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The Role of Occupational Physicians in Ergonomic and CTDs

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Occupational physicians view Cumulative Trauma Disorders (CTDs) differently from other physicians, in large part because the concept of illnesses resulting from chronic work exposure is fundamental to occupational medicine.

As early as 1713, Bernardino Ramazzini the "father" of occupational medicine, described the cumulative effect of silica dust on miners. Four years later, in *The Diseases of Workers*, he recognized two primary causes of occupational injury in certain workers: those resulting from the nature of the substance and from 'certain violent and irregular motions and unnatural postures...' In the early part of this century, occupational physicians (or, as they were called at the time, industrial physicians), as well as early industrial hygienists, began documenting the effects of exposure to lead and other heavy metals. Later, the results of prolonged exposure to solvents and a host of other substances began to be recognized, investigated, and regulated.

In the 1960s, perhaps as no other illness before, asbestosis received increasing attention as an occupational disease with a dramatically long latency period (40 years). Only in recent years has the financial impact of asbestosis been eclipsed by our present epidemic of CTDs. As the pace of assembly and other work increased, and with the widespread introduction of computers, we began to recognize the insidious effects of chronic repetition, excessive force, abnormal and static positions, and vibration.

Until recently the prevention of these disorders has received more attention from safety professionals (ergonomists) than physicians. Fortunately, occupational physicians and nurses are beginning to change their approach, focusing not only on diagnosing CTDs, and treating people suffering from these disorders, but also trying to intervene to reduce them. No longer is it acceptable to treat an injured worker without ensuring that the

precipitating causes are reduced or eliminated. In organizations without a medical department, someone needs to ensure that appropriate ergonomic corrections and accommodations are made. Traditional medical providers, especially surgeons, generally think this falls outside the scope of their field.

Occupational doctors have a different paradigm of CTDs because of their training in population-based medicine. They see their clientele as consisting of groups, not merely of individuals, and this gives them a broader perspective. Many occupational doctors also have a degree in public health (MPH or MSPH), with its strong curricula in biostatistics and epidemiology. Credentialing in Occupational Medicine falls under the umbrella of the Board of Preventive Medicine. The field of occupational medicine is still very small, with board-certified occupational physicians representing only one of every 600 physicians in this country.

Not only is occupational medicine under-represented in medical school curricula (totally absent in many) , but the entire field of physical medicine is barely touched upon. It is therefore no wonder that general and family doctors, especially in managed care, look askance at CTDs. They have not been trained to investigate the causes, recognize the physical signs, and offer appropriate treatment of these and other soft-tissue disorders. Additionally, frequently they over-diagnose and over-treat these disorders. What follows is a brief review of what I see as the most commonly omitted procedures in CTD diagnosis and management.

1. Conduct an ergonomic evaluation before a medical workup. Not every person with hand pain has carpal tunnel syndrome. The premature labeling of someone with this diagnosis can set the stage for disability. The diagnosis should never be given unless a definitely positive nerve conduction study and electromyogram (EMG) has been performed and interpreted by a competent practitioner. These tests are performed prematurely when no search for risk factors and their control has been done. In every case, a number of risk factors will be discovered by an onsite workstation evaluation.

All too frequently, the treating physician, whether family doctor or surgeon, sends a suspected CTS case prematurely for nerve study, including nerve conduction velocity (NCV) and EMG. The former measures any delay in propagation of the nerve impulse, such as through the carpal tunnel of the wrist. The EMG uses needles placed in muscles to detect abnormal function. Although they are usually ordered and performed together, the needle study need not be performed unless the noninvasive nerve conduction study is abnormal.

I have seen far too many reports concluded with a hedging statement like, "cannot rule out CTS," or "compatible with CTS." Worse, the specialist performing the nerve conduction study may feel obliged to "confirm" the diagnosis of the referring physician, interpreting the study as positive (abnormal) when it is really borderline or equivocal. This does a great disservice to all parties (except perhaps the surgeon and hospital). Before initiating a medical workup, a trial of proper neutral position bracing at night, anti-inflammatory medications, and frequent stretching is nearly always indicated.

Like most physiologic characteristics, nerve conduction velocity varies from one individual to another. Cutoff points are frequently arbitrary and too narrow. Nerve functioning, like all physiological characteristics, has a range of "normal." Some persons who have no problem will fall outside this range (the so-called, "false positives"). Borderline cases should have the unaffected side studied for comparison. Unless the nerve study is clearly abnormal and symptoms and physical examination are consistent, a diagnosis of carpal tunnel syndrome should be withheld. Many patients today equate that diagnosis with severe disability.

If the nerve study is abnormal, the report should include whether it is acute or chronic, and whether mild, moderate, or severe. After all, why perform the test, which is uncomfortable and expensive, if surgery is not being considered? Unfortunately, these crucial details are usually missing. Knowing the extent and duration of the problem will influence treatment decisions.

Bottom Line: Do not perform nerve studies unless the causes have been investigated, alleviated, and initial general treatment measures have failed. Do the testing if it will influence treatment decisions and ensure that the maximal amount if information is obtained.

2. Use regional diagnoses instead of over-diagnosing. The pressure to make a specific diagnosis should be resisted. It is perfectly acceptable, in my opinion, to use a regional diagnosis such as "hand pain" or "shoulder pain" as a working diagnosis, especially initially. A given patient with a CTD is likely to receive a different diagnosis from every doctor that she or he sees, especially in today's managed care environment. When a patient is initially told he or she has wrist overuse syndrome and the next week is given a diagnosis of De Quervain's tenosynovitis, the result is a breakdown in confidence in the medical profession — even though these terms are essentially the same. A natural reaction is to think, "They don't know what is wrong with me." This in turn leads to discouragement and concern for the injured person's future prognosis and career.

Another reason to embrace regional diagnoses is to enable outcome studies. How can we ever expect to compile our collective experiences with treatment regimens when we all use a different term for the same, or essentially the same, condition? More than 50 different medical terms are used to describe the typical case of low-back pain. We will never be able to assess the efficacy of the many types of physical therapy, for example, if we cannot agree on a common term.

Bottom Line: Use regional diagnoses such as "hand pain," "elbow pain," and "shoulder pain" instead of the myriad of specific diagnoses that serve only to bolster an impression of the physician's diagnostic acumen.

3. Avoid over-treatment: Mobilize, don't immobilize. Braces for CTDs should be properly selected and carefully used. Even today, many persons with CTDs are told to use a brace at work. The misunderstanding that theses injuries arise principally from repetitive motion has generated a misguided notion that immobilization is curative. Lack of motion, such as static posture, is much more common as a precipitating factor. Hours spent reaching forward for the mouse or keyboard, staring at the monitor, holding the wrists, thumbs or little fingers up high, all are greater contributors to injury than even the most rapid keyboarding with proper technique.

There are times when a wrist brace is useful, but almost never when at the keyboard. Carpal tunnel sufferers, in particular, are much more comfortable in a brace while sleeping. These braces generally have their stabilizing element along the back of the hand and forearm and keep the wrist in a neutral position. I still occasionally see patients who have been given or have self-prescribed a wrist brace that not only increases pressure in the carpal tunnel by a metal stay along the palmar aspect of the wrist (at the base of the palm), but also forces the wrist into an extended (upward) position—which also increases pressure within the carpal tunnel. (See image.)

If the improper wrist position has not been corrected, wrist braces can create another problem. If VDT workers tend to hold their wrists up when keying (which is the most common position), they will tend to "fight" the brace, which is restricting this motion. The result is often a pain along the outer aspect of the elbow (commonly known as "tennis elbow"). This location, called the lateral epicondyle, is the origin of the muscles that extend the wrist upwards. As a final example, a sling for a shoulder strain is almost

always inappropriate. Unless discarded quickly, it will lead to stiffness, loss of motion, and weakness.

Bottom Line: Motion is essential for normal activity and for resolution of CTDs.

4. Avoid excessive restrictions. Vague, global restrictions such as "no repetitive use of the arms" or "no keyboarding" are easy for the medical provider to prescribe but counterproductive and irresponsible. Although movement may need to be moderated and abnormal positions corrected, in general it is therapeutic. In fact, movement is essential for recovery. Excessive restrictions set the stage for "off duty" status, displacement from usual routines and family roles, and a progressively downward spiral of fear, discouragement, anger, depression, and disability.

Instead, the medical provider should set realistic restrictions based on the patient's job duties and objective reckoning of their ability. An accurate history may reveal that the job requires intermittent rather than continuous keyboarding. This may be permitted in all but the severest cases. Objective testing is available by most physical and occupational therapy departments. Some can verify the level of keyboarding ability by observation and monitoring of the heart rate. (Pain will lead to a rise in heart rate.)

Much more effective are restrictions that displace the precipitating causes. Examples: "Gentle stretching for about 3 minutes every half hour," "stand up or walk about once every hour," "must use proper keyboarding technique," "limit keyboarding to 30 minutes per hour," or "must adjust workstation correctly." Unless the case is far advanced, these restrictions not only lead to recovery, but alleviate the underlying cause of the problem. It is rare for a substantiated CTD sufferer to have correct workstation adjustment and use correct keyboarding technique. Personally, I have never seen this.

5. Surgery should be the last and seldom-utilized resort. The most egregious mismanagement of CTDs occurs when a person is operated upon without sufficient (or any) documentation that surgery is necessary, or without attempting to understand and mitigate the risk factors. Sometimes this disregard for precipitating causes extends to the postoperative period, when patients are told they are "cured" and then returned to the same environment that caused the condition. At other times they are advised never to use a keyboard again, effectively condemning them to career disaster, lifelong disability, and depression. I have seen this happen far too often.

Bottom Line: Carpal tunnel syndrome and other CTDs are not surgical problems, they are ergonomic problems. Fortunately, there are very effective ergonomic solutions, especially when initiated early. If primary prevention measures are taken—that is, before the development of symptoms—essentially all of these problems could be eliminated from the workplace. Although surgery may be indicated, it should be rare and cannot be successful independent of the ergonomic solutions.

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