

# **An Introduction to Ergonomics**

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# 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

(how **long**)

(how **often**  
**often** often)

(how **MUCH**)

- Combinations of risk factors

**+++**

# **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

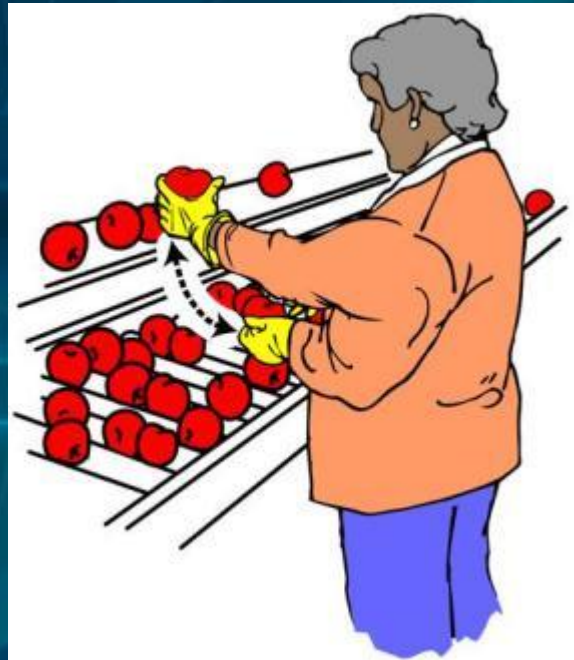
- Keep items within close reach  
(design reach distance for the shortest worker)
- Remove obstacles
- Use gravity feed racks

# **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.

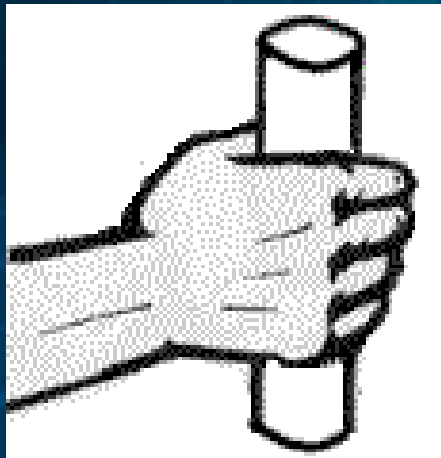
# Reducing repetition

- 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

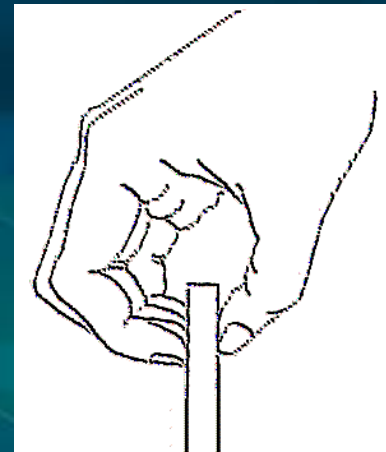


# Hand Intensive Work – Gripping and Pinching

A power grip is 5 times  
stronger than a pinch grip



=



10 lbs

2 lbs

# Other factors

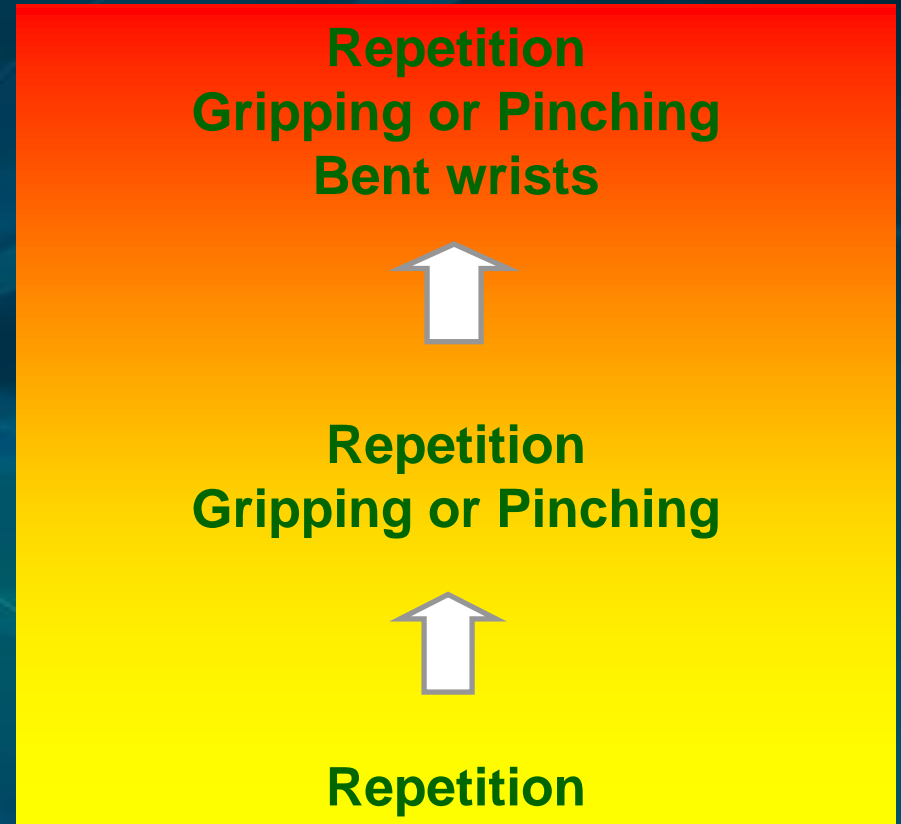
Your grip strength decreases when you:

- 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



# 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