid retention. Therefore, strategies to reduce fluid retention will probably be of more benefit in pregnancy-induced CTS than they have been shown to be in idiopathic CTS.

### Etiology/Risk Factors

Most cases of CTS have no easily identifiable cause (idiopathic). Secondary causes of CTS include the following: space-occupying lesions (tumors, hypertrophic synovial tissue, fracture callus, and osteophytes), metabolic and physiologic conditions (pregnancy, hypothyroidism, and rheumatoid arthritis), infections, neuropathies (associated with diabetes mellitus or alcoholism), and familial disorders. One case-control study found that risk factors in the general population included repetitive activities requiring wrist extension or flexion, obesity, rapid dieting, shorter height, hysterectomy without oophorectomy, and recent menopause.

### Prognosis

One observational study (CTS defined by symptoms and electrophysiologic study results) found that 34% of persons with idiopathic CTS without treatment had complete resolution of symptoms (remission) within six months of diagnosis. Remission

### Clinical Questions

#### What are the effects of drug treatments for carpal tunnel syndrome?

Likely to be beneficial	Corticosteroids (local injection)
Unknown effectiveness	Diuretics Nonsteroidal anti-inflammatory drugs

#### What are the effects of nondrug treatments for carpal tunnel syndrome?

Unknown effectiveness	Therapeutic ultrasound Wrist splints
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#### What are the effects of surgical treatments for carpal tunnel syndrome?

Likely to be beneficial	Surgery (vs. no treatment or placebo)*
Trade-off between benefits and harms	Endoscopic carpal tunnel release vs. open carpal tunnel release (seem equally effective at improving symptoms but both associated with adverse effects)
	Surgery vs. local corticosteroid injection (unclear which is most effective; both associated with adverse effects)
	Surgery vs. wrist splint (surgery more effective but associated with adverse effects)

\*—There is consensus that surgery is effective in persons who have not responded to nonsurgical treatment.

rates were higher for younger age groups and for women. One observational study in pregnant women found that, in most cases, pregnancy-induced CTS spontaneously improved after delivery. However, some women had symptoms of CTS one year after delivery. An observational study of untreated idiopathic CTS also found that symptoms can spontaneously resolve in some persons. The main positive prognostic indicators were short duration of symptoms and young age, whereas bilateral symptoms and a positive Phalen test result were indicators of a poorer prognosis.

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