

An Introduction to Ergonomics

This material was produced under grant [SH20856SH0] from the Occupational Safety and Health Administration, U.S. Department of Labor. It does not necessarily reflect the views or policies of the U.S. Department of Labor, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government

What is Ergonomics?

“The scientific discipline concerned with understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, methods and data to design in order to optimize human well-being and overall system performance”.

Ergonomics means

“fitting the job to the worker”

From the Greek

Ergo = Work

Nomos = Laws

- Source : International Ergonomics Association (IEA) in 2000

What are Work Related Musculo-Skeletal Disorders (WMSDs)?

- WMSDs are also known as:
 - Cumulative Trauma Disorders (CTDs)
 - Repetitive Strain Injuries (RSIs)
 - Overuse injuries
- They are soft tissue injuries which occur gradually

What are some of the symptoms of WMSDs?

- Discomfort
- Pain
- Numbness
- Tingling
- Inflammation
- Burning
- Swelling
- Change in color
- Tightness, loss of flexibility

What causes WMSDs?

- Heavy, Frequent, or Awkward Lifting
- Pushing, Pulling or Carrying Loads
- Working in Awkward Postures
- Hand Intensive Work
- Vibration
- Contact Stress

Risk Factors

Risk of injury depends upon:

- Duration of exposure
- Frequency of exposure
- Intensity of exposure
- Combinations of risk factors

(how **long**)

(how **often** often)

(how **MUCH**)

+++

Risk factors for WMSDs

Heavy, frequent or
awkward lifting

Heavy lifting



There are only recommendations for maximum weight a person can lift.

Frequent lifting

Lifting more than twice per minute



Awkward lifting

Lifting above the shoulders, below the knees or at arms' length



Risk factors for WMSDs

Awkward postures

- Extended reaching
- Bending or twisting of the trunk
- Working with arms away from the body
- Kneeling or squatting

Awkward Postures - Low work

Bending



Kneeling



Squatting



Reducing low work

- Raise and/or tilt the work for better access
- Use a stool for ground level work
- Use tools with longer handles
- Alternate between bending, kneeling, sitting, and squatting

Reducing Reaching

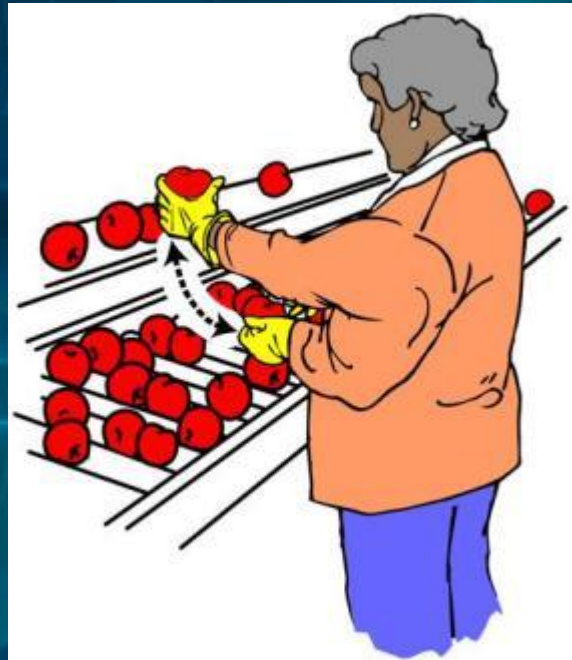
- Keep items within close reach
(design reach distance for the shortest worker)
- Remove obstacles
- Use gravity feed racks

Risk factors for MSDs

Hand Intensive Work

Hand Intensive Work

Repetitive motions



Hand Intensive Work – Highly repetitive motion

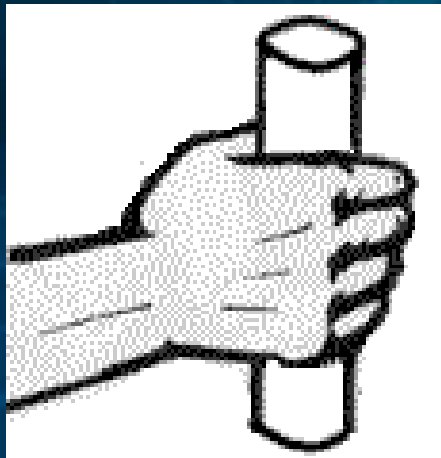
Making the same motion repeatedly can cause a lot of wear and tear on the joints being used, and if you don't rest to allow time for them to heal, the damage can just keep building up.

Reducing repetition

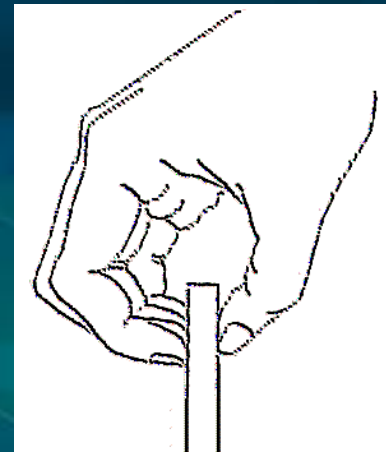
- Arrange work to avoid unnecessary motions
- Let power tools and machinery do the work
- Spread repetitive work out during the day
- Take stretch pauses
- Rotate task with co-workers if possible
- Change hands or motions frequently

Hand Intensive Work – Gripping and Pinching

A power grip is 5 times
stronger than a pinch grip



=



10 lbs

2 lbs

Other factors

Your grip strength decreases when you:

- Bend your wrists
- Pick up slippery items
- Wear poorly fitting gloves
- Have cold hands

Hand Intensive Work – Combinations

Risk of injury goes
up as you combine
factors

Risk



Repetition
Gripping or Pinching
Bent wrists



Repetition
Gripping or Pinching



Repetition

OSHA Guidelines for Ergonomics

- OSHA has developed industry- or task-specific guidelines for a number of industries based on current incidence rates and available information about effective and feasible solutions
- OSHA is conducting inspections for ergonomic hazards and issues citations under the General Duty Clause and issues alert letters where appropriate
- OSHA is providing assistance to business to help them proactively address ergonomic issues in the workplace
- OSHA has chartered an advisory committee to identify gaps in research and application of ergonomics and ergonomic principles in the workplace

**Remember, OSHA does not have
regulations to address
ergonomics,
only Recommendations and
Guidelines**

What you can do:

- Recognize and report signs and symptoms early
- Get involved in ergonomics

Recognition and reporting signs and symptoms

Report signs or symptoms if:

- Pain is persistent, severe or worsening
- Pain radiates
- Symptoms include numbness or tingling
- Symptoms keep you from sleeping at night
- Fingers blanch or turning white

Why is it important to report signs and/or symptoms early?

- Acute injuries can easily become chronic injuries and can sometimes lead to disability, even surgery
- Early treatment save time and money

Getting involved

- Look at jobs
- Come up with solutions
- Work with solutions
- Take part in training
- Take responsibility for changing the way you do your job
- Help to make sure efforts are successful

Five key points to remember

1. Ergonomics can help you on your job
2. WMSDs can happen in jobs with risk factors
3. Risk factors can be reduced and WMSDs prevented
4. Reporting signs and symptoms early is important
5. You can help your company put ergonomics changes into place