ERGONOMICS: WHY IS IT IMPORTANT, WHAT DOES IT REALLY MEAN AND WHAT IS BEST PRACTICE

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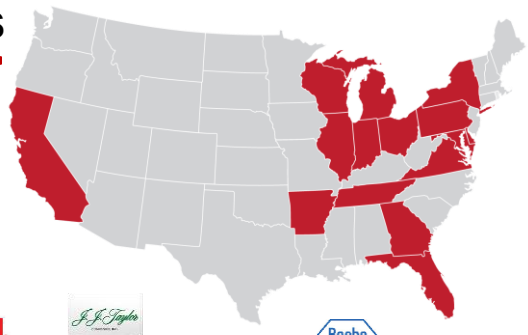
Introduction to ATI

- Nationally recognized rehabilitation provider
- Founded in 1996 with one clinic; now 190+ in seven states (IL, IN, WI, OH, DE, MD, PA)
- Our mission to "exceed customer expectations by providing the highest quality of care in a friendly and encouraging environment"
- Services include
  - ATI Worksite Solutions
  - Sports medicine program with over 150 affiliations
  - Leading provider of outpatient rehabilitation to workers' compensation patients
  - Dedicated in-house research department

AWS Partnerships



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ATI Worksite Solutions

- On-site Occupational Health provider
  - Certified Early Intervention Specialist program
  - Traditional Occupational Health services
- Consulting Services
  - Functional Task Analysis – facilitates RTW, ADA claims and fitness for duty assessments
  - Job-site Analysis
    - OfficeTrac™
  - Post-Offer Testing

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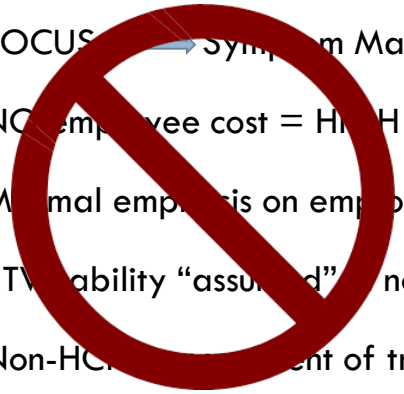
Traditional Medical Model

- FOCUS ⟹ Sym m Management
- NO emp yee cost = HI H utilization
- M mal emp is on emp yee accountability
- RTW ability "assu d" non-work related cases
- Non-HC nt of transitional duty



Industrial Athlete Model

- FOCUS ⟹ Early Reporting and ROOT Cause correction
- CEIS access – no cost to the employee
- Consistent interaction drives accountability
- Field Fit-for-Duty testing
- MANAGE Transitional Duty
- Provide all regulatory surveillance testing and comply with Federal recording guidelines

Today's PLAN

- Understand the role of the HCP in reducing work related pain and discomfort

Through an introduction to……..

- Medical Terminology and Anatomy
- Common Injuries
- Principles of Body Mechanics
- Wellness and Safety
- Identifying HIGH RISK and Quantifying Change
- Prevention

WHY

- "I hurt my back and now the outside of my calf is numb"
- "My shoulder hurts when I put on my seatbelt, is that bad?"
- "I wake up with my hand numb, do you think I have cancer?"
- "The job only requires lifting of 15 lbs., I can't understand why everyone is complaining of shoulder pain!"

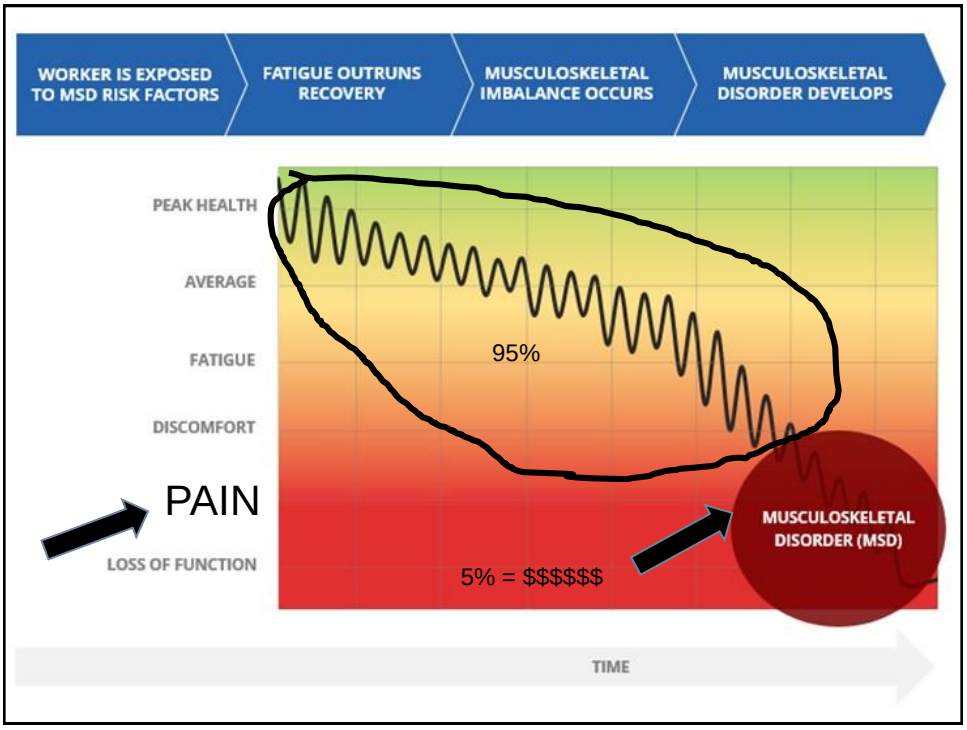
Why Early Intervention?

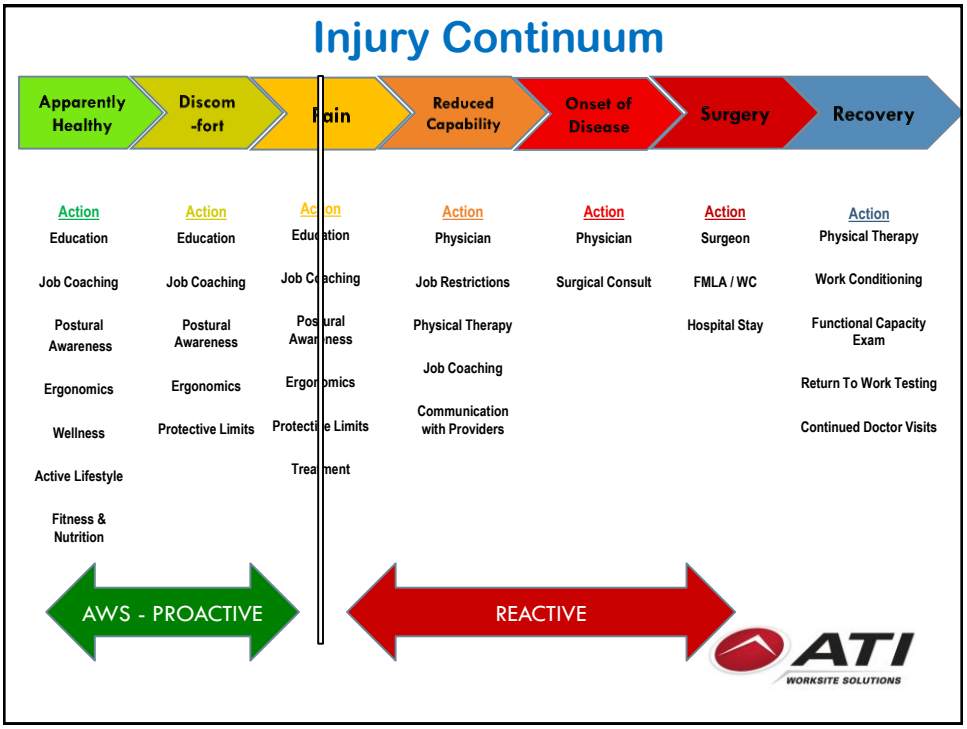
- "Research shows that when absenteeism, presenteeism, medication costs, short term disability, and restrictions are added together,

musculoskeletal pain is 4 times more expensive for employers than any other medical condition.

- According to the OSHA, NIH, and The Bureau of Labor Statistics,

painful muscular disorders are 60% of all occupational illnesses."


WORKER IS EXPOSED TO MSD RISK FACTORS
FATIGUE OUTRUNS RECOVERY
MUSCULOSKELETAL IMBALANCE OCCURS
MUSCULOSKELETAL DISORDER DEVELOPS
PEAK HEALTH
AVERAGE
FATIGUE
DISCOMFORT
PAIN
LOSS OF FUNCTION
95%
5% = $$$$$$
MUSCULOSKELETAL DISORDER (MSD)
TIME


Injury Continuum
Apparently Healthy
Discom -fort
Pain
Reduced Capability
Onset of Disease
Surgery
Recovery
Action
Education
Job Coaching
Postural Awareness
Ergonomics
Wellness
Active Lifestyle
Fitness & Nutrition
Action
Education
Job Coaching
Postural Awareness
Ergonomics
Protective Limits
Action
Education
Job Coaching
Postural Awareness
Ergonomics
Protective Limits
Treatment
Action
Physician
Job Restrictions
Physical Therapy
Job Coaching
Communication with Providers
Action
Physician
Surgical Consult
Action
Surgeon
FMLA / WC
Hospital Stay
Action
Physical Therapy
Work Conditioning
Functional Capacity Exam
Return To Work Testing
Continued Doctor Visits
AWS - PROACTIVE
REACTIVE
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Injury Continuum

HOW

Action	Action	Action
Education	Education	Education
Job Coaching	Job Coaching	Job Coaching
Postural Awareness	Postural Awareness	Postural Awareness
Ergonomics	Ergonomics	Ergonomics
Wellness	Protective Limits	Protective Limits
Active Lifestyle	ENGAGEMENT	Treatment
Fitness & Nutrition		ENGAGEMENT
ENGAGEMENT		

WHO

Team Leads
Supervisors
CEIS

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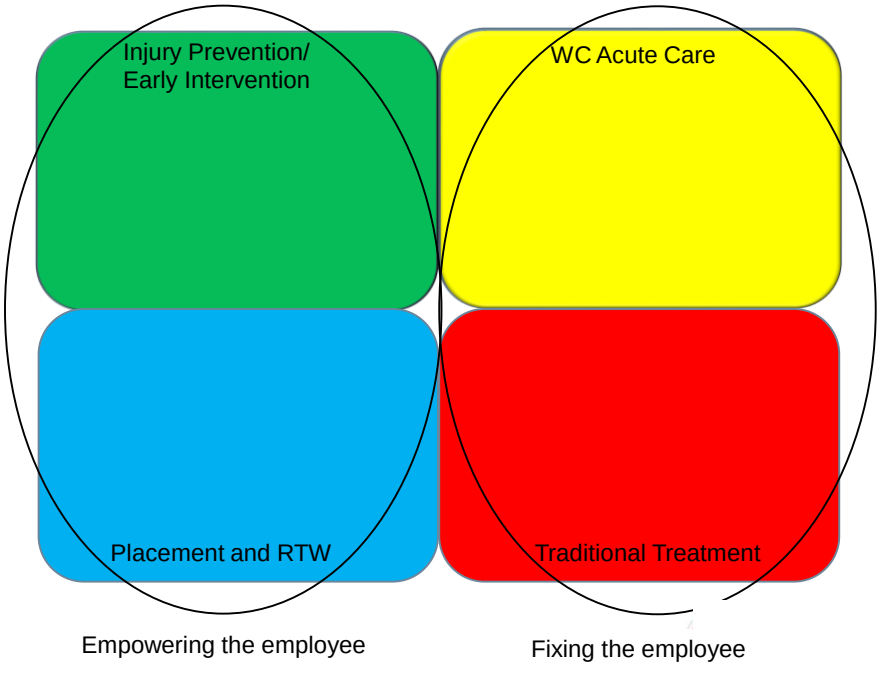
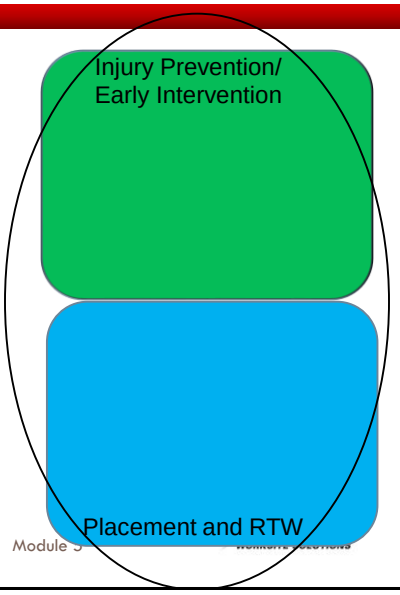


Window of Opportunity

- OSHA and First Aid
  - Job Coaching
  - Soft supports
  - Protective Limitations
  - Stretching*
  - Heat/Cold



Module 3

LOOKING FOR ROOT CAUSES

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What are root causes? Hammers?

- Awkward / sustained postures
- Repetition
- Forceful exertion or strain
- Contact Pressure
- Exposure to vibration
- Heat/cold exposure
- Combinations

Add in: home stressors, habits, age, culture

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READY to DIVE IN???

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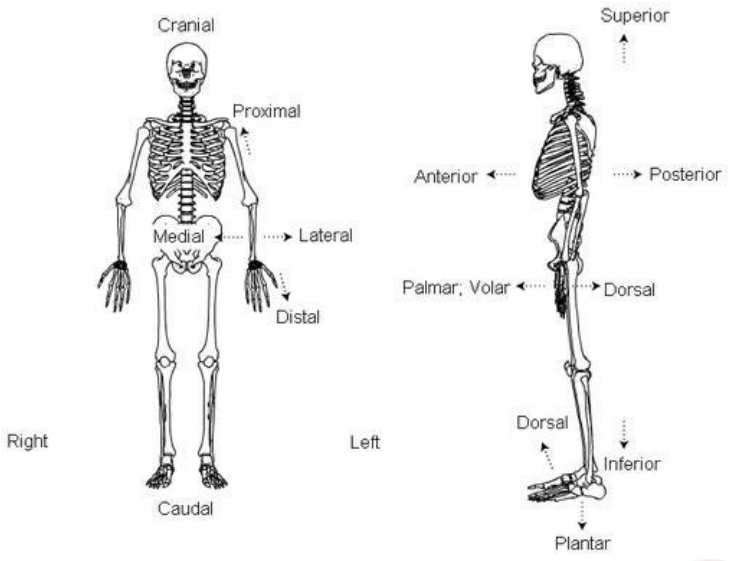
Medical Terminology

- Abbreviations
- Anatomical terminology



Anatomical Neutral

Medical Terminology

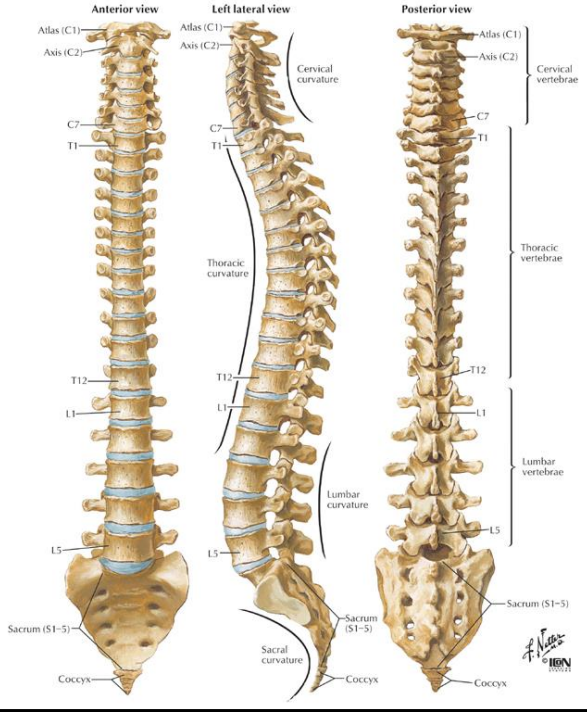
- Abbreviations
- Anatomical terminology
- Motion

Anatomy

- Body Area
  - Boney structure
  - Motion
  - Musculature
  - Neural component
  - Injuries

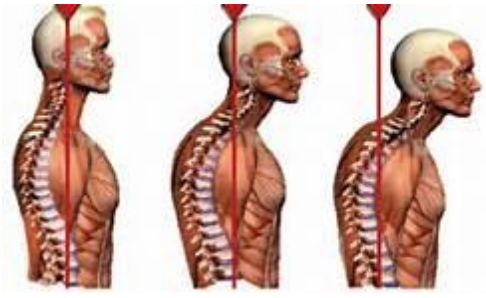
The Spine

- Cervical
- Thoracic
- Lumbar
- Sacral



Neck Pain

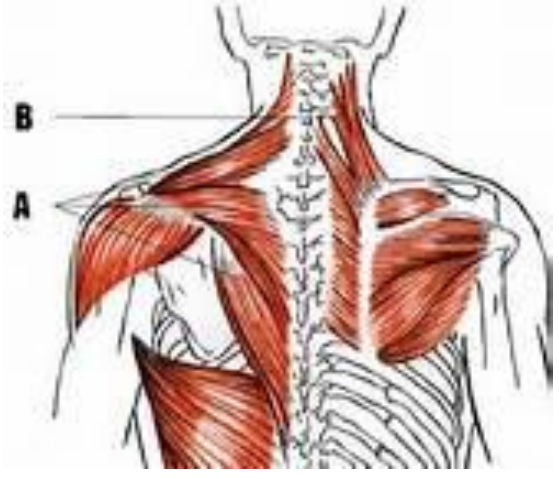
Relative Weight of the Head



12 lbs 32 lbs 42 lbs

Neck Pain / Levator Spasms

- Spasms in posterior neck region
- Shoulder elevation, stress, poor scapularization
- Massage, biofreeze, heat, body mechanic education, stretching



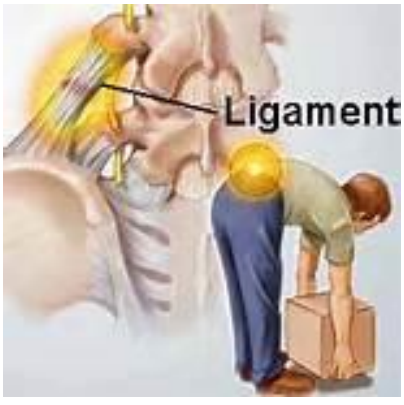
Cervical and Thoracic Spine

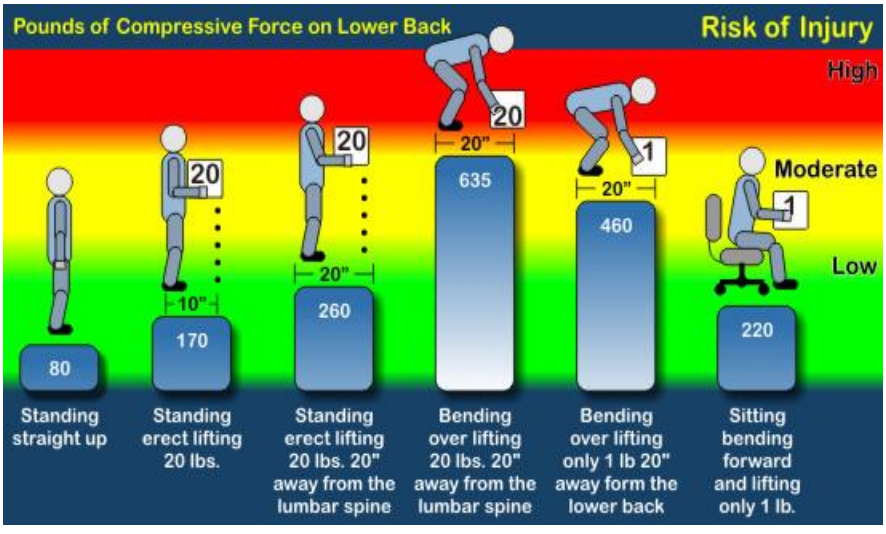
Low Back Pain

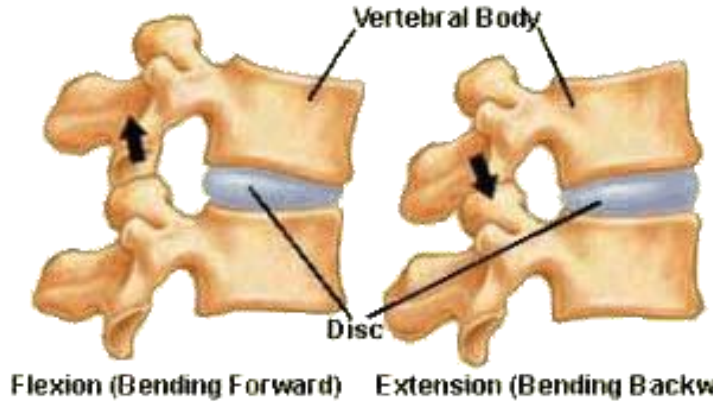
Low Back Strains

- Generalized muscle pain, spasms, (-) N/T
- Improper or repetitive lifting, near slip/fall, poor lifting techniques
- Ice / heat, biofreeze, NSAIDS, stretching and education

Ligament and/or muscle damage with lifting



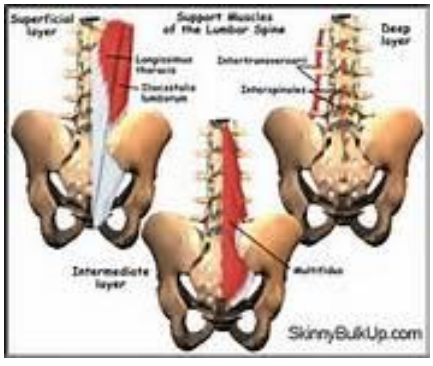

Pounds of Compressive Force on Lower Back
Risk of Injury
High
Moderate
Low
80
20
10"
170
20
20"
260
20
20"
635
1
20"
460
1
220
Standing straight up
Standing erect lifting 20 lbs.
Standing erect lifting 20 lbs. 20" away from the lumbar spine
Bending over lifting 20 lbs. 20" away from the lumbar spine
Bending over lifting only 1 lb 20" away form the lower back
Sitting bending forward and lifting only 1 lb.

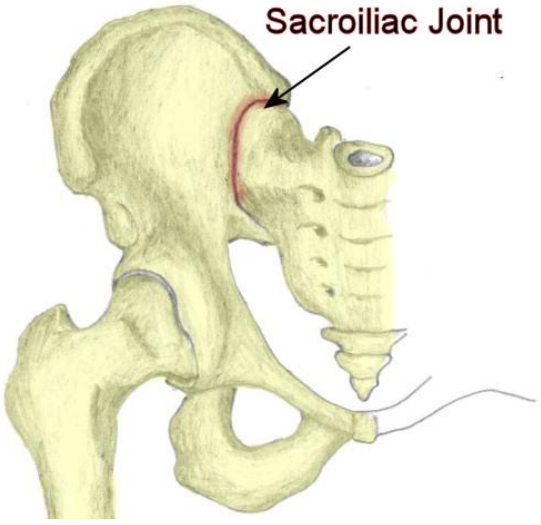


LUMBAR SPINE SEGMENT

SI Pain

- Central / just off center pain, may wrap to groin, increases with sitting
- Asymmetrical movement, muscular imbalances
- ICE!! Symmetrical motion, sleeping posture education, abdominal. stabilization





Sciatica

- Pain/numbness in the posterior LE due to compression of the Sciatic nerve
- Disc, piriformis, contact pressure
- Stretching, ice, body mechanics, remove contact pressure, avoid asymmetrical postures

A.D.A.M.

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The Shoulder

ATI WORKSITE SOLUTIONS

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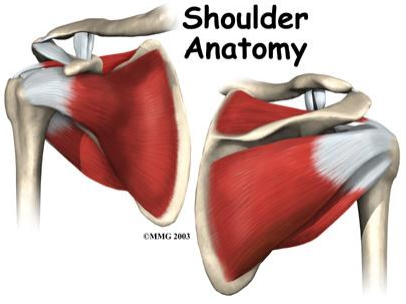

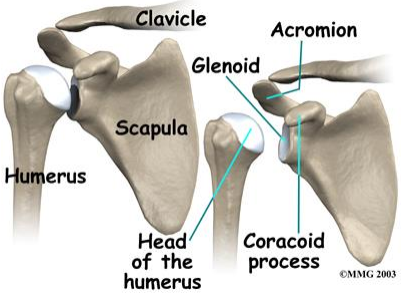

ATI WORKSITE SOLUTIONS

The Shoulder

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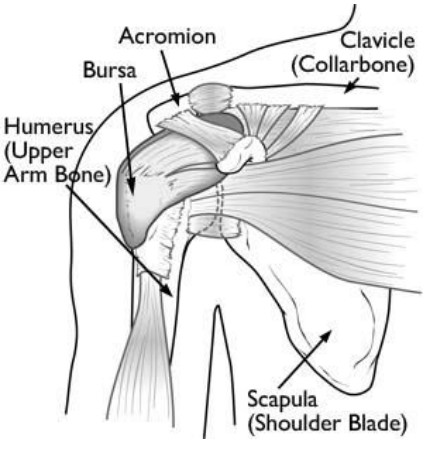
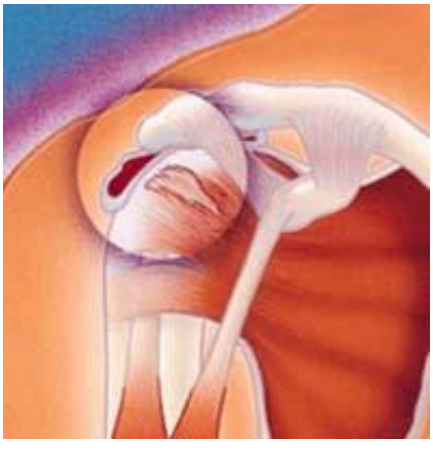
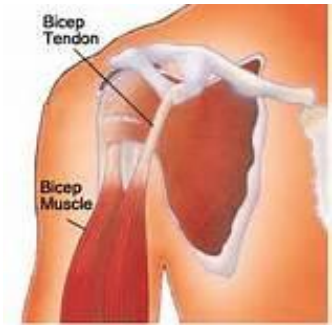
Rotator Cuff Tendonitis/Impingement

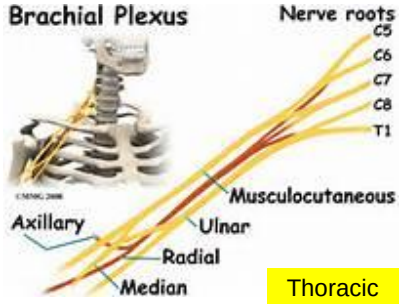
- Irritation of the tendons and/or bursa
- Poor posture/scapular stabilization, repetitive internal / external rotation
- Ice, body mechanics education, sleeping posture, scapular stabilization





Rotator Cuff Tears





Thoracic Outlet

Bicep tear

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Shoulder Dislocation

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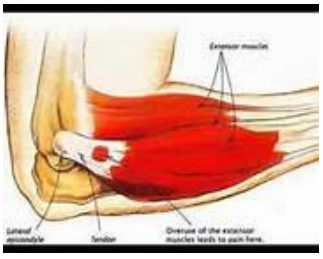
The Elbow



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Tennis Elbow

- Inflammation of the extensor tendons for the wrist at the proximal attachment. Middle digit test
- Overuse
- Stretching, ice, NSAIDS, forearm strap, body mechanics education

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Olecranon Bursitis

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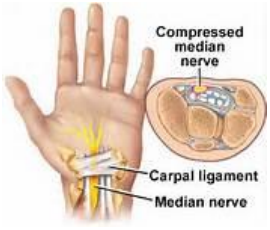
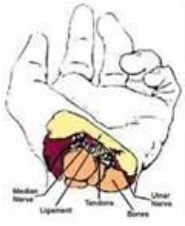
Hand and Wrist





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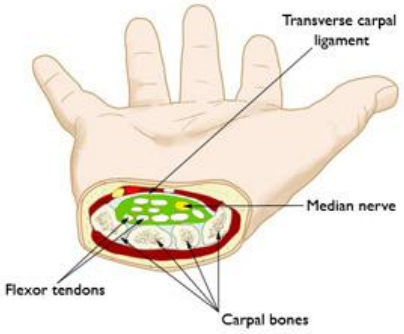

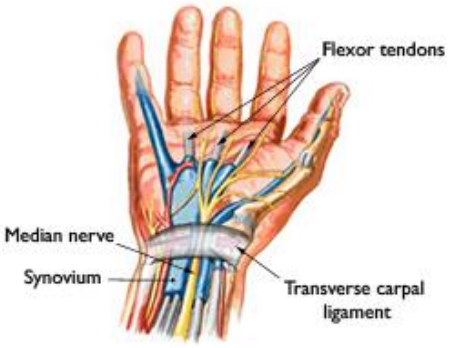

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Carpal Tunnel

- Swelling of synovium narrows the tunnel and puts pressure on the median nerve
- Hand use, wrist contact pressure, sustained flex/ext
- Bracing, night splint, body mechanics correction

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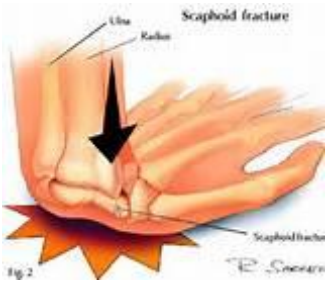
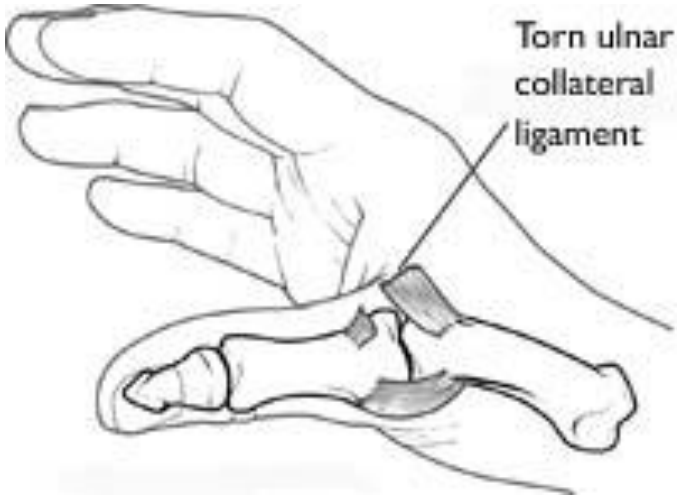
Fractures



Game Keepers Thumb

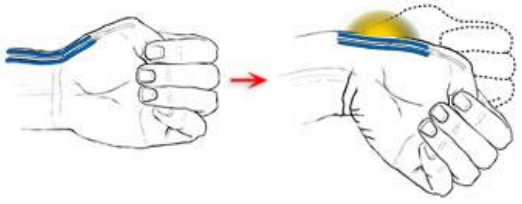
Gamekeepers Thumb

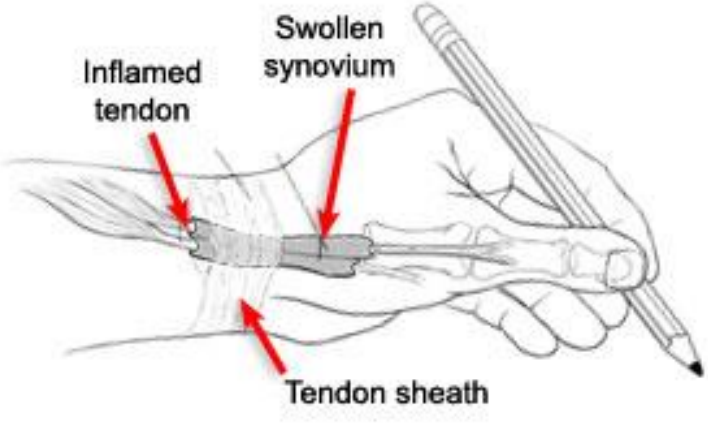
- Strained / torn ulnar collateral ligament
- Ice, NSAIDS, splint/taping



De Quervain's

- Thumb extensor tendon is inflamed and thickens. May catch or snap. (+) Finkelstein
- Overuse such as with pipetting
- Splinting, ice, NSAIDS





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Dupuytren contracture

DeQuervain's Tendonitis

Ganglion Cyst

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The Knee

Lateral

Hyperextension

DISLOCATION

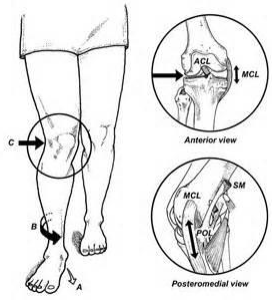
Arthritis

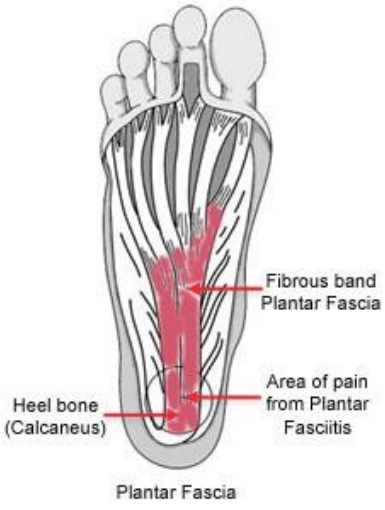
Bakers Cyst

THE FOOT

Plantar fasciitis

- Poor shoe support, decreased gastroc flexibility, high arch
- STRETCHING, ice, heel cup, night splints





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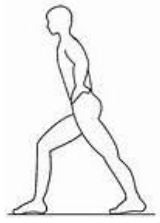
Plantar Fasciitis



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Sprain vs Fracture

OSHA – what can you do

- Heat and Ice
- Soft splints
- Soft tissue massage
- Education/body mechanics/coaching

CAUTION

- Stretching for PAIN WILL trigger a recordable

Healing Phases

- Acute/Inflammatory Phase
  - The inflammatory response is the body's natural response that occurs immediately following tissue damage. It's main functions are to defend the body against harmful substances, dispose of dead or dying tissue and to promote the renewal of normal tissue
- Occurs when the injury happens to about 3 days
  - Body's protection mechanism
  - Increased blood flow to the area causes swelling
  - Swelling increases pressure
  - Chemical agents that "search and destroy"
  - Does not occur with chronic/overuse type injuries

Ice vs Heat

- ICE
  - Reduces pain
  - Reduces swelling
  - Use
    - After trauma – 24 hrs
    - After all subsequent "trauma"
    - 10 – 15 minutes
    - "cold"-"painful"-"numb"
- HEAT
  - Reduces spasms
  - Allows for more effective stretching
  - Use
    - Before activity
    - 15-20 minutes
    - ALLOWS MOVE after heat!!!!

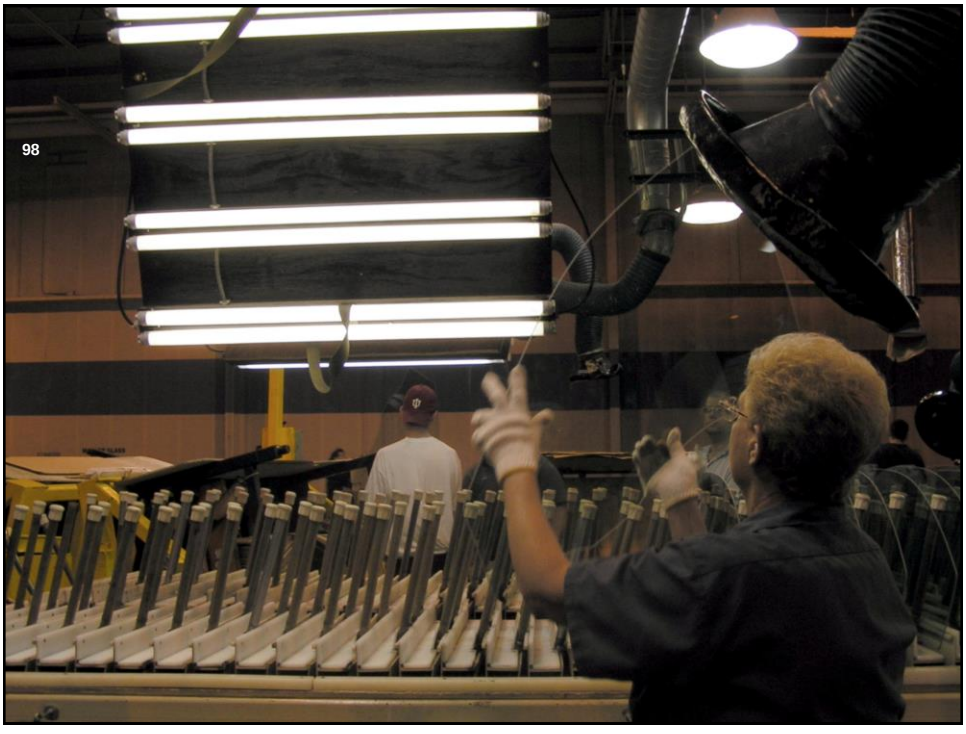
So How Can you HELP

- Recognize risk
- ENCOURAGE early reporting!!!!!!
- ENGAGE with the employee
- Educate them on THEIR responsibilities
- Celebrate successes

Review of High Risk Movements/Postures

- Forward Head
- Arms overhead
- Flaring elbows
- Wrist flexion/extension
- Twisting

95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100

101

102

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Trauma and how we heal

Abrasion

- A wound caused by superficial damage to the skin, no deeper than the epidermis
- Less severe than a laceration, and bleeding, if present, is minimal

Treatment

First Aid:

- Clean with warm mildly soapy water and remove any debris
- Apply a topical antibiotic (Neosporin or Bacitracin) to prevent infection and keep the wound moist
- If the EE is returning to work, cover

Refer if:

- Foreign body imbedded
- Any sign of infection – redness, streaking, pus, foul smell, warmth, fever or discoloration

Burns

- Burns are caused by a wide variety of substances and external sources such as exposure to chemicals, friction, electricity, radiation, and heat
- Classified on how much of the skin's thickness is involved
  - First-degree (or superficial) burns involve only the top layer of the skin and are the least serious burn injuries.
  - Second-degree (or partial-thickness) burns injure deeper into the skin and cause blistering.
  - Third-degree (or full-thickness) burns involve all the layers of the skin, including the nerves that supply the skin, and are extremely serious injuries.

First Degree Burns

- Only the outer layer of skin is burned
- Skin is usually red with swelling and pain is sometimes present
- Treat as a minor burn unless it involves substantial portions of the hands, feet, face, groin or buttocks, or a major joint

Second Degree Burns

- First layer of skin has been burned through and the second layer of skin also is burned
- Blisters develop and skin takes on an intensely reddened, splotchy appearance
- Severe pain and swelling
- If the burn is no larger than 3" treat as a minor burn

Third Degree Burns

- The most serious burns involve all layers of the skin and cause permanent tissue damage
- Fat, muscle and even bone may be affected
- Areas may be charred black or appear dry and white
- Major burns are a **medical emergency**

Treatment

First Aid(Minor Burns):

- Hold the burned area under cool (not cold) running water for 10 or 15 minutes or until the pain subsides
- Cover the burn with a sterile gauze bandage. Wrap loosely to avoid pressure on the burn
- Take an OTC pain reliever such as aspirin, ibuprofen, naproxen, or acetaminophen

Major Burns:

Seek emergency medical help

- Until they arrive:
  - Don't remove burned clothing
  - Don't immerse large, severe burns in cold water
  - Check for signs of circulation (breathing, coughing, or movement)
  - Elevate the burned body part
  - Cover burned area with moist towel or bandaging

Compartment Syndrome

- Occurs when excessive pressure builds up inside an enclosed space in the body.
- Usually results from bleeding or swelling after an injury
- Dangerously high pressure in compartment syndrome impedes the flow of blood to and from the affected tissues
- The legs, arms, and abdomen are most prone to developing compartment syndrome

Causes of Compartment Syndrome

- Acute compartment syndrome is the most common type of compartment syndrome.
  - The most common cause for acute compartment syndrome is a broken leg or arm. Acute compartment syndrome develops rapidly over hours or days.
- Acute compartment syndrome can also occur after injuries without bone fractures, including:
  - Crush injuries.
  - Burns.
  - Overly tight bandaging.
  - Prolonged compression of a limb during a period of unconsciousness.
  - Surgery to blood vessels of an arm or leg.
  - A blood clot in a blood vessel in an arm or leg.
  - Extremely vigorous exercise, especially eccentric movements (extension under pressure).

Chronic Compartment Syndrome

- Develops over days or weeks.
- Also called exertional compartment syndrome, it may be caused by regular, vigorous exercise
  - Most common sites are lower leg, buttock, or thigh.

Signs and Symptoms of Acute Compartment Syndrome

- A new and persistent deep ache in an arm or leg
- Pain that seems greater than expected for the severity of the injury
- Numbness, pins-and-needles, or electricity-like pain in the limb
- Swelling, tightness and bruising

Treatment

- The most common form of treatment for compartment syndrome is surgery to cut the fascia in order to relieve the pressure that is building within the compartment

Contusion

- Caused by internal bleeding which does not break through the skin, usually initiated by blunt trauma
- Trauma sufficient to cause bruising can occur from a wide variety of situations including accidents, falls, and surgeries

Treatment

- Treatment for light bruises is minimal and may include RICE (rest, ice, compression, elevation), painkillers (particularly NSAIDs)
- Immediate application of ice while elevating the area may reduce or completely prevent swelling by restricting blood flow to the area and preventing internal bleeding
- Preventing re-injury is essential for rapid recovery

Open Wounds

- Incisions or incised wounds, caused by a clean, sharp-edged object such as a knife, razor, or glass splinter
- Lacerations, irregular tear-like wounds caused by some blunt trauma
- Puncture wounds, caused by an object puncturing the skin, such as a nail or needle
- Penetration wounds, caused by an object such as a knife entering and coming out from the skin

Treatment

First Aid:

- Clean with warm mildly soapy water and remove any debris
- Apply a topical antibiotic (Neosporin or Bacitracin) to prevent infection and keep the wound moist
- If the EE is returning to work, cover

Refer if:

- Visibly gaping wound and/or wound can become gaping by gentle tug on the skin near the wound
- Visual subcutaneous tissue.
- Bleeding that cannot be stopped with direct/indirect pressure to wound
- Laceration located near or on body part where skin is stretched with movement
- Foreign body in or near wound that cannot be easily removed
- Any sign of infection – redness, streaking, pus, foul smell, warmth, fever or discoloration

ATI WORKSITE SOLUTIONS

NOW – DIVE IN!!!!!!

ATI WORKSITE SOLUTIONS

ORTHOPEDIC ABBREVIATIONS	MEANING
AC	acromioclavicular
ACL	anterior cruciate ligament
B	bilateral
C-spine	cervical spine
C1-C7	cervical vertebrae
CMC	carpometacarpal (joint)
CTS	carpal tunnel syndrome
DC (physician)	Doctor of Chiropractic
DDD	degenerative disc disease
DJD	degenerative joint disease
DO (physician)	Doctor of Osteopathy
DTRs	deep tendon reflexes
FROM	full range of motion
fx	fracture
FWB	full weight bearing
HEP	Home exercise program
HNP	herniated nucleus pulposus
IM	intramuscular
IP	interphalangeal
IT Band	iliotibial
Lateral	Away from middle
LE	Lower extremity
L-spine	lumbar spine
L1-5	lumbar vertebrae
LS	lumbosacral (spine)
Medial	Towards the middle
MCL	medial collateral ligament
MCP	metacarpophalangeal (joint)
MTP	metatarsophalangeal (joint)
NSAID	nonsteroidal anti-inflammatory drug
ORIF	open reduction internal fixation
ortho	orthopedics
PCL	posterior cruciate ligament
PIP	proximal interphalangeal joint
PROM	Passive range of motion
PT	physical therapy
RA	rheumatoid arthritis
ROM	range of motion
ROMI	range of motion intact
RTC	Rotator cuff
SI	sacroiliac (joint)
TENS unit	transcutaneous electrical nerve stimulation
THR	total hip replacement
T-spine	thoracic spine
T1-T12	thoracic vertebrae
tib-fib	tibial-fibular
TMJ	temporomandibular joint
U	unilateral
UE	upper extremity
WFL	Within functional limits
WNL	Within normal limits

1. Basic Medical Terminology

    a. Abbreviations

    b. Anatomical Neutral

    c. Planes of the body
        i. Anterior/Ventral
        ii. Posterior/Dorsal
        iii. Cranial
        iv. Caudal
        v. Proximal
        vi. Distal
        vii. Medial
        viii. Lateral
        ix. Supine
        x. Prone

    d. Motion
        i. Flexion
        ii. Extension
        iii. Abduction
        iv. Adduction
        v. Internal rotation
        vi. External rotation
        vii. Supinate
            1. Palm or sole of foot upward
        viii. Pronate
            1. Palm or sole of the foot downward

    e. Anatomy
        i. Spine
            1. Cervical:
                a. 7 vertebrae – curve IN
                b. Primary motion: Flx/Ext and rotation
                c. Musculature

            2. Thoracic:
                a. 12 vertebrae – curve OUT
                b. Primary motion: Flx/Ext
                c. Musculature

            3. Lumbar:
                a. 5 vertebrae – curve IN
                b. Primary motion: Flx/Ext, rotation and side bending
                c. Musculature

4. SI joint
    a. Joint????
    b. Musculature

5. Disc

6. Spinal Nerves

7. Injuries
    a. Facet joint
    b. Paraspinal strain/sprain
    c. Bulging disc/HNP
    d. Sciatica
    e. Piriformis syndrome

ii. Upper Extremity
1. Shoulder
    a. Joint: scapula, AC, clavicle and humerus

    b. Musculature

    c. Motion

    d. Injuries
        i. Impingement
        ii. Rotator cuff tendonitis
        iii. Bursitis
        iv. Rotator cuff tear
        v. Adhesive capsulitis
        vi. Bicep tendonitis/tear
        vii. Thoracic outlet
        viii. Dislocation
2. Elbow
    a. Joint
        i. Nerve tunnels
        ii. Medial/lateral epicondyle
    b. Musculature
    c. Motion
    d. Injuries
        i. Epicondylitis
        ii. Cubidal tunnel
        iii. Dislocation
        iv. Fracture
        v. Olecranon Bursitis
3. Wrist
    a. Joint
        i. Nerve tunnels
    b. Motion
    c. Injuries
        i. Fractures
        ii. Carpal tunnel
4. Fingers/Thumb

a. Joints

b. Motion

c. Injuries
    i. Metacarpal phalangeal sprain – Game Keepers thumb
    ii. Dupuytren contracture
    iii. De Quervains
    iv. Trigger finger
    v. Ganglion Cyst

iii. Lower Extremity
1. Hip
    a. Joint
    b. Motion
    c. Injuries
        i. Bursitis
        ii. IT band tendonitis
2. Knee
    a. Joint
    b. Motion
    c. Injuries
        i. Patella dislocation
        ii. Patella-femoral pain
        iii. Meniscus tears
        iv. Ligament tears
        v. Bakers Cyst
        vi. Quadriceps tear
3. Ankle/foot
    a. Joint
    b. Motion
    c. Injuries
        i. Sprain/strain
        ii. Fibula fx
        iii. Jones fx
        iv. Plantar fasciitis
        v. Achilles tendonitis or rupture
        vi. Metatarsal/Tarsal fractures

Work-Zones

	Close	Away	Far Away
Overhead	TOO HIGH	BAD	MOST RISKY
Head to Chest	GOOD	FAIR / POOR	RISKY
Shoulder to Waist	IDEAL	GOOD / FAIR	RISKY
Waist to Knee	GOOD	FAIR / POOR	RISKY
Below Knee	TOO LOW	BAD	MOST RISKY

All postures, positions and repetitive movements need to be interrupted, even good or ideal ones. However, the frequency of interruption and special considerations of work performed is determined by the amount of stretching required, the amount of load (weight) and the consequential risk for injury, sprain/strain of repetitive disorder. The critical factors are:

1) the height of your hands
2) the distance your hands are away from your body
3) the amount of weight or force
4) the frequency of the task
5) the time spent in the position and
6) the presence or absence of warning signs

Green Zones (GO)

These are the ideal or good work areas. These should be interrupted every hour, or if warning signs develop. Remember that the further hands move away from the body, the lighter the weight should be and more often the work should be interrupted.

Yellow Zones (CAUTION)

These are fair or bordering on poor work areas. These should be interrupted every 30 minutes, or more often if the work is heavy and/or warning signs are developing.

Red Zones (STOP AND THINK)

These are risky work areas, and need to be well thought-out before proceeding. If you are required to work in these areas, the load should be minimal to non-existent (i.e. just reaching, not pushing/pulling, lifting/carrying) and the work should be interrupted continuously. If any warning signs develop, the work should be avoided or immediately modified until a resolution is found.