




*Welcome to today's
Back Injury Prevention Webinar*

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Introduction 

Learning points:

- How the back works
- Understanding forces on the back
- Awareness of common back injuries and how they occur
- Safe Lifting Techniques
- What you can do to prevent an injury




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Facts and Statistics – Low Back Pain 

- Low back pain is the most common work-related medical problem in the United States and the second most common reason for doctor visits among U.S. citizens,
- It affects more than 20 million Americans and is the leading cause of disability among people ages 19 - 45
- Low back is the No. 1 leading cause of missed work days, costing Americans \$60 billion per year in treatments and American businesses about \$15 billion annually
- It's estimated that at least 80 percent of all Americans will experience some form of low back pain at some point in their lives

**National Center for Health Statistics.*





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Facts and Statistics

Loss time due to Back Injuries



- Injuries and illnesses to the back made up **62%** of the days-away-from-work cases
- Back injuries account for nearly **20%** of all injuries and illnesses in the workplace
- Back injuries cost the nation an estimated **20 to 50 billion dollars** per year
- On stairways alone, falls result in over **two million** disabling injuries yearly



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The Spine's Basic Functions

- Providing support
- Protecting the spinal cord
- Providing flexibility to allow bending and rotation



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Your Spine

- The spine includes vertebrae (bones), discs (cartilaginous pads or shock absorbers), the spinal cord and nerve roots (neurological wiring system), and blood vessels (nourishment).
 - Ligaments link bones together
 - Tendons connect muscles to bones and discs
 - Ligaments, muscles, and tendons work together to handle the external forces the spine encounters during movement, such as bending forward and lifting.



Ligament



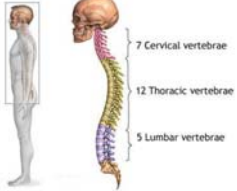
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Human Anatomy – The Spine

The human spine consists of 3 major regions


- Cervical Spine
 - supports the neck, tilts, bends and turns the head
- Thoracic Spine
 - supports the mid-back, ribs and is limited in flexibility
- Lumbar Spine
 - supports the lower back and carries most of the body weight. Under constant stress when you sit, stand and to some extent when you lay down on your back.

(Coccyx - responsible for positioning of pelvis and therefore the rest of the spine)




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Human Anatomy – Cartilaginous Discs



The spine also includes Cartilaginous Discs that sit between each bone in the spine. Each disc is made up of two parts – the tough outer layer called the **annulus** surrounds a mushy moist center termed the **nucleus**.

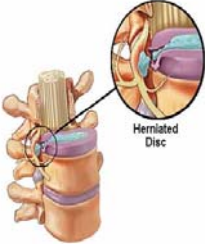
A variety of nerves that run through body start from the brain and run through the spine. The main cord that runs through the spine is known as the **spinal cord**.




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Disc Problems

- In between each of the five lumbar vertebrae (bones) is a disc, a tough fibrous shock-absorbing pad. Endplates line the ends of each vertebra and help hold individual discs in place.
- Excess spinal pressure can cause these discs to be compressed until they rupture.
- Disc herniation occurs when the annulus breaks open or cracks, allowing the nucleus to escape. This is called a **Herniated Disc**.




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Disc Herniation Factors

Factors that increase risk of disc herniation include:

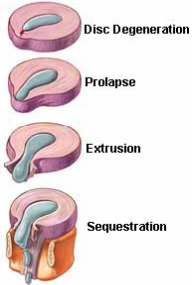
- Lifestyle choices such as tobacco use, lack of regular exercise, and inadequate nutrition substantially contribute to poor disc health.
- As the body ages, natural biochemical changes cause discs to gradually dry out affecting disc strength and resiliency.
- Poor posture combined with the habitual use of incorrect body mechanics stresses the lumbar spine and affects its normal ability to carry the bulk of the body's weight.




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Disc Degeneration

- **Disc Degeneration:** chemical changes associated with aging causes discs to weaken
- **Prolapse:** the form or position of the disc changes with some slight impingement into the spinal canal. Also called a **bulge** or **protrusion**.
- **Extrusion:** the gel-like nucleus pulposus breaks through the annulus fibrosus but remains within the disc.
- **Sequestration** or **Sequestered Disc:** the nucleus pulposus breaks through the annulus fibrosus and lies outside the disc in the spinal canal (HNP).



Disc Degeneration
Prolapse
Extrusion
Sequestration




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Disc Problems

- Combine these factors with the affects from daily wear and tear, injury, **incorrect lifting, or twisting** and it is easy to understand why a disc may herniate.
- A herniation may develop suddenly or gradually over weeks or months.

Lifting something incorrectly can cause disc pressure to rise to several hundred pounds per square inch!

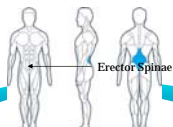



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Human Anatomy – Skeletal Muscle

Important Muscles

- Latissimus Dorsi
 - Lower back extension
- Erector Spinae
 - Deep tissue extensor
- Rhomboideus Major & Trapezius
 - Upper body extension



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Human Anatomy – Skeletal Muscle

Important Muscles

- Rectus Abdominis
 - Spine flexor
 - Located in the middle of the stomach
 - Assists the back during lifting
- Internal & External Oblique
 - Allows "twisting" and "side to side" motion of the trunk
 - Supports back during lifting



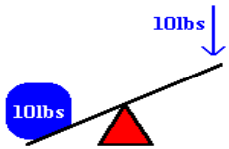
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Forces on the Back

The amount of force you place on your back in lifting may surprise you!

Think of your back as a lever.

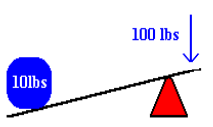
With the fulcrum in the center, it only takes ten pounds of pressure to lift a ten pound object.



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Forces on the Back

If you shift the fulcrum to one side, it takes much more force to lift the same object. Your waist acts like the fulcrum in a lever system, on a 10:1 ratio.

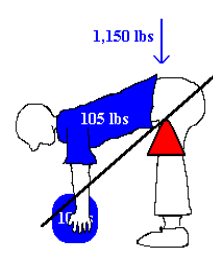


Lifting a ten pound object puts 100 pounds of pressure on your lower back.

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Forces on the Back

When you add in the 105 pounds of the average human upper torso, you see that lifting a ten pound object actually puts **1,150 pounds** of pressure on the lower back.



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How Do Injuries Occur?

- Acute
 - Immediate
 - Trauma
 - Poor Posture
- Cumulative
 - Over time
 - Repetitive Motion
 - Poor Posture

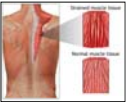


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Common Back Injuries – Strains vs. Sprains


Strains


- Strains affect the muscle and/or tendon that attaches to the bone
- Injuries are typically acute resulting from an over stretched or over contracted muscle and/or tendon
- Back strains are the most common forms of back injury



Sprains

- Sprains involve a stretching of the ligament or joint capsule
- Injuries are also derived from acute overexertion to the joint complex



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Common Causes of Back Injuries

- Twisting at the waist while lifting or holding a heavy load:
 - Loading materials, using a shovel
- Reaching and lifting
 - Over your head, across a table
- Lifting and Carrying objects with odd shapes
 - Liquids, people
- Working in awkward positions
 - Bent over
- Sitting or standing too long in one position
 - At a computer
- Slipping and falling




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Lifting Risk Factors and Proper Techniques



I'm really careful with my **back** these days, I use any means available to avoid **heavy** lifting.

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Lifting Risk Factors

The **main risk factors**, or conditions, associated with the development of injuries during lifting activities include:

- Awkward Postures (i.e. Bending, twisting)
- Repetitive Motions (i.e. Frequent lifting, carrying, reaching)
- Forceful Exertions (i.e. Heavy Loads)
- Static Postures (i.e. Fixed position for an extended period of time)



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Safe Lifting Techniques

! If at all possible...
Try to avoid lifts from the floor

If you must lift from the ground level:

1. Bend your knees in the squatting position
2. Pull and keep the load close to the body
3. Lift by pushing up with your legs

Lifting in this manner will distribute weight among the quadriceps opposed to back muscles



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Safe Lifting Techniques

 **Team Lifts** can reduce half the weight with large or bulky objects

When team lifting be sure and plan the movements ahead of time to reduce surprises

Note: It would be ideal to find a co-worker with similar height



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Safe Lifting Techniques


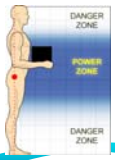
Organization is Key

It is best to store heavier or bulkier items in the **power zone**

Lighter items can be stored higher or lower

The **power zone** for lifting is between mid-thigh and mid-chest height

Comparable to the strike zone in baseball, this zone is where arms and back can lift the most with the least amount of effort




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Prevention of Back Injuries – Mechanical Devices

Some industries have the need for **mechanical devices** to assist in lifting. These devices take away close to all the risks of lifting.

People who oppose the use of mechanical devices argue they are:

- High in costs
- Large learning curve
- Bulky in size and take up space



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Prevention of Back Injuries – Assistive Devices

Less technical devices can still assist worker's in lifting. Some may argue that these devices are more practical.

- Hand Trucks
 - Specialty hand trucks even come with hand brakes
 - Other hand trucks can convert to four wheels
 - Some hand trucks are specially designed for cylinders
- Platform Trucks
 - Evenly distribute weight
 - Allow users to push instead of pull



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Prevention of Back Injuries – Assistive Devices

Non-Mechanical Devices are constantly being developed and improved. These devices typically consist of straps and/or belts that allow the user maintain posture while lifting large objects



Other Non-Mechanical Devices that use leverage or magnets work to make everyday tasks easier and safer



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Are Back Belts Good for You?

Physical Implications

- Prolonged use of back belts have been known to cause atrophy in back extensor muscles (Department of Defense, 2005)
- Mechanical compression to the abdomen, forces blood away from the trunk
 - Blood then travels to upper or lower extremities causing a rise in blood pressure (Department of Defense, 2005)

Mental Implications

- The tighter the back belt is worn the heavier the capacity the participant is willing to lift (Yi-lang, 2002)



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Stretching



- Stretching has a variety of benefits!
 - Increases blood flow
 - Increases flexibility
 - Encourages movement throughout the day
- Remember when stretching to:
 - Do not work through breaks
 - Take mini-breaks throughout the day
 - Perform a different task for a few minutes
 - Stretch during the day
 - Hold a stretch for 5-30 seconds
 - Stretch to the point of mild tension

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Lower Back Stretch

- While seated, cross your right leg over your left leg
- Rest your left elbow/forearm on the thigh of your right leg
- Look over your right shoulder
- Gently twist your torso toward the right side and hold for 20 seconds
- Repeat steps 1 - 4 with the opposite side




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Avoid Slips, Trips and Falls

Slip, trips, and falls are root causes of many injuries yearly, therefore employer's with manual handling employees should take special precautions in safety.


Look out for:

- Wet surfaces
- Smooth surfaces
- Unstable surfaces
- Hazardous objects
- Unclear pathways





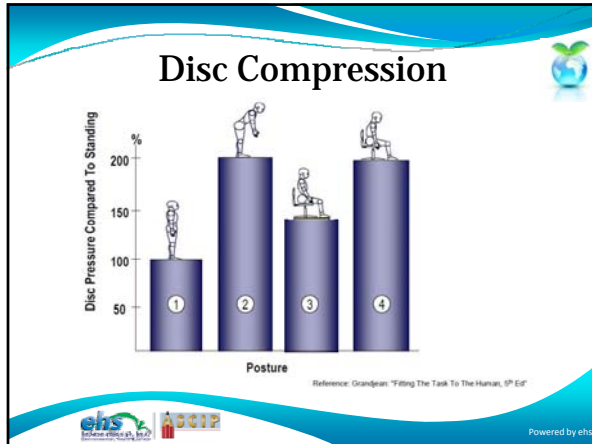
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Seated Workstations



BAD POSTURE (EXAMPLES OF)

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Seated Workstations

- Sitting with your body at 90-degree angles all the time this is not the healthiest way to spend a workday
- Fixed postures generate fatigue
- Recline when you can
- Frequent positional changes are vitally important to good health

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The Task Chair

- Height – feet firmly on the ground or on a footrest
- Adjust seat pan to allow you to sit all the way back in the chair
- Adjust backrest height so that the lumbar support is in the curve of your back
- Adjust the angle of the backrest so that you are comfortably supported
- Adjust tilt/rock feature to allow movement when you're performing non-typing tasks




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Chair Adjustment: Before and After



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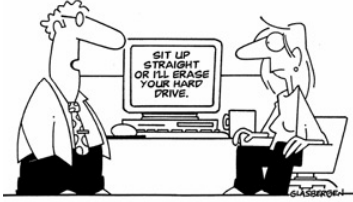
Example of Proper Upper Extremity Posture







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Avoiding Injury

© 2006 Randy Glasbergen, www.glasbergen.com





"It's called Ergonomics."

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What Can I Do?

- In Standing Posture:
 - Keep your spinal column aligned in its natural curves
 - Prop one foot up on a footrest, stool or bar to reduce stress on the lower back



What Can I Do?

- Lift with Common Sense:
 - Assess the situation
 - Is the load big, bulky, heavy?
 - Do you need help?
 - Is the path clear?



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What Can I Do?



- Do I need equipment to move it?
 - Hand truck
 - Dollies
 - Carts
 - Chairs
 - Can I slide it instead of lifting it?



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What Can I Do?



- **Must I twist or stretch to get it?**
 - Readjust the load or position before you lift.
 - Use a step stool or ladder when items are overhead
 - Squat instead of bend when items are below the knuckle
 - Get help!



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What Can I Do?


- **Shift Positions Often**
 - Shift your posture
 - Keep your body flexible (not rigid or fixed)
 - Stretch frequently throughout the day
 - Don't force your body to conform



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Suggestions for Preventing Back Injuries




- **Lifting tasks** –
 - Utilize proper lifting techniques
 - Minimize the weight of the load
- **Carrying tasks**
 - Eliminate carrying by utilizing assistive devices
- **Reaching tasks**
 - Move items closer to reduce reaching
- **Pushing/pulling tasks**
 - Minimize forceful exertion by using equipment that moves easily
- **Sitting tasks**
 - Adjust your chair to offer proper lumbar support
 - Change positions
- **Standing tasks**
 - Elevate one foot on a footrest or stool to relieve pressure on the back



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What Can I Do?



- Personal Factors:
 - Loss of body flexibility
 - Poor physical condition
 - Previous episode of back injury
 - Smoking
 - Restricts blood vessels cutting off the blood supply to the vertebrae
 - Healing takes much longer



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Summary

- How the back works
- Awareness of common back injuries and how they occur
- Understanding forces on the back
- Safe Lifting Techniques
- What you can do to prevent an injury



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Questions?



Websites
ehs International, Inc.
www.ehsinternational.org
ASCIP
www.ascip.org



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