

IUPUI
**OFFICE OF ENVIRONMENTAL
HEALTH & SAFETY**

INDIANA UNIVERSITY-PURDUE UNIVERSITY
Office of Administration and Finance
Indianapolis

Ergonomics

Definition

The term “ergonomics” can simply be defined as the study of work. It is the science of fitting the workstation and tools to the people who work in them. Adapting the job to fit the worker can help reduce ergonomic stress and eliminate many potential ergonomic disorders (e.g., carpal tunnel syndrome, trigger finger, tendonitis). Ergonomics focuses on the work environment and items such as the design and function of workstations, controls, displays, safety devices, tools and lighting to fit the employee’s physical requirements, capabilities and limitations to ensure his/her health and well being. It may include restructuring or changing workplace conditions to reduce stressors that cause musculoskeletal disorders (MSDs).

Musculoskeletal Disorders (MSDs)

Ergonomic injuries may be referred to as Repetitive Stress Injuries (RSI’s), Musculoskeletal Disorders (MSD’s), Cumulative Trauma Injuries (CTI’s), or Cumulative Trauma Disorders (CTD’s).

Musculoskeletal Disorders (MSDs) are disorders of the muscles, nerves, tendons, ligaments, joints, cartilage, blood vessels or spinal discs.

Risk Factors associated with MSDs

The areas most affected by repetitive strain injuries are the upper limbs (e.g., hands, wrists, elbows, shoulders, neck). These injuries also affect the lower limbs (e.g., knees, ankles) although to a lesser degree.

Workplace MSDs are caused by exposure to the following risk factors:

Repetition:

Doing the same motions over and over again places stress on the muscles and tendons. The severity of risk depends on how often the action is repeated, the speed of the movement, the number of muscles involved and the required force.

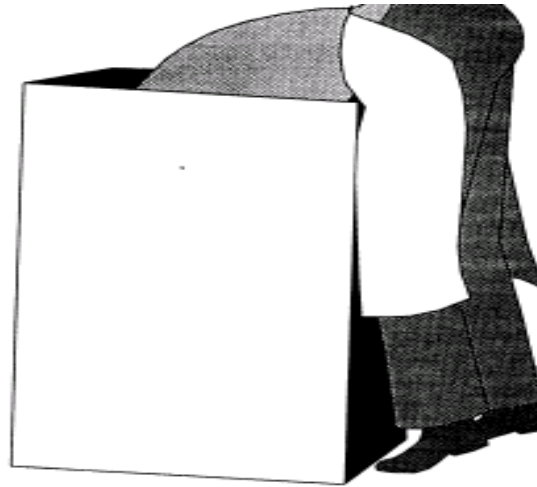
Forceful Exertions:

Force is the amount of physical effort required to perform a task (such as heavy lifting) or to maintain control of equipment or tools. The amount of force depends on the type of grip, the weight of an object, body posture, the type of activity and the duration of the task.

Awkward Postures:

Posture is the arrangement of the body parts, limbs, trunk, and head relative to each other during work. Your posture affects muscle groups that are involved in physical activity.

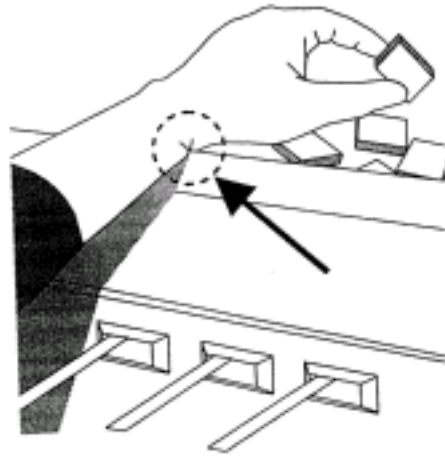
Awkward postures include repeated or prolonged reaching, twisting, bending, kneeling, squatting, working overhead with your hands or arms, or holding fixed positions.



Awkward Postures

Contact Stress:

Contact stress occurs when any body part is compressed against a hard or sharp object. This can result in placing too much pressure on nerves, tendons and blood vessels. For example, using the palm of your hand as a hammer can increase your risk of suffering an MSD.



Vibration:

Operation of tools which vibrate such as sanders, grinders, chippers, routers, drills and other saws can lead to nerve damage.



Individual Susceptibility:

Individuals may be predisposed to MSD based on their heredity, prior injuries, other illnesses, medication, smoking, etc.



Common MSDs

MSDs are injuries and illnesses that affect muscles, nerves, tendons, ligaments, joints or spinal discs. Your doctor might tell you that you have one of the following common MSDs:

- Carpal Tunnel Syndrome
- Trigger finger
- Tendonitis
- Muscle strains
- Low back pain
- De Quervain's Disease
- Epicondylitis
- Tenosynovitis

Signs and Symptoms

Employees suffering from MSDs may experience less strength for gripping, less range of motion, loss of muscle function and inability to do everyday tasks. Common symptoms include:

- Numbness or a burning sensation in the hand
- Reduced grip strength in the hand
- Swelling or stiffness in the joints
- Pain in wrists, forearms, elbows, neck, or back
- Reduced range of motion in the shoulder, neck, or back
- Stiffness
- Dry, itchy, or sore eyes
- Blurred or double vision
- Aching or tingling
- Cramping
- Loss of color in affected regions
- Weakness

Reporting Injuries

If MSD signs and symptoms are not reported early, permanent disability may result. It is important that you report MSD signs and symptoms right away to avoid long-lasting problems. MSDs, MSD signs and/or symptoms, or MSD hazards should be reported to your supervisor and Environmental Health and Safety.

If you are experiencing signs and symptoms MSD please schedule an appointment with IUPUI Health Services Health located in Coleman Hall.

Workstation Analysis

Workstations should be ergonomically designed to accommodate the full range of required movements among employees. Moreover, they should be designed so that they accommodate the employees who are actually using them to perform the job, not just for the "average" or "typical" employee.

Neutral Body Positioning

To understand the best way to set up a computer workstation, it is helpful to understand the concept of neutral body positioning. This is a comfortable working posture in which your joints are naturally aligned. Working with the body in a neutral position reduces stress and strain on the muscles, tendons, and skeletal system and reduces your risk of developing a musculoskeletal disorder (MSD). The following are important considerations when attempting to maintain neutral body postures while working at the computer workstation:

- Hands, wrists, and forearms are straight, in-line and roughly parallel to the floor.
- Head is level or bent slightly forward, forward facing, and balanced. Generally it is in-line with the torso.

- Shoulders are relaxed and upper arms hang normally at the side of the body.
- Elbows stay in close to the body and are bent between 90 and 120 degrees.
- Feet are fully supported by floor or footrest.
- Back is fully supported with appropriate lumbar support when sitting vertical or leaning back slightly.
- Thighs and hips are supported by a well-padded seat and generally parallel to the floor.
- Knees are about the same height as the hips with the feet slightly forward.

Regardless of how good your working posture is, working in the same posture or sitting still for prolonged periods is not healthy. You should change your working position frequently throughout the day in the following ways:

- Make small adjustments to your chair or backrest.
- Stretch your fingers, hands, arms, and torso.
- Stand up and walk around for a few minutes periodically.