Ergonomics Awareness Training

Frank Gonzales, M.Ed., CPE
Ergonomics Administrator
Risk Management & Insurance
1. Introduction to Occupational Ergonomics
2. Identifying Ergonomic Risk
3. Work Related Musculoskeletal Disorders
4. Recognizing Ergonomic Issues - Injury Risk Factors
5. Methods of Controlling Ergonomic Risk
6. Ergonomics Program Services at CSU
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Where is Ergonomics?
Rental Car

What’s the first thing you do in a rental car?

• Adjust mirrors, seat, etc. to fit “YOU”!
  • This is **ERGONOMICS**!

• New designs allow for “auto-fit”
  • Automatically adjusts via the “app”

• Camera system, measure you **before you enter the vehicle**
Sprayers

- Common water hose hand sprayers
- No squeeze of trigger
  - Less fatigue to hand, fingers, thumb
- Turn it on, hold, and point
Peelers

- Grip designed for the human hand
- Non slip rubber grip
- Extended handle of at least 5.5”
- Diameter of ~1.2-2.0”
- Serrated edges for finger/thumb
Ergonomics is Everywhere

- Picking up your children
- Shoveling your driveway
- Cooking
- Work
- Riding your bicycle (handle grip diameter)
- Watching TV (remote control design)
  - **Phone design**
Occupational Ergonomics
What is Ergonomics?

Proper posture when looking at the computer makes all the difference!
Ergonomics (NIOSH Definition)

- Ergonomics is the study of people at work
  - Design tasks, work spaces, controls, displays, tools, lighting, and equipment to fit the employee’s physical capabilities and limitations (NIOSH)

- Goals - reduce stress, eliminate injuries, increase productivity and efficiency
Human Capabilities

• Design the job to *meet the capabilities* of workers!
  • Fit the job, task, tools, equipment to the person
Fitting Human Capabilities

• Does this task fit the capabilities of the worker?
  • How fast will knees, legs, shoulders, etc. begin to hurt?

• Is this task designed with the human involved?
Design to Fit Most Everyone

Did they design the workstations to fit?

 Poor design creates barriers
Why Ergonomics...Work Comp Costs

Musculoskeletal Disorders (MSDs) account for:
- 34% of all lost-workday injuries and illnesses
- $1 of every $3 spent on Work Comp costs
- >$15-20 billion in Work Comp costs

According to BLS

*More spent on pain/discomfort losses*
Ergonomics Injuries are #1 at CSU

- 253 # of ergo injuries
- 23% % of claims
- $1,663,319 Total Incurred Cost
- $6,574 Avg cost per ergo injury
- 39% % of total incurred costs

Source: AON - Laser Casualty Diagnostics - CSU Laser Draft 3.0
9-01-2013 through 8-31-2016
More than half of workers reported discomfort at work. $61.2 billion was lost annually. Percentage of occupational injuries which do not appear on the BLS report card.

Reasons for Underreporting:
- Fear of reprisal
- A belief that pain is “part of work”
- Aging
- Lack of management responsiveness
- Fear of losing their job

Employee Underreporting Numbers:
- <5% Reported a work related injury (one year)
- >85% Reported work-related symptoms (pain)
- 50% Had persistent work-related problems
- 30% Reported lost or restricted time

Stewart, W., et al. Lost productive time and cost due to common pain conditions in the US Workforce. Journal of the American Medical Association, 290(18), 2003

It’s Not Just About Work
Lost Wages

It hurts your wallet as well!

Ergonomics

• To “prevent” injuries - address risks, not consequences (injuries)
  • I.e., implement fall protection only after someone falls of a roof

• With proper evaluation & control = prevent injuries, save time & money
Ergonomic Risks
Work Task

• What are we missing here?

• What could you do differently?

• http://www.youtube.com/watch?v=lV-iP1jSMlI
What are we missing?

- Cart
- Dolly
- Sturdy ramp
- Wheelbarrow
- Crane, lift device, etc.
Injury Risks

• Not all hazards or injury risks are as obvious

• Start looking at your job tasks with “ergo glasses”

• Identify injury risks in your job
Ergonomics

• Identify **RISKS** in your job

• Implement **SOLUTIONS**!
Find the problems, Fix the problems

<table>
<thead>
<tr>
<th>Risk Score - Before</th>
<th>Risk Score - After</th>
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</thead>
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<td>1.09</td>
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Find the problems, Fix the problems

<table>
<thead>
<tr>
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<th>Risk Score - After</th>
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</thead>
<tbody>
<tr>
<td>5</td>
<td>2</td>
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</tbody>
</table>
Employee Participation

• The best ideas come from YOU!
Musculoskeletal Disorders
What is a Musculoskeletal Disorder?
MSD’s

- MSD’s are injuries to the soft tissues
  - Muscle, bones, ligaments, tendons, nerves, etc.

- Work-related MSD’s are commonly to the upper body
  - Neck, shoulder, elbows, back, hands, etc.
MSD Injuries

- MSD’s can also be called
  - Cumulative Trauma Disorders (CTDs)
  - Repetitive Strain Injuries (RSIs)
  - Repetitive Motion Injuries

- Can be acute or chronic
  - Repeated trauma over time
  - Acute trauma (lifting a heavy box)
Common MSD’s

- Tendonitis
- Bursitis
- Tenosynovitis
- Epicondylitis
  - Tennis Elbow
  - Golfers Elbow
- Carpal/Cubital Tunnel Syndrome
- Trigger Finger
- Back/Neck Strain
- Herniated Discs
- Shoulder Impingement
Musculoskeletal Disorders/Injuries

• Over time, with repeated trauma, our bodies weaken and damage occurs
  • E.g. Gently squeeze a pop can
    • Squeeze once - little effect
    • Squeeze Repeatedly - permanent damage

• Our ability to function at this point is minimal. (Pain, discomfort, fatigue, etc.)
Pain & Discomfort

- Work does not need to cause pain!
  Fatigue, sweating, heavy lifting ≠ working harder or getting more done

- Punishing the body does not make a better product or improve the service provided
What are Signs & Symptoms of Injury?
MSD Signs and Symptoms

- Fatigue
- Aches and Pain
- Weakness
- Stiffness
- Discomfort
- Tenderness
- Numbness
- Burning
- Tingling
- Swelling
- Body parts “Falling asleep”
- Loss of strength
- Loss of joint movement
- Trouble sleeping due to pain
It’s Not Just About Work
If You Have an Injury/Pain/Discomfort...

• Report signs and symptoms (early)
  • Tell your supervisor
  • Request an ergo eval

• Early intervention is crucial
  • Does not mean you have to visit a physician

• Complete online incident/injury report
  risk.colostate.edu

PREVENT PAIN FROM OCCURRING BY ADDRESSING THE RISKS
Reporting Hazards

• Would you report this?

• Would you try to do it differently?
Reporting Hazards

• Would you report this?

• Would you try to do it differently?
Ergonomic Evaluations are PREVENTIVE!

- Don’t wait for pain!
  - Schedule an evaluation
  - Get to the “root” of the problem

- Find the problem
  - Evaluate the problem
  - Discuss solutions

- Fix the problem
Prevention

• Let’s avoid:

  • Adding fall protection until someone falls off a roof
  • Adding hearing protection until someone loses hearing
  • Adding a lift table until someone ruptures a disc in their back
Identify & Eliminate Injury Risks in Your Job!
Where Do You Report Ergonomic Issues, Injuries, Hazards?
Reporting – Workers’ Compensation Claim

risk.colostate.edu
http://rmi.prep.colostate.edu/insurance/incident-reporting/
491-6745
Reporting – Incident – Not seeking Medical

risk.colostate.edu
http://rmi.prep.colostate.edu/insurance/incident-reporting/
491-6745
Reporting - Safety Concern/Near Miss

risk.colostate.edu

http://rmi.prep.colostate.edu/insurance/incident-reporting/

491-6745
Ergonomic Evaluation Request

risk.colostate.edu

http://rmi.prep.colostate.edu/ergonomics/ergonomic-evaluation-request/

491-6745
Recognizing Ergonomic Issues

Injury Risk Factors
Risk Factors

• Risk factors are conditions of a job that contribute to the risk of developing an MSD

• Exposure does not guarantee injury but increases the chances
  • Smokers = lung cancer
  • Exceeding speed limit = speeding ticket
  • Running a red light = car accident

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Low Risk</th>
<th>Medium Risk</th>
<th>High Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1 Risk Factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Risk Factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-4 Risk Factors</td>
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<td></td>
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</tr>
</tbody>
</table>
Why Identify Ergonomic Risk Factors?

• Ergonomic risk factors are primary culprits for MSDs

• Identifying these risk factors is crucial in
  • Preventing injuries (work & home)
  • Minimize wasted motions
  • Increase productivity
Primary Ergonomics Injury Risk Factors

Repetition + Force + Awkward Postures = Injury (MSD)
Excessive Force Example
Risk Factors Cont.

• Contact Stress
• Cold/heat
• Vibration
• Noise
• Physical Stress
• Emotional Stress
• Etc
Risk Factors

• Exposure seen on a daily basis!

• Identify, report and control risk factors = reduce risk for injury.
Awkward Postures

• Can quickly fatigue the body
• Any part of the body can be affected

• Example
  • How long can you hold your arm above your shoulder (painting)?
  • What happens to your arm/shoulder?
Neutral Posture/Comfort Zone

• No awkward postures (bend, reach, etc.)

• Places the least amount of stress on muscles/joints

• Allows for maximum strength output
Risk Factor Impact
Awkward Postures

How much strength is lost when the wrist is bent?

A. 0-10%
B. 0-20%
C. 0-40%
D. 0-55%
Wrist Deviation (Awkward Posture)

- **Radial**:
  - $0^\circ$, 100%
  - $25^\circ$, 80%
  - $45^\circ$, 75%

- **Ulnar**:  
  - $0^\circ$, 100%
  - $45^\circ$, 75%

- **Extended**
  - $0^\circ$, 100%
  - $45^\circ$, 60%

- **Flexed**
  - $0^\circ$, 100%
  - $65^\circ$, 45%
Power vs. Pinch?

Which is stronger?

Power grip is 5 times stronger

10 lbs

2 lbs
Example

With your neighbor, one of you make the “OK” symbol

Partner try to pull apart
- With wrist straight
- With wrist bent

Which is easier?
Identifying Ergonomic Risk
Which Is Most Likely to Create a Back Injury?
Which Is Most Likely to Create a Shoulder Injury?

A. 

B. 

C.
Which Task Needs the Most Attention?
(Which is the most hazardous job?)

A. Needs to be determined

B. ?

C. Needs to be determined
Ergonomic Evaluation - Quantifies Risk

• Number and colored “risk score” assigned to the task.

• Indicate the “level of risk” associated with the task.

<table>
<thead>
<tr>
<th>Ergo Scoring Key</th>
<th></th>
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<tbody>
<tr>
<td>0-6</td>
<td>Low Risk</td>
</tr>
<tr>
<td>7-12</td>
<td>Medium Risk</td>
</tr>
<tr>
<td>13-18</td>
<td>High Risk</td>
</tr>
<tr>
<td>19-24</td>
<td>Very High Risk</td>
</tr>
</tbody>
</table>
Prioritizing Risk

We 1st evaluate the job & gather data

Now...

Which job task needs the most attention?

<table>
<thead>
<tr>
<th>Final Ergo Risk Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job Task 1</td>
</tr>
<tr>
<td>Job Task 2</td>
</tr>
<tr>
<td>Job Task 3</td>
</tr>
<tr>
<td>Job Task 4</td>
</tr>
</tbody>
</table>
Ergo Risk - Example

Ergo Risk Score: 22

Ergo Risk Score: 11

Ergo Risk Score: 18
Identify Injury Risks Everywhere!
Ergonomics Control Strategies
Controlling Ergonomic Risks

How can we control ergonomic risk?
How to do reduce/eliminate risk factors?
Engineering Controls

• Eliminating the Problem
  • Ideal!

• Add equipment, tools, processes to allow for reduced exposure to risk factors

• Not always feasible
Administrative Controls

• Job rotation
  • Switching tasks/job

• Training
  • Body Mechanics
    • Awareness of lifting & safety techniques
    • Do’s and don’ts
Work Practice Controls

• Training
• Proper use of tools, equipment
• Procedural changes

Likely does **not** eliminate ergonomic risk factors
Ergo Tools Available

Mechanical assistance
Ergo Tools Available

Use a tool with longer handles
Ergo Tools Made by Employees

• Mini-pallet for hand truck
Ergo Tools Made by Employees

Raise and tilt the work
Eng. Control to Reduce Awkward Posture
Eng. Control to Reduce Awkward Posture

Re-orient the object (if possible)
Eng. Control to Reduce Awkward Posture

1. Relaxed shoulders and upper arms
2. Low thumb forces
3. Relaxed hand grip
4. Neutral forearm and wrist rotation
5. Low arm and elbow height

1. Elevated shoulder and upper arm
2. High thumb forces
3. Tight hand grip
4. Supinated forearm, ulnar deviation and flexion in wrist
5. Elevated arm and elbow

Pictures courtesy Vistalab Technologies & Ovation Bionatural Pipette
Ergonomics at Home

• Washer/Dryer elevated
  • Minimize Bending

• Add elevated laundry bin (minimize bending)

• Add wheels (minimize/eliminate bending)
Ergonomics at Home
Ergonomics at Home
Ergonomics
Brainstorming for Solutions

• Meeting to brainstorm for solutions is crucial
  • *There is not always an easy fix*

• Focus on quantity of ideas not quality

• Open discussion of how to fix the problem

• Did we create issues with the solution?
Ergonomics Program Services
Ergo Services Offered to Prevent Injuries

• Ergonomic Evaluation/Ergo Risk Assessment
  • Office
  • Industrial - Non-Office (Lab, Animal Care, Custodial, etc.)

• Customized & Online Training

• Product, Equipment & Design Review
  • Ergo eval of products, equipment, workspaces, etc.

• Equipment Loans (Office Ergo)

• Matching Funds (Funding Reimbursement)
Ergonomic Evaluation

**Office**
- Evaluation of office workstation, equipment, keyboard, mouse, tools & behavior

**Industrial**
- Evaluation of workstation, tools, equipment, reach height/depth, force, weight, distance, etc.

- Identify risk factors, quantify risk, control risk - reduce likelihood for injury
Quantifying Ergonomic Risk

- Ergo evaluation quantifies risk
  - Office or non-office work

- Identify task or employee at highest risk for injury

- Focus on high risk first
  - No “guesswork”

<table>
<thead>
<tr>
<th>Final Ergo Risk Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifting Task 4</td>
</tr>
<tr>
<td>Lifting Task 1</td>
</tr>
<tr>
<td>Lifting Task 5</td>
</tr>
<tr>
<td>Lifting Task 3</td>
</tr>
<tr>
<td>Lifting Task 2</td>
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### Ergonomic Evaluation (Before Changes)

<table>
<thead>
<tr>
<th>Neck</th>
<th>Shoulder</th>
<th>Elbow</th>
<th>Wrists</th>
<th>Feet/Legs</th>
<th>Back</th>
<th>Contact Stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Present</td>
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</table>

### Ergonomic Risk Rating Chart

<table>
<thead>
<tr>
<th>Ergonomic Risk Rating Chart</th>
<th>Final Ergonomic Risk Assessment Score</th>
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<tbody>
<tr>
<td>0-15</td>
<td>Low</td>
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<tr>
<td>16-30</td>
<td>Medium</td>
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<tr>
<td>31-45</td>
<td>High</td>
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<tr>
<td>45+</td>
<td>Very High</td>
</tr>
<tr>
<td></td>
<td><strong>32</strong></td>
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</table>
### Ergonomic Evaluation (Before Changes)

<table>
<thead>
<tr>
<th>Neck</th>
<th>Shoulder</th>
<th>Elbow</th>
<th>Wrists</th>
<th>Feet/Legs</th>
<th>Back</th>
<th>Contact Stress</th>
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</thead>
<tbody>
<tr>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Not Present</td>
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#### Ergonomic Risk Rating Chart

<table>
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<tr>
<th>Rating (0-45)</th>
<th>Level</th>
<th>Post Ergonomic Risk Assessment Score</th>
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<tbody>
<tr>
<td>0-15</td>
<td>Low</td>
<td>Low</td>
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<tr>
<td>16-30</td>
<td>Medium</td>
<td></td>
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<tr>
<td>31-45</td>
<td>High</td>
<td>4</td>
</tr>
<tr>
<td>45+</td>
<td>Very High</td>
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</table>
Matching Funds Program (Office Ergo)

- RMI offers potential reimbursement of 50% (up to $500) in matching funds for office ergonomics related equipment purchases

- Requirements
  - Training
  - Evaluation
  - Application
    - Dashboard for employees to track progress

Instructions

It is your responsibility to ensure each of the below criteria have been completed within the allotted time frames listed. If you do not fulfill the criteria within listed time frames, your application will be void and you will have to complete the process once again.

1. Please complete the Matching Funds Application accessible by means of the links below.
2. Your matching funds application will only be submitted after you have met all other matching funds criteria including - Attendance at an Office Ergonomics Training session and Completion of an Office Ergonomic Evaluation. Note that items expire after the following durations:
   - Application - 90 days
   - Ergonomic Evaluation - 12 months
   - Office Ergonomic training - 5 years
3. After the matching funds application has been submitted, it will be submitted for final approval. The evaluation report will detail both injury risk factors and recommendations and will be submitted to the Physical Safety Subcommittee (PSS) for final review.

Matching Funds Status for: Frank Gonzales

<table>
<thead>
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<th>Criteria</th>
<th>Status</th>
<th>Date</th>
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<td>Application</td>
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<td>Ergonomics Evaluation</td>
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<tr>
<td>Ergonomics Training</td>
<td>INCOMPLETE</td>
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</tbody>
</table>

- Complete - Step completed (no further action necessary on your part)
- Incomplete - Action needed (further action is necessary on your part)
- Pending - Processing (no further action is necessary on your part)
Ergonomics Training
Ergo Training

- Benefits of Ergonomics
- Common Injuries
- Injury Signs & Symptoms
- Injury Risk Factors
  - Understanding Ergonomic Risk
- Controlling Ergonomic Risk
  - Eng vs. Admin Controls
- Proper Technique

- Training can be designed specifically to address the jobs/job tasks performed in the department
Ergo Training Details

- Ergo training will ideally include discussions, demonstration & “on site” “hands-on” training

- Employees will help facilitate and be actively involved in training
  - Increases retention
Ergonomics

- Ergonomics website has a great deal of resources and information
  - Ergonomic evaluation request
  - **Online training**
    - Back Safety, Office Ergo, STF
  - Customized training
  - Back Safety
  - Laboratory Ergonomics
  - Office ergonomics
  - Ergo lab & equipment trials

risk.colostate.edu
Risk Reduction

• Focus on “risks” not “injuries”

• By eliminating risk and “fitting tasks to human capabilities” we should see:
  • ↓ Injuries
  • ↓ Waste
  • ↑ Productivity
  • ↑ Efficiency
Putting on Ergo Glasses

• Start looking at your job and other jobs with ergo glasses on

• Look for the problems
  • We need to see the problems before we solve them

• Don’t just accept them, change them
ANY QUESTIONS?

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491-2724 my office
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