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
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
Traditional Medical Model

- FOCUS: Symptom Management
- No employee cost = High utilization
- Minimal emphasis on employee accountability
- RTW ability “assumed” in non-work related cases
- Non-HCP management 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.”
Injury Continuum

Worker is exposed to MSD risk factors
Fatigue outruns recovery
Musculoskeletal imbalance occurs
Musculoskeletal disorder develops

Pain
Loss of function

Action
Education
Job Coaching
Postural Awareness
Ergonomics
Wellness
Active Lifestyle
Fitness & Nutrition

AWS - PROACTIVE

Action
Education
Job Coaching
Postural Awareness
Ergonomics
Protective Limits

Action
Physician
Job Restrictions
Physical Therapy
Job Coaching
Communication with Providers

Action
Physician
Surgical Consult
FMLA / WC
Hospital Stay

Action
Surgeon
FMLA / WC
Hospital Stay

Action
Physical Therapy
Work Conditioning
Functional Capacity Exam
Return To Work Testing
Continued Doctor Visits

Reactive
Injury Continuum

**HOW**

- Action
  - Education
- Job Coaching
- Postural Awareness
- Ergonomics
- Wellness
- Active Lifestyle
- Fitness & Nutrition
- ENGAGEMENT

**WHO**

- Team Leads
- Supervisors
- CEIS

Injury Prevention/Early Intervention

- WC Acute Care

Placement and RTW

- Traditional Treatment

Empowering the employee

Fixing the employee
Window of Opportunity

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

Injury Prevention/Early Intervention
Placement and RTW

LOOKING FOR ROOT CAUSES
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

READY to DIVE IN???
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
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
The Shoulder
The Shoulder
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
Bicep tear

Shoulder Dislocation

Thoracic Outlet
The Elbow

[Diagram showing the human elbow with labels for muscle attachments]

Forearm muscles attach to lateral epicondyle.
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
Cubital Tunnel Syndrome Pain

Olecranon Bursitis

Hand and Wrist

Compressed median nerve
Carpal ligament
Median nerve

 ATI WORKSITE SOLUTIONS

 ATI WORKSITE SOLUTIONS
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
Fractures

Game Keepers Thumb
Gamekeepers Thumb

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

Torn ulnar collateral ligament
De Quervain’s

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

DeQuervain’s Tendonitis

Trigger Digit

Ganglion Cyst
The Knee

Lateral

ATI

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DISLOCATION

Hyperextension
Poor shoe support, decreased gastroc flexibility, high arch

STRETCHING, ice, heel cup, night splints
Plantar Fasciitis

Plantar Fascia

Heel bone (Calcaneus)

Fibrous band Plantar Fascia

Area of pain from Plantar Fasciitis

Heel Bone

Plantar Fascia Strain

ATI WORKSITE SOLUTIONS
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

<table>
<thead>
<tr>
<th>ICE</th>
<th>HEAT</th>
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</thead>
<tbody>
<tr>
<td>Reduces pain</td>
<td>Reduces spasms</td>
</tr>
<tr>
<td>Reduces swelling</td>
<td>Allows for more effective stretching</td>
</tr>
<tr>
<td>Use</td>
<td>Use</td>
</tr>
<tr>
<td>• After trauma – 24 hrs</td>
<td>• Before activity</td>
</tr>
<tr>
<td>• After all subsequent “trauma”</td>
<td>• 15-20 minutes</td>
</tr>
<tr>
<td>• 10 – 15 minutes</td>
<td>• ALLOWS MOVE after heat!!!!!</td>
</tr>
<tr>
<td>• “cold”-“painful”-“numb”</td>
<td></td>
</tr>
</tbody>
</table>

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
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

NOW – DIVE IN!!!!!
<table>
<thead>
<tr>
<th>ORTHOPEDIC ABBREVIATIONS</th>
<th>MEANING</th>
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<tbody>
<tr>
<td>AC</td>
<td>acromioclavicular</td>
</tr>
<tr>
<td>ACL</td>
<td>anterior cruciate ligament</td>
</tr>
<tr>
<td>B</td>
<td>bilateral</td>
</tr>
<tr>
<td>C-spine</td>
<td>cervical spine</td>
</tr>
<tr>
<td>C1-C7</td>
<td>cervical vertebrae</td>
</tr>
<tr>
<td>CMC</td>
<td>carpometacarpal (joint)</td>
</tr>
<tr>
<td>CTS</td>
<td>carpal tunnel syndrome</td>
</tr>
<tr>
<td>DC (physician)</td>
<td>Doctor of Chiropractic</td>
</tr>
<tr>
<td>DDD</td>
<td>degenerative disc disease</td>
</tr>
<tr>
<td>DJD</td>
<td>degenerative joint disease</td>
</tr>
<tr>
<td>DO (physician)</td>
<td>Doctor of Osteopathy</td>
</tr>
<tr>
<td>DTRs</td>
<td>deep tendon reflexes</td>
</tr>
<tr>
<td>FROM</td>
<td>full range of motion</td>
</tr>
<tr>
<td>fx</td>
<td>fracture</td>
</tr>
<tr>
<td>FWB</td>
<td>full weight bearing</td>
</tr>
<tr>
<td>HEP</td>
<td>Home exercise program</td>
</tr>
<tr>
<td>HNP</td>
<td>herniated nucleus pulposus</td>
</tr>
<tr>
<td>IM</td>
<td>intramuscular</td>
</tr>
<tr>
<td>IP</td>
<td>interphalangeal</td>
</tr>
<tr>
<td>IT Band</td>
<td>iliotibial</td>
</tr>
<tr>
<td>Lateral</td>
<td>Away from middle</td>
</tr>
<tr>
<td>LE</td>
<td>Lower extremity</td>
</tr>
<tr>
<td>L-spine</td>
<td>lumbar spine</td>
</tr>
<tr>
<td>L1-5</td>
<td>lumbar vertebrae</td>
</tr>
<tr>
<td>LS</td>
<td>lumbosacral (spine)</td>
</tr>
<tr>
<td>Medial</td>
<td>Towards the middle</td>
</tr>
<tr>
<td>MCL</td>
<td>medial collateral ligament</td>
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<tr>
<td>MCP</td>
<td>metacarpophalangeal (joint)</td>
</tr>
<tr>
<td>MTP</td>
<td>metatarsophalangeal (joint)</td>
</tr>
<tr>
<td>NSAID</td>
<td>nonsteroidal anti-inflammatory drug</td>
</tr>
<tr>
<td>ORIF</td>
<td>open reduction internal fixation</td>
</tr>
<tr>
<td>ortho</td>
<td>orthopedics</td>
</tr>
<tr>
<td>PCL</td>
<td>posterior cruciate ligament</td>
</tr>
<tr>
<td>PIP</td>
<td>proximal interphalangeal joint</td>
</tr>
<tr>
<td>PROM</td>
<td>Passive range of motion</td>
</tr>
<tr>
<td>PT</td>
<td>physical therapy</td>
</tr>
<tr>
<td>RA</td>
<td>rheumatoid arthritis</td>
</tr>
<tr>
<td>ROM</td>
<td>range of motion</td>
</tr>
<tr>
<td>ROMI</td>
<td>range of motion intact</td>
</tr>
<tr>
<td>RTC</td>
<td>Rotator cuff</td>
</tr>
<tr>
<td>SI</td>
<td>sacroiliac (joint)</td>
</tr>
<tr>
<td>TENS unit</td>
<td>transcutaneous electrical nerve stimulation</td>
</tr>
<tr>
<td>THR</td>
<td>total hip replacement</td>
</tr>
<tr>
<td>T-spine</td>
<td>thoracic spine</td>
</tr>
<tr>
<td>T1-T12</td>
<td>thoracic vertebrae</td>
</tr>
<tr>
<td>tib-fib</td>
<td>tibial-fibular</td>
</tr>
<tr>
<td>TMJ</td>
<td>temporomandibular joint</td>
</tr>
<tr>
<td>U</td>
<td>unilateral</td>
</tr>
<tr>
<td>UE</td>
<td>upper extremity</td>
</tr>
<tr>
<td>WFL</td>
<td>Within functional limits</td>
</tr>
<tr>
<td>WNL</td>
<td>Within normal limits</td>
</tr>
</tbody>
</table>
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. Baker's 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
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

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.

Green Zones
(GO)

Yellow Zones
(CAUTION)

Red Zones
(STOP AND THINK)

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.