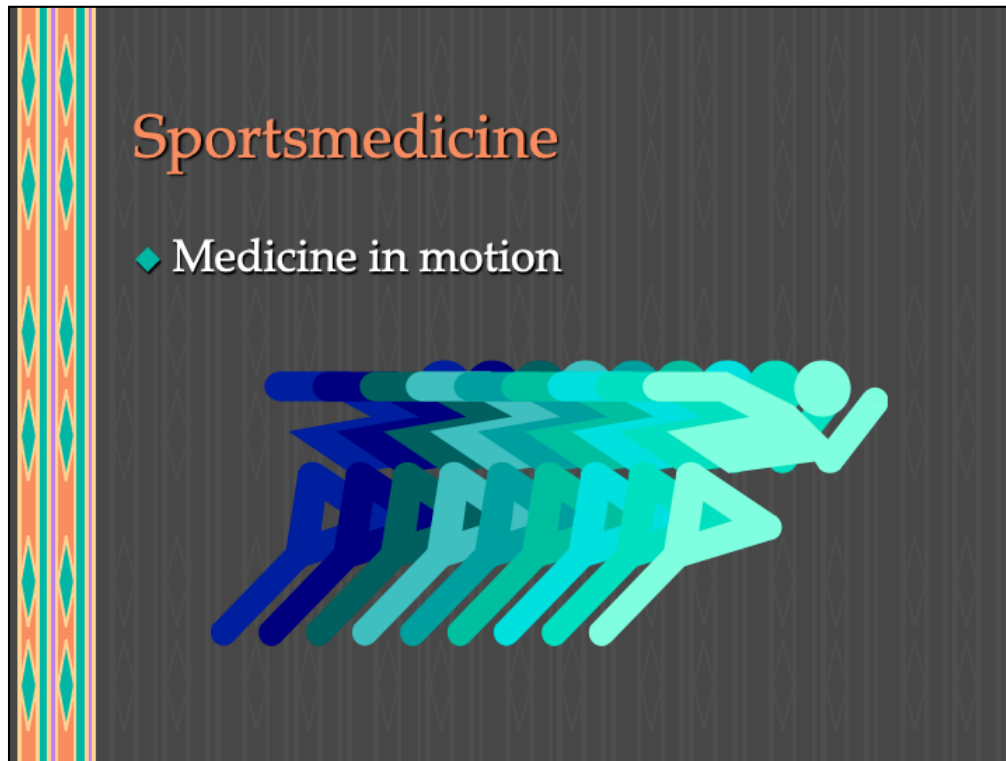


A Sports Medicine Approach to Overuse Injuries in the Workplace

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Sportsmedicine is best defined as medicine in motion.

After all, the typical individual does not go through his/her life perched on top of a doctors' examination table. Yet, this is how most physicians see their patients.

Sports medicine docs try to appreciate the human body for how it is in reality - active.

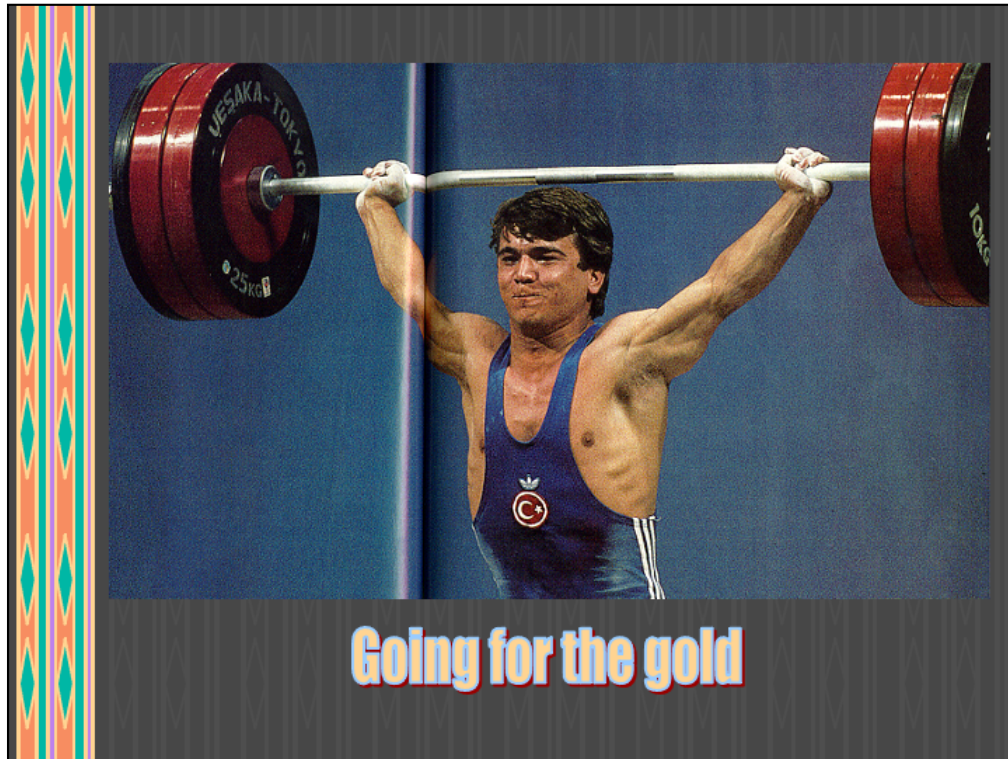
The “Industrial Athlete”

- ◆ Applying the principles of sportsmedicine to the evaluation and treatment of injured workers.



What is an industrial athlete?

This concept originated somewhere around 10 years ago. Through it we apply the principles of sportsmedicine to the evaluation and treatment of injured workers.



A lot of time and money has been spent evaluating athletes to discover ways in which to help them perform better. They've been hooked up to all sorts of machines monitoring their hearts and lungs, strength/endurance, analyzing their diets and whatever supplements they might be taking, etc..

Of course, this is all done with the best of intentions.....utilizing this information, the best athletes may look forward to winning Olympic gold.

(or perhaps lucrative careers earning obscenely high salaries, not to mention millions of dollars endorsing various advertising products.)

The “Industrial Athlete”

◆ Advantages

- ❖ *Faster, more efficient return to participation*
- ❖ *enhances self-esteem of injured worker*
- ❖ *Team physician concept*

Fortunately, the information gleaned from the athletic studies can easily be applied to the American work force. *Treating these workers as “industrial athletes offers several advantages:*

FIRST -faster return to participation: the typical athlete wants to get right back into the game ASAP. They generally won’t stand for a doctor who tells them to “stay in bed for 3 weeks so that back can heal.” Furthermore, we know that activity promotes more rapid healing and restoration of performance.

And, while Michael Jordan probably wouldn’t miss a few weeks of income, not many of us regular folks can go too long, as a result of an injury, without a full paycheck.

SECOND -self-esteem is improved: the sports medicine team serves as cheerleaders in a sense. We psych up our athletes every step of the way through their recovery, filling them with positive reinforcement. We do the same for our industrial athletes. [“Doc says he’s treating me just like Joe Montana!” or, in San Diego: cómo Péle!]

FINALLY -Team physicians are important. Not only does a good team doc cover events, but we truly become a part of the team. We know our players and coaches.

We understand the personality dynamics around the workplace, as well, and how this may affect a worker’s recovery. [It’s well-recognized that *an employee who likes their job will return to work faster than one who does not!* Also, if the employees feel comfortable with us, they may start to trust us with such things as the truth of how or when an injury really occurred.]



Are there any gold medals in our industrial hero's future?

Well, someone may have sprung a few bucks for her uniform and hopefully she'll earn some tips, in addition to her impending backache.

Humans are machines

- ◆ Underlying structure
- ◆ electrical system
- ◆ plumbing
- ◆ pulleys
- ◆ energy plant
- ◆ thermostat

Let's start off with the basic premise that HUMANS ARE MACHINES.

We have a skeleton as our underlying structure:

Nervous system which conducts electricity;

Circulatory system serves as our plumbing and
tendons act as pulleys;

For an energy plant, we have our gut

and finally, our thyroid gland and other hormones serve as our thermostat;



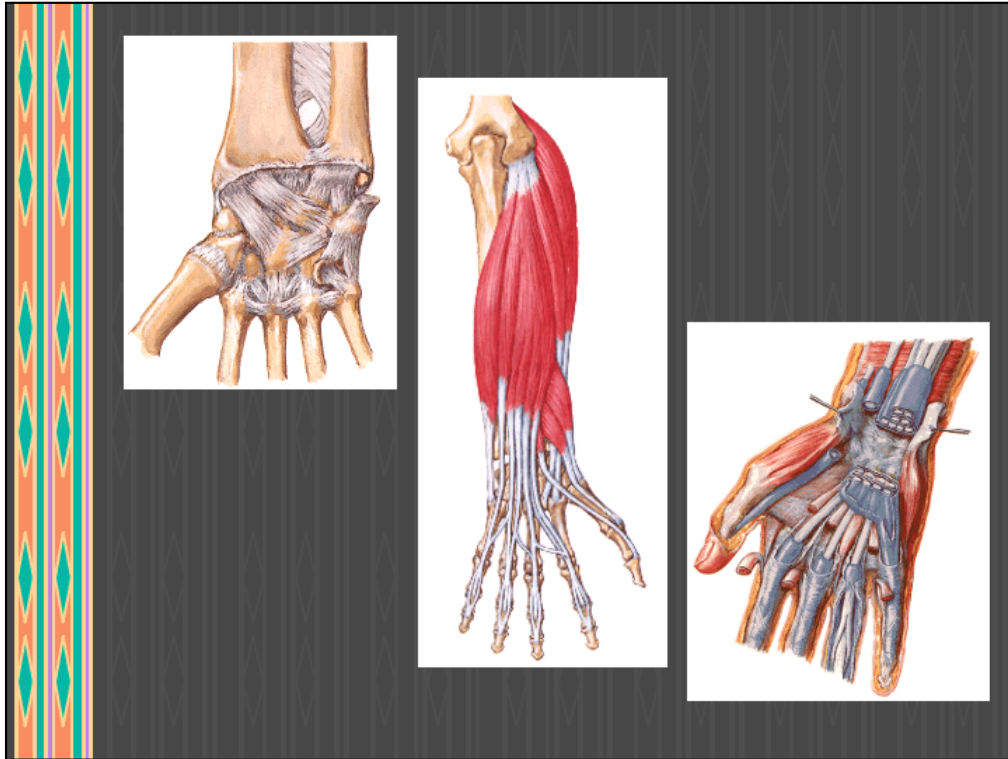
Review of anatomy

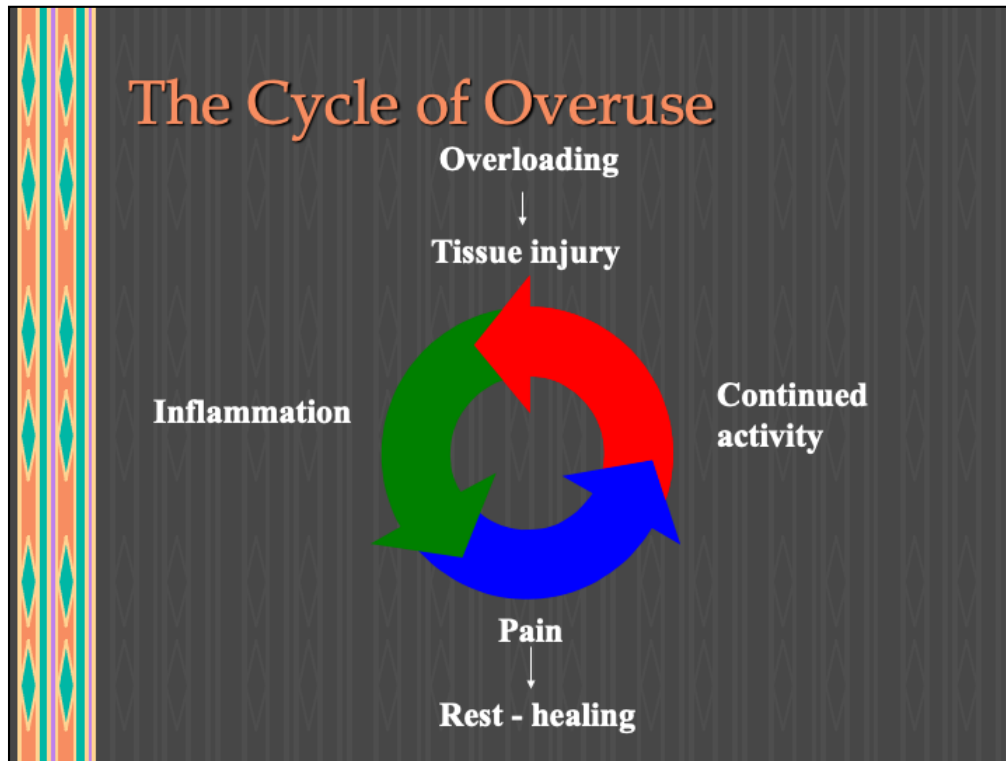
- ◆ bones
 - ❖ *joints/synovial linings*
- ◆ ligaments
- ◆ muscles/ tendons
 - ❖ *synovial sheaths*

Bones: hardest substances in our body. Where 2 bones meet to create movement is called a joint. Now, we don't want bone to actually touch another bone because that would cause too much friction leading to wear and tear. Therefore, synovial linings encapsulate the joints and produce lubricating fluid.

Ligaments: the Scotch tape that connects bones to prevent them from dislocating, providing stability.

Muscle and tendon units: the elastic muscle fibers contract in order to initiate movement of a joint, but they can't act unless connected to the bones through their non-stretching tendons. Like the joints, the tendons are also covered with synovial linings, called sheaths, to provide for lubrication.





Can one ever get too much of a good thing?

The cycle of overuse generally begins with too much load placed upon a tissue. At some point, this induces microscopic injury to the tissue, which leads to inflammation. (Inflammation is the first part of the healing process and is important because it summons the required chemicals and cells to the injury site to begin the repair process.)

By the way, the chemicals involved with inflammation, called prostaglandins, also comprise part of the pain sensation pathways, hence one of the symptoms of inflammation is pain (the others are swelling, warmth, and sometimes redness).

Rest, at the earliest hint of injury, will permit healing and allow for a quick return to activity.

On the other hand, continuous trauma of the tissues leads to further damage that worsens over time, creating a vicious cycle of injury.

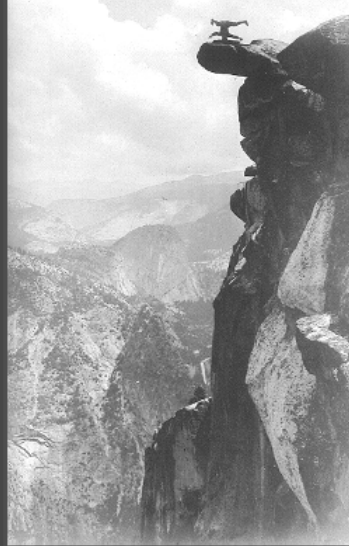


Overuse: force vs. time

- ◆ Effects of **force** (intensity)

- ❖ *jumping from chair to floor*
- ❖ *jumping from significant height*

- ◆ **acute** overuse



Overuse is generally the result of a combination of 2 components: force and time.

Looking at force alone: It's fairly obvious that falling from this height is far more likely to induce structural damage to the body, than a jump from a chair.

An unexpected overload of force is most likely to cause an ACUTE overuse problem, i.e. a sudden or fresh injury.

Overuse: force vs. time

- ◆ Effects of **time** (duration)

- ❖ *walking around the block*
- ❖ *hiking the Continental Divide*

- ◆ **chronic** overuse

- ❖ *cumulative trauma*



TIME, on the other hand, is more likely to induce CHRONIC overuse syndromes.

There is not a lot of force involved with the simple process of walking. However, walking a lot, day after day after day (such as seen in military recruits), can lead to problems, such as stress fractures of the feet.

Common types of overuse injuries

◆ Tendons

- ❖ *de Quervain's tenosynovitis*
- ❖ *extensor tendonitis/lateral epicondylitis*
- ❖ *rotator cuff impingement*

◆ Nerves

- ❖ *carpal tunnel syndrome*
- ❖ *cubital tunnel syndrome*

Just a quick review of commonly seen overuse injuries in the workplace:

TENDONS:

De Quervain was a Swiss surgeon in the mid-1800's who lent his name to "Hitchhikers thumb."

Extensor tendonitis and lateral epicondylitis are the fancy medical terms for "tennis elbow."

The rotator cuff refers to a group of 4 muscles that raises and rotates the upper arm. Their common tendon travels through a small space that may become inflamed with overuse. This is commonly seen in many athletes, particularly swimmers. Anyone who must repetitively reach overhead is at risk for this, particularly as we become "more mature." (I.e. >35 yrs old)

NERVES:

Carpal refers to wrist, in Latin. There are 8 carpal bones, which are actually located in the heel of the hand, and they create a trough that is bridged overhead by a ligament, forming a "carpal tunnel." The median nerve travels through this into the hand controlling the thumb, index and middle fingers generally. Placing pressure upon it or inflammation of it causes paresthesias (tingling/numbness) in these digits and is called carpal tunnel syndrome.

The cubital tunnel refers to a passage around the bones in the elbow,

permitting passage of the ulnar nerve. Whereas the median nerve went to the thumb, index, and middle fingers, the ulnar nerve controls the 4th and 5th, which are responsible for most of a hand's grip strength. (e.g. hammer)

Common types of overuse injuries

- ◆ Bone and joints
 - ❖ *stress fractures*
 - ❖ *degenerative arthritis*
- ◆ Connective tissues
 - ❖ *plantar fasciitis*

BONES:

We mentioned stress fractures briefly before. These are microscopic fractures of bone which are simply too small to see on an x-ray of a fresh injury. However, repeating the x-ray films 2 weeks after the onset of pain may reveal evidence of bony healing, confirming the diagnosis. (Bone scans and MRI's are used in rare occasions if time is of essence.).

Degenerative arthritis simply refers to the usual wear 'n tear changes in our joints.

(And, finally) CONNECTIVE TISSUES:

The bottom of our foot is referred to as the plantar surface. Helping to support our arch is a thick band of connective tissue called the plantar fascia. Every step induces a stretching force on this fascia which, over time, can lead to microtears and inflammation. Inflammation, in Latin is “-itis”, hence the term plantar fasciitis. If any of you has stepped out of bed in the AM and felt as though you were walking on super sharp nails, then you've had plantar fasciitis.

Grading overuse injuries

- ◆ Grade I (most mild)
 - ❖ symptoms occur generally *only after activity or at night*.
 - ◆ May keep hands under pillow.



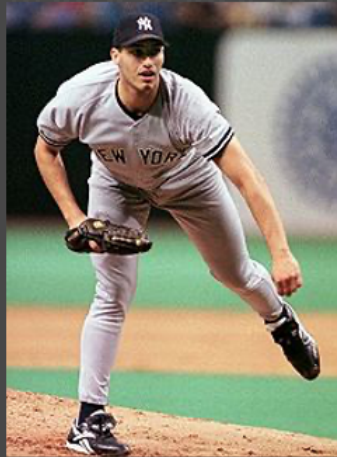
Grading overuse injuries

- ◆ Grade II
 - ❖ symptoms occur during activity, *but do not interfere with performance of tasks.*



Grading overuse injuries

- ◆ Grade III
 - ❖ symptoms occur during activity and do interfere with performance.



Grading overuse injuries

- ◆ Grade IV
 - ❖ symptoms so bad
unable to use the
affected part.



Treatment of overuse injuries

◆ General principles

- ❖ flexibility
- ❖ strength
- ❖ endurance

Moving on to the treatment of overuse injuries, we find 3 general principles:
Flexibility, strength, and endurance.

With overuse, muscles become tight, e.g. using a screwdriver..... More likely to sustain microscopic tears.

Hence , the more resiliency, the less chance of tissue damage.

Strength is defined as how much effort can be generated to perform a specific task, and it helps to provide stability

Endurance is simply how long can this effort (or strength) be maintained?



These guys heard the results of the controlled studies that proved vitamin B6 did nothing for carpal tunnel, so they're trying something else!

Treatment of overuse injuries

◆ Acute phase

❖ PRICES

- ◆ Protection
- ◆ Rest
- ◆ Ice
- ◆ Compression
- ◆ Elevation
- ◆ Support

Regarding acute (or fresh) injuries, we're all familiar with the mnemonic RICE from our school days (rest, ice, compression, and elevation).

Somewhere along the way, someone added a "P" for protection and an "S" for support.



This is a scene that most never get to view after the game's over....
Which brings us to the sports medicine mantra: ICE IS NICE!

Think of a broken water main pipe.....(ice vs. heat)
A sprained ankle behaves the same way.....

ICE IS NICE!

Treatment of overuse injuries

◆ Grade I

- ❖ Reduce intensity or duration of activity by 25%. More diligent stretching. Ice following activity.
- ❖ Follow the 10% per week rule.
 - ◆ *Sudden, excessive overtime is a sure-fire recipe for overuse complaints because the workers do not have an opportunity to build up their endurance prior to the extra work.*

Follow the 10% per week rule.

Sudden changes in an athletic workout program leads to injuries. By advising our runners not to exceed their previous week's total mileage by 10%, we prevent these injuries.

The same is true for the jobsite. *Sudden, excessive overtime is a sure-fire recipe for overuse complaints because the workers do not have an opportunity to build up their endurance prior to the extra work.*

Treatment of overuse injuries

◆ Grade II

- ❖ *Reduce intensity or duration of the activity by 50%.*
- ❖ NSAIA's
- ❖ Counterforce bracing
- ❖ Consider physical therapy
 - ◆ flexibility, endurance, eccentric strengthening



Treatment of overuse injuries

◆ Grade III

- ❖ "Active" rest: the worker should stop performing the offending tasks, but is allowed to move the affected part for his daily activities.
- ❖ Physical therapy
- ❖ Consider steroid injection

Treatment of overuse injuries

◆ Grade IV

- ❖ *Complete rest of the affected part, usually involving the use of some sort of sling or splint*
- ❖ *If all else fails, consider surgical options.*

Sports Medicine Pearls

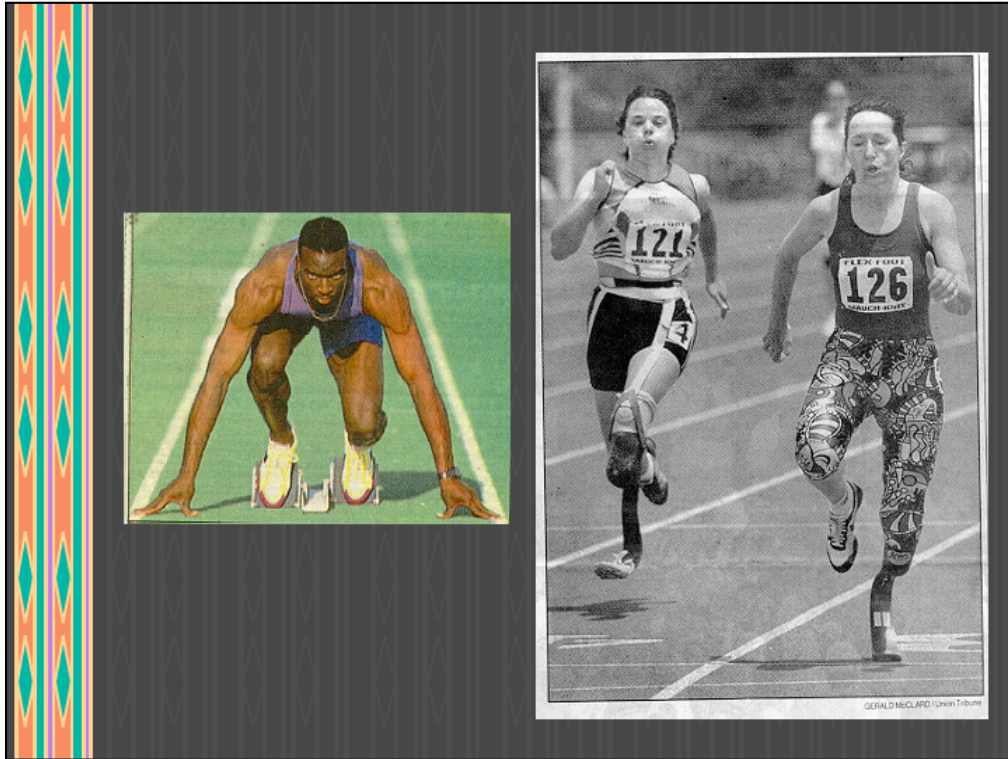
- ◆ Healthy people perform better than sick people.
 - ❖ *Difficult to win Super Bowl with team of injured athletes*
- ◆ Athletes perform better when using the right equipment
 - ❖ *Difficult to run marathon if shoes too big or too small*

Healthy people perform better than sick people. *It's difficult to win the Super Bowl with a team of injured athletes*

This is a no-brainer: keeping employees healthy makes company more productive in the long run. Employer will see improved balance sheets, not to mention happier employees.

Athletes perform better when using the right equipment. *It's difficult to run a marathon if shoes too big or too small*

Cannot over emphasize the importance of workstation design and the use of appropriate tools.



There is rarely a situation where we cannot help an athlete or an employee adapt to unusual circumstances.

Sports Medicine Pearls

- ◆ Training/conditioning
 - ❖ Should progress gradually
 - ❖ *Example: return to running program*
 - ◆ cycling 45 minutes
 - ◆ walk 2 miles in 30 minutes
 - ◆ alternate jogging/walking
 - ◆ gradually increase speed/intensity/distance
 - increase by 10% per week maximum



Training/conditioning

Incidentally, you can throw away your back belts as the only thing ever been shown to prevent back injuries is conditioning, specifically, good cardiovascular endurance.

Now, whether it be in preparation for an event or return from injury, the conditioning program needs to progress gradually, as in this sample return to running program, following a lower extremity injury.

We'll start out with cycling 45 minutes...

walk 2 miles in 30 minutes

alternate jogging/walking

gradually increase speed/intensity/distance

- increase by 10% per week maximum

Sports Medicine Pearls

◆ Training/conditioning

❖ In the workplace, consider:

- ◆ *Increase duration of a specific task gradually, e.g. an hour/day/week.*
- ◆ *alternating tasks/departments every few hours.*

Adapting this concept to the workplace, we advise a gradual increase in the duration/intensity of a specific task, eg one hour/day/week.

- assembly line workers may initially resume their repetitive tasks for 1-2 hours/day, and then increase it to 3 hours/day the following week, then 4 hours the next, etc..

Also, ***alternating tasks or rotating departments*** every few hours makes good prevention sense, as well.

Sports Medicine Pearls

- ◆ Work smartly with proper **ergonomics**
 - ❖ *concept of neutrality*



Buildings last longer when there is less stress placed upon them.



So do our necks and spines. We need to find the least stressful way to perform our daily work tasks

For example, a “desk jockey” may have tucked telephones under his/her chin for many years, leading to degenerative changes and cervical radiculopathy.

We cared for one of the local city governments for many years. They were constantly plagued by chronic neck complaints.....

-My physical therapist and myself toured the offices and made appropriate recommendations regarding their workstations. We emphasized the use of headsets and proper monitor heights.....

Sports Medicine Pearls

- ◆ Maintain flexibility
 - ❖ stretches every 2 hours (approximately)
 - ❖ slow and controlled movements



Do you all remember watching, a few years ago, the television pictures of the Japanese auto workers - taking exercise and stretch breaks together?

Well, this works. We've demonstrated this fact with some of our larger companies in the past. One in particular - the workers would have to mark and polish eyeglass lenses all day long. In addition to encouraging job rotations, groups started to exercise together. Their work comp costs nose-dived dramatically.

*I recommend stretching approximately every 2 hours during the course of the work day, and, particularly at day's end (when employees should ice any troublesome regions, as well). Remember that stretches should always be performed with slow and controlled movements, taking around 15-20 seconds per repetition. **How many repetitions should be performed?** Sportsmedicine studies have shown that there are no additional benefits beyond 4 repetitions performed at a given time.*

I'd like to quickly demonstrate 2 quick and easy desk jockey stretches.

First, for the carpal tunnel region.....

Next, this is a great neck stretch that I picked up at an Ergonomics conference a few years ago.....

Sports Medicine Pearls

◆ Decrease unnecessary forces to body

❖ footwear

◆ Vibram rubber soles

❖ shock mats



-Did you realize that pro football injuries are Work Comp?

Whereas most jobs will not require helmets, we do have to worry about our feet.

When I stamp my foot on a hard floor, the floor doesn't feel a thing. It silently laughs to itself as the forces travel back up into my foot, into my ankle, lower leg, and eventually up to my back. If I were to stand barefooted on a hard cement floor all day long, my back would be killing me.

If employee is in same place all day long, e.g. cashier at a supermarket, place them on a shock mat.

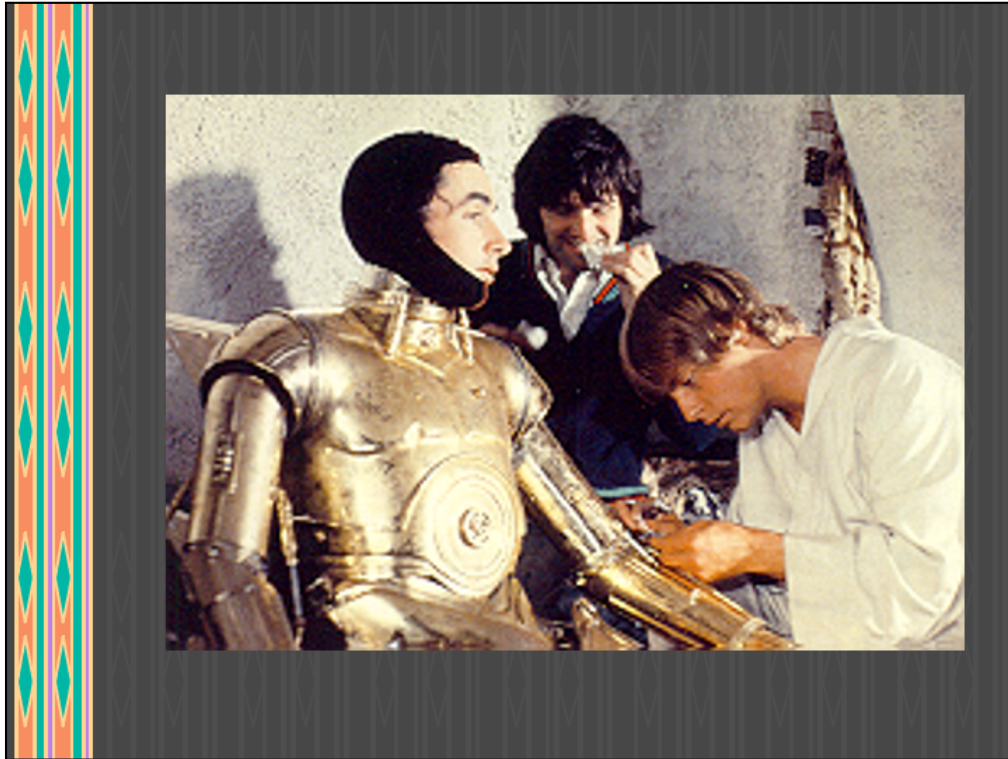
If they must walk around, encourage them to wear shock absorbing shoes, e.g. Vibram-soled work boots. Sneakers may look comfortable, but they quickly lose their shock-absorbing capability

(average running shoe loses its shock-absorbing abilities after 300-500 miles, or about 3 months time for the typical runner).



Summary

- ◆ We have only one body/machine that needs to last us for our entire lifetime.
- ◆ Taking good care of the machine helps to ensure that it will not break down as much and last a long time.



And so my young Jedi warriors, may the *forces* be with you and (next slide: Thank you)



