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Work-Related Carpal Tunnel Syndrome: The Facts and the Myths

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Carl Zenz's 1988 second edition of "Occupational Medicine: Principles and Practical Applications" contains only two citations on carpal tunnel syndrome in the index and includes only one brief paragraph on the subject in the entire volume [1]. By contrast, the 1994 third edition (the latest) of Zenz's text cites carpal tunnel syndrome 20 times in the index and covers the subject in depth [2].

In Austin, Texas, a neurologist currently advertises the opening of a carpal tunnel clinic, and in Houston, a hand surgeon has spent approximately \$200,000 annually to place a monthly ad in Southwest airline's magazine to entice patients who have carpal tunnel syndrome to his clinic for surgical treatment. A subject that was deemed barely worth mentioning in the occupational medicine textbooks of the 1980s has become big business.

Carpal tunnel syndrome currently accounts for more lost time than any other work-related malady. According to the US Bureau of Labor Statistics, since 1994, the median lost days average for carpal tunnel syndrome was the highest of all claims. For example, in 2000, the carpal tunnel syndrome median average was 27 days off, compared with 20 days for a fracture and 18 days for an amputation [3]. Although it still accounts for a relatively small percentage of occupationally related claims filed, carpal tunnel syndrome has gained substantial media attention and accounts for substantial disability. What has happened in the interim since the 1980s—when carpal tunnel syndrome was barely more than mentioned in occupational medicine textbooks—that has brought about the idea that a chief cause of carpal tunnel syndrome is repetitive workplace activities?

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A review of the literature regarding the potential for work activities to cause carpal tunnel syndrome reveals wide variation in opinion on the matter, ranging from “almost never” to up to 90% of cases being caused by workplace activities [4–7]. The wide variation in opinions on the matter suggests multifactorial causation and the fact that there is much variability in criteria used to determine work relatedness. Little consistent scientific evidence supports the idea that routine physical activities of the modern American workforce are a major cause of carpal tunnel syndrome. Most studies find no consistent relationship between carpal tunnel syndrome and workplace activities, and studies that do find relationships have been criticized for having serious methodologic flaws [5,8–11]. In most states, however, carpal tunnel syndrome is still commonly attributed to repetitive work activities from a legal standpoint.

All cultures develop myths that reflect deeply entrenched beliefs and ideas, and the culture of the medical profession is no exception. Established medical myths can be difficult to discredit, even sound scientific evidence refutes them. The workers’ compensation system in particular has promulgated numerous myths and societal expectations regarding causation and management of injuries perceived to be caused by workplace exposures and activities. The common aches and pains of everyday living that would be accepted as a normal condition of aging or lack of conditioning often are attributed to the work environment.

Patients, doctors, insurance carriers, employers, and the legal system have some vested or self-serving interest in supporting given cultural beliefs and expectations regarding illness and management, and these strongly held beliefs and expectations greatly influence the medical management and outcome of a given case. A Medline search on carpal tunnel syndrome–related medical articles published between 1997 and 2005 is revealing regarding where the areas of interest regarding carpal tunnel syndrome lie for the medical profession. There were 531 citations, with the highest number (177) focusing on surgical aspects of treatment. Eighty-seven citations addressed electrodiagnostic testing and imaging, 57 focused on issues of diagnosis, 50 focused on nonsurgical treatments, 30 discussed causation determination, 22 involved workers’ compensation issues, 4 focused on psychosocial aspects, and two articles addressing the issue of return to work.

The lack of focus on subject areas that provide little financial incentive to physicians, such as areas that deal with psychosocial issues or return-to-work issues, is compelling. According to US Bureau of Labor Statistics data, not only has the median lost days average been highest for carpal tunnel syndrome than all other claims but also it has been increasing. In 2000, the average time off for carpal tunnel syndrome was 27 days; in 2003 it was 32 [3].

The current controversy regarding carpal tunnel syndrome work causation may embroil treating physicians in conflict regarding work relatedness, treatment, and the need for work restrictions and disability in a venue in which medically it is arguable at best that the job is causative but in which the legal and social constructs deem it work related. This article discusses those controversies and suggests ways of managing carpal tunnel syndrome cases.

Causation

The status of being designated work related is in itself a risk for disability [12]; logically, a primary means of minimizing the risk of disability from carpal tunnel syndrome is to avoid classifying a case as work related when no good evidence supports it as being caused by the job. When the causation of a given disorder is misdirected, then too might be the direction and content of care and the outcome of the case. For instance, a clerical worker who has carpal tunnel syndrome is restricted from the job because of an erroneous assumption that the condition is work related, when in actuality a 25-pound weight gain and hormonal problems are the cause. Not only does the patient suffer financially and emotionally from loss of work but also treatment is not likely to address the true causes. The patient is at risk of gaining even more weight when off work, which further contributes to the problem.

SYSTEMIC

Flexor tendinitis
 Rheumatoid diseases
 Diabetes
 Collagen-vascular &
 Thyroid disease
 Gout
 Renal disease
 Long term Dialysis
 Gynecological disorders
 Amyloidosis
 Pregnancy
 Obesity
 Alcoholism
 Dupuytren's disease
 Hereditary Neuropathy with
 liability to pressure palsies
 Genetic (trisomy of chromosome 8)
 Endocrinopathies
 Use of certain medications
 Cigarette smoking
 High caffeine consumption
 Aerobic deconditioning
 Congestive heart failure
 Infection (33 agents)
 Nutritional deficiency
 Vitamin toxicity
 Exposure to Neurotoxins
 Ingestion of rapeseed oil
 Multiple myeloma
 Raynauds syndrome

ANATOMIC

Osteoarthritis
 Anomalous muscles
 Small wrist dimension
 Neoplasms
 Tubercular granuloma
 Radial head fracture
 Hematoma
 Volkman's ischemia
 Carpal bone fracture with
 dislocation
 High pressure injection injury
 Burn injuries

ERGONOMIC

Awkward posture
 +
 High repetition
 +
 High force
 +
 Vibration

High force
 +
 High repetition
 +
 Cold work environment

Fig. 1. Causation of carpal tunnel syndrome is difficult to determine, and work relatedness is controversial. Causation is believed to be multifactorial in many cases and often may be idiopathic, with no apparent associated risk factors.

Carpal tunnel syndrome is an illness, not an injury, and health factors such as obesity, smoking, heavy alcohol consumption, diabetes, and thyroid disease are much more likely to contribute substantially to the onset of carpal tunnel syndrome than workplace activities. Carpal tunnel syndrome can be caused or associated with many systemic diseases and conditions, and it also occurs in patients with no identifiable risk factors. Tendonitis, pregnancy, and hormonal disorders are just a few more of the medical conditions that have been associated with carpal tunnel syndrome. The tendency to develop carpal tunnel syndrome has even been found to be genetic [4,6,8,11,13]. Numerous associated conditions must be considered in the assessment of patients who have carpal tunnel syndrome (Fig. 1).

Although there is a prevailing cultural perception that carpal tunnel syndrome is often caused by physical activities, the combination of a sedentary lifestyle and being overweight has been identified as one of the most significant risk factors [14]. Association with carpal tunnel syndrome has been found most consistently found with obesity, advanced age, small wrist dimensions, and lack of exercise [8,14]. Long-term periodic follow-up of patients who have prolonged median nerve latency at the wrist has indicated that latency and nerve pathology tend to remain and increase with aging. Symptoms tend to fluctuate through the years, however, but in most cases do improve. Most workers with median nerve latency who initially are asymptomatic do not develop clinical carpal tunnel syndrome [8].

Work-related carpal tunnel syndrome

Although there are numerous associations with other medical conditions, many—if not most—cases of carpal tunnel syndrome occur with no clear-cut cause or association in presumably perfectly healthy individuals, and establishing causation is often not possible. Patients without clear medical associations are more likely to be presumed to have work-related carpal tunnel syndrome by misinformed administrators, employers, and physicians, even when no identifiable activity at work would be expected to promote symptoms. Generally, in the workers' compensation arena the decision of work relatedness may be more of a legal one than a medical one. In most cases it is an administrative decision made by an insurance company using input from a patient, the employer, and the treating physician.

National Institute of Occupational Safety and Health (NIOSH) reviewed the literature on causation, and the analysis suggested that for work activity to be considered significantly causative, high repetition, high force, awkward posture, and vibration exposure all must be present [15]. An analysis conducted by New Zealand researchers suggested that a combination of performing highly repetitive and forceful arm activity while in a cold environment seems to be the most significant work risk. In fact, the only two occupations that seem to have a higher risk ratio for developing carpal tunnel syndrome are boners who work in a cold

(refrigerated) environment and frozen food workers who perform highly repetitive, forceful work [16].

Routine occupational activities sometimes may unmask rather than actually cause carpal tunnel syndrome. If a data entry worker's job requires prolonged sedentary work and the workload is excessive because of layoffs, the worker may be more bothered by intermittent numbness and tingling from carpal tunnel syndrome while performing that task than he or she would be by comparison if performing the varied tasks of a warehouse worker. Consequently, the data entry worker might be more likely to seek treatment and believe that the work caused the problem than would the warehouse worker.

Because the symptoms and signs associated with carpal tunnel syndrome are nonspecific and occur in unaffected persons on a frequent and regular basis, the disorder is commonly overdiagnosed, particularly in the workers' compensation arena [4,14]. One study found that only 17% of patients who were diagnosed with work-related carpal tunnel syndrome actually had symptoms and objective evidence [17]. Consequently, it is possible that most patients who present to an occupational medicine clinic with classic symptoms of carpal tunnel syndrome do not actually have carpal tunnel syndrome, because the symptoms occur commonly and transiently in people who, if tested, have normal nerve conduction studies [4,18]. Typical symptoms may be brought on by muscle tension caused by work in static postures, fatigue, stress, or poor conditioning [6,8]. Although from a medical causation standpoint there is good reason to argue that carpal tunnel syndrome is rarely substantially caused by the workplace, many cases still are being designated as work related because the job duties, although not causative, are believed to exacerbate the symptoms of the disease.

Carpal tunnel syndrome and trauma at work

Uncommonly, carpal tunnel syndrome can develop from trauma at work. Carpal tunnel syndrome can occur as sequelae from a radial fracture, traumatic tenosynovitis, carpal bone fracture with dislocation, Volkman's ischemic contracture, traumatic ganglion, or a carpal tunnel hematoma [19]. Symptoms may occur acutely or may be delayed.

Carpal tunnel syndrome and keyboarding

A 2004 NIOSH report of job activities associated with carpal tunnel syndrome listed computer use as the primary cause and indicated that it accounted for one half of all cases [20]. To quote Brandt Steele, a renowned psychiatrist, "statistics are like bikinis—what they reveal is quite interesting, but what is concealed is vital." Although it may be true that computer workers file claims for carpal tunnel syndrome, it is also true that the three most common occupations listed by

people with carpal tunnel syndrome consistently have been homemaker, unemployed, and retired [20–22]. The NIOSH report could lead one to assume erroneously by association that computer work was causative. According to the NIOSH report, the other most commonly associated activities noted were reaching and twisting, followed by lifting and loading. To a much lesser degree the report related customer service, handwriting, and cashier work to carpal tunnel syndrome. The implication of the NIOSH report is that these job tasks largely caused the carpal tunnel syndrome cases.

The NIOSH report does not reflect the considerable controversy regarding work causation and carpal tunnel syndrome within the medical and scientific community, nor does it reflect that sound studies do not support a causal relationship between carpal tunnel syndrome and repetitive physical activity. All of these activities, including keyboard activities, are common, routine activities of daily living, regardless of job duties, performed by a large segment of the population at work and away from work, and although a person who has carpal tunnel syndrome may become more aware of symptoms during certain activities (including sleeping), that does not mean that the activity was causative.

No scientific evidence supports the fact that carpal tunnel syndrome can be caused or aggravated by prolonged keyboard use, yet it has been reported regularly as fact in such widely read periodicals as *TIME*, *Newsweek*, and the *New York Times*, and consequently the predominant public perception is that keyboarding is causative. Major manufacturers of computers commonly include a safety manual with each new computer that warns that prolonged use of a computer keyboard may cause serious injury, despite the lack of scientific evidence substantiating this commonly held belief. Currently a preponderance of evidence indicates that carpal tunnel syndrome is not caused by keyboarding and no sound scientific supports that finding [23–33].

Although keyboarding does not cause carpal tunnel syndrome, it is still not uncommon for an occupational medicine practitioner to be asked to assess and treat patients who have carpal tunnel syndrome presumed to be caused by keyboarding. Because work causation is a legal determination in most states despite a medical opinion to the contrary, carpal tunnel syndrome that develops in a computer worker may be deemed work related. For instance, an insurance company may have incorrectly accepted culpability initially and may be required to continue coverage. Some companies may request that all carpal tunnel syndrome cases of their computer workers be treated as work related by the company physician to ensure that appropriate care is delivered by a knowledgeable physician. Occasionally, because of individual circumstances, a physician may feel that work-related keyboarding substantially exacerbates a carpal tunnel syndrome condition and should be treated as work related.

Most patients with the diagnosis of carpal tunnel syndrome are able to work at a keyboard for prolonged periods without experiencing significant problems. Staying physically fit, using proper body mechanics and frequent brief postural breaks, and having a well-situated workstation increase the likelihood that a patient who has carpal tunnel syndrome can perform job tasks, such as key-

boarding, without particular discomfort. The focus of management of workers who have carpal tunnel syndrome and use a keyboard extensively should be educating patients about the disorder, allaying any fears and misapprehensions about keyboarding and carpal tunnel syndrome, and promoting improved fitness to improve work tolerance.

Carpal tunnel syndrome and neurotoxin exposures

A Medline search failed to identify any articles that confirmed neurotoxin exposure as a work-related cause of carpal tunnel syndrome. The National Institutes of Health website on toxicologic hazards of the workplace listed 557 references to carpal tunnel syndrome and toxins [34]. Almost none of these articles referred to chemical neurotoxin exposures but instead focused on the physical and ergonomic aspects of the workplace relative to carpal tunnel syndrome. There were individual references to possible increased associations of carpal tunnel syndrome and exposures to mercury, radiofrequency electromagnetic fields, and chlorpyrifos, although the supporting evidence was isolated and limited [35–37]. There were also two case reports regarding patients who developed carpal tunnel syndrome within a few weeks of receiving a vaccination (one rubella and the other influenza) [38,39]. The associations seemed limited.

Diagnosis

The diagnosis of carpal tunnel syndrome can be made in patients who have symptoms and signs typical of median nerve entrapment or ischemia that is confirmed by electrodiagnostic testing that demonstrates median nerve latency at the wrist [6,31]. In cases that involve symptoms without electrodiagnostic abnormalities or electrodiagnostic latency without symptoms, neither situation confirms carpal tunnel syndrome; both must be present. A careful history and examination should indicate cases in which patients need further medical evaluation to exclude an associated medical condition.

Typical symptoms may include intermittent numbness and tingling of the hand and the thumb, index, and middle finger (or some combination of those three and occasionally the ring finger), which generally cause nocturnal awakening. Symptoms may be brought on by routine activities of daily living and often manifest with static postures, such as when driving or reading the newspaper. Patients may experience paresthesias or pain proximally in the forearm, sometimes even extending to the shoulder and neck areas.

The history should assess for symptoms that suggest any of the large number of medical conditions known to be associated with carpal tunnel syndrome, including diabetes, hypothyroidism, hormonal conditions, and obesity [32,33]. Cigarette smoking, ingestion of caffeine, and excessive alcohol consumption are also associated risks [40]. Recent weight gain, dry skin, constipation, and fatigue

can suggest hypothyroidism. Cyclical fluid retention and weight gain in middle-aged women can suggest perimenopause. Use of certain medications (such as nonsteroidal anti-inflammatory drugs) can cause fluid retention and exacerbate symptoms. Certain antibiotics, such as cipro derivatives, can cause tendonitis, which in turn can cause carpal tunnel syndrome. Carpal tunnel syndrome may result from a recent wrist or carpal bone fracture [32]. One also should ask about pain, numbness, and tingling of the lower extremities to exclude peripheral neuritis. Peripheral neuritis generally involves the feet before the hands, and patients who present with hand symptoms may not mention lower extremity symptoms unless asked. Patients also should be asked about the presence of neck or shoulder symptoms.

It is important to document patients' exercise status, because carpal tunnel syndrome is more common in individuals with a sedentary lifestyle [41]. Carpal tunnel syndrome can present after recent weight gain. Patients should be asked about problems with sleeping, which can indicate depression and hormonal deficiency and can be a cause of increased muscle tension that contributes to symptoms. Patients also should be asked about other symptoms of anxiety, depression, and increased recent stress, because they can contribute to increased musculoskeletal symptoms and may impede recovery [6,42].

Job history is important to assess job requirements and a patient's perception of it. Just as pain is more accurately described as a perceptual phenomenon rather than a purely sensory one, a patient's perception of how dangerous or noxious a job is can have significant impact on how he or she perceives any physical symptoms. What is a patient's understanding of what is causing the problem? What activities of daily living cause symptoms? Specifically, one should ask about job title, length of time on the job, and relation of physical symptoms to work activity. Do they only occur at work or at home? Do they occur on off days or at night? Can the patient specify what aspect of the job is associated with onset of symptoms? Have any family members had carpal tunnel syndrome? The tendency to develop carpal tunnel syndrome can be inherited, including such diagnoses as Dupuytren's contracture, hereditary neuropathy with liability to pressure palsies, and even a genetic defect (eg, trisomy of chromosome eight) [13,43].

Physical examination should include height and weight. A thorough neck and bilateral upper extremity examination should be performed. Axial compression of the neck should be done to assess for cervical root compression. Research has estimated that 92% of all carpal tunnel syndromes may involve a double crush syndrome in the median nerve distribution [44]. The Spurling test is also helpful. The neck and trapezius areas should be palpated for spasm (which can contribute to paresthesias and pain symptoms in the arms and hands), and the thyroid should be examined for enlargement or nodularity. Shoulder retraction can help identify contributing muscle spasm in the shoulders and upper back. Shoulder retraction is performed by having a patient lift both arms to shoulder height with both elbows flexed to 90° and the wrists in a neutral position. Passive retraction of the shoulders posteriorly that causes paresthesias in the hand within 10 to 20 seconds suggests that muscle spasm/tension is contributing to hand symptoms.

The skin around the elbow should be felt to identify dryness from hypothyroidism. In patients who present with any symptoms in the lower extremity (eg, paresthesias, edema), the lower extremity should be inspected for edema and tested for sharp dull sensation on the feet. Reflexes of the upper and lower extremity also should be tested. Physical examination may reveal a decrease in two-point discrimination (>10 mm) in the thumb, index, and possibly the middle finger. Only rarely does motor involvement occur, in which case there may be thenar atrophy and weakness to testing of thumb opposition. The Phalen and Tinel tests are generally performed to provoke symptoms, although neither test has high reliability [45,46].

The flexor fingers should be assessed for evidence of Dupuytren's disease or flexor tendonitis, both of which can bring about symptoms of carpal tunnel syndrome [13]. The finger joints should be palpated for tenderness and observed for swelling and arthritis. Grip strength should be assessed by a dynamometer, and wrist strength should be tested for. Grip strength should not be affected by carpal tunnel syndrome, although discomfort caused by carpal tunnel syndrome may prevent good effort and can give a good indication of a patient's fitness level.

Diagnostic tests

Because there is no valid clinical test to confirm the diagnosis of carpal tunnel syndrome, electrodiagnostic studies are needed to confirm the diagnosis. If a patient's symptoms improve substantially with conservative treatment and do not impair function, electrodiagnostic testing is not necessary. If there is conservative treatment failure, motor weakness, or uncertainty about the diagnosis or if surgery is being considered, however, electrodiagnostic testing is recommended. Ideally, bilateral nerve conduction velocity should be obtained, even when symptoms are unilateral, and it is recommended that the ulnar and radial nerves be included to rule out a polyneuropathy [11].

A substantial number of people over age 40 (reported by some researchers as up to 40%) may have median nerve slowing but be entirely asymptomatic [8]. Most patients who have median nerve latency who are asymptomatic do not develop symptoms of carpal tunnel syndrome according to studies of long-term follow-up [8,47]. Conversely, less than 50% of women younger than 40 years who had been given the diagnosis of carpal tunnel syndrome actually had median nerve latency [18].

Identify underlying contributing health conditions

Treatment focus should be on identifying any underlying health condition that may contribute to symptoms. When historical or physical evidence suggests that patients need a further medical evaluation to exclude systemic disease, patients should be advised of that and told to follow-up with a personal physician.

In some instances the workers' compensation insurance company may approve a limited systemic evaluation to clarify the issue of work causation.

Management

Although a case may be designated as work related by a given legal or administrative action, in many cases it is unlikely that the workplace activities contribute substantially to causation. Such knowledge enables a physician to avoid unnecessary disability during treatment, because in almost all cases—even when some aspects of work tend to bring about symptoms—patients may remain at work, generally at full duty, during conservative care. If substantial exacerbation of symptoms occurred with overtime work, then patients should be advised not to work overtime until symptoms abate. Although the condition is not work related, patients should be given advice on how to minimize symptoms at work and should be encouraged to promote blood supply to the upper extremity by strengthening, stretching, reducing muscle tension, and improving aerobic fitness.

Provide a conceptual model in the explanation of causation

A key aspect of management often involves explaining to patients' satisfaction that in all likelihood the symptoms of carpal tunnel syndrome that they experience are not caused by the workplace activities. Giving patients a conceptual model may help them to understand the condition and its relationship to activity. For example, the association between data entry, reaching, twisting, loading, lifting, and handwriting and carpal tunnel syndrome is analogous to a comparison that an increased number of poisonous snake bites has been associated with an increased consumption of ice cream in a population. One should not assume that the association means that snakes are more likely to bite people who eat ice cream but rather that snakebites occur primarily in the summer months, which is the peak time of ice cream consumption. A high percentage of workers perform keyboard tasks or data entry as routine parts of their jobs, and a worker who has carpal tunnel syndrome might experience some symptoms while performing routine tasks of all kinds. Workers also read the newspaper, use a steering wheel, and perform housekeeping tasks, but that does not mean that any of these tasks caused carpal tunnel syndrome. Even while sleeping, patients may experience symptoms of carpal tunnel syndrome.

In cases in which it seems that certain job activities substantially exacerbate carpal tunnel syndrome, physicians should explain to patients that although the job did not cause the condition, it seems to exacerbate the condition; consequently, short-term treatment to improve job tolerance is indicated. If patients should decide to have surgery at a later date, however, that generally would not be considered work related. The decision regarding whether an exacerbation of

carpal tunnel syndrome is covered by workers' compensation generally is made by the insurance company but may vary in different states.

Surgery

For true carpal tunnel syndrome that persists after conservative care, surgery is generally successful. Patients who have work-related carpal tunnel syndrome claims may not fare as well, however [36]. During the Australian repetitive strain injury epidemic of the 1970s and 1980s, surgery rarely benefited workers diagnosed with carpal tunnel syndrome [47]. A 1999 review of the literature on surgical outcomes found that one third of patients continued to experience pain and functional loss after surgery, and work-related cases were much more likely to have poor outcomes. In a 3-year follow-up, 41% had complete relief of symptoms, 45% had moderate relief, and 14% had no improvement [48].

These findings can be compared with patients who receive no treatment for carpal tunnel syndrome. An Italian study followed 196 untreated patients who had carpal tunnel syndrome and abnormal median nerve conduction velocities. After 10 to 15 months with no treatment, 27% of the subjects had improved, 57% remained the same, and 16% experienced worsening of their condition [49]. When a patient who has carpal tunnel syndrome does not respond well to surgical treatment, it may indicate that the patient did not actually have the diagnosis, because many of the mildly positive nerve conduction cases involve false-positive results.

Patients older than age 50 who experience constant paresthesias and have an accompanying stenosing synovitis are most likely to benefit from surgery. Rarely, carpal tunnel syndrome occurs acutely because of a rapid, sustained rise in carpal tunnel pressure that occurs over a period of hours. Unrelenting and severe symptoms occur, and in such cases, emergent surgery should be performed within 40 hours of the onset to avoid poor clinical outcome caused by intraneural scarring. Acute carpal tunnel syndrome reportedly has occurred after trauma to the wrist, infections, rheumatologic diseases, hemorrhage, vascular disorders, burns, and high-pressure injection injuries [23,50].

Conservative treatment

Limited data are available on conservative treatment success, and long-term data are lacking on most treatments. A systematic review of nonsurgical treatment of carpal tunnel syndrome indicated that 50% of patients who had carpal tunnel syndrome improved with placebo [51]. A 2005 Cochrane Database concluded that oral steroids gave short-term benefit only and the use of splints (at night) was equivocal, as was ultrasound. One trial that comparing yoga to splinting found that yoga was better than splinting. Another trial suggested that carpal bone mobilization could be effective. No good evidence supports exercise, magnets, lasers, or medication use. The conclusion of the review was that more studies are

needed and that the effectiveness and duration of benefit from nonsurgical treatment for carpal tunnel syndrome remain unknown. [52].

Patients who have carpal tunnel syndrome symptoms should be educated regarding weight reduction or at least control, aerobic fitness, and smoking cessation. Perimenopausal women who are retaining fluids may be helped by salt restriction and an aerobic exercise program [53]. Key to management is educating patients regarding the natural course of the disease and allaying fears and reassuring patients that the condition will not become disabling.

Work status

Temporary restrictions from performing highly repetitive and forceful hand work in a cold environment may be indicated because of subjective intolerance by the worker, as would be jobs in which there is substantial vibration exposure to the arm. Using the arm while held in an awkward posture, performing highly repetitive and forceful work, and avoiding compressive forces on the volar wrist should be restricted initially until the symptoms are treated successfully [15,54,55]. Persons with more severe carpal tunnel syndrome may require work limitations because of loss of hand dexterity, as measured with the Perdue Peg Board Test. Grip strength is generally not affected, although discomfort may decrease gripping tolerance early in treatment [15,23].

Expected duration of disability days for conservative treatment of persons who work sedentary and light jobs ranges from 0 to 7 days, whereas persons who perform heavy work have expected disability days of 0 to a maximum of 28 days. Patients who undergo surgical treatment who work at light office jobs are expected to miss 0 to 7 days of work, and persons who work heavy jobs miss from 21 to 61 days, according to Hand Center data [56]. Despite the recommended best practices, the US Bureau of Labor Statistics reported in 2003 that the average median of lost days for carpal tunnel syndrome was 32 days, which indicates that there is much room for improvement regarding disability for carpal tunnel syndrome [3].

Summary

The concept of work-related carpal tunnel syndrome has grown to such proportions as to be problematic for society, having spawned health care industries to support a cultural concept and a largely mythical medical paradigm. This in turn provides an economic benefit to health care providers and hospitals and may provide a simplistic, albeit unhealthy, solution for patients in the midst of difficult life situations. Because of these social and economic reinforcements, cultural perceptions and expectations have adjusted to this flawed medical model.

Carpal tunnel syndrome is a medical disease, not an injury, although symptoms may occur in association with certain physical activities of the upper

extremity. Success in improving patient management and making the best use of sound medical evidence depends on the concurrent use of educational strategies that address social influences and attitudinal changes of practicing physicians, patients, and third-party administrators. To change culture requires changing the public perception and, no doubt, legislation. Key is the promotion of evidence-based medicine. Such a change for the better in what is a flawed medical paradigm is a tall order. Economic necessity, along with increased concern about health and the health care industry, may be sufficient to foster such change.

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