

Repetitive Motion Disorder/ Carpal Tunnel Syndrome

Also called Cumulative Trauma Disorder (CTD), Repetitive Strain Disorder, Repetitive Strain Injury (RSI), Occupational Overuse Injuries, and Work-Related Musculoskeletal Disorders of the upper extremity (WMSD). Carpal Tunnel Syndrome is a subset of repetitive motion disorder.

Description of the Disability

Repetitive Motion Disorder (RMD) is an umbrella term for a number of disorders affecting the hand, wrist, arm, neck, upper back, and shoulder, which result in pain, muscle weakness, and other symptoms. These disorders can be caused by repetitive movements, repeated use of force (pushing or pulling, hammering, etc.), working in an unnatural body position, or long-term vibration. The problems are the result of a cumulative "micro-traumas" that exceed the body's normal healing ability. They are not caused by a single injury or event, but months or years of repeated physical stresses. The disorder is usually associated with a combination of poor job design and poor work behavior (unnatural body position, infrequent breaks, etc.). The damage arises from injury to muscles, tendons, and nerves that are not given a chance to rest and recover. Most RMD injuries involve the hands, arms, shoulders, or neck.

The initial symptoms include numbness, tingling, lack of endurance, tremors, clumsiness, numbness, a feeling of heaviness, and, pain. These symptoms can appear anywhere on the hand, arm, shoulder, neck or legs. Frequently, the symptoms will first appear during the night as the nerves attempt to recover from the day's trauma.

Secondary symptoms can include depression, anger, and poor sleep (see entry on Lack of Sleep). In addition, RMD problems in one arm can trigger problems in the other arm or in other parts of the arms as the muscles try to compensate.

Specific types of Repetitive Motion Disorders include:

- Tendonitis - overuse of a set of muscles and tendons can cause painful swelling, inflammation, and damage in the tendons.
- Tennis Elbow (Epidonylitis) - tendonitis specific to the muscles of the elbow and wrist where they pass over bony ridges in the elbow called the epicondyles.
- De Quervain's stenosing tenosynovitis (De Quervain's Disease) - tendonitis specific to the muscles of the thumb from overuse. Causes pain in the thumb and wrist when gripping or grasping or when twisting the wrist.
- Thoracic Outlet Syndrome - Tension in the neck, or poor neck posture, can compress the nerves and blood vessels feeding the arm and hand, resulting in pain, numbness, and weakness.
- Trigger Finger Syndrome - Tendonitis in the index finger.

- Carpal Tunnel Syndrome - A complication of tendonitis at the wrist. See below.

Carpal Tunnel Syndrome is a specific and common form of Repetitive Motion Disorder involving the fingers and hands. It involves the compression of the Median Nerve, which runs from the arm to the hand through a small passage in the wrist called the Carpal Tunnel. Various tendons also run through this passage, and it is the inflammation of these tendons that initially squeeze against and pinch the median nerve, resulting in numbness and pain in the fingers. Typically, the numbness first shows up at night. This is because the initial pressure from the tendons during the workday is not enough to impair the nerve, only irritate it. But once the pressure is off at night, the nerve has room to swell and become inflamed. As the pressure continues in the following days and weeks, the numbness and pain grow worse, potentially leading to permanent damage.

Although repetitive movements and overuse are usually the causes of carpal tunnel syndrome, wrist fractures, arthritis, joint dislocations, arthritis, diabetes, thyroid conditions, and even swelling during pregnancy can also be involved.

Symptoms commonly associated with Carpal Tunnel Syndrome include:

- Pain, tingling and numbness in the thumb, index, middle, and ring fingers.
- Aching pain from the base of the thumb up the wrist and possibly up the entire arm
- Burning pain in the wrist and fingers
- Either increased or decreased sensitivity in the fingers
- Weakened grip
- Poor coordination in fingers and thumb
- Swelling in the hand and forearm
- Increased sweatiness of the hand
- Symptoms worse at night and early in the morning
- Driving a car can be painful

Incidence Statistics

- There are approximately 100,000 new cases of carpal tunnel syndrome each year
- RMD is responsible for up to half of all worker compensation expenses and is the main disability cited in ADA lawsuits.
- Each year, surgeons perform more than 260,000 carpal tunnel release surgeries, nearly half of them work related.

- DeQuervain's stenosing tenosynovitis is most common in women between 30 and 50 years old.
- Carpal Tunnel Syndrome has the highest median number of days of work loss (30 days on average) of all major work-related injury or illness categories.
- Only 1% of individuals with Carpal Tunnel Syndrome develop permanent damage from the problem.

Individuals most at risk:

Anyone spending long periods of time in one position or doing a limited set of motions without frequent breaks is at risk.

- Musicians
- Industrial workers, especially assembly line workers
- Factory workers
- Hair stylists
- Individuals working in meat processing
- Individuals stuffing envelopes for bulk mail
- Individuals using computers
- Individuals with some types of arthritis
- Individuals with previous injury to the bones of the hand (such as a broken wrist)

Common Treatments, Medications, and Side Effects

- Avoidance of triggering activities - the treatment of choice. This often allows the body to repair the injury, but the injury will return quickly if no changes are made in work activities.
- Splints and braces - can help improve posture, and reduce inflammation.
- Occupational therapy or physical therapy - teaches better work habits, stretching and strengthening exercises, dexterity exercises, and lifestyle changes.
- Injections – some types of RMD (including Carpal Tunnel Syndrome) are treated with injections of corticosteroids, powerful anti-inflammatory drugs related to steroids. See Drug entry on Corticosteroid Injections for side effects.
- NSAIDS (Non-Steroidal Anti-inflammatory Drugs) such as Ibuprofen, Advil, Nuprin, others. These are more useful for acute (short-term) injuries than for chronic symptoms. See drug entry on NSAIDs for side effects
- Braces to maintain better position and reduce inflammation

- Thermotherapy – heat packs, cold packs, paraffin baths, ultrasound, and other variants on heat or cold treatments can help with the inflammation by improving blood flow and relaxing muscles in the area.
- Massage to reduce muscle tension
- Work Hardening – a gradual process of returning to “normal” functions of daily life under the supervision of a physical therapist.
- Biofeedback – used to help the person control muscle tension in the affected areas.
- Surgery to release pressure - used only in serious cases. In Carpal Tunnel Syndrome, the surgery involves cutting a ligament running across the wrist that forms one wall of the tunnel. This allows the pinched nerve and tendons more room. Other RMDs have similar techniques to relieve pressure on nerves or tendons.

Possible Functional Issues

(also see chronic pain)

- Difficulty gripping
- Difficulty with detail work involving hands or fingers
- Difficulty typing
- Difficulty driving
- Difficulty sitting or standing for long periods of time
- Poor coordination in affected muscles
- Reduced strength in affected muscles
- Low endurance in affected muscles
- Sensitivity to cold (poor circulation)

Common functional issues in the home:

- Difficulty lifting pots, pans, dishes, etc. in the kitchen
- Difficulty doing laundry
- Difficulty carrying vacuum cleaner
- Difficulty opening jars
- Difficulty reaching for and lifting objects on high shelves or cabinets
- Difficulty with craft projects or home repairs

Initial Interview Considerations

Initial Questions

- What kinds of activities trigger the pain?
- What activities and movements do they need to avoid?
- How has the problem affected their life? What things can they do and not do?
- Are they taking any medications for the pain? Does it have any side effects?
- Are they getting any other kind of treatment for the pain? (heat, massage, injections, etc.)
- What hobbies or activities are they still able to enjoy without difficulty? (gets at other skills that might lead to employment)
- What accommodations have they made at home that seem to help?
- How much trouble do they have sleeping?
- How much trouble do they have driving?
- How much trouble do they have lifting and carrying objects?

Initial Observations

- Do they have any obvious limitations in range of motion?

Possible Accommodations and Assistive Technology

- Voice recognition software to limit typing
- Headset telephone to avoid holding handsets for long periods of time
- Ergonomic keyboard, chair, desk, etc.
- Fingerless gloves to keep hands warm
- Heating pad to keep hands warm
- Power steering and automatic transmission for driving
- Frequent, regular breaks
- Rotation through different job activities during the work day
- Jobsite evaluation by a rehabilitation engineer
- Padding on gripping surfaces (steering wheel, levers, etc.) to improve grip and enlarge gripping surface
- Transition into job tasks to allow job hardening
- Physical Therapy to develop targeted exercises for new job tasks

Career Planning Issues

- Work history should be unaffected, but may be centered on a single industry or career
- Experience from previous work might be useful in a related supervisor, sales, or consultant position that does not involve the same physical activities
- Learning skills should be unaffected, so training or school may be an option
- Social skills should be unaffected
- Overall endurance should be unaffected, but some specific activities (lifting, typing, etc.) may need to be avoided

Emerging Issues

- Recognition as a real and painful injury
- Awareness of ergonomic and job design issues

Additional Information Resources

- IMPACC USA - a group of industrial physical therapists specializing in back pain and in RMS causes and treatment. - www.impaccusa.com
- Living with CTD, by Lauren A. Hebert (A booklet from IMPACC USA)
- American Society for Surgery of the Hand (ASSH) www.hand-surg.org