

# Ergonomic Safety Strategies for Repetitive Motion Injuries

Ergonomics is a way of thinking about the design of tools and equipment, the layout of the workplace and the overall organization of work. The goal of ergonomics is to fit the job to the worker, rather than making the worker fit the job. Ergonomics today involves every worker in every kind of work situation and is an important tool for worker safety and health.

In some ways there is nothing new about ergonomics. People have always tried to find better ways of working by taking advantage of human talent and by using machines to overcome our limitations. What is new is a more scientific and systematic approach to understanding human anatomy and physiology, and learning about human differences, limitations, and reactions. These concepts are entering industry, not only to prevent cumulative trauma, but also as an effective tool for promoting innovation, improving quality and productivity, and increasing job satisfaction.

Recognizing the risk factors in the workplace is an essential first step in correcting hazards and improving worker protection. The following provides information for reducing the incidence and cost of cumulative trauma injuries, and at the same time increase productivity and the well being of workers.

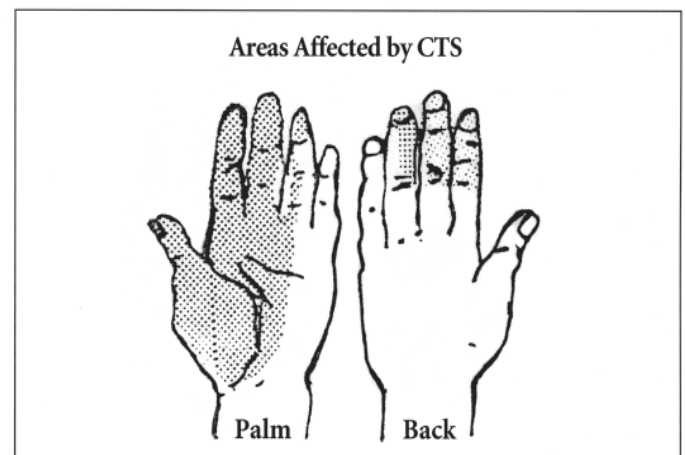
## CTDs

**Cumulative Trauma Disorders** (CTDs) are musculoskeletal disorders caused by (or aggravated by) physical trauma to the hands, wrists, arms, back, legs, or shoulder. The trauma isn't caused by a single incident but by an accumulation of repeated actions. Addressing CTDs is complex because there are many factors associated with its development. That makes it difficult to predict whether or not an employee will develop a cumulative disorder. CTDs can involve a variety of tissues, including nerves, tendons, blood vessels, muscles and bones. Some examples of CTDs include:

**Carpal Tunnel Syndrome** is a nerve disorder that involves the compression of the median nerve that runs through the base of the wrist up to the hand in the carpal tunnel. This disorder affects feeling and movement in the thumb and the first three fingers. It frequently begins with tendinitis in the wrist. Often from word processing or data entry at video display terminals.

Anything that creates pressure on the median nerve will affect a person's ability to use their hand. The pressure may be caused by irritation and swelling of synovial membranes that lubricate the tendons which pass through the carpal tunnel.

The first symptoms of carpal tunnel (numbness, tingling, burning sensation) usually occur at night or during rest periods. If the illness is allowed to continue, the tingling or numbness can occur during the day with pain spreading to the hand and possibly up the arm. If the disorder progresses too far, surgery may be the only recourse. However, those who have had surgery and returned to the same job will likely develop the same symptoms again unless their job and/or workplace are modified. Early detection and appropriate ergonomic medical intervention should be provided to control the illness.



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**Cubital Tunnel Syndrome** is similar to carpal tunnel syndrome but on the little finger side of the hand. It involves irritation and swelling of the ulnar nerve as it passes behind the medial epicondyle of the elbow, causing numbness on the little finger side of the hand. Causes include resting the elbow on a hard surface for long periods of time and flexion of the elbow past 90 degrees.

**Thoracic Outlet Syndrome** is similar to carpal tunnel syndrome but may affect any of the nerves of the upper extremity. It involves the compression of nerves and blood vessels between the neck and shoulder resulting in numbness in the hand and fingers. Repeated or prolonged raising of elbows above the shoulders may cause this illness.

**Tendinitis**, the most common CTD, is an inflammation of the muscle-tendon junction and the adjacent muscles. Any movement we make requires muscles to expand and contract, and moves tendons back and forth through a joint. When a tendon is used too long or too hard the result could be tendinitis. The condition is painful, recovery is slow, and may become chronic if the cause is not eliminated.

**Tenosynovitis**, another tendon disorder, is an irritation and inflammation of the synovial sheath surrounding the tendon. This type of problem is especially common where the wrist moves side-to-side repetitively.

**Raynaud's Syndrome** involves the narrowing of blood vessels in the hand resulting in the loss of sensation and function of the hands. This condition is caused as a result of vibration of the hand and arm from the use of such tools as jackhammers, chainsaws, grinders, chippers, drills, polishers, etc. and it can be aggravated by cold temperatures.

When vibration affects the whole body, it can affect the lower back leading to a progressive destruction of the lower back vertebrae. Vibration in conjunction with prolonged periods of sitting may also result in degenerative changes in the spine, such as from driving tractors, construction equipment, trucks, buses, and other heavy equipment.

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## Prevention

The role ergonomics plays in the prevention of cumulative trauma starts with the identification of the primary factors commonly associated with the development of a CTD:

- **Repetition:** the number of repetitive motions made per work day whether of the arm, wrist or lower back.
- **Force:** the exertion to do the job, usually with the hands.
- **Posture:** the position used while working.
- **Mechanical Stress:** excessive contact between machinery or tool and sensitive body tissues such as the nerves.
- **Vibration:** from the use of hand-held power tools or a tool that causes whole body vibration.
- **Unaccustomed Activity:** New job, new equipment, new product.

The presence of any one risk factor in a worktask can promote a CTD — the more extreme the risk factor, the greater the potential for injury. In combination, the potential for a CTD increases still more. Conversely, if any of the factors can be reduced or eliminated, the risk of injury can be lessened, even if not all of the factors are eliminated.

Another major element to be considered is that not all employees exposed to the same risk factors will be affected. The risk of getting a CTD may be high to low depending on the exposure, but high levels do not automatically mean a disorder will occur.

Rarely are CTDs life-threatening — often people continue their jobs even while suffering the disorder. But one's ability to do their job or everyday activities are often impaired.

In order to control CTDs you need to have an ongoing ergonomics program involving management and employees, as well as medical, safety, and health personnel. Look beyond the factory floor to the service and office environment for the risk factors. To assist you, a job task analysis checklist has been provided in evaluating jobs for CTDs.

# Job Task Analysis

Company: \_\_\_\_\_

Date: \_\_\_\_\_

Department: \_\_\_\_\_

Supervisor: \_\_\_\_\_

Job/Machine: \_\_\_\_\_

Job #: \_\_\_\_\_ Shift: \_\_\_\_\_

Evaluate and implement controls for all that apply in questions 1-5.

Questions in items 6-18 answered "No" indicate controls are necessary.

1. The design of the task adequately minimizes:

Yes No

- Twisting?
- Bending?
- Crouching?
- Reaching?
- Bending or twisting of wrist?
- Extension of arms?
- Elevation of elbows?
- Static muscle loading?
- Clothes wringing motions?
- Finger pinch grip?

- 6. Mechanical devices are used when necessary?
- 7. The task can be done with either hand?
- 8. The task can be done with two hands?
- 9. Push or pulling forces are involved with the task?
- 10. Required forces are acceptable?
- 11. Good handholds are provided on containers?
- 12. Jigs, fixtures and vises are used where needed?
- 13. The job can be done without gloves?
- 14. When gloves are needed they are of the proper size and composition?
- 15. The task involved has no body contact with sharp edges?
- 16. Push button controls are necessary or needed, and are of proper design?
- 17. Personal protective equipment doesn't impede the task?

2. Are the materials handled:

- Slippery?
- Bulky?
- Awkward?
- Sharp?

3. Repetitive motion can be avoided by:

- Job rotation?
- Job enlargement?
- Self-pacing?
- Sufficient rest pauses?
- Adjusting the job to the skill level of the worker?

4. Repetitive motion rates are promoted by:

- Incentive programs?
- Production Requirements?
- Assembly line rates?

5. The employee is trained in:

- Proper work practice?
- When and how to utilize adjustments?
- Signs and symptoms of potential physical problems?

Comments \_\_\_\_\_