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Ergonomics & Injury Prevention

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Learning Objectives

- Outline National Injury statistics & impact of economy on Work Comp injuries / costs
- Explain cost drivers for Work Comp medical spend
- Analysis of Risk Factors for musculoskeletal injuries
- The concept of injury management vs. injury prevention
- Education on Injury Prevention methods, strategies for successful implementation, and sustainment

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Work Comp Stats & Facts

Source: U.S. Bureau of Labor Statistics for 2013

- Work-related MSD (Musculoskeletal Disorders) are 33% of all work injuries
- Injuries due to repetitive motion highest median lost work days (LWD)
- Sprains/strains due to overexertion are most common type of injury/illness

Economic Impact

Source: **2014 Liberty Mutual Workplace Safety Index**
OSHA SafetyPays website

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- Cost: In 2012- $60 **B**illion dollars

- Average MSD (Strain) claim cost:

Direct Cost	$33,528
Indirect Cist	$36,880
Total Cost	**$70,408**

WC Costs: WC$ = f(X)

- F → Frequency:
- X → Claim Cost (Medical & Indemnity)

Work Comp Costs:

Driving force = frequency x length of claim

So to maximize cost reduction need to address Injury Prevention and Post Injury Management

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Industrial Services Continuum

- Injury Management

- Injury Prevention

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Injury Management Services

- Return to Work Program
  - Acute and Sub Acute Injury Management
  - Work Conditioning/Work Hardening
  - Functional Capacity Evaluation
  - Job Site Analysis
  - Transitional work programs
- Focus on early intervention, functional restoration and RTW.

Injury Prevention

- Stay at Work Services
  - Functional Employment Testing
  - Educational Programs
  - Ergonomics

What Are We Trying To Prevent?

- Accidents and trauma injuries
- Force exertion injuries
- Repetitive motion injuries
- Cumulative trauma disorders
- Over use injuries

How Do These Injuries Occur?

- Stress is applied to the body through participation in specific risk factors without chance of recovery

Risk Factors

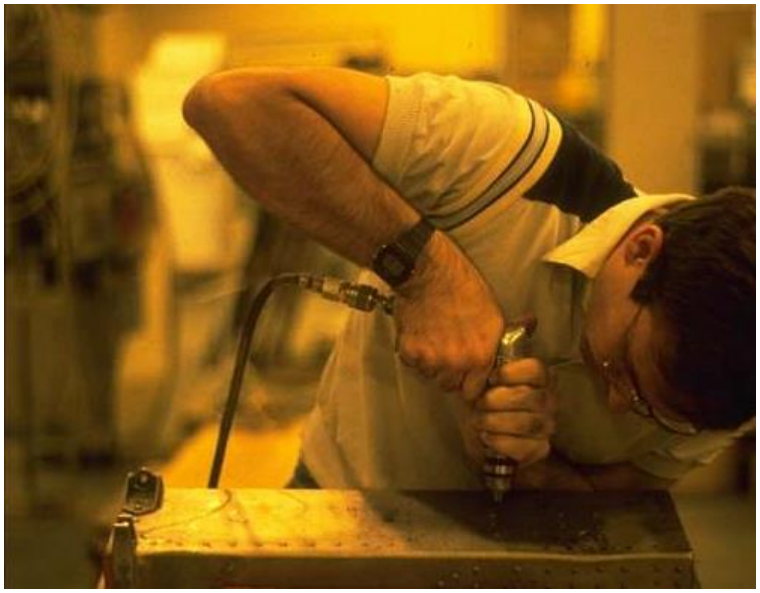
- Defined: Elements of a task or job that are physically stressful to the body and known to contribute to cumulative trauma disorders
- Common Risk Factors:
  - Repetitive Motions
  - Forceful Exertions
  - Awkward postures
  - Contact Stress
  - Inadequate Rest
  - Environmental
    - Vibration/Cold/Stress

Repetitive Motions

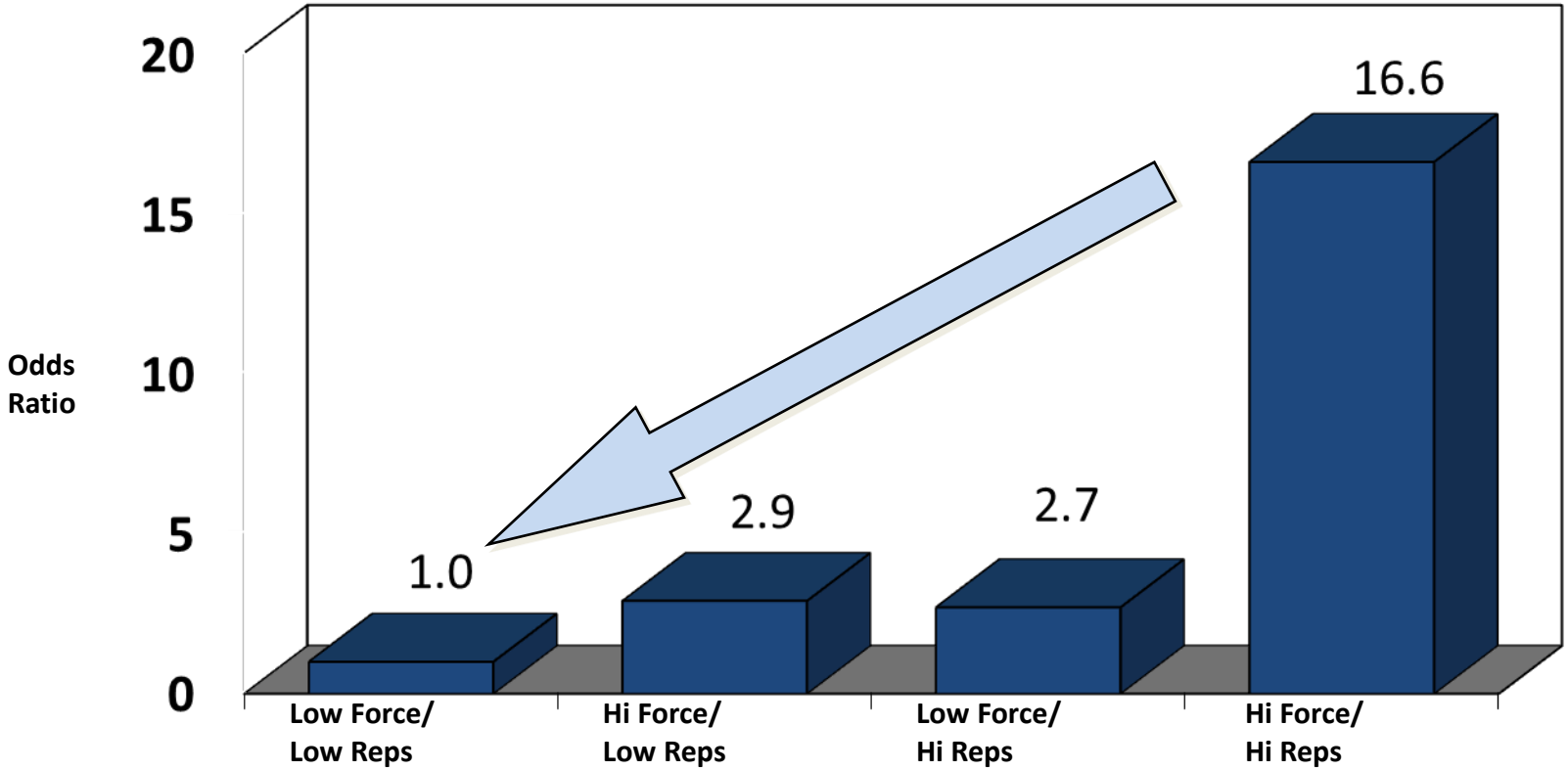
- Motions or exertions repeated during a task
- Risk increases with increase in # of reps
- Repetitive motions include:
  - Back: bending and/or twisting
  - Shoulder: reaching and/or rotating
  - Wrist: bending and/or deviating
  - Fingers: grasping and/or fine motor manipulation
- No specific threshold for # of reps safe vs. risk as dependent on task, force & worker characteristics

Forceful Exertions

- High muscular effort required to perform work task
- Typically: As force requirement increases, risk associated with task increases.
- Forceful exertions include:
  - Lifting
  - Pushing
  - Pulling
  - Carrying



Wrist CTDs - Reps & Force



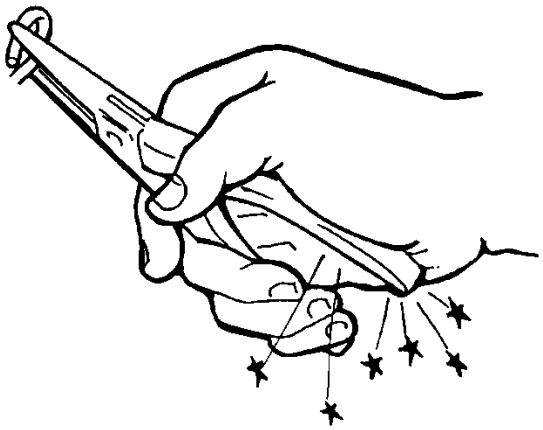
Silverstein 1985

Awkward Postures

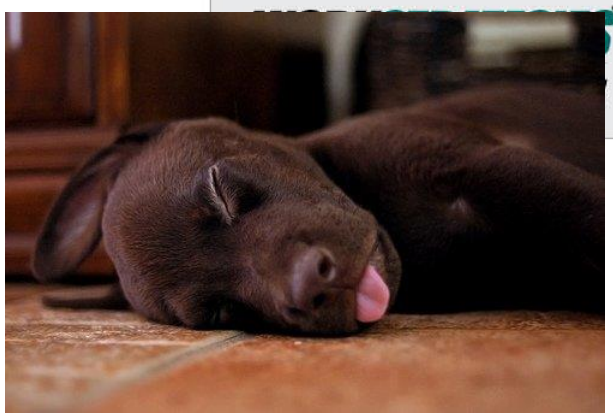
- Activities that requires the joint to deviate from the neutral position.
- Risk increases the further the joint moves away from neutral
- Neutral positions:
  - Spine
  - Shoulder
  - Elbow
  - Wrists/hands

Contact Stress

- Mechanical pressure on soft tissues that impedes blood flow & normal functioning of the muscles & nerves.
- Can occur with:
  - Workstation edges
  - Continuous striking against object
  - Equipment requirements
  - Use of tools



Inadequate Rest



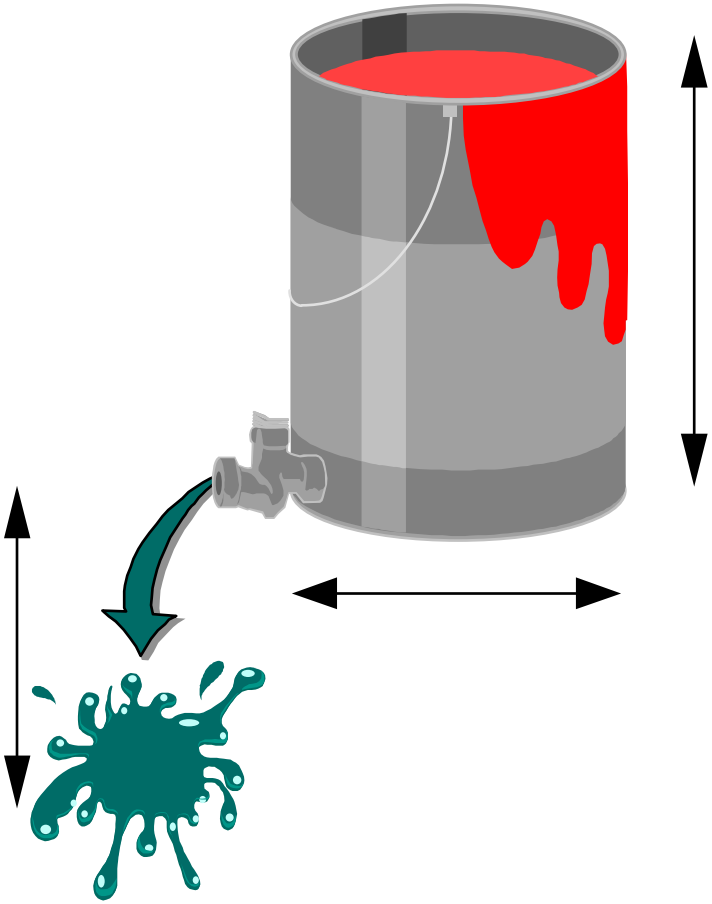
- Continuing activities that stress one part of the body without a chance for rest or change of activity
- Contributing factors:
  - Continuous activity without job change/rotation
  - Extended shift hours / work weeks
  - Sustained positions without change
  - External activities can contribute also: hobbies or lack of sleep @ home

Bucket Analogy

→ Cumulative Trauma: Wear & Tear Exceeds Healing

Personal Factors

- Age
- Gender
- Height/Weight Ratio
- Diabetes
- Thyroid Disease
- Hormonal Status



Risk Factors & CTD

- CTD (Cumulative Trauma Disorder) potential increases with exposure to multiple risk factors
- Conversely, decrease or elimination of even one Risk Factor can decrease injury risk
- Good news: CTD are preventable & least costly injury is one that never occurs

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Injury Prevention Strategies

1. Employment Testing Programs
2. Educational Programs
3. Ergonomic Programs

For each, will provide overview of program, peer reviewed literature, discussion of why programs succeed or fail and strategies to maximize program success & Return on Investment.

Employment Testing Program

- Goal of employment testing is to select workers who demonstrate the physical ability to perform the job and screen out employment candidates who cannot meet the physical demands of the target job
- This is an injury prevention process but needs collaboration between HR, safety & legal departments.

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Why Employment Testing?

http://www.bls.gov/news.release/archives/osh2_11262013.pdf

This is a quote from the BLS News release from Nov 2013

- **Length of service-** Among private industry workers, injuries and illnesses to workers with fewer than 3 months of service and 3 to 11 months of service accounted for 30 percent of all cases. The number of injury and illness cases for workers with fewer than 3 months of service increased 8 percent—notably in manufacturing with a 9 percent increase. Workers with 3 to 11 months of service had a 5 percent increase in the number of cases—notably in retail trade with an 18 percent increase.

- Indicating- the number of injuries and illnesses in newly hired workers is increasing and the solution is Functional Employment Testing.

Why Employment Testing?

This study indicates that physical capacity testing that compares lifting ability to job lifting requirements correlates to work injury incidence.

The application of appropriate post-offer, pre-placement testing is shown to be a cost-effective method to lower the incidence of work-related injuries.

Wiley-Liss, Inc. Am. J. Ind. Med. 47:296–307, 2005.

Employment Testing Considerations

- Laws relating to employment testing:
  - Title VII of Civil Rights Act of 1964
  - Age Discrimination in Employment Act of 1967
  - Title I of the Americans with Disabilities Act 1990
  - EEOC Uniform Guidelines on Employee Selection
  - ADA Amendment Act
  - Collective Bargaining Agreements

Employment Testing

- Employers can use physical tests to screen out employees, IF:
  - They are job related (not just industry related)
  - They are consistent with business necessity
  - Test has the least adverse impact

Employment Testing Considerations

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- Hiring Stage
  - Pre-Offer
  - Post-Offer
  - Post Employment
- Safety within Protocols
- Validation Process
- Testing Content

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Employment Test Benefits

- Screen out applicants without strength to meet lifting demands of job
- Screen out applicants without adequate endurance
- Screen out applications who cannot meet positional demands of job
- Screen out medically unstable clients
- Identify pre-existing history and pre-injury baseline status

Employment Testing Pro's & Con's

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- Average Return on Investment of program is 4:1 to 10:1 with cost savings
- Employers have experienced substantial savings with reduced WC costs as well as increased productivity, reduced turn-over and can have reduced insurance premiums
- If set up / administered in discriminatory fashion, can have substantial penalties (Dial Case)

Maximizing Success of Employment Testing

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- Use a third party to development & administer the test
- Ensure validity of screening process
- Collect & track data
- Standardized process
- Have no “unhealthy fear”
- Update program with changes in jobs
- Focus on safety in the process
- Consider your choices of testing

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Educational Programs

- Focus is to train employees to take active responsibility for their own safety
- Objectives:
  - Recognize risk factors & safety risk situations
  - ID ways to eliminate safety risks
  - Demonstrate strategies to minimize stress accumulation with work-related activities
  - Develop strategies for program success

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Education – Lifting Programs

Education – Strength and Conditioning Programs

Educational Programs

- Examples:
  - Job Specific injury prevention program
  - Focus on a specific risk- Ex. Slips and Falls
  - Wellness education
  - Posture & body mechanics education
  - Spine education / back school
  - Stretching / exercise education

Educational Programs

- Injury reduction has been reported in multiple sites by employers utilizing education programs
- Content of education program vitally important
- Efficacy of injury prevention through education is disputed in literature review
- Kingma et al in *Physical Therapy* did in-depth investigation of 4 lifting postures and there was no one technique for all positions
- Certain stretching activities can actually lower muscle output up to 1 hour after ex
- Warm-up exercises actually increase muscle output and joint mobility

Education – Strength and Conditioning Programs

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Center for Transportation Research at The University of Texas at Austin – March 2014

- Research studies have shown that muscle strengthening exercises can reduce workplace strain/sprain-related incidents. However, most of the Stretch and Flex programs currently being implemented involve more stretching than flexing.

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Patrick S. Clarke - Risk Engineering Manager, Zurich Services Corporation

Based on Zurich's experience with more than 100 companies implementing workplace stretching programs, the results are dramatic: an overall **61%** reduction in strain/sprain frequency and **30%** reduction in strain/sprain severity.

These savings can often add up to **100 - 150%** of direct costs.

Education-Implementation options:

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- Direct education on-site by external expert
- Train-the-trainer process
- Ongoing on-site injury prevention presence
- Development of educational tools (poster, video, etc.)

Maximizing Success of Educational Programs

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- Management commitment / involvement
- Employee involvement to ensure job related
- Effective expert consultation – knowledge and awareness of jobs/industry
- Include practical application education
- Repeat the message over and over throughout the program (not just one day)
- Positive reinforcement / reward

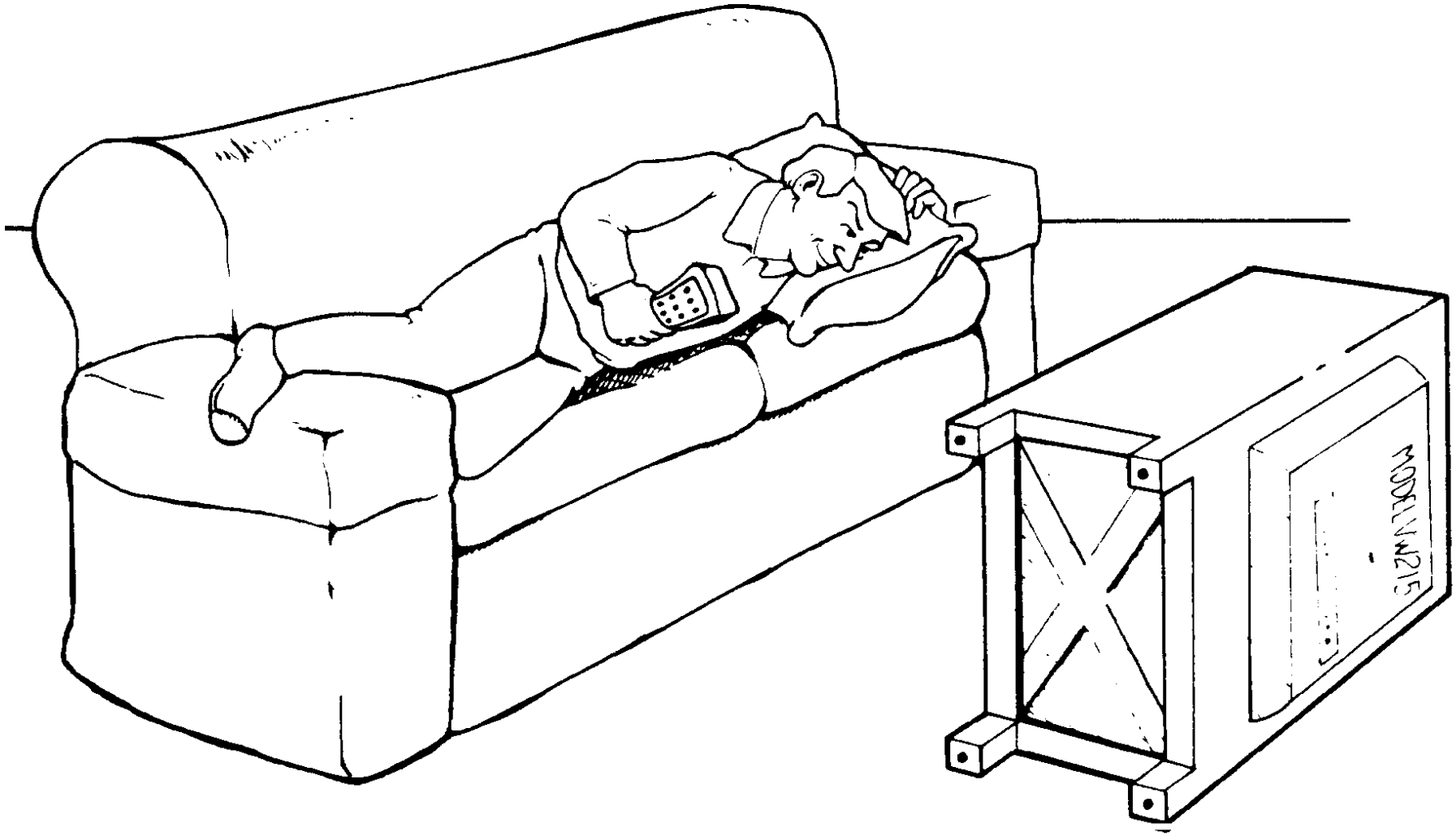
Education: Maximize Success

- Avoid "canned" presentations
- Make sure it is applicable to target audience
- Avoid "flavor of the month" mentality – this is here to stay
- Strategize best ways to get message out to everyone

Typically educational programs are low in cost, therefore reduction in severity of one MSD/CTD would more than cover cost.

Ergonomics Program

- Defined: Ergonomics is the application of administrative or engineering controls to design the work environment to accommodate the employee.
- Administrative controls: procedures & methods for how work is set up including job rotation or work pace.
- Engineering controls: physical changes to the job or equipment such as altering tool design, adjustable workstations, or decreasing material handling demands.



Ergonomic Principles

- Start with Job Analysis: on-site evaluation of risk factors through observation of work processes and employee work behaviors
- Educational programs and Post Offer Testing programs also start with Job Analysis.

Encouraging Investment in Safety

- Ergonomic costs are minimal compared to injury costs!
- Large majority of ergonomics interventions are very low cost

Ergonomics

- Reducing or minimizing one risk factor especially on a task performed over majority of day can have significant impact
- Common ergonomic interventions:
  - Adjusting work surface heights
  - Varying worker tasks during job
  - Short breaks during continuous activity
  - Lowering lift demands or providing lift assist
  - Tool / equipment design to minimize stress

Ergonomic Outcomes

- Journal of Occupational Medicine: Snook et al (1978) – found Ergonomics to be most effective method of injury reduction
- Pitfalls:
  - Expensive equipment that stays in closet
  - Expensive equipment no one knows how to use
  - Job rotation program that is ignored
  - Job rotation program that doesn't "rotate"
  - Available breaks aren't taken

Maximizing Success of Ergonomic Programs

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- Systematic approach to interventions:
  - Identify Risk Factors for Type/Intensity
  - Propose & Implement Ergonomic Solutions
  - Monitor & Modify the Solution
- Workstation adjustability
- Employee involvement in process / interventions
- Employee education process
- Variability with interventions/equipment
- Enforcement of the program
- Transition in new process / equipment

Ergonomic programs can be more costly than educational but typically program/equipment cost covered by reduction of 1-2 injuries and often lead to productivity increase.

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Parting Considerations

- There are many approaches & programs available for Injury Prevention
- Key to success is to customize program to be a solution to YOUR needs.
- Enter interactive discussion/partnership with your IP program provider to ensure YOUR goals are met.
- Provide data on your injury / cost history so solution based approach can be instituted.
- Continue the discussion throughout and especially after program to ensure success.

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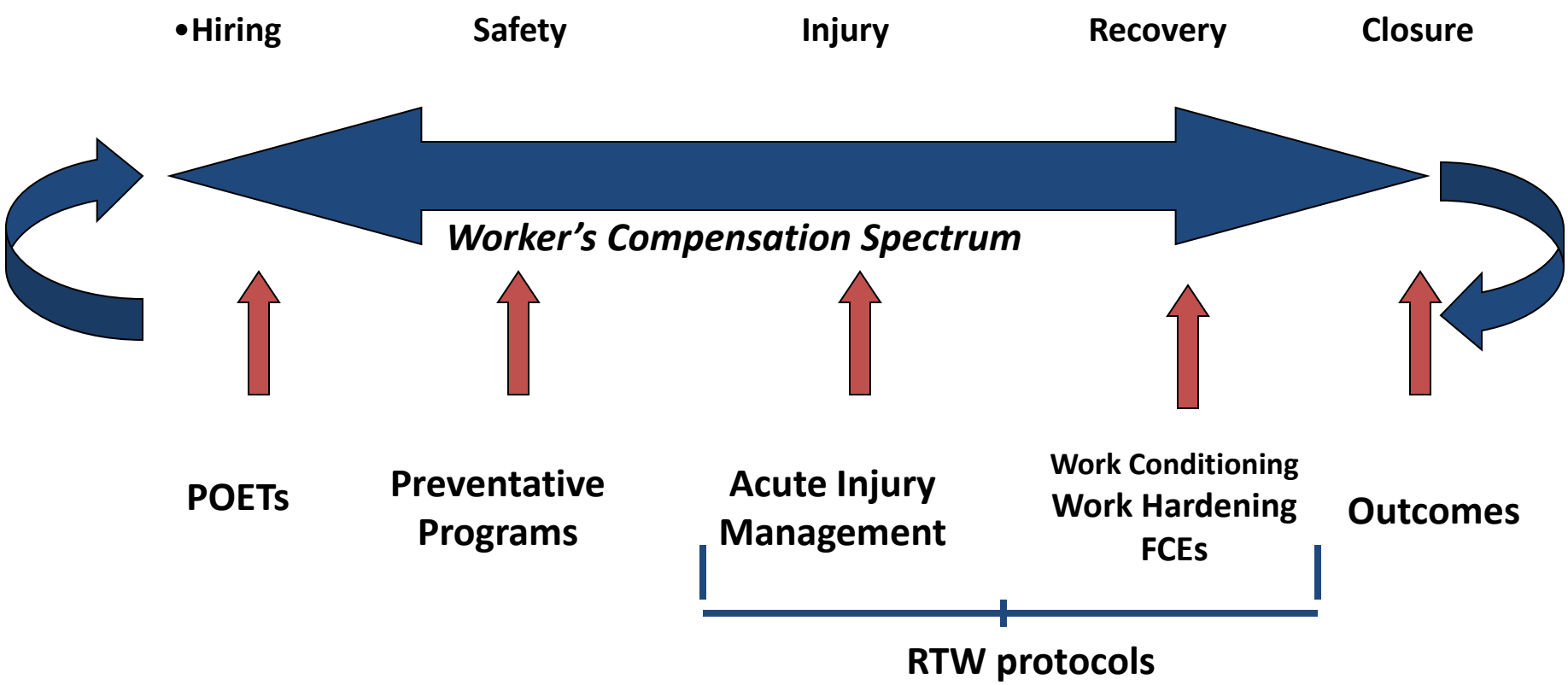
Value Proposition

Reduce Percentage of EEs not working at full capacity



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