

ERGONOMICS
and the
**PREVENTION OF
UPPER EXTREMITY
CUMULATIVE TRAUMA
DISORDERS**

MEMIC

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CUMULATIVE TRAUMA
DISORDERS**

BY

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MEMIC
Partners for Workplace SafetySM

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THE GOAL OF THIS BOOKLET IS TO

- ✓ Increase Productivity and
- ✓ Decrease Injuries

BY LEARNING ABOUT

- ✓ Ergonomics
- ✓ Human anatomy and physiology
- ✓ Risk factors associated with the development of upper extremity cumulative trauma disorders
- ✓ How to identify and correct risk factors

Ergonomics is the science of designing the workplace, machines, and work tasks within the capacity and capability of the human body. It is a proactive approach to injury reduction that strives to fit the job to the worker, not the worker to the job. There are two basic controls, or approaches, incorporated to reduce injuries in an occupational setting. They are engineering controls and administrative controls.

ENGINEERING CONTROLS

Engineering controls reduce and/or eliminate risk factors that have been associated with the development of occupational injuries.

Examples of engineering controls include:

- ✓ Workstation design
- ✓ Task design
- ✓ Product design
- ✓ Tool design
- ✓ Improved work flow
- ✓ Mechanical lift assists

Workstation design can be as easy as raising or lowering a work surface to promote neutral positioning of the wrist, hands, arms, and neck. It could also include the reorientation of tools and/or equipment on the work surface, again to promote neutral body positioning.

Task design controls include the use of fixtures or jigs to hold a product being worked on. It could also refer to the order in which an item is assembled with the goal of reducing movement and/or steps that put workers at risk.

Product design could include reducing the weight of an object. For example, instead of ordering paint in 5-gallon containers, which are heavy and awkward to handle, use 2.5-gallon containers to reduce the weight.

Tool design could include using tools that keep the wrist in a neutral posture when engaged or using clutches to reduce torque. Tool design could also refer to the use of mechanical aids such as powered nut runners or screwdrivers for assembly tasks or of split keyboards, wristrests, copy holders, and/or other ergonomic input devices designed for office tasks.

Improved work flow includes looking at how many times an object is handled throughout a work process. Oftentimes, products are handled more times than necessary from the beginning of the work process to the completion of work.

Mechanical lift assists include any device from a counterbalance jig to a forklift to an overhead lifting assist.

ADMINISTRATIVE CONTROLS

Administrative controls are the other ergonomic control strategy. However, instead of eliminating risk factors as is done through engineering controls, administrative controls limit or restrict individual exposure to the risk by spreading out the physical demands across a larger population base. Educating the workforce on the importance of proper body mechanics while performing work tasks and teaching them methods to increase the body's natural recovery time are also examples of administrative controls.

- ✓ Work rotation
- ✓ Work enlargement
- ✓ Stretching
- ✓ Training and education

Work rotation describes a control that sequences a worker through different job tasks on a regular schedule for a set number of hours per shift. For a work rotation control to be effective, it is vital that workers rotate into jobs which stress different muscle/tendon groups from the ones stressed in the previous position.

Work enlargement is a control strategy that increases the amount of work done on one piece. Instead of performing one task on an item before it is moved to the next station, in work enlargement the worker could actually complete *all* the tasks performed on the product. As with work rotation, for work enlargement to be successful, additional job tasks performed should stress different muscle/tendon groups.

Stretching is an excellent administrative control that promotes increased blood flow to stressed body parts, thereby reducing fatigue and enhancing muscle recovery times. Stretching improves flexibility and general range of motion as well as refreshing stressed muscles.

Training and education are key to every company's success. We often find that employees work harder than necessary to perform work tasks. This is especially true when working in awkward postures. A good training and education class identifies risk factors that are associated with the development of injuries and demonstrates methods that individuals can employ to reduce and/or eliminate stress.

MEMIC recommends that both engineering and administrative controls be implemented to reduce risk factors and to promote efficiency within an organization. With these controls in place, your organization can expect increased productivity and decreased injuries.

Good ergonomics takes a team approach. Coworkers and managers alike must work together to develop methods and to make work less physically demanding by eliminating unnecessary effort and designing tasks within the capacity and capabilities of the workforce. MEMIC advocates the development of ergonomic teams to identify problems and solve them before employees suffer the effects of a cumulative trauma disorder.

Poor ergonomics not only hurts the worker who suffers the pain and loss of physical ability but also the manager who must work without a key employee while paying higher workers' compensation rates, not to mention the cost of hiring and training a replacement.

The bottom line is:

ERGONOMICS JUST MAKES SENSE

DEFINITIONS

Ergonomics is not new. The recognition that work may adversely affect health was recorded more than 200 years ago by an Italian physician, Bernardino Ramazzini. Records show that the word *ergonomics* was first used in 1857 in a Polish newspaper to describe work-related injuries.

The word *ergonomics* comes from the Greek word *ergo* (work) and *nomos* (law).

$$\begin{array}{c} \text{ERGON} = \text{WORK} \\ + \\ \text{NOMOS} = \text{NATURAL LAW} \end{array}$$

ERGONOMICS IS THE WAY WE INTERACT WITH OUR WORK ENVIRONMENT.

Cumulative trauma disorder (CTD): OSHA defines CTDs as a class of musculo-skeletal disorders involving damage to the tendons, tendon sheaths, synovial lubrication of the tendon sheaths, and the related bones, muscles, and nerves of the hands, wrists, elbows, shoulders, neck and back. The more frequently occurring occupationally induced disorders in this class include tendonitis, carpal tunnel syndrome, tenosynovitis, and thoracic outlet syndrome.

Risk factors are conditions and/or activities that are associated with the development of CTDs. Primary risk factors associated with upper extremity CTDs include: awkward prolonged postures, excessive force, repetition, mechanical contact stressors, hand/arm segmental vibration, and cold work environments. The more risk factors performed simultaneously, the higher the risk of developing an injury.

Cumulative: Accumulating over a period of time.

Trauma: Injury to the body that happens secondary to some physical cause.

Disorder: A dysfunction of the normal body processes. A group of symptoms—for example, pain, tingling, or weakness—that describes the manifestations of a certain disorder (syndrome).

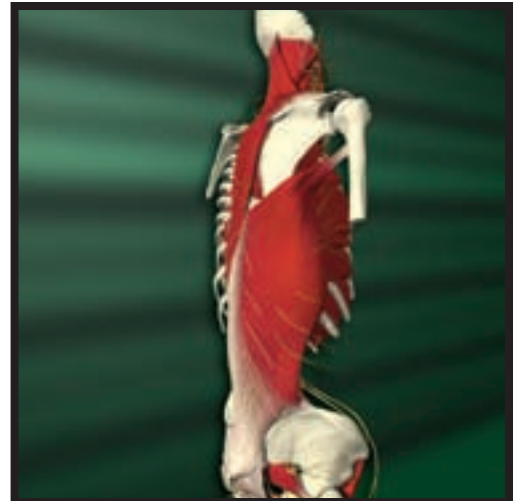
The musculoskeletal system is made up of:

- ✓ Bones and ligaments
- ✓ Muscles and tendons
- ✓ Nerves

BONES AND LIGAMENTS

Bones

The human skeleton consists of bones which form a system of levers that have to sustain the weight of our body and to provide a mechanism for force exertion. Bones are what gives structure to our body. The entire skeleton in the adult male consists of 200 bones.



Ligaments

These are strong ropelike fibers that connect one bone to another to form a joint. Their function is to bind the bones together and to limit the range of joint motion. When a joint is twisted past its normal range, some fibers stretch or may be torn/ripped loose from the bone. This is referred to as a sprain. Ligaments that are injured generally take weeks or even months to heal because of their poor blood supply.



MUSCLES AND TENDONS

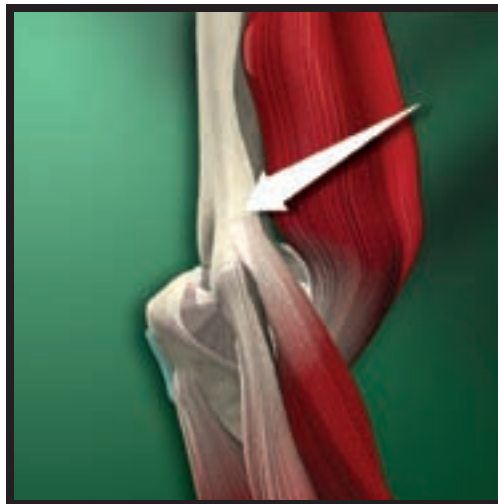
Muscles

Muscles are composed of thousands of tiny fibers that run in the same direction. They are red because they are filled with many blood vessels that supply the tissue with oxygen and nutrients and that carry away carbon dioxide and waste metabolic materials. Muscles contract and relax. When you contract a muscle, it tightens and shortens. Oftentimes when one muscle contracts, another opposing muscle relaxes. Muscles generate all forces, and blood flow is critical to their effective use. When a muscle is held in contraction, the blood flow required for fuel is severely restricted, increasing fatigue and risk of injury.



Tendons

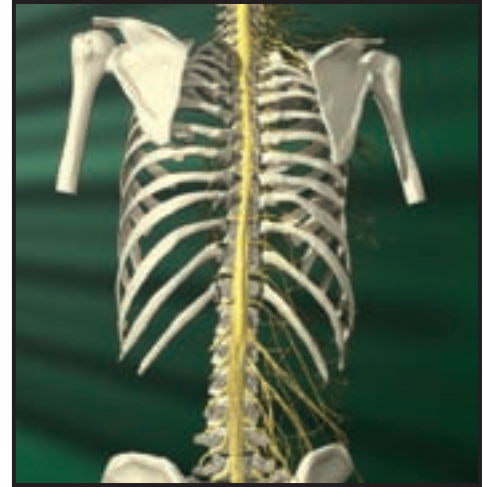
Tendons attach muscle to bone. Tendons are made of tough, ropelike material that is smooth, white, and shiny. Tendons do not stretch or contract, they merely transfer forces and movements from the muscles to the bone. Tendons are the natural pulleys in our body. When you contract a muscle, it pulls on the tendon that is attached to a bone, and the result is movement.



NERVES

Nerves

Nerves are responsible for all feeling and movements in our body. The central nervous system is our body's information superhighway, sending electrical current to a specific muscle or sensory group, which in turn produces the desired response. The two types of nerves which are most often affected by CTDs are *motor nerves* and *sensory nerves*. Motor nerves make it possible for us to move a desired body part by supplying an electrical stimulus to the muscle for contraction. Sensory nerves make it possible for us to differentiate sensations and/or pain from a cut, burn, or other sudden-event trauma.



In order for these nerves to function properly, there needs to be an unimpeded circuit/flow to and from the nerve endings. When this circuit is interrupted by compression or other sudden-event trauma, the result would be:

- ✓ When motor nerves are affected, limited muscle contraction/movement or none at all;
- ✓ When sensory nerves are affected, numbness or a tingling sensation or complete loss of feeling.



There are three major groups of CTDs:

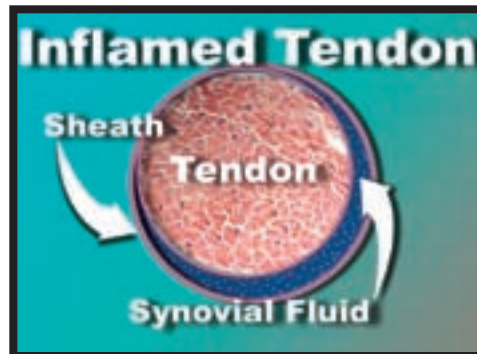
- ✓ Tendon disorders
- ✓ Nerve disorders/impingements
- ✓ Neurovascular disorders

TENDON DISORDERS/TENDONITIS

In this cross section of a healthy tendon the red area is the tendon. Around the tendon is a substance called synovial fluid which is encompassed in a sheath. As the tendon glides back and forth, the synovial fluid acts as a lubricant.



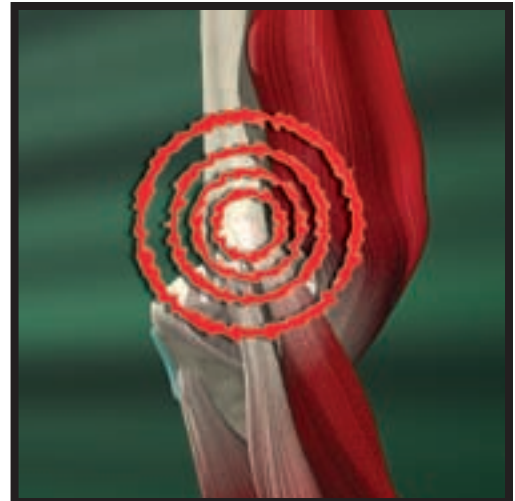
When a muscle/tendon unit is repeatedly used, fibers that make up the tendon can actually fray or tear apart. This is often referred to as micro tears, which result in the tendon becoming bumpy and/or irregular. Continued use of the tendon will lead to friction within the tendon sheath, resulting in heat and inflammation. An inflamed tendon is referred to as *tendonitis*.



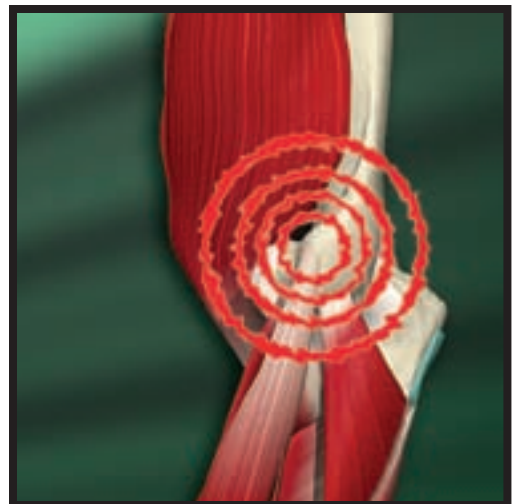
Unsheathed tendons are found in the elbow and shoulder joints. The elbow is particularly vulnerable to tendonitis because of the imbalance between the large forearm muscles and the small insertion area of the elbow.

Common Forms of Tendonitis

Tennis Elbow (Lateral Epicondylitis). This is one of the most common forms of tendonitis and involves the finger extensor muscles. These muscles allow you to straighten out your fingers and perform jerky throwing motions. They are attached at the elbow via a tendon. When the tendon is strained or subjected to overuse, the tendon becomes irritated and radiates pain from the elbow down the forearm.

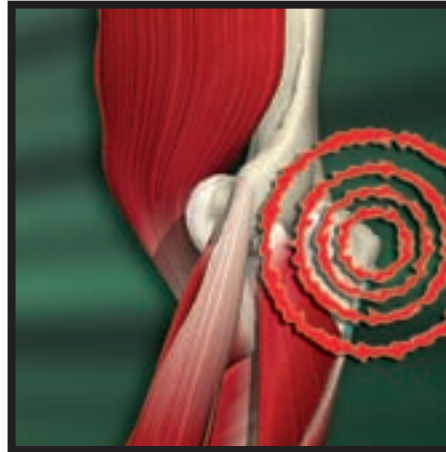


Golfer's Elbow (Medial Epicondylitis). This is an irritation of the tendon attachments of the finger flexor muscles on the inside of the elbow. The flexor muscles allow us to make a fist or hold an object. When the tendon is strained or subjected to overuse, the tendon becomes irritated and radiates pain from the elbow down the forearm.



Note that performing job tasks in a neutral posture can help prevent injuries to the elbow.

Tendon disorders occur mostly where the tendon attaches to the bone, as in tennis elbow and golfer’s elbow. The second place tendonitis can occur is where the tendon attaches to the muscle. The third place a tendon disorder occurs is somewhere along the tendon route. The body’s natural response to irritation within a tendon sheath is to send in synovial fluid. If this fluid builds up, it can form a cyst that is called a ganglionic cyst.



NERVE DISORDERS/IMPINGEMENTS

Nerve CTDs occur when repeated or sustained work activities expose the nerves to pressure from hard, sharp surfaces or from nearby bones, tendons, and ligaments.

Three nerves travel down your cervical spine and enter your arm through the shoulder. These are the ulnar, median, and radial nerves.

Compress a nerve in your neck or shoulder and the result will be numbness and tingling or loss of function somewhere in your upper extremities.

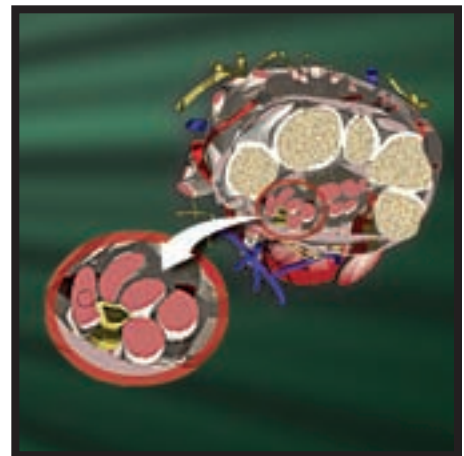
Impingement is another term for a compressed nerve. Oftentimes you do not get symptoms at the point of impingement. Instead, symptoms affect the areas of the body that the compressed nerve serves. Remember, if you compress, or impinge, a nerve, the round-trip flow of electrical impulses will become interrupted, resulting in dysfunction at the point where that nerve is responsible for innervating a specific body segment.



Carpal Tunnel Syndrome

Carpal tunnel syndrome is a common nerve disorder. The carpal tunnel is a passageway for the median nerve, blood vessels, and tendons which are responsible for flexing the fingers. Arched carpal bones in the wrist form tunnel walls, and a tough ligament called the transverse ligament wraps around the wrist bones to form its roof. As we move our fingers to grasp an object or perform keyboarding tasks, the tendons within the tunnel glide back and forth. When performing a task in a neutral posture, the tendon paths are unobstructed. When performing a task in an awkward wrist posture, travel distance for the tendon increases. In these instances it is common for the tendons to glide over nearby bones and ligaments, which can lead to irritation within the carpal tunnel.

Carpal tunnel syndrome is a compression, or impingement, of the median nerve as it traverses through the carpal tunnel. People with carpal tunnel syndrome usually have numbness and tingling in their thumb, index and middle fingers, and in half their ring finger, which is the nerve distribution for the median nerve.



NEUROVASCULAR DISORDERS

Two common forms of neurovascular CTDs are:

- ✓ Thoracic outlet syndrome
- ✓ Vibration white finger

Thoracic Outlet Syndrome

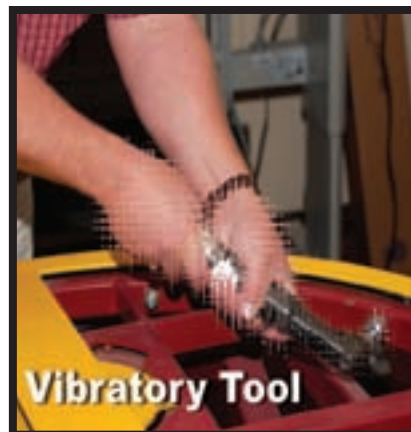
Thoracic outlet syndrome involves the shoulder and upper arm; it is a general term for compression of the nerves and blood vessels between the neck and shoulder. The symptoms of thoracic outlet syndrome are similar to those of carpal tunnel syndrome. Examples of activities associated with this syndrome are:

- ✓ Pulling your shoulders back and down, as you do when carrying a stretcher, knapsack, or suitcase; or
- ✓ Reaching frequently above shoulder level as a part of your job tasks.



Vibration White Finger

Vibration white finger is another neurovascular disorder. Continual or prolonged use of vibratory tools breaks down the small capillaries within the fingers. This causes a restriction or interruption in the blood supply to the fingers. Symptoms of vibration white finger include blanching of the fingers when the hand gets cold and may be accompanied by significant pain, numbness, or a tingling sensation. This disorder can be progressive over a period of years.



SYMPTOMS OF CTDs

Studies have shown that recovery time for CTDs is dramatically shortened when medical management is sought shortly after the report of symptoms. Tendonitis or tendon disorders generally heal over a period of time. However, with a nerve disorder, if timely medical management is not administered, permanent nerve damage can occur. Early medical intervention is the best relief you can find.

Below are symptoms that have been associated with CTDs. Remember, the sooner treatment begins, the sooner healing will occur.

- ✓ Aching
- ✓ Swelling
- ✓ Numbness
- ✓ Pins and needles
- ✓ Throbbing
- ✓ Burning
- ✓ Loss of strength
- ✓ Pain
- ✓ Unusual bumps

Risk factors are conditions of a job process, workstation, or work method that contribute to the risk of developing a CTD. Not all risk factors will be present in every job where a CTD has been reported; however, studies indicate that the more risk factors performed simultaneously, the greater the risk of developing a CTD. An example of this synergistic effect is as follows: The risk for developing a CTD for a highly repetitive job is 3.6 times greater than for a low-repetition job. CTD risk for a job that contains high repetition as well as high force requirements is 16.5 times higher than low-repetition and low-force jobs.

The most prevalent risk factors in the workplace for CTDs are:

- ✓ Repetition
- ✓ Awkward Postures
- ✓ Excessive Force
- ✓ Mechanical Contact Stressors
- ✓ Hand/Arm Segmental Vibration
- ✓ Cold Work Environments

REPETITION

Repetition is a series of motions performed every few seconds with little variation. This may produce fatigue and muscle-tendon strain. If adequate recovery time is not allowed for these effects to diminish, or if the motions also involve awkward postures or forceful exertions, the risk of actual tissue damage and other musculo-skeletal problems will increase. A task cycle time of less than 30 seconds has been considered as repetitive. It is important to note that awkward postures and force will decrease repetitions per minute.

Repetition Rate

The chart below lists repetition rates, by body part, that may pose a hazard.

| Body part | Repetitions Per Minute |
|------------------|-------------------------------|
| Shoulder | More than 2.5 |
| Upper arm/elbow | More than 10 |
| Forearm/wrist | More than 10 |
| Finger | More than 200 |

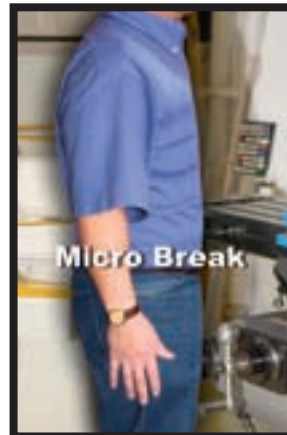
From A. Kilborn (1994). Repetitive work of the upper extremity. Part II: The scientific basis for the guide. Int J Ind Erg 14:59-86

The repetition rate of a job should be measured by movements or exertions performed by the joint/body links involved. To obtain this measure, movements are counted during a representative work period and divided by a standard unit of time. The repetition rate should be defined for each joint or body link, because each major group has a different threshold. Additional factors to consider when measuring repetition are duration of task broken down into work cycles and the available recovery time between work cycles.

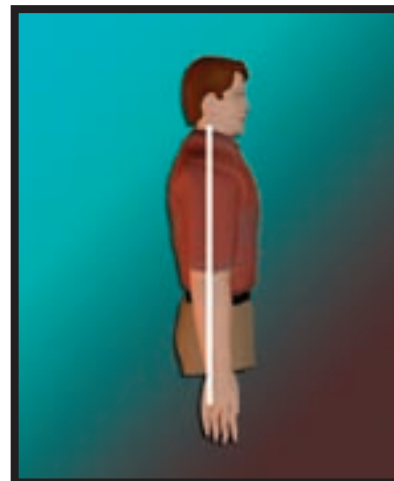
Preventing Repetitive Injuries

Micro Breaks. This is a 60- to 90-second period of time when you *stop* doing an activity. If you're sitting down, stand up. If you're standing up, sit down. Place your hands at your sides, and take several deep breaths.

Micro breaks are recommended every 20 to 30 minutes if you are performing a highly repetitive task. This 60-90 seconds of rest allowance give your muscles a chance to recover from the repetitive stresses placed on them, by returning blood flow and relaxing the muscle/tendon groups.

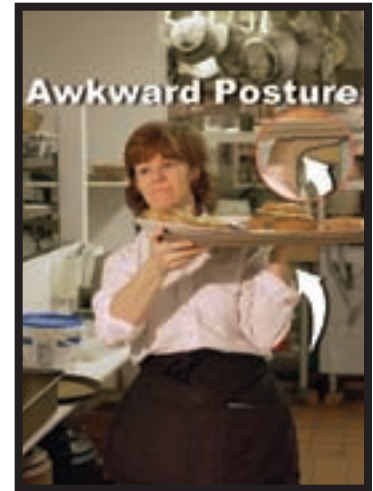


Neutral Posture. This is the ideal posture, with the ears over shoulder, torso upright, arms hanging comfortably to the side, and legs straight with feet flat on the floor.



AWKWARD POSTURES

Awkward postures pose significant biomechanical stress to the joints of the upper extremities and surrounding soft tissues. Research has established that posture is a significant factor in the development of CTDs. Awkward postures include any fixed or constrained body position which is out of neutral. As a general rule, anything more than 20 degrees out of neutral can be considered awkward. One exception is the head and neck extension (tilting head backward). With head/neck extension, anything greater than 5 degrees is considered awkward. Certain job tasks require the worker to assume a variety of awkward postures.

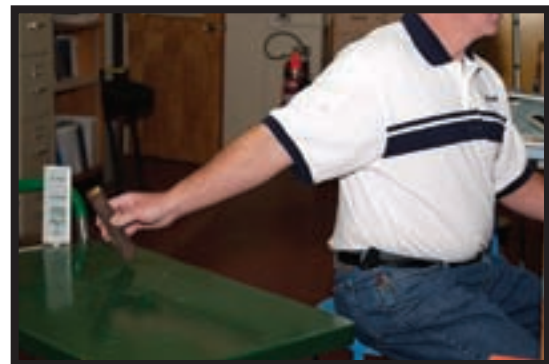


Shoulders

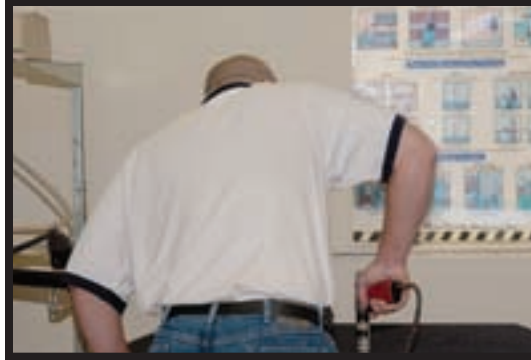
Shoulder Flexion. This occurs when the upper arm is forward/upward away from the torso. This posture is common when reaching for items in front of the torso; it places stress on the upper arm and shoulder.



Shoulder Extension. This is performed when you are working with the arms behind the torso.



Shoulder Abduction. This is the action of working with the elbow out to the side of the torso.



Wrists

Awkward wrist postures include wrist flexion/extension, ulnar/radial deviation, and pronation/supination. It is very common for more than one of these postures to be assumed simultaneously. Awkward wrist postures significantly increase the amount of force required when performing job tasks, because these awkward postures also increase the amount of pressure within the carpal tunnel.



When working with the wrist in 45 degrees of flexion, 40% of grip strength is lost. This means you will have to exert 40% more force to perform the job task.



Elimination of Awkward Postures

The Root Cause. The first step in eliminating awkward postures in a job is to identify the root cause. Are the postures assumed because of the work height in relationship to the worker? Are postures assumed because of the location of the work? Do the tools force awkward postures while exerting force? Is the work orientation causing excessive reaches? Is it worker behavior? Implementing a combination of engineering and administrative controls, as discussed earlier, can have a positive effect on eliminating awkward postures.



Dynamic and Static Muscle Activity. The next step is to consider the part played by dynamic and static muscle activity. Some of the most damaging postures performed in the course of a workday are static or sustained postures. To understand why, let's look at the physiology of muscle contractions.

Fatigue is the result of muscle contractions and forces we generate throughout the day to perform necessary job tasks. The harder the task, the more effort is required and the faster fatigue occurs. Muscle fatigue occurs when the demand for energy exceeds the supply available, causing an imbalance. Muscular contractions use energy in performing both static and dynamic work activities. This energy comes from the nutrients in food which we digest, and is supplied to the muscles via blood. The process by which muscles convert the nutrients into energy is known as muscle metabolism. The blood also carries away heat and waste products (lactic acids) caused by muscle metabolism.



Any increase in muscle work causes a demand for additional energy for the muscles. This is achieved by using any available sources within the muscles. A *static muscle contraction* is defined as a heightened state of muscle activity without movement. It can involve holding an object in the hand or just simply holding a body part in a steady state without movement. When a muscle is contracted in static work, the blood vessels are greatly constricted and, as a result, little oxygenated nutrient-rich blood is able to pass into the muscle and the waste products of metabolism are not removed. Static muscle contractions speed up the fatigue process and increase the length of time required for muscles to recover from the exertion.

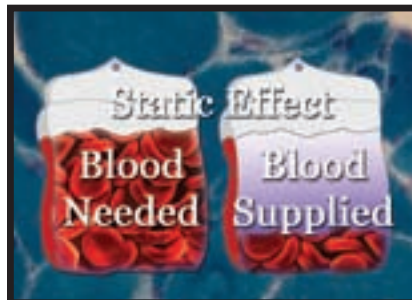
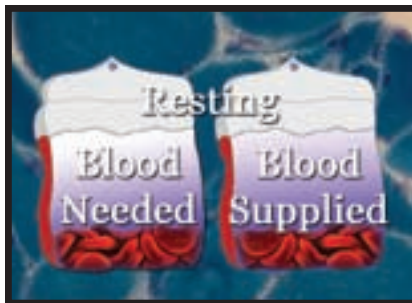
When muscles are working in a static posture, the amount of blood required to keep the muscle healthy is high, but the amount of blood supplied is significantly less. Muscles are working in an anaerobic state due to the oxygen deficit. Static postures increase muscle fatigue and soreness due to the accumulation of lactic acids and other waste metabolic materials.



During *dynamic muscle activity*, the contraction and relaxation of the muscle act as a type of pump which supplies nutrients and oxygen to the muscles and surrounding tissue, making this type of work acceptable. The amount of blood required within the muscle to keep it healthy equals the amount of blood supplied. Supply equals demand. And oxygen-rich blood is our body's fuel and is the secret to our health.



Muscular Work Blood Flow



EXCESSIVE FORCE

Excessive force placed on the body can come from two sources, internal and external.

Internal Force

It is very common to never consider the internal forces placed on the body as a result of working in prolonged awkward postures. When work is performed with the arms in front of the body or out to the side of the torso, muscles must generate enough internal force to counteract the effects of gravity, which is continually pulling the arms down.



External Force

External forces are generated whenever we lift, hold, push, or pull an item. The amount of force required to handle an external load is dependent on where the hands are located in relationship to our bodies. For example, when picking up an item with the arm extended in front of the torso, the amount of force exertion required by the shoulder muscles will be greater than the weight of the object multiplied by the distance the object is away from the shoulder.



It is not uncommon for these internal forces be significantly higher than the external force being generated by the muscle to pick up or handle an object. The first chart below highlights how much force constitutes high force, based on frequency. The second chart lists the amount of force generated, based on type of grip.

Frequency/Force

How much force constitutes “high” force?

- Repetitive forces should not be > 15% of the one-time maximum capacity of the individual for highly repetitive tasks
- Occasional tasks should not be > 30%
- Infrequent tasks should not be > 50%

Force/Grip

Maximum grip strength capacity based on grip type and percentage of one-time grip.

| GRIP TYPE | MALES (% OF ONE-TIME GRIP) | | | | FEMALES (% OF ONE-TIME GRIP) | | | |
|---------------|----------------------------|------|------|------|------------------------------|------|------|-----|
| | 100% | 50% | 30% | 15% | 100% | 50% | 30% | 15% |
| POWER GRIP | 104.3 | 52.1 | 31.3 | 15.6 | 62.8 | 31.4 | 18.8 | 9.4 |
| LATERAL PINCH | 24.5 | 12.3 | 7.4 | 3.7 | 16.2 | 8.1 | 4.9 | 2.4 |
| TIP PINCH | 17 | 8.5 | 5.1 | 2.6 | 11.3 | 5.6 | 3.4 | 1.7 |
| PALMAR PINCH | 23.4 | 12.7 | 7 | 3.5 | 16.3 | 8.2 | 4.9 | 2.5 |

Astrand and Rodahi, 1986. Right hand dominant and units expressed in pounds.

As the chart indicates, the one-time maximum power grip for a male is 104.3 pounds. The average one-time maximum tip pinch (posture used to pick up a piece of paper) is 17 pounds. Type of grip used, as well as posture, will determine the amount of force required to perform a task.

When you are performing a job task with the wrist in 45 degrees of flexion, you lose 40% of your grip strength. When you work in an awkward posture, you use more force, which means you are working harder than you have to in order to complete a job task. In a word, poor posture results in increased force requirements.



MECHANICAL CONTACT STRESSORS

There are two types of mechanical compression, internal and external, that have an effect on the body.

Internal Compression

This occurs when muscles are held in a static contraction, thereby reducing blood flow to the nerves. Sustained or prolonged static postures can result in internal nerve compression.



External Compression

This occurs when parts of the body come in contact with hard or sharp objects. An examples of external compression could be using your hand as a hammer or using a short handled tool that ends in the palm of your hand.



Ways in which you can decrease mechanical compression include:

- ✓ Reducing and/or eliminating prolonged static postures.
- ✓ Padding all sharp edges of workstations and tool handles.
- ✓ Using tools that do not end in the palm of the hand.
- ✓ Using mechanical aids for hammering (*not your hand*)



HAND/ARM SEGMENTAL VIBRATION

Continual or prolonged use of vibratory tools breaks down the small capillaries within the fingers. This causes a restriction or interruption in the blood supply to the fingers. The loss of blood flow causes the fingers to turn white or blanch. Hand/arm segmental vibration takes from months to years of exposure before the onset of symptoms. The effect of hand/arm segmental vibration is magnified when working in cold work environments and/or smoking, as these risk factors also restrict blood flow. Hand/arm vibration is measured with accelerometers along three axes.

Vibration-damping materials, including gloves or tool wraps, can be an effective control as long as they do not increase the amount of force required to hold the tool by decreasing grip strength or by increasing the diameter of the tool handle.

COLD WORK ENVIRONMENT

Working in cold conditions has an impact on our musculoskeletal system. When our hands are subjected to cold temperatures, there is a negative impact on tactile sensitivity. As we lose the ability to feel an item, it is common to grip harder in order to gain control over it and to feel the part we are working with. When gloves are worn to keep the hands warm, the amount of force required to perform a specific task also increases. This increased force generated to perform work tasks has a negative impact on the hands and wrist.



A CTD may develop when the work demands habitually exceed a worker's capacity to respond to those demands. The solution is to balance work demands with worker capacity. Fit the job to the worker, not the worker to the job. Remember we generally work harder than necessary to perform job tasks because of awkward postures and/or poor job design. Getting injured is not part of the job. We need to take a positive attitude toward workplace stressors and to find solutions that will ease the stress.

There are solutions to every problem if you look deep and hard enough. Use the information in this booklet to help identify and correct risk factors performed in the work environment. Identify and neutralize the problems. The gratifying results will be increased efficiency and decreased injuries.

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