Ergonomics for School Districts

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Objectives

• Define ergonomics and its effect on the workplace
• Discuss ergonomic risk factors
• Review the preferred order of controls when making fixes
• Practice – multiple case studies
What is Ergonomics?

• Ergonomics is the study of how the human body relates to its work environment

• Ergonomics is designing or redesigning the work environment with the characteristics, capacities, and limitations of the user in mind
What Are We Trying to Avoid?

**Musculoskeletal Disorders**

An MSD is a disorder of the muscles, nerves, tendons, ligaments, joints, cartilage, blood vessels, or spinal discs.

Most workplace MSD's are injuries or illnesses that occur over time and are usually the result of the accumulation of minor stresses in the body.
• Musculoskeletal disorder (MSD) cases (380,610) accounted for 33 percent of all days away from work cases in 2013.

_U.S. Bureau of Labor Statistics_

• Workers who sustained MSD’s in 2013 required a median of 11 days to recuperate before returning to work, compared with 8 days for all types of cases.

_U.S. Bureau of Labor Statistics_
Common MSD Injuries

- **Tendonitis** - pain and swelling of the tendons.
- **Carpal Tunnel Syndrome** - compression of the median nerve by swollen tendons in the wrist.
- **Tenosynovitis** - pain and swelling of the tendon and its sheath, especially in the hand or wrist.
- **Epicondylitis** - pain and tenderness at the two bony points on either side of the elbow (tennis elbow or golfer's elbow).
- **Thoracic Outlet Syndrome** - compression of the nerves and blood vessels between the neck and shoulder.
- **Low Back Pain**
Be Aware of MSD Symptoms

Early intervention is a key to reducing the probability of MSD’s occurring in your workplace

- Back or neck pain
- Swelling or inflammation
- Stiffness
- Burning sensations
- Weakness or clumsiness in hands; dropping things
Be Aware of MSD Symptoms

• Encourage employees to report any work related discomfort to their supervisor at the first sign of symptoms

• Take immediate action where possible
What’s immediate action?
Develop An Ergonomics Plan

1. Find your exposures to MSD’s
   ✓ Ergonomic Risk Factors
2. Eliminate or reduce Risk Factors
3. Train
4. Monitor for desired results
5. Repeat
How Do You Find Ergonomic Risk Factors

✔ Ask/ listen to the workers
✔ Past accident records
✔ Job observations
Listen To Your Workers

• Worker complaints of undue strain, fatigue, pain, or discomfort that does not go away after a night of rest

• Workers making frequent trips to doctors or chiropractors due to physical aches and pains

• High turnover in certain departments or positions

• Employees bringing in their own devices or modifying their tools or work stations
Past Accident Records

Rule of Thumb

Unless something in the operation has changed, what has happened in the past is a relatively good predictor of what will happen in the future.
Past Accident Records

Look at:

• OSHA 300 Log
• Insurance Workers Compensation Loss Reports
• Your internal accident report forms

Look for:

• Trends
  ✓ Overexertion (Lifting) Accidents
  ✓ MSD’s
  ✓ Sprain/ Strain Injuries
  ✓ Upper extremity Injuries (backs, shoulders, wrists)
  ✓ Frequency
  ✓ Severity
Past Accident Records

Examples of accident descriptions:

- **Lifting** tables—chest and rib strained
- **Unloading** the kindergarten book drop box—back strain
- **Repetitive** typing and using mouse—hands numb
- **On hands and knees** scrubbing floor—knees swelled
- **Repetitive** turkey gravy scooping—wrist tendonitis
- **Reaching** in to clean countertop—upper arm strain
- **Throwing** heavy garbage bag into dumpster—back pain
Job Observations

• Use the information obtained from listening to your workers and past accident records
• Review tasks with known risk factors; Ask Why?
• Use a checklist to help
  ✓ Weights and shapes of lifted items
  ✓ Repeated tasks
  ✓ Postures used
  ✓ Duration of tasks
Ergonomic Risk Factors

1. Forceful Exertions
2. Awkward Postures
3. Repetitive Motions
4. Prolonged Exertions (Duration)
5. Contact Stress
6. Vibration
The more risk factors you can remove from jobs in your facilities, the less likely it is that employees will develop ergonomic injuries.
MSD Risk Factors

Forceful Exertions
The amount of force exerted when moving or handling materials, tools, or objects depends on a combination of factors, including:

- Load shape, weight, dimensions, and bulkiness
- Grip type, position, and friction characteristics
- Amount of effort required to start and stop the load when moving it (i.e., how physically demanding it is to accelerate or decelerate the load)
- Length of time continuous force is applied by the muscles (e.g., the amount of time the load or object is held, carried, or handled without a muscle relaxation break)
Forceful Exertions

• Excessive force may contribute to:
  • Muscle fatigue
  • Sprains & strains

• Examples:
  • Lifting, lowering, or carrying heavy objects
  • Pushing, pulling, or dragging
  • Tearing or gripping
  • Swinging a tool with high force
Forceful Exertions
OSHA’s Ergonomic Risk Factors

• Lifting
  • More than 75 lbs. any time
  • More than 55 lbs. more than 10 times per day
  • More than 25 lbs. below knees or above shoulders more than 25 times per day
Awkward Postures

Awkward postures can make work tasks more physically demanding, by increasing the exertion required from smaller muscle groups, and preventing the stronger, larger muscle groups from working at maximum efficiencies.

• Goal is to get as close as possible to neutral posture (standing, arms relaxed at sides)

• The increased exertion from the weaker, smaller muscle groups impairs blood flow and increases the rate of fatigue.

• Wrist Example
Awkward Postures

Common Awkward Postures

• Arms above the shoulders
• Flexed wrists
• Twisting wrists
• Bending at the waist
• Elbows out
• Pinch grips
• Twisting the back
• Bending the neck
Awkward Postures
MSD Risk Factors

Repetition/Prolonged Exertion

In repetitive work the same types of motions are performed over and over again using the same muscles, tendons, or joints.

- The amount of repetition can be affected by the pace of work, the recovery time provided (i.e., number and length of muscle relaxation breaks), and the amount of variety in work tasks.

- Continuous application of negligible force
MSD Risk Factors

Repetition/Prolonged Exertion
MSD Risk Factors

Contact Stress

- Repeated or continuous contact with hard or sharp objects such as non-rounded desk edges, unpadded corners, or narrow tool handles may create pressure over one area of the body and reduce nerve function and blood flow.

- Certain areas of the body (palms, wrists, sides of fingers, elbows, knees) are more susceptible due to nerves, tendons and blood vessels close to the skin.

- Use of the hand in place of a hammer is another common cause of contact stress.
MSD Risk Factors

Contact Stress
MSD Risk Factors

Vibration

Exposure to local vibration occurs when part of the body comes into contact with a vibrating object, such as a power hand tool. Exposure to whole-body vibration can occur while sitting or standing in vibrating environments or objects, such as when operating heavy-duty vehicles or large machinery.
MSD Risk Factors

Vibration
Individual Capacities

Each person is unique and there are many individual capacities that may affect their potential for MSD

- Previous Injury
- Age
- Gender
- Attitude
- Work Methods
- Physical Condition
Individual Capacities

Remember that our bodies do not stop functioning when we leave work. Home and recreational activities may also contain risk factors that contribute to MSD’s or make them worse.

- Home computers and video games
- Playing musical instruments
- Weight training
- Landscaping and gardening
- Side jobs
Solutions to Ergonomic Problems

After jobs have been analyzed and risk factors have been identified, the next step is to select the most appropriate control. This can be done using something called the **hierarchy of hazard control**.
Hierarchy of Hazard Control

- Hierarchy of hazard control is used to recommend the most appropriate measure for controlling an observed hazard.
- Always start from the top, and work your way towards the bottom.
- NEVER start at the bottom and work your way up!
Elimination

• Where no hazard exists, no chance of injury or illness exists.

• The hazard is often eliminated through job, part, or workstation redesign.

• Example
  
  • Employees are experiencing shoulder and back injuries due to repetitions tasks of manually stripping floor.

  • Risk factors are eliminated by purchase and use of a riding floor scrubber.
Engineering Controls

- Use engineering controls when you cannot eliminate the hazard or provide a less hazardous substitute.

- Examples:
  - Use mechanical aids (lift tables, hoists) to minimize bending, lifting, etc.
  - Provide adjustable workstations to accommodate employees of different heights.
  - Providing machine guarding.
Administrative Controls

Administrative controls are the management procedures that do not actually eliminate or reduce the hazard, but try to reduce the employee’s exposure to the hazard.

• Examples
  • Training employees on safe lifting techniques.
  • Job rotation for intense jobs.
  • Requiring workers in hot environments to take breaks in cool rest areas and providing fluids for re-hydration.
Personal Protective Equipment

PPE should only be used after all other steps in the hierarchy have been investigated. Many organizations make the mistake of starting with PPE, allowing the hazard to exist and in many cases leaving it up to the employees to protect themselves from hazards.

• Examples
  • Knee pads for kneeling tasks
  • Non-slip footwear
  • Backbelts??
Personal Protective Equipment

• There is no evidence that personal protective equipment for ergonomics, like back belts, does anything to reduce the incidence of lifting injuries (NIOSH, CDC, et al)

• NIOSH Back Belt Working Group Recs:
  • Back belts should not be considered as personal protective equipment.
  • Back belts should not be recommended for use in occupational situations.
School District Ergo Solutions

The following solutions to Ergonomic Risk Factor issues were developed by school district employees!

Solutions do not have to be expensive.

Doing something is better than doing nothing!
Current Operation

Opening lids and throwing trash bags into dumpsters

Risk Factors:
Force
Awkward posture
Localized contact stress
Repetition
Being struck by wind blown lid
Ideas for Improvement

• Inquire if supplier has alternative lid designs
• Provide portable stair
• Provide lid lift/prop

Reduces or Eliminates

• Force (required to lift lid)
• Posture
• Localized Contact Stress
Current Operation

Flipping boxes over to unload cans

Risk Factors
- Force
- Posture
- Repetition
Ideas for Improvement

• Cutting the boxes along the bottom edge

Reduces or Eliminates

• Force
• Posture
Current Operation

Filling carpet cleaning machine with water

Risk Factors:
- Force
- Awkward posture
- Localized contact stress
Ideas for Improvement

• Create a gravity flow tank with an existing cart and plastic barrel

Eliminates

• Force
• Posture
• Localized contact stress
Current Operation

**Filling a steam kettle with hot water using 5 gallon buckets**

**Risk Factors:**

- Force
- Awkward posture
- Repetition
- Localized Contact Stress
Ideas for Improvement

• Install a new hot water line

Reduces or eliminates

• Force
• Posture
• Repetition
Current Operation

Opening 5 gallon buckets

Risk Factors:

Force

Awkward posture

Localized Contact Stress
Ideas for Improvement

• Lid removal tool made especially for removing these types of lids

Reduces or eliminates

• Force

• Posture

• Localized Contact Stress
Additional Resources

Ask your insurance loss control representative

OSHA
https://www.osha.gov/SLTC/ergonomics/index.html

Centers for Disease Control and Prevention
http://www.cdc.gov/niosh/topics/ergonomics/

Oregon OSHA
http://www.cbs.state.or.us/external/osha/subjects/ergonomics.html

Cornell University
http://ergo.human.cornell.edu/default.htm
Questions?

Thank You

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