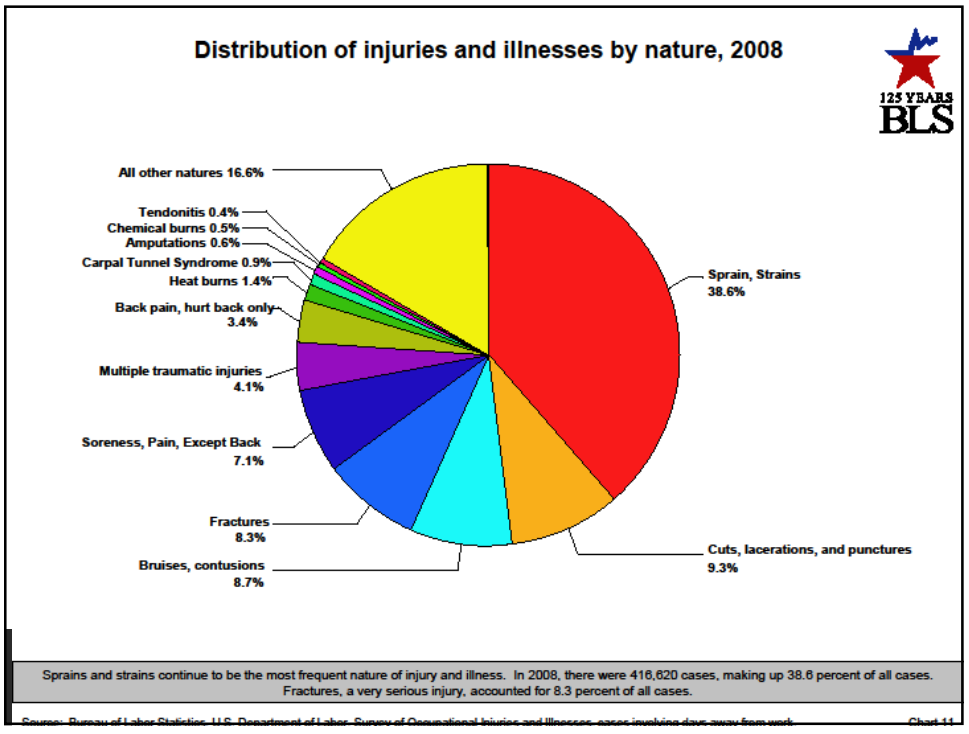
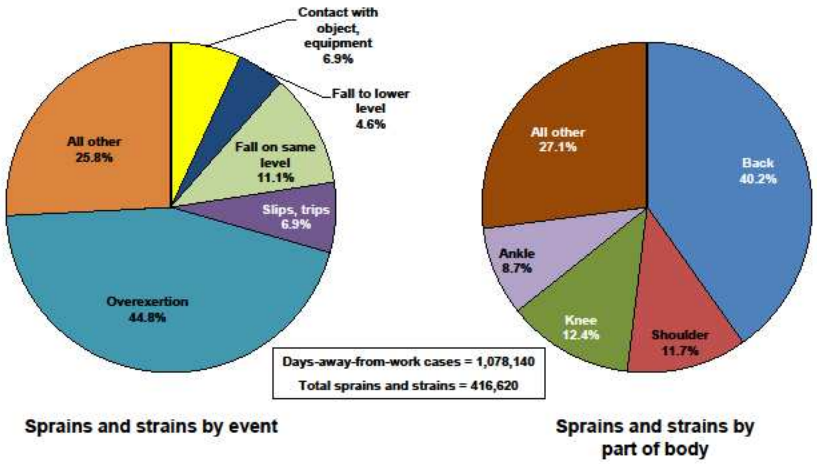
# Strain & Sprain Injuries: Prevention Techniques

Danielle Denne CSP, MPH

WCF



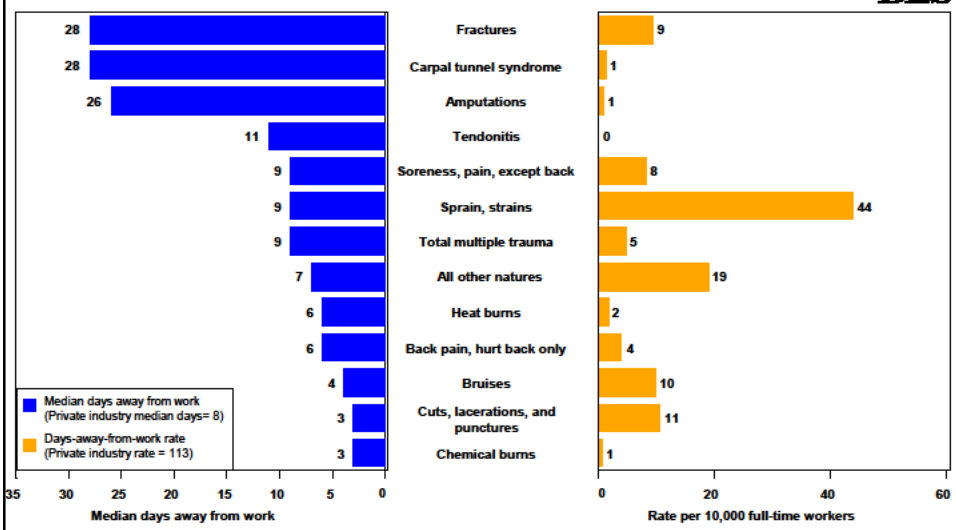
## Sprains and strains by event or exposure and part of body, 2008




Sprains and strains made up nearly 4 out of 10 injuries. Overexertion was a common event causing this. Most of these cases affected the back.

Source: Bureau of Labor Statistics, U.S. Department of Labor, Survey of Occupational Injuries and Illnesses, cases involving days away from work. Chart 12

## Median days away from work and incidence rate due to injuries and illnesses by nature, 2008



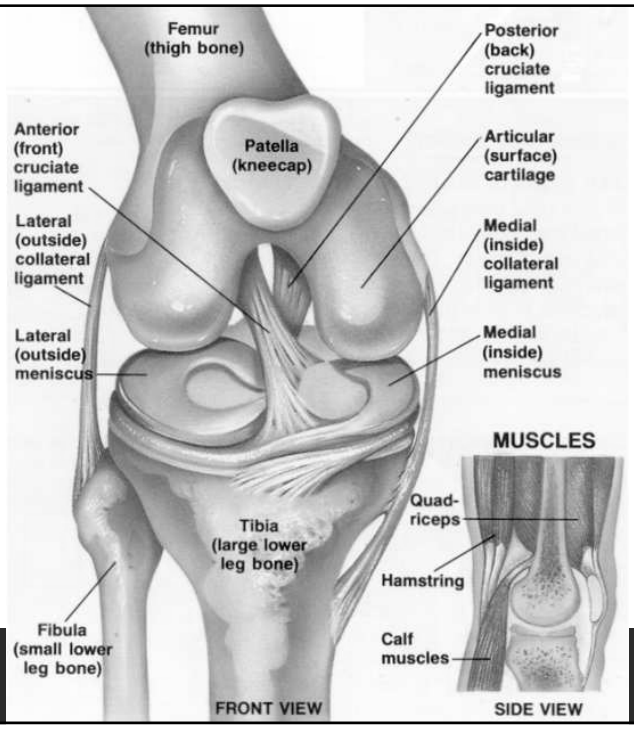

In 2008, fractures and carpal tunnel syndrome were the most severe natures of injury and illness, with median days of 28 days away from work to recover. Amputations had 26 days away from work to recover.

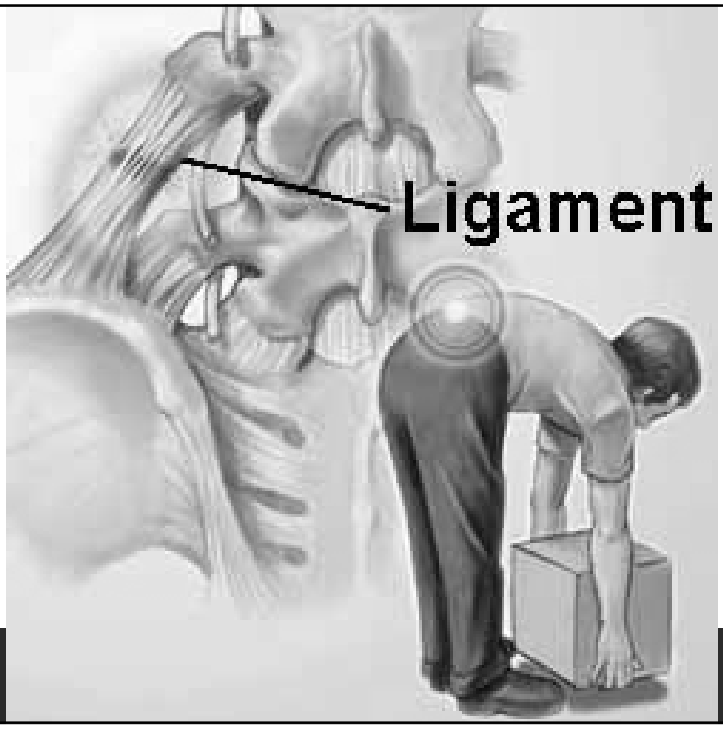
Source: Bureau of Labor Statistics, U.S. Department of Labor, Survey of Occupational Injuries and Illnesses, cases involving days away from work. Chart 13

# What is a sprain?

A sprain is a stretch and/or tear of a ligament, the fibrous band of connective tissue that joins the end of one bone with another. Ligaments stabilize and support the body's joints. For example, ligaments in the knee connect the upper leg with the lower leg, enabling people to walk and run.

WCF

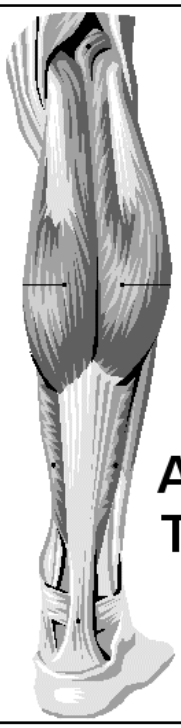





## What is a strain?

- A strain is a twist, pull and/or tear of a muscle and/or tendon. Tendons are fibrous cords of tissue that attach muscles to bone.

WCF




## What is muscle soreness?

Sore muscles result primarily from micro-tears in the muscles from muscle overexertion.

WCF

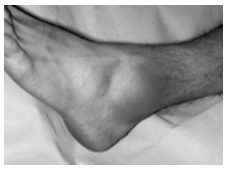
## What Causes Sprains?

- Direct or indirect trauma
- Knocks a joint out of position, and overstretches, in severe cases, ruptures the supporting ligaments

WCF

## What are the signs of a sprain?

- Pain
- Bruising
- Swelling
- Inflammation
- Feel a “pop” or tear in joint
- Some instability or loss of use



WCF

## What Causes Strains?

- Overuse of muscles & tendons
- Inadequate rest breaks
- Direct blow to body
- Overstretching
- Excessive muscle contraction

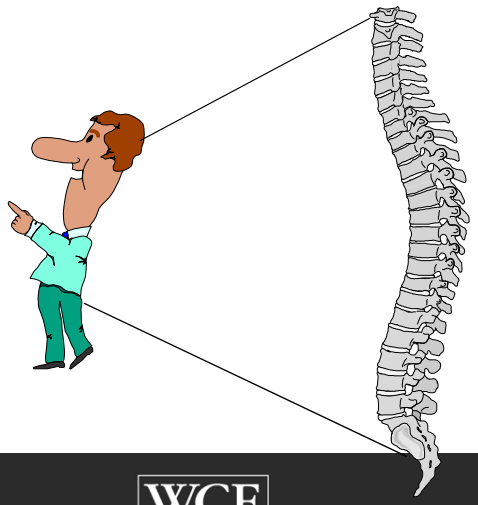
WCF

## What are the signs of a strain?

- Pain
- Muscle spasm
- Weakness
- Swelling
- Inflammation
- Cramping
- Can incapacitate a person

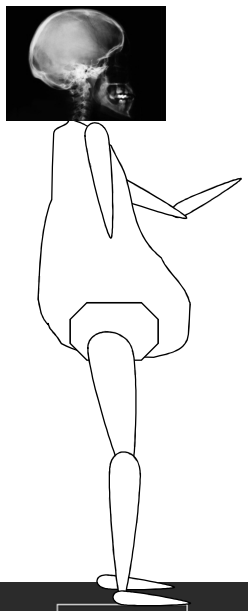
WCF

# Back Injury Prevention



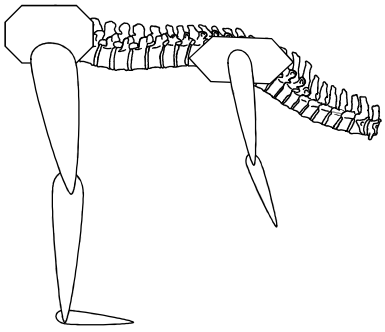
WCF

WCF



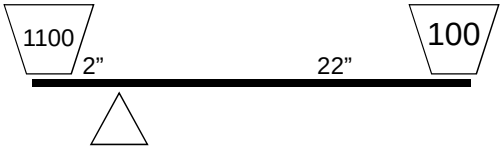
WCF

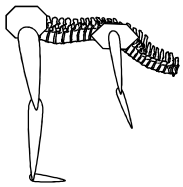
## Poor Lifting



WCF

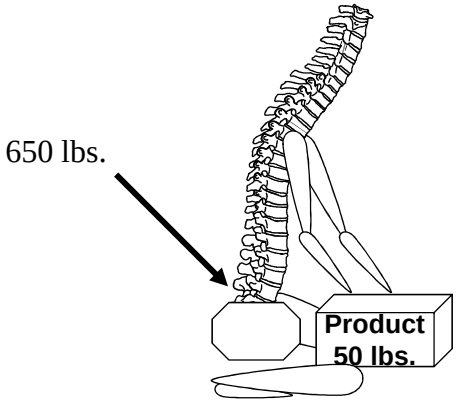
# Effect on Back



**1200 lbs.**

WCF




WCF

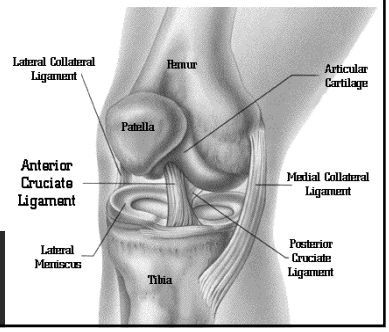
# Proper Lifting

- Bend your knees
- Test the Weight
- Get a Firm Grip
- “HUG” the Load
- Keep it Straight

WCF

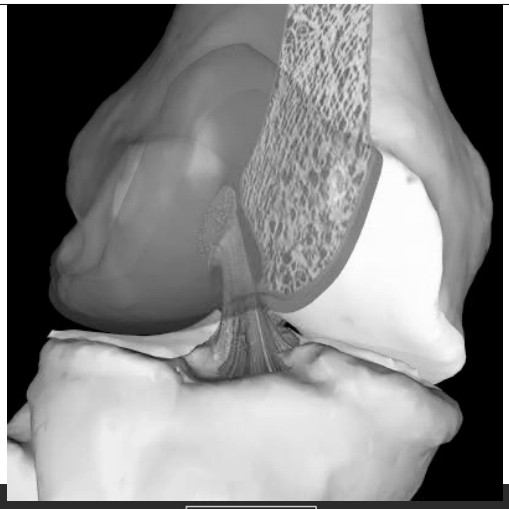
# Knee Sprain & Strain

- Not always told which ligament is injured
- Could be ACL, MCL, or PCL
- Some feel a “pop”
- Knee “gives out”
- Blow to the knee




WCF

## How the knee moves



WCF

## Questions for the Doctor

- Where is the sprain located and how severe is it?
- What treatment do you recommend?
- What rehabilitation program do you recommend?
- Will surgery be recommended?
- Can conservative treatment be tried first?
- Will the knee ligaments be permanently weak or susceptible to injury?

WCF

## Treatment for knee injury

- Ice
- Anti-inflammatory meds
- Cortisone injections
- Surgery in worst case

WCF

## Shoulder Sprain & Strain

- Tearing can occur
- Weakness in a shoulder
- Inability to raise an arm as high as other
- Rotator cuff tear
- Age = Rheumatoid Arthritis

WCF

## Causes of Shoulder Injuries

- Falls
- Not warming up muscles
- Underuse
- Lack of exercise
- Impingement (like CTD)
- Instability

WCF

## Treatment

- RICE
- Rest body part
- Ice: 20 min on 20 min off for 24-48 hrs
- Compression
- Elevation
- Crutches & exercises in more severe cases

WCF

## Alternative Treatment

- Vitamin C & Bioflavonoids (antioxidant)
- Whole grain, fresh fruit, vegetables
- Tumeric & bromelain in pineapple (anti-inflammatories)
- Arnica & Ruta herbs

WCF

## Accident Prevention Program

- Management Commitment
- Assign Responsibility
- Hazard ID & Control
- Employee & Supervisor Training
- Workplace Conditioning
- Medical Assistance & Emergencies
- Return to Work
- Incident Investigation & Recordkeeping

WCF

## Strain & Strain Prevention Program

- Analyze tasks to find body parts at most risk
- Write & use functional job descriptions
- Test if employee can do essential job functions
- Take steps to reduce risk by:
  - Work/task design changes
  - Using mechanical devices
  - Train employees in preventive measures

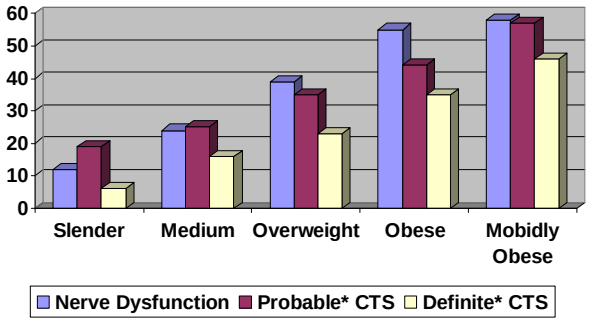
WCF

## Strain & Sprain Prevention

- Individuals performing work tasks:
  - Receive instruction in safe task execution
  - Have muscle groups and joints prepared for work activity

WCF

## Prevalence of Cumulative Trauma Syndrome (CTS) by Body Mass



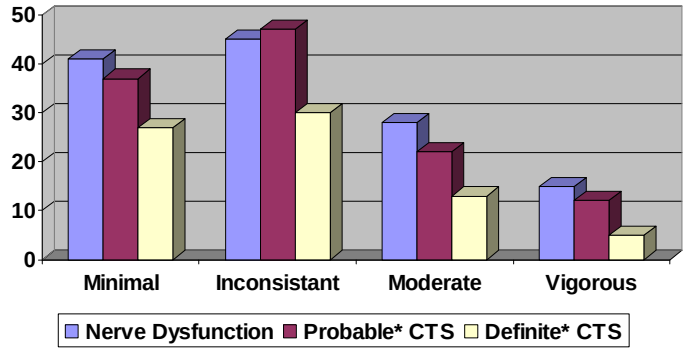

WCF

## Body Mass Facts

- 55% of American workforce is overweight or obese
- The average American is 7 pounds heavier than they were 10 years ago
- Obesity is the 2nd leading preventable cause of death in US after smoking, responsible for 300,000 deaths per year

WCF

## Prevalence of Cumulative Trauma Syndrome (CTS) by Exercise Level




WCF

# Prevention Tips

- Participate in a conditioning program to build muscle strength
- Do stretching exercises daily
- Always wear properly fitting shoes
- Nourish your muscles by eating a well-balanced diet
- Warm up before any moderate to strenuous activity (work, sports, practices, etc.)
- Use or wear protective equipment appropriate for that activity

WCF

## Predisposing Factors for Strain

- Muscle tightness - Tight muscles are vulnerable to strain.
- Muscle imbalance - Antagonistic muscles work together, don't want one strong than another
- Poor conditioning – Weak muscles are less able to cope with the stress of exercise and more likely to be injured.

WCF

## Predisposing Factors for Strain

- Muscle fatigue - Reduces the energy-absorbing capabilities of muscle
- Insufficient warm-up - A proper warm-up increases range of motion and reduces stiffness.

WCF

## Workplace Warm-up

- Workplace exercise programs have:
- Reduced costs of healthcare
- Reduce absenteeism
- Reduce injury rates
- Increase performance and productivity

WCF

## Precautions :

- Warm up before any moderate to strenuous activity. This will help increase your speed and endurance.
- Stretch slowly and gradually, holding each stretch to give the muscle time to respond and lengthen.

WCF

## WARM-UP EXERCISES

- ***Warm-up-*** prepares your body for physical exertion.
- Athletes warm up to improve performance and avoid injury.
- Eating a meal bring blood from the muscles to the internal organs.
- You are especially injury-prone *right after meals!*

WCF

## Exercise & Activities

**Proper exercise means**

- Improved health
- Stronger body
- Improved endurance
- Reduced stress
- Better range of motion

**No exercise means**

- **Easily fatigued**
- **Muscles weaken**
- **Easily injured from light activity**
- **No endurance**
- **Less resistance to illness**

WCF

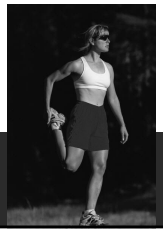
## Regular Stretching

- Reduces muscle tension and stress
- Permits easier movement.
- Increases joint range of motion and lubrication.
- Decreases the risk of a cumulative trauma disorder

WCF

## Correct Stretching

- Relaxed, slow and frequent.
- No bouncing or stretching to the point of pain.
- Hold for 3-5 relaxing breaths
- Do both sides



WCF

## Upper Body Stretches—

### Shoulder Shrug
- Look straight ahead with arms relaxed at your sides.
- Lift shoulders up toward your ear lobes.
- Take a deep breath, count to three, and exhale.
- Roll shoulders back as you return them to their natural position.

### Neck Stretch
- Look straight ahead, arms at your sides.
- Drop your left ear toward your left shoulder. Don't raise your shoulder.
- Take a deep breath, count to three, and exhale.
- Return your head to an upright position. Don't roll your head forward or backward.
- Repeat the exercise on the right.

### Rotator Cuff Stretch
- Reach up and place your right hand on your upper back.
- Place the back of your left hand in middle of your back.
- Reach your right hand toward your left, attempting to grasp fingers together.
- Take a deep breath, count to three, and exhale.
- Repeat the exercise on the opposite side.

### Back Extension Stretch
- Stand upright with feet shoulder-width apart.
- Place both hands on the small of your back.
- Lift your rib cage, arching your back.
- Take a deep breath, count to three, and exhale.
- Do not tip your head backward.

### Shoulder Stretch
- Stand upright with your feet shoulder-width apart.
- Clasp your hands behind your back.
- Raise clasped hands, bending your elbows slightly until you feel a stretch.
- Do not bend your body forward during the stretch.
- Take a deep breath, count to three, and exhale.

## Mid Body Stretches—

### Reach High
- Stand up straight with your feet shoulder-width apart.
- Stretch your arms up over your head as high as you can.
- Spread your fingers.
- Take a deep breath, count to three, and exhale.

### Wrist Curl Stretch
- With your arms at your sides and your knuckles forward, make loose fists.
- Curl fists in the direction of your elbows.
- Take a deep breath, count to three, exhale, and relax your fists.

### Palm Press Stretch
- Place your palms together with fingers at chin level.
- While keeping your palms together, press and lower your hands until you feel a stretch.
- Be careful not to raise your shoulders.
- Take a deep breath, count to three, exhale.

### Side Bending Stretch
- Stand upright with your feet shoulder-width apart, and place your left hand on your waist.
- Reach overhead with your right arm. Bend slightly to the left, letting the weight of your right arm create the stretch.
- Take a deep breath, count to three, exhale, and repeat the exercise on opposite side.

### Side Turning Stretch
- Stand upright with your feet shoulder-width apart and your left hand on your right hip.
- Reach your right arm straight up from your side, then move it slightly back with your palm forward and thumb up. Look over your right shoulder at your right hand.
- Take a deep breath, count to three, exhale, and repeat the exercise on opposite side.

### Cat Stretch
- Stand with your feet shoulder-width apart. Bend down, putting your hands on slightly bent knees.
- Look up, pointing your chin at the ceiling and creating an arch in your back.
- Take a deep breath. As you exhale, count to three, tuck your chin into your chest, and round your back.

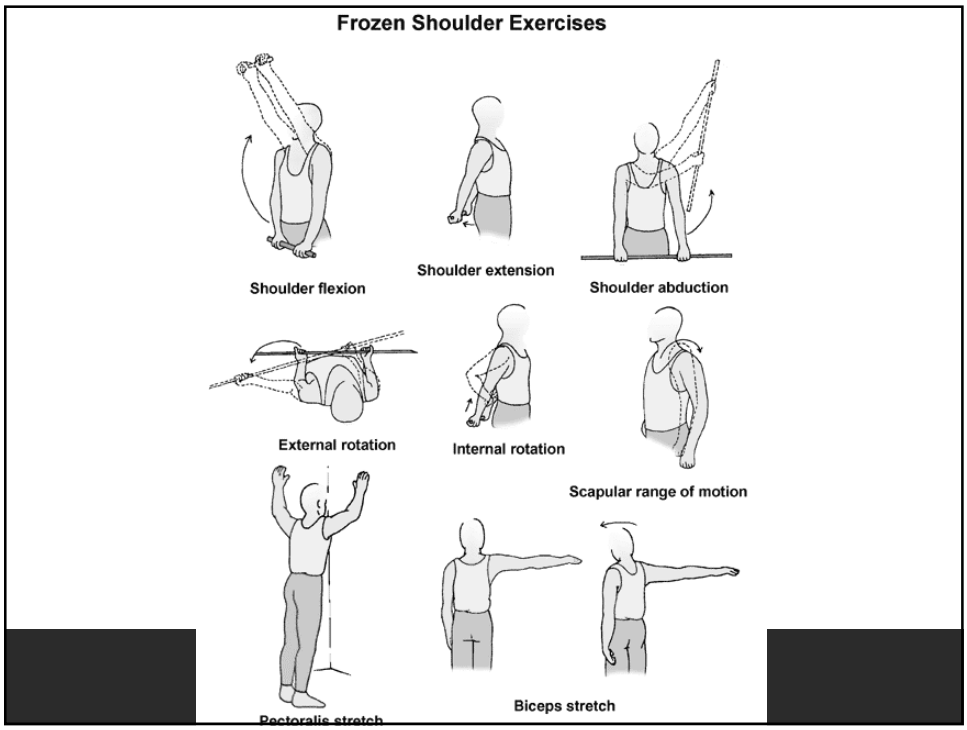
## Lower Body Stretches—

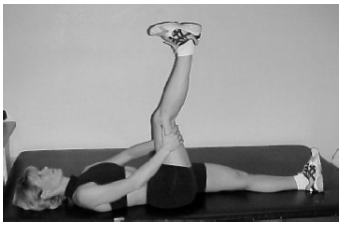
### Hamstring
- Stand up straight, with your feet slightly apart. Slightly bend your left leg, putting hands on your left knee.
- Extend your right leg, keeping your heel on the floor. Look straight ahead.
- Increase stretch by bending your left knee more and pointing the toes of your right leg toward your chin.
- Take a deep breath, count to three, exhale, and repeat the exercise on the opposite side.

### Quad
- Stand up straight with your feet slightly apart.
- Extend your left arm or use a wall for balance.
- Grasp your right ankle with your right hand and pull up toward your back.
- Keep your body in good alignment with your knees fairly close together.
- Take a deep breath, count to three, exhale, and repeat the exercise on the opposite side.

### Calf
- Stand up straight with your feet slightly apart.
- Step forward with your left foot. Bend and put both hands on your left knee.
- Bend your right leg, leaning slightly forward and keeping both feet flat on the floor.
- Take a deep breath, count to three, exhale, and repeat the exercise on the opposite side.

saif corporation



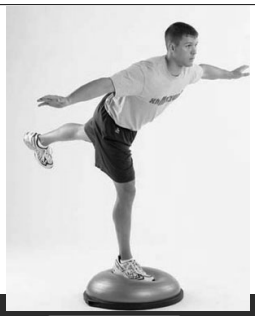


Hamstring stretch



WCF

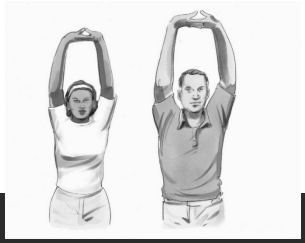
# Knee & Balance Handout



WCF

## Warm up

- All stretching is ineffective if it is performed when the body is cold, so begin with exercises to warm the body
- The total duration of the stretch should be about 20 seconds.



WCF

## An Effective Program Will:

- Identify muscles/tendons at most risk
- Exercises target at risk groups
- Survey employees for needed modifications to exercise
- Have group leaders to instruct how to do exercises & in what order

WCF

## Stretch & Flex Exercises

- http://www.westvalley.edu/stretch/default.html
- http://www.saif.com/_files/SafetyHealthGuides/S-884.pdf
- http://k2.kirtland.cc.mi.us/~balbachl/stretch.htm

WCF

Lack of fitness is more of a risk factor than smoking, high blood pressure and elevated cholesterol for cardiovascular disease and premature death.

C. Everett Koop, former US Surgeon General

WCF

# Summary

- Look at hazards
- Remove hazards where possible
- Give employees tools to get job done
- Ensure employees are fit for the job
- Encourage exercise
- Develop a wellness program

WCF