

Ergonomics Program



Overview

- ID Musculoskeletal Disorders
- Apply Engineering Controls
- Apply Administrative Controls
- Reduce Musculoskeletal Disorders
- Describe how to incorporate ergonomics into repair or replacement of tools, equipment or facilities

What is **ERGONOMICS**?

- Matching the work place to the worker
- OSHA enacted the Ergonomics Program
- Why are we hearing about Ergonomics now

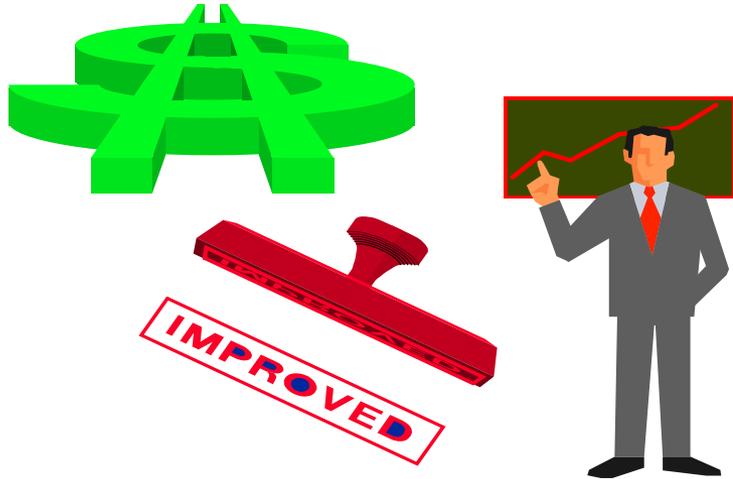


Recent History

- WMSDs = half of all rated military disabilities
 - one third reported civilian injuries and illnesses within the Marine Corps
- Increase in reporting WMSDs
 - Changes in work processes
 - Increased awareness

WIFM

“What’s in it for me”



Higher Production

Higher Quality

Compliance

Lower Compensation Costs

Careers/Employment
Longevity

Safe Working Conditions

Quality of life

Morale



Neutral Posture



Neutral posture

Standing neutral posture



Seated neutral posture

Two Broad Categories of Workplace Disorders

- Injuries:
 - cut, crush, or fall
- Illnesses:
 - repeated exposure to various substances, hazards, or environmental conditions

Scope of Ergonomic Illnesses

- *Cumulative trauma disorders* (CTDs)
 - Repeated biomechanical stress
 - Damage to the tendons, tendon sheaths, related bones, muscles, and nerves of:
 - Hands, wrists, elbows, shoulders, neck, back.

Scope of Ergonomic Illnesses cont.

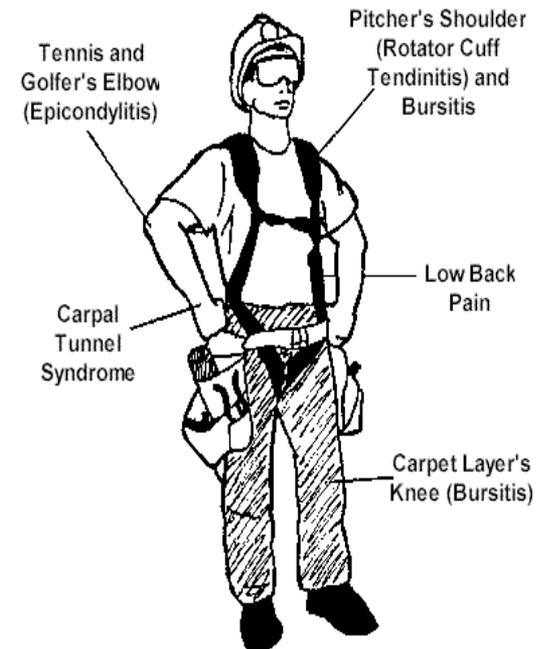
- *Musculoskeletal disorders* (MSDs)
 - Neck, back, shoulder, elbow, hand, wrist, and fingers
 - Nerves, tendons, cartilage, ligaments, and muscles
 - MSDs can happen to anyone

Scope of Ergonomic Illnesses cont.

- *Work-related musculoskeletal disorders*
(WMSDs)
 - Caused by or made worse by the work environment
 - Affect or reduce performance capabilities

Frequently Occurring Occupationally Induced Disorders

- Carpal Tunnel Syndrome
- Tendonitis
- Tenosynovitis
- Synovitis
- Stenosing Tenosynovitis of fingers
- Low back pain



Potential Indicators and Symptoms of CTDs

- Trends in accidents and injuries
- Incidents of CTD
- Absenteeism
- High turnover rate
- Working conditions noted by people with disabilities

Potential Indicators and Symptoms of CTDs cont.

- Complaints about musculoskeletal pain
- High overtime and increased work rate
- Manual material handling/repetitive motion task
- Poor product quality

Risk Factors

- *Force*: physical effort required to maintain control of equipment or tools
 - perform heavy lifting, pushing, pulling, or carrying

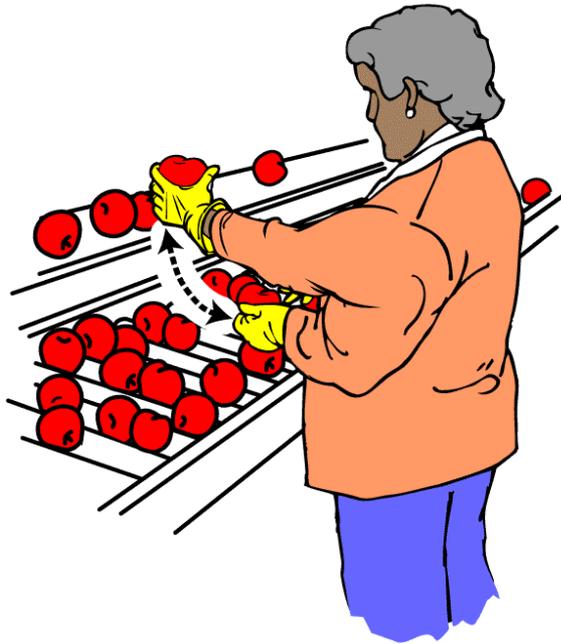
Risk Factors

- *Repetition:*
performing the same motion, prolonged typing, assembling components, and repetitive hand tool usage. “Lifting more than twice in a minute

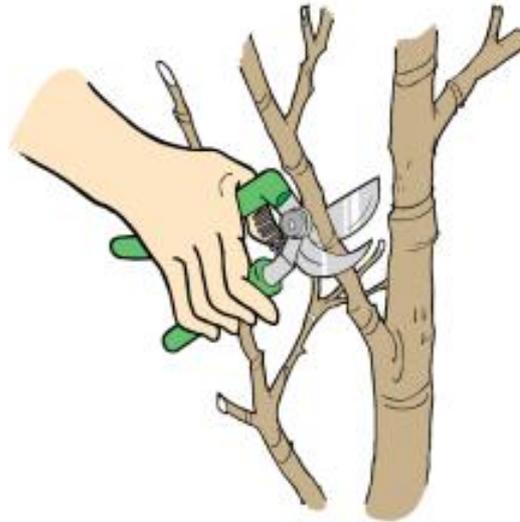


Hand Intensive Work

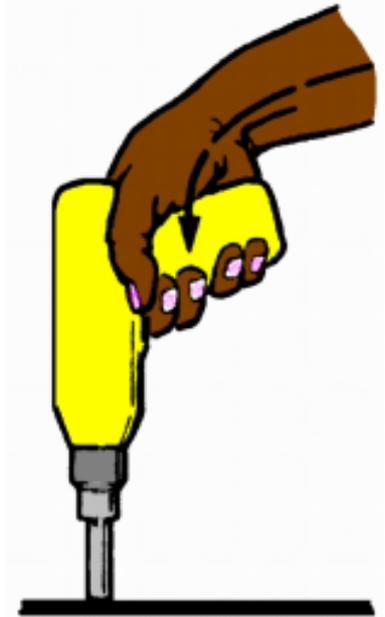
Repetitive motions



Gripping
Pinching



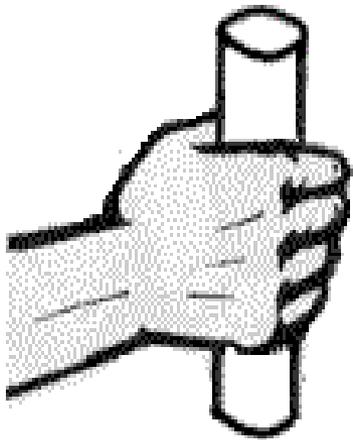
Bent wrists



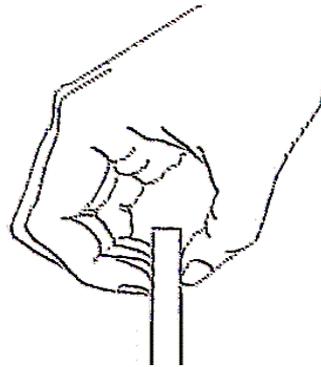
Hand Force

A power grip can be 5 times stronger than a pinch grip

Takes 4.6 lbs. of force



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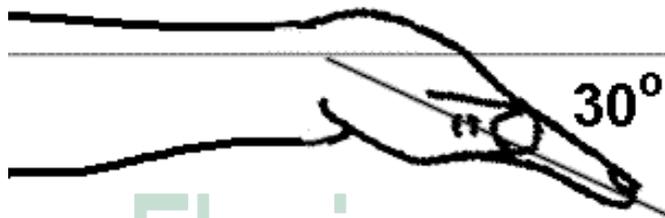
10 lbs.

2 lbs.

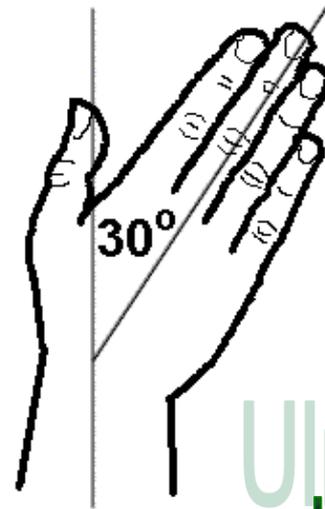


Wrist Bent

Extension
Extension



Flexion
Flexion



Ulnar deviation
Ulnar deviation

Intensive Typing



The Prototype

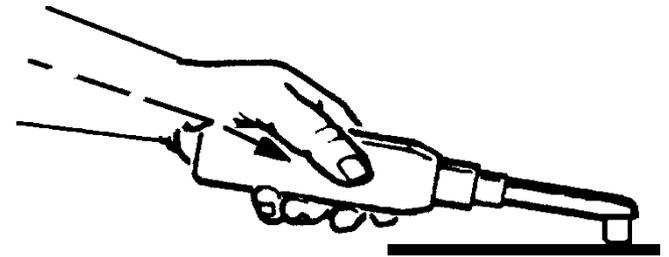
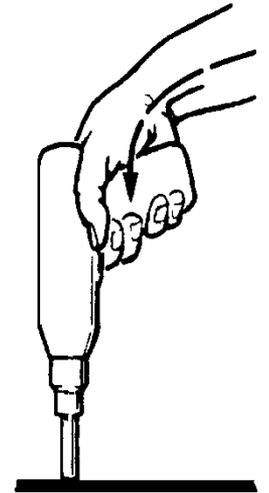


Tool Use

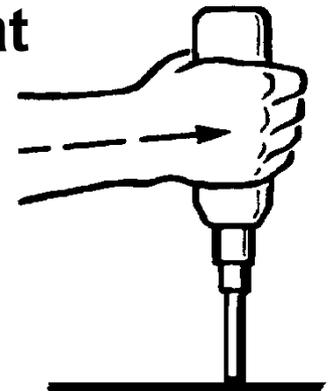
Handles get smaller,
but hand does not



Working with
bent wrists
decreases grip
strength

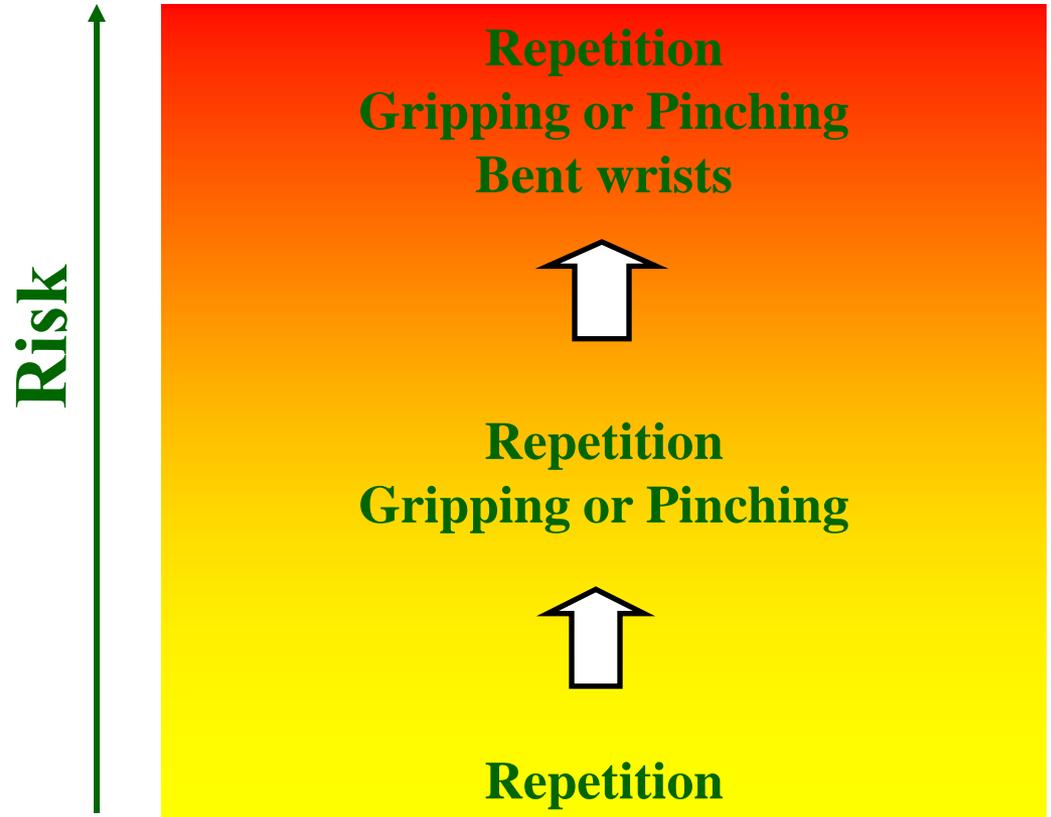


Use tools that
let you keep
your wrist
straight



Hand Intensive Work – Combinations

Risk of injury goes up as you combine factors



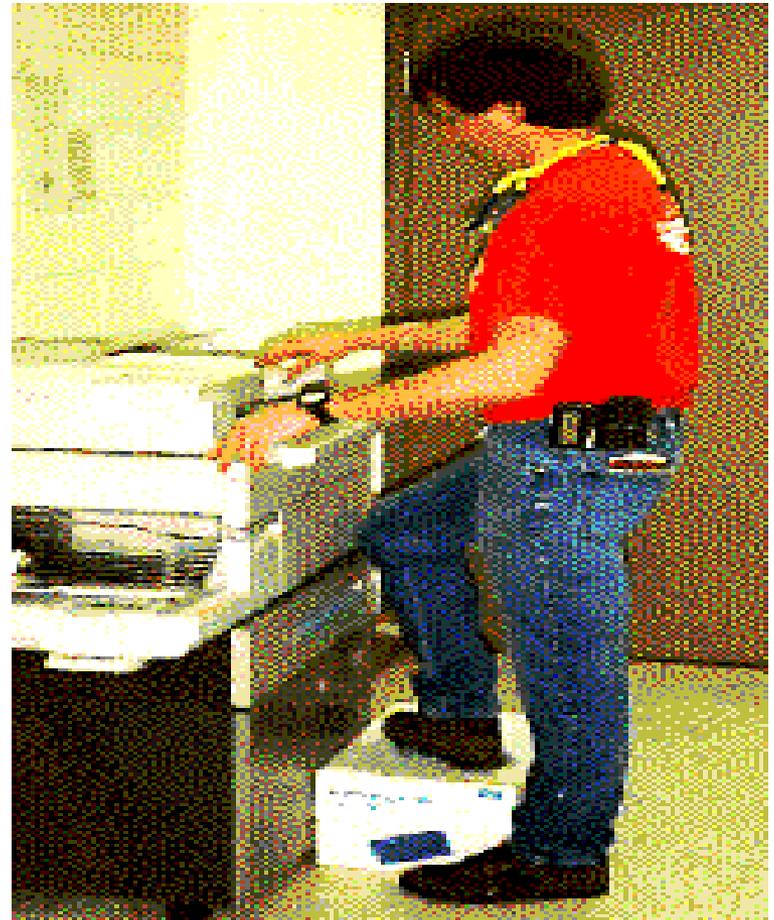
Risk Factors cont.

- *Awkward postures:* positions that significantly deviate from the neutral position.
- Working over-head, extended reaching, twisting, squatting, or kneeling

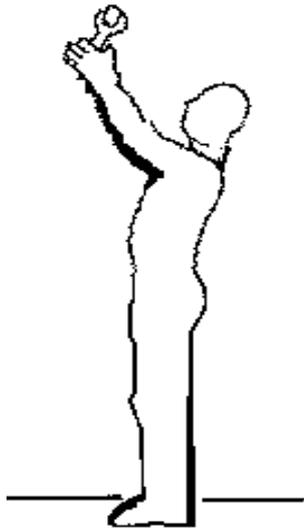
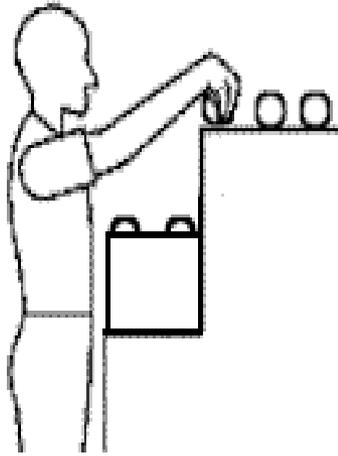


Risk Factors cont.

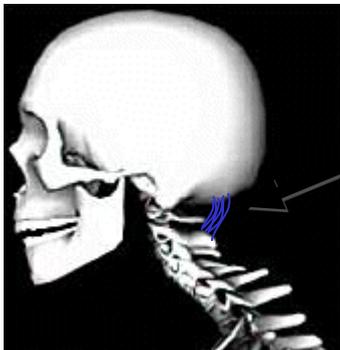
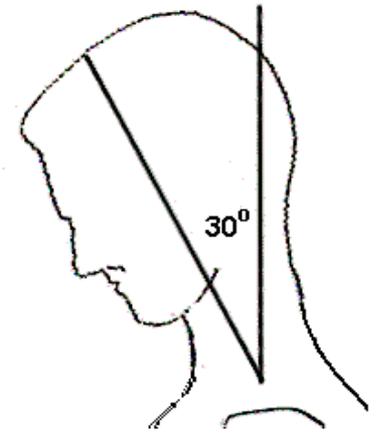
- *Static postures:*
holding a fixed position or posture
 - gripping tools that can't be set down
 - standing in one place for prolonged periods



Hands Over Head or Elbows Above Shoulders



Neck Bent More Than 30 degrees



Shortened
muscles
compress nerve

Back Bent More Than 30 Degrees



Frequent, Awkward, or Heavy Lifting



Awkward Positions



Risk Factors cont.

- *Vibration*: specific part of the body comes into contact with a vibrating
 - chain saw, electric drill, chipping hammer, wood planer, punch press, or packing machine
- **Whole body vibration** occurs when standing or sitting in vibrating environments
 - driving a truck over bumpy roads or operating a jack hammer

Vibration



Repeated Impacts



Risk Factors cont.

- *Contact stress*: continuous contact between sensitive body tissues and hard or sharp objects

Ergonomics Program Elements

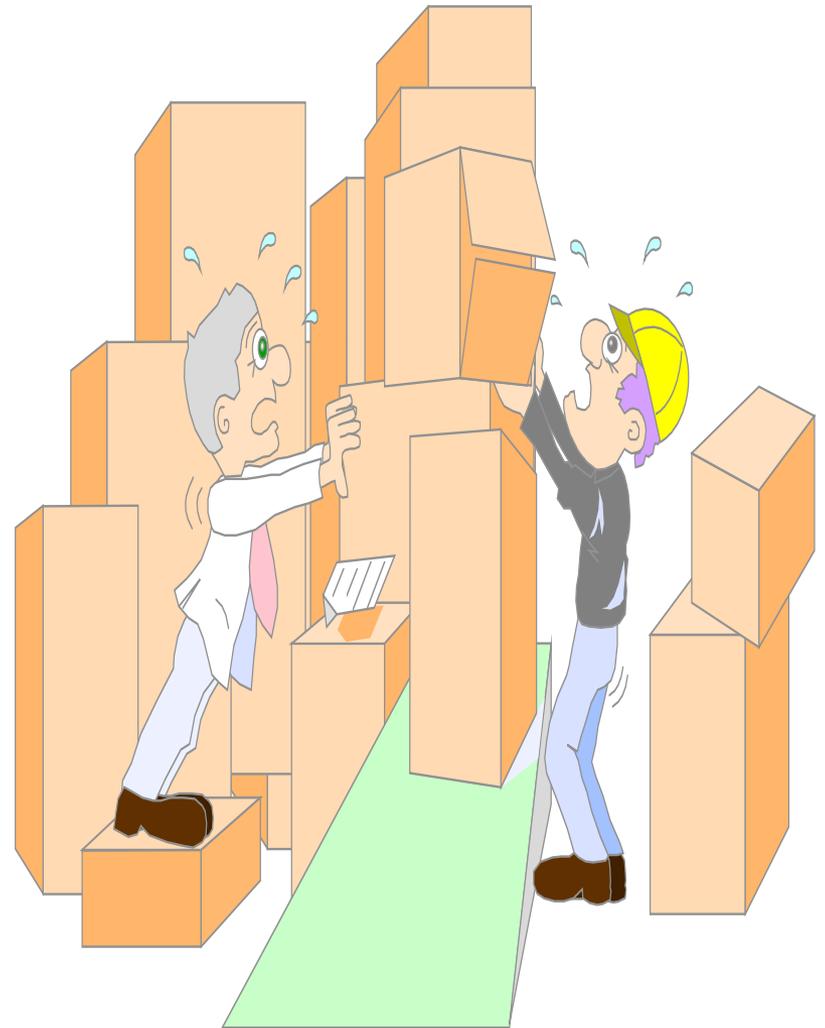
- Management Commitment and employee Involvement
- Work Center Analysis
- Hazard Prevention and Control
- Facility Modification, New Construction, or Material Acquisition
- Medical management program for personnel with WMSDs

Installation Responsibilities

- Develop and implement an ergonomics program
- Provide support to tenant commands
- Contact local installation safety office for assistance

Supervisors Responsibilities

- Ensure personnel receive training
- Identify and report potential risk factors
- Request assistance for managing risk factors



Management Commitment and Personnel Involvement

- Partnership between all working levels is essential to prevent WMSDs
- Command emphasis and management commitment
 - Personnel involvement is essential

Work Center Analysis

- Identify existing hazards that may cause WMSDs
 - Review mishap logs and compensation claims
 - ANYMOUSE or Unsafe/Unhealthful forms
 - Personnel complaints or suggestions
 - Safety inspections and IH surveys
 - Questionnaires, interviews, direct observation

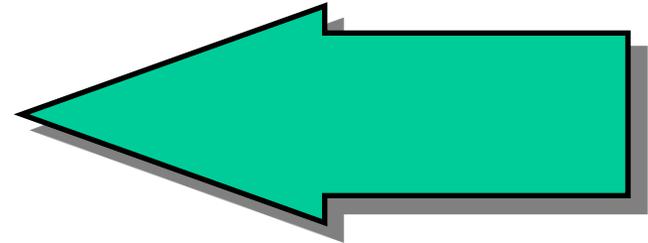
Hazard Prevention and Control

- Eliminate, reduce, or control the presence of risk factors
 - Engineering controls
 - Administrative controls
 - PPE
 - DOD does not recognize back belts or wrist splints as PPE

Control Strategies

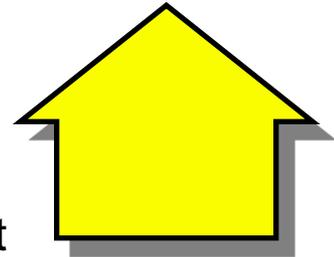
Engineering Controls

- Workstation Design
- Tool Design
- Process Modification
- Mechanical Assist
- Education



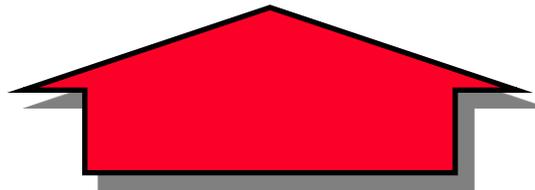
Administrative Controls

- Training
- Job Rotation
- Pacing
- Policy
- Job Enlargement



Band Aid Solutions !?!

- Splints
- Braces



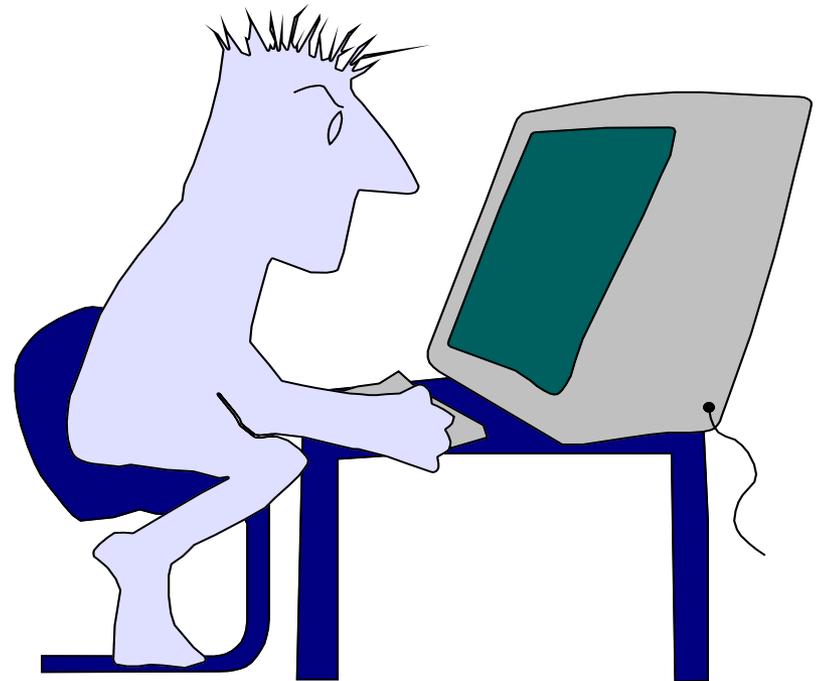
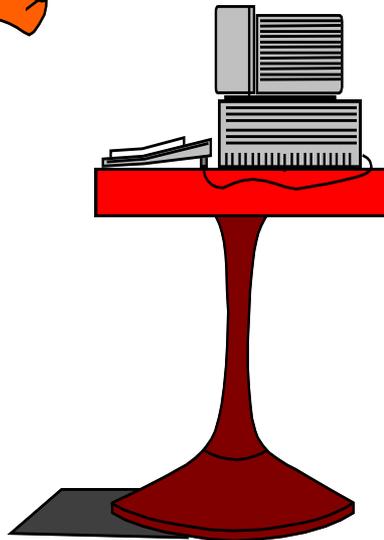
Engineering Controls

- Preferred mechanism for controlling ergonomic hazards
- Redesigning the work station, work methods, and tools



Work Station Design

Workstations must be easily adjustable to accommodate the worker performing the task



*Height
of the
Monitor*

Viewing Angle

*Angle
of the
Head*

Distance to the Screen

*Quality
of
Back Support*

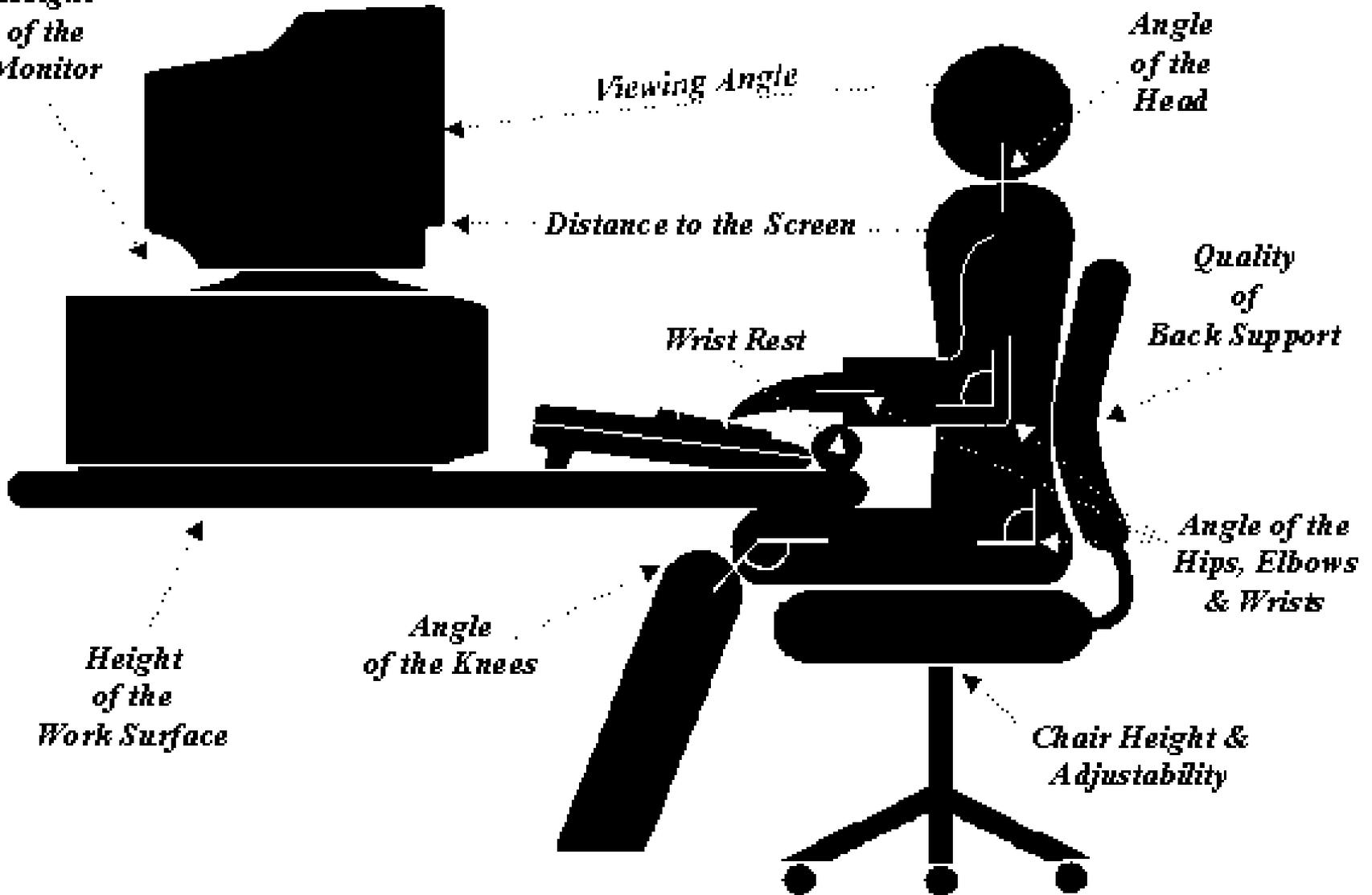
Wrist Rest

*Angle of the
Hips, Elbows
& Wrists*

*Height
of the
Work Surface*

*Angle
of the
Knees*

*Chair Height &
Adjustability*



Administrative Controls

- Rotating personnel to jobs with dissimilar physical requirements
- Establishing work/rest schedules
- Training personnel to use appropriate work methods

Training

- Provided to all Marine Corps personnel
- Recognize risk factors and understand procedures used to minimize the risks
- Refresher training will be provided annually or if new risks are discovered

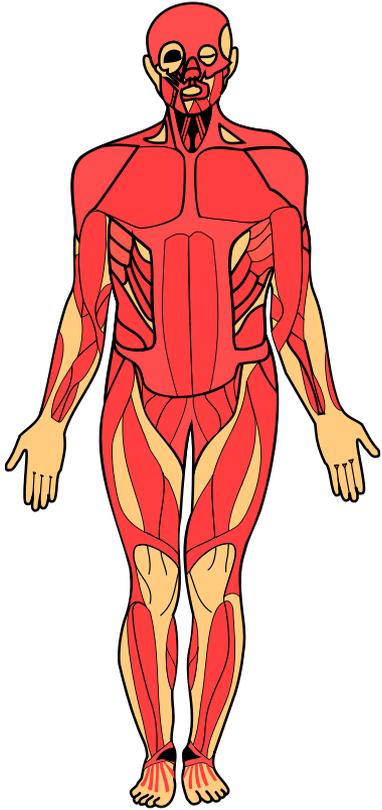
Training Elements

- Ergonomic definitions and concepts
- Contributing physical risk factors and personal trait
- How to recognize and report early warning signs and symptoms of WMSDs

Training Elements cont.

- How to prevent WMSDs by recognizing risk factors and basic elements of effective design
- Understand the components and their role in the Ergo Program
- Wellness and Semper Fit Programs

Two Kinds of Back Injuries



MUSCULAR



SPINAL

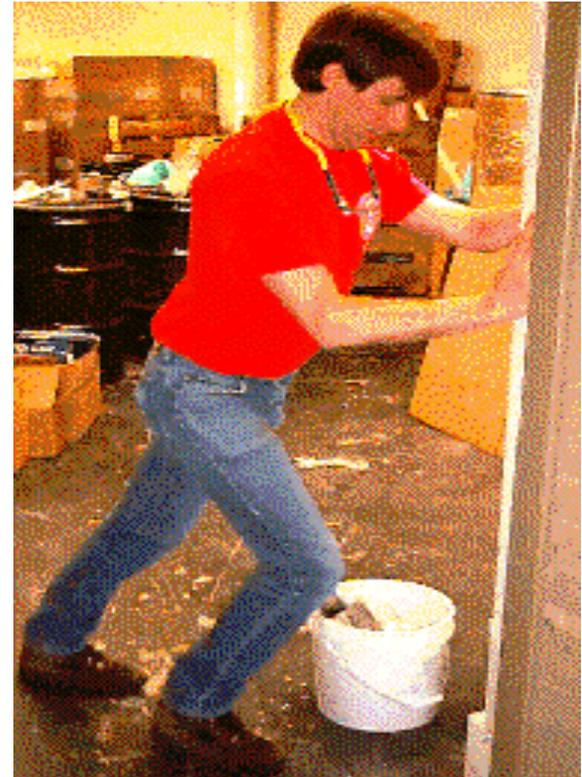
Back Injury Training

- Anatomy and physiology
- Biomechanics of lifting
- Weight control
- How to avoid back injuries
- Physical fitness



Stretch and be Ready

- Stretch your muscles or warm up before lifting
- Slip resistant shoes
- Clear a pathway before you move the item



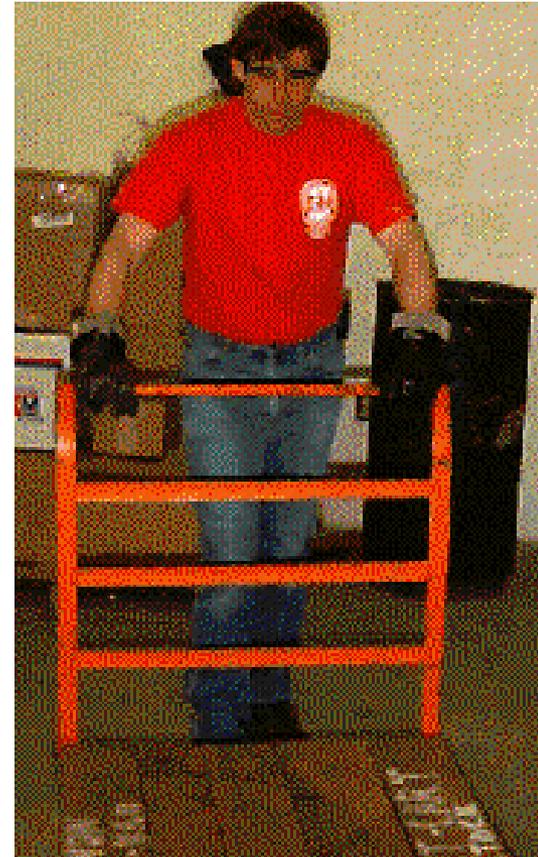
Use Lifting Devices

- Use proper equipment
 - Hand trucks
 - Forklifts
 - Dollies
 - Use gloves if needed



Push not Pull

- Can you slide it instead of lifting it



Lift with Your Legs

- Plant your feet firmly - get a stable base
- Bend at your knees - not your waist
- Tighten your abdominal muscles to support your spine

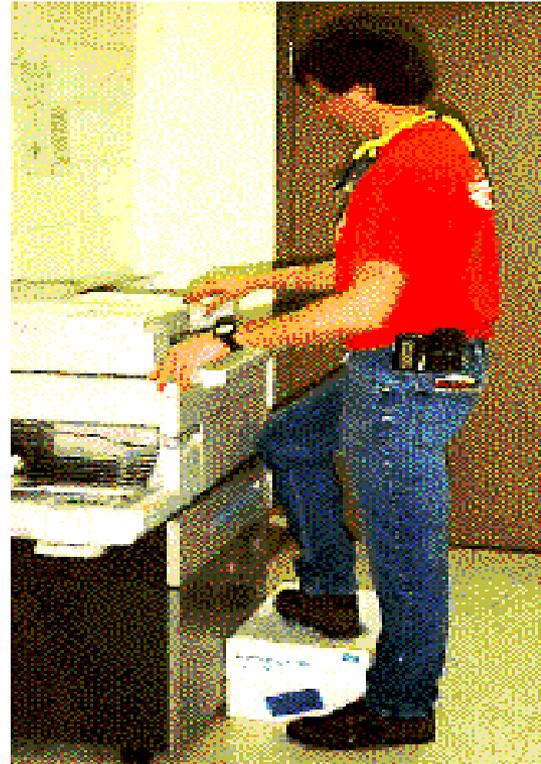


Lift with Your Legs cont.

- Get a good grip - use both hands
- Keep the load close to your body
- Use your leg muscles as you lift
- Keep your back upright, keep it in its natural posture
- Lift steadily and smoothly without jerking

Standing Posture

- Keep your spinal column aligned in its natural curves
- Prop one foot up on a stool



Shift and Stretch

- Shift your posture often
- Stretch frequently
- Keep your body flexible (not rigid or fixed)
- Don't force your body to conform to its workspace



Facility Modification, New Construction, Material Acquisition

- Evaluate to ensure design criteria is met
- Calculate weight and height limits
- Ensure proper lighting is installed

References

- NAVMC DIR 5100.8, Chapter 19
- OPNAVINST 5100.23G
- NIOSH PUB. NO. 97-117
- DODI 6055.1

