



# Prevalence of Carpal Tunnel Syndrome in Motorcyclists

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**Abstract:** Carpal tunnel syndrome is prevalent in patients who have a repetitive motion, vibration, or pressure exerted on the wrist joint for an extended period of time. The prevalence of this condition in the general population is approximately 5%. Motorcyclists subject themselves to high levels of vibration from the road and use their wrists to control the motorcycle's brakes, gas intake, and gears via the handlebars. Under these conditions, the author hypothesized that an increased prevalence of carpal tunnel syndrome would be observed in this population.

Carpal tunnel syndrome is prevalent in patients who have a repetitive motion or pressure exerted on the wrist joint. It can be caused by sewing, typing, driving, painting, writing, vibratory tools (eg, jackhammers), and sports (eg, handball, racquetball).<sup>1</sup> A 1 in 20 incidence of carpal tunnel syndrome is found in the adult population, with woman outnumbering men 3 to 1.<sup>2</sup> To the author's knowledge, no studies exist in the orthopedic literature regarding the prevalence

of carpal tunnel syndrome in motorcyclists, or bikers (not to be confused with bicyclists).

Two mechanisms cause cumulative repetitive pressure and injury to the wrist, and therefore the median nerve, when riding a motorcycle. First, the handlebars receive an enormous amount of vibration from the engine and the irregular road surface. Second, devices on the handlebars are controlled by the biker. The biker's right hand controls the throttle (to increase or decrease

gas flow) and the front brakes, and the left hand controls the clutch. All of these controls add to the repetitive pressures that are generated on the wrist joint.

The author evaluated 50 long-term bikers using a questionnaire, consultation, physical examination, and electromyography (EMG) studies. Compared with the average male population, the current study found an increase in the incidence of carpal tunnel syndrome in bikers.

## MATERIALS AND METHODS

One hundred questionnaires were sent to bikers on a list obtained from the Nassau Wings Motorcycle Club, a bikers' club in Long Island, New York. The bikers used for this study had been biking for >5 years and averaged ≥10 hours per week riding. Average age was 48 years, and all participants were men. Bikers with other possible causes of carpal tunnel syndrome, such as diabetes mellitus, kidney disease, obesity, arthritis, alcoholism, hypothyroid, rheumatoid ar-

thritis, and fractures, were eliminated (n=2). The remaining bikers were asked to report for a consultation, physical examination, and EMG. Fifty participants complied with the full study.

## RESULTS

Based on the physical examination, history, and EMG results,<sup>3</sup> 15 (30%) bikers had evidence of carpal tunnel syndrome in the right hand and 6 (12%) in the left hand. Bilateral carpal tunnel syndrome was observed in 4 (8%) bikers.

## DISCUSSION

The median nerve in the wrist supplies sensation to fingers<sup>1-4</sup> and some of the intrinsic muscles in the hand. The pathophysiology of carpal tunnel syndrome is not completely understood, but it is believed by most that the condition results from pressure on the median nerve.<sup>4</sup> It may be caused by repetitive stress on or damage to the wrist joint.<sup>5</sup> Theoretically, the tissue in the tunnel (ie, tendons,

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fascia, synovium) becomes inflamed, irritated, edematous, and thickened.<sup>4</sup> The thickening causes increased pressure directly on the nerve or ischemia to the blood supply to the median nerve.<sup>4</sup>


The symptoms of carpal tunnel syndrome include numbness, tingling, and muscle weakness in the hand and pain up and down the arm.<sup>2</sup> The paresthesias occur in the thumb, index, and middle fingers, and one half of the fourth finger. Frequently, patients experience numbness while sleeping and immediately after waking. They try to shake their hand repeatedly in an attempt to get the feeling back in the fingers. Atrophy of the thenar muscles may occur if the condition is left untreated.

If the causative factor is not removed, the condition usually worsens.<sup>6,7</sup>

While riding a motorcycle, an excessive amount of vibration from the engine, road, and hand controls (ie, throttle, brake, and clutch) cause pressure on the wrist joint and the median nerve. This is a perfect scenario to cause a carpal tunnel syndrome. (Note: a small increase in carpal tunnel syndrome was also seen in bicycle riders, although ulna neuropathy was more common in that population.<sup>8</sup>)

This study evaluates the incidence of carpal tunnel syndrome in long-term bikers, which was found to be greater than in the general population. Carpal tunnel syndrome was observed in the right hand in

30% of participants, in the left hand in 12%, and bilaterally in 8%.

The bikers' association is aware of the carpal tunnel syndrome prevalence and makes several recommendations: using padded gloves to reduce vibrations; using special throttles that make rotation easier; having a throttle lock (for cruise control); reducing the angle of the levers and the handlebar; and using soft hand-grips. 

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