



# Ranger - Athlete – Warrior

## *Principles of Sports Medicine*

MAR 2011





# Components of RAW



- Functional Fitness
  - Strength
  - Endurance
  - Movement skill

- Performance Nutrition
  - Nutrient needs
  - Ideal body composition
  - Supplements



- ***Sports Medicine***
  - Prevention
  - Early intervention
  - Multi-disciplinary team

- Mental Toughness
  - Ideal Performance State
  - Fatigue counter-measures
    - Endurance events



# Sports Medicine



Sports medicine for Rangers involves the prevention and treatment of injuries in elite performers with the ultimate goal of achieving 100% individual and unit combat effectiveness and strength.







# Sports Medicine Mission



- Ensure each Battalion is at the highest level of physical fitness during the JORT cycles and world wide deployments.
- Prevent avoidable under recovery /and traumatic musculoskeletal injuries through unit training assessments, individual physical assessments, individual and key leader education on injury prevention and human performance optimization.
- Provide immediate orthopedic evaluations, a definitive diagnosis and evidenced based physical therapy for a rapid return to duty.



# Sports Medicine Approach



- Prevention

- Injury Screening

- Modified Functional Movement Screen
    - ID Ranger at Injury Risk
    - Conducted by Physical Therapist and HPOCs
    - Movement deficits are addressed
    - On-going validation of modified FMS and other screening tools



- Principles of RAW

- Avoid overuse injuries through planned progression/scheduling
    - Develop optimal movement skills (core stability, agility, skillful power production)
    - Create balanced strength and flexibility (develop Push and Pull)



# Sports Medicine Approach



- Early intervention
  - Don't ignore injuries
  - Leaders are responsible for taking care of their men
- Multi-disciplinary team
  - Extensive comms between BN staff (medics, PA, PT, surgeon) and specialist (Ortho, neurology, etc) at the post or local hospitals
- Rehab/Return-to-Duty Transition
  - Rangers must finish rehab
  - Pain is a liar...because you don't hurt doesn't mean you are 100%...or even 70%!



# Sports Medicine Approach

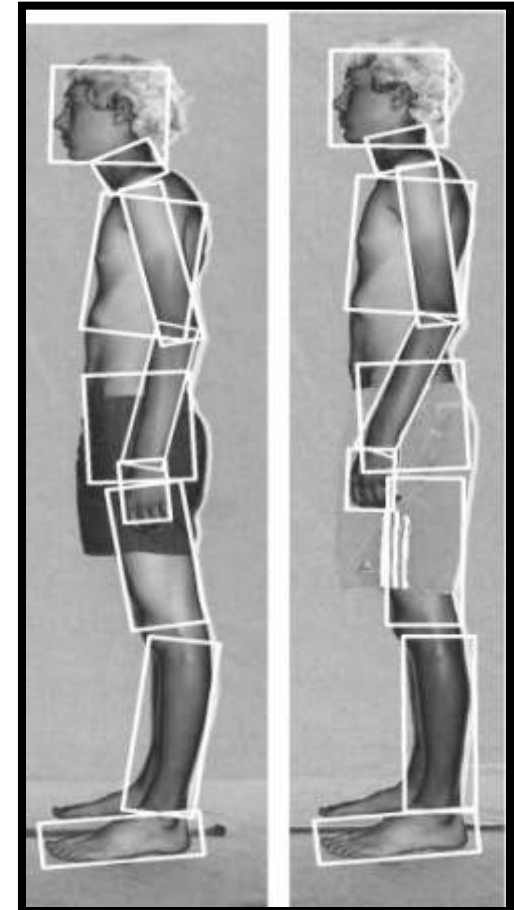


## •Protective Equipment

## •Posture

- Too much of any posture is bad
- Good postures balance stress
- Bad postures promote imbalances

## •Ergonomics/Biomechanics



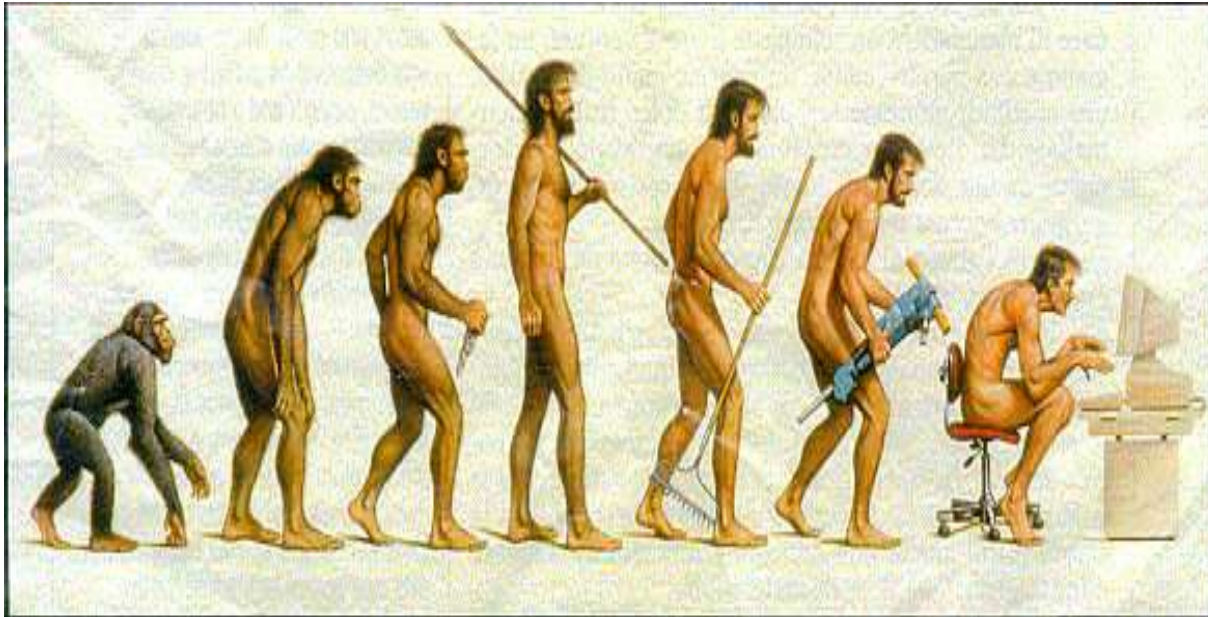




# S.A.I.D. Principle



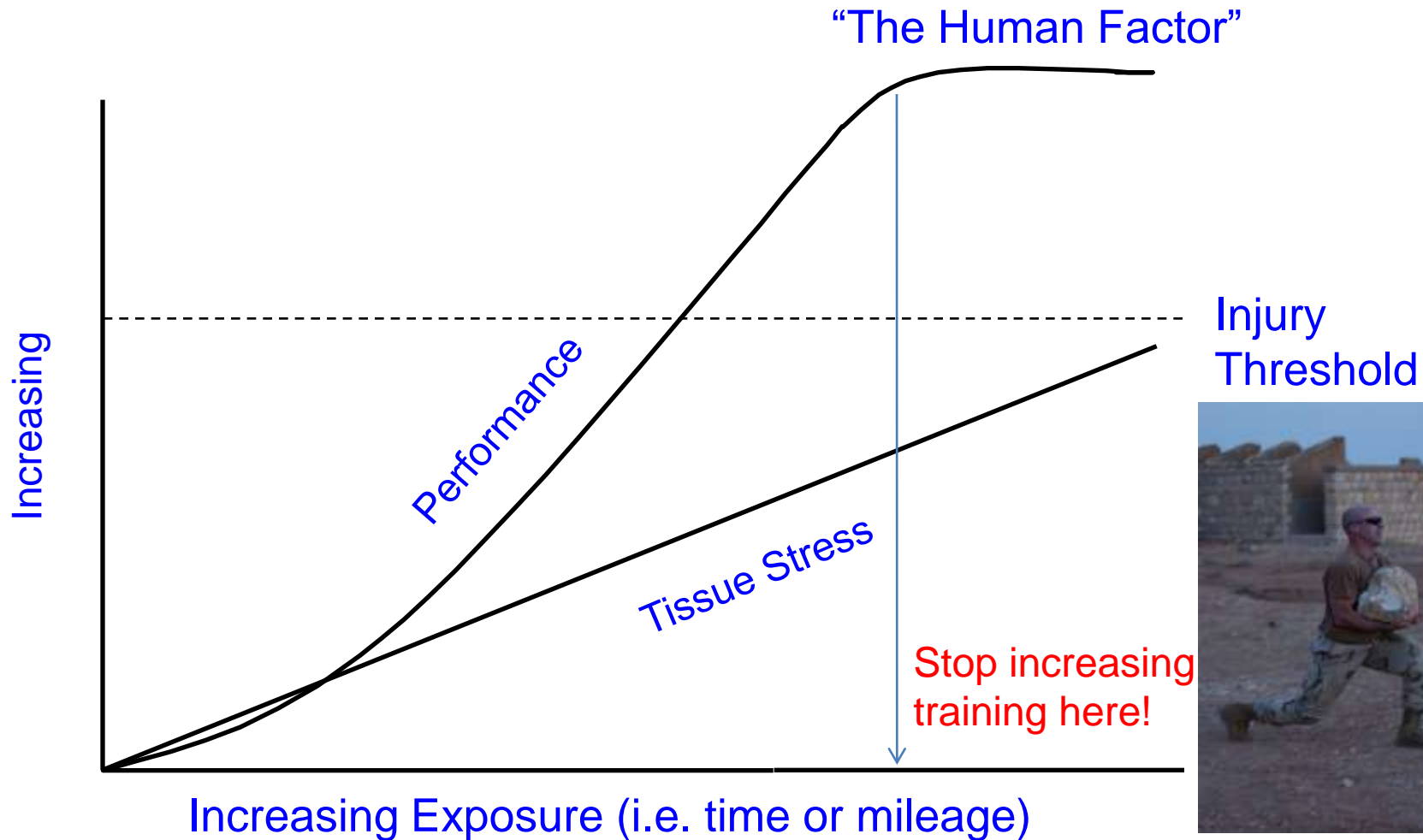
- Tissues adapt to the stress placed upon them
  - This is why posture and biomechanics matters







# Balancing Performance and Injury Prevention





# Training Assessment



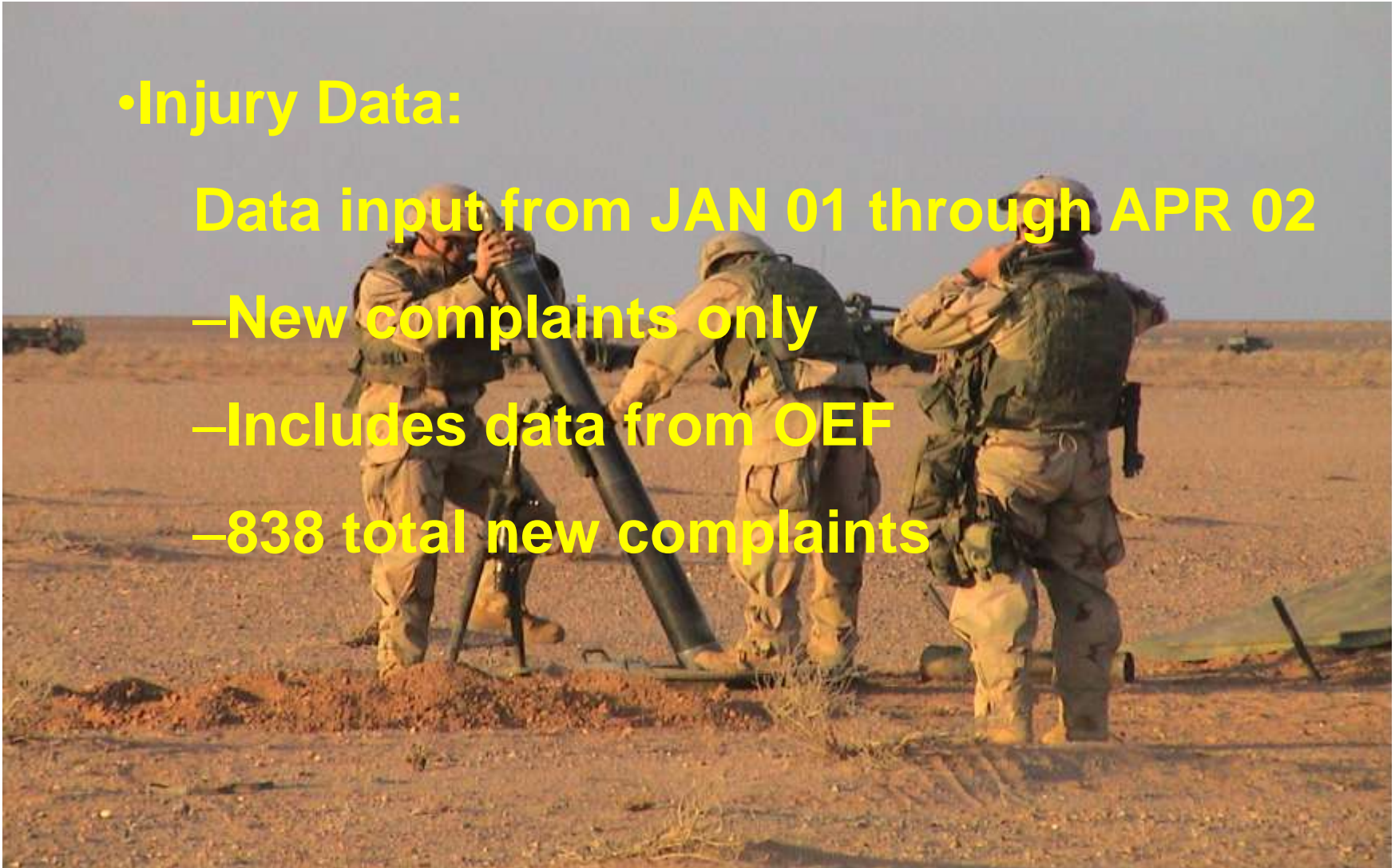
## •Injury Data:

Data input from JAN 01 through APR 02

–New complaints only

–Includes data from OEF

–838 total new complaints





# Training Assessment



- **34% of all injuries are due to overuse**
  - **Running**
    - **Duration - > 5 miles**
    - **Route Selection - Airfield**
    - **Frequency - 5 days a week**
  - **Lifting**
  - **Rucking**
  - **Body Mechanics**





# Training Assessment



- 12,166 days lost from training because of profiles

- TOP THREE CAUSES

- #1 Airborne Ops - 2,632 days (22%)

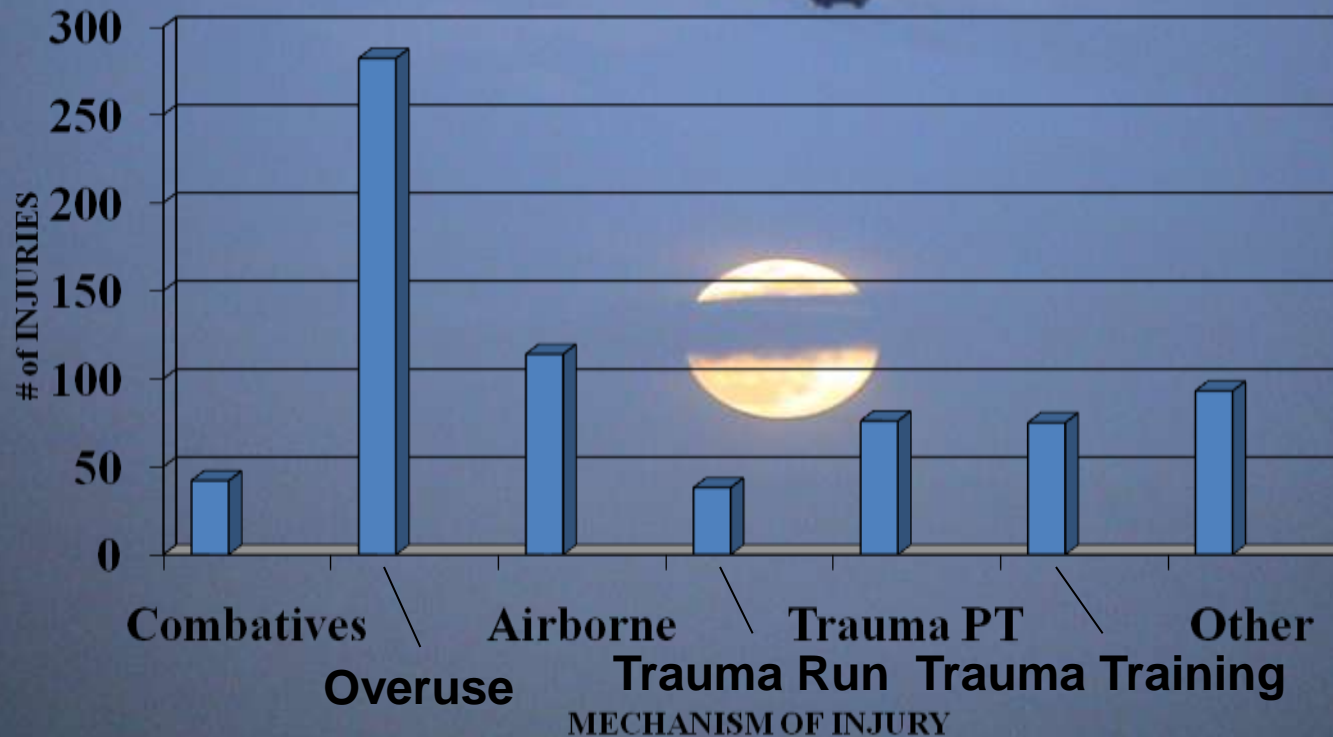
- #2 Overuse Injuries - 1,582 days (13%)

- #3 Other (non duty hours) - 1,505 days (12%)





# Training Assessment





# Training Assessment



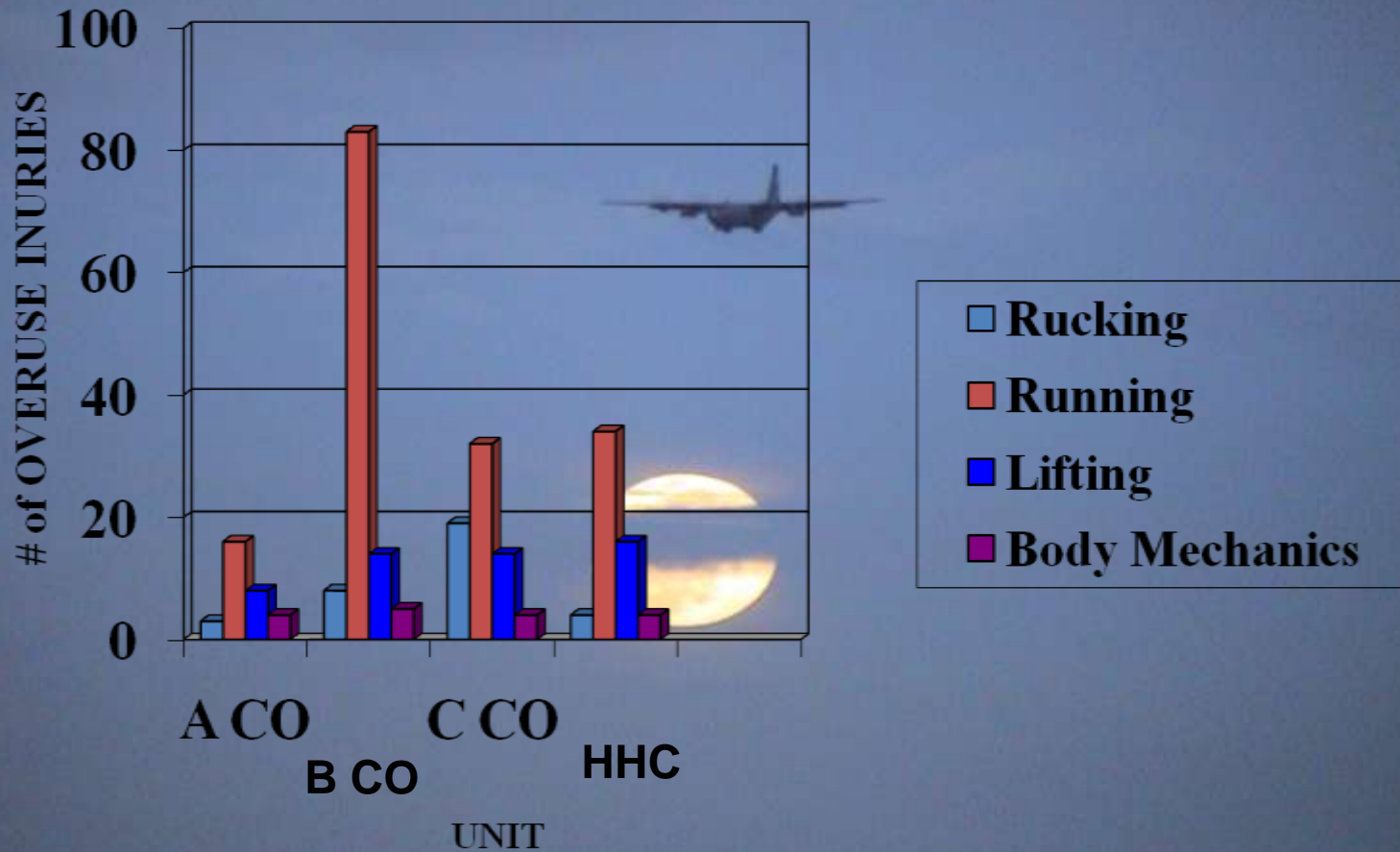
- **Most Jump Injuries secondary to PLFs**
  - **Increased Distance Running**
  - **No Implemented Plyometric Training**
  - **Minimal Agility Training**





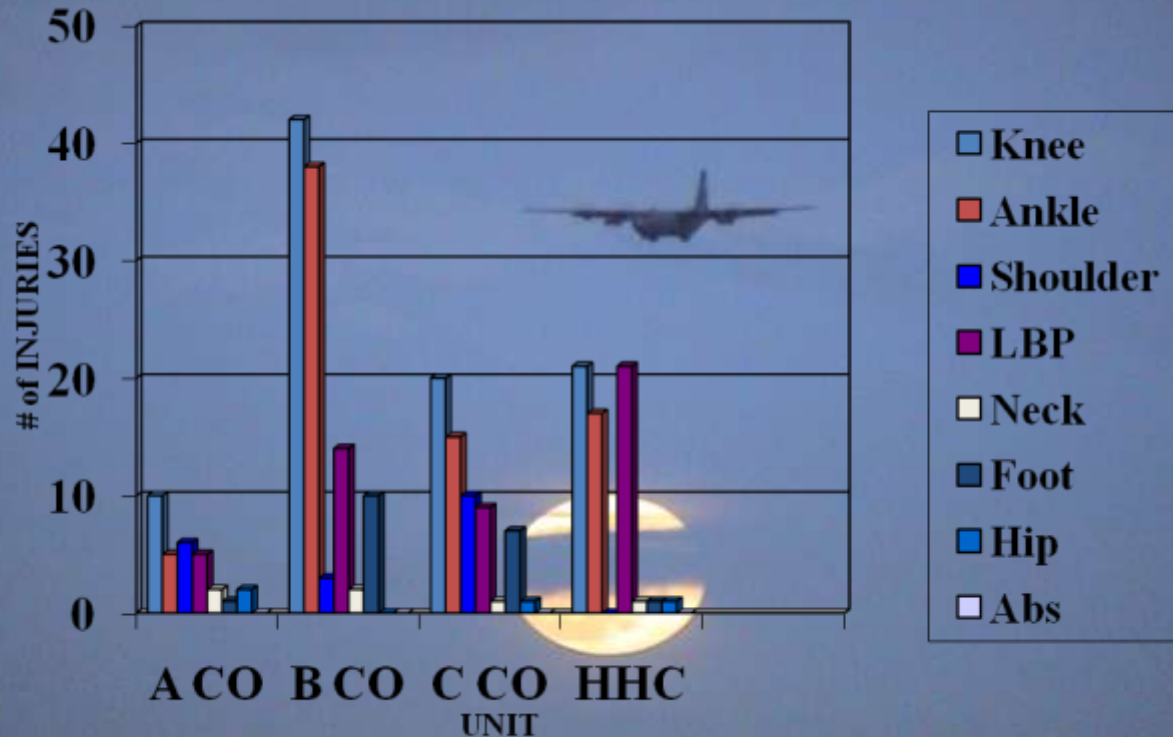


# Training Assessment





# Training Assessment



- 838 total injuries
- 282 overuse injuries = 34% preventable injuries
- 26 overuse ISB only = 3.1% preventable



# Training Assessment



- Follow on injury metrics
- After implementation of Combat Focused Physical Training
  - Data input from JAN 03 through FEB 04
  - New complaints only
  - Includes data from Operation Iraqi Freedom
  - 433 total new complaints





# Training Assessment



- 14,985 days lost from training because of profiles
- TOP THREE CAUSES
  - #1 Airborne Ops – 4,609 days (30%) increase in jump injuries and profile length secondary to two combat jumps with significant lower extremity fractures and dislocations with multiple surgeries and revisions and profiles for over 300 days.
  - #2 Combat Trauma – 2,270 days (15%) includes Rangers on profile for over 300 days due to shrapnel injuries and multiple surgeries.
  - #3 Overuse Injuries - **751days (5%) a drop in 8%**
    - **Decrease due to unit injury prevention training and early intervention for injuries sustained**



# Training Assessment



- OEF II 2002 (1<sup>st</sup> six weeks): **31 overuse injuries/16% of Company's combat strength degraded**
  - Running daily (sometimes twice a day)
  - Improper Lifting
- OEF III 2004 (1<sup>st</sup> six weeks): **3 overuse injuries/100% combat strength maintained at Company level**
  - All individuals who had not attend CFTC in past year
  - All staff members



# Overuse/Under Recovery Injury



- Repetitive stress
- Bend, bend, break
- Posture and biomechanics may predispose individuals
- Principles of exercise are usually violated





**REPETITIVE  
USE**

**LOSS OF  
STRENGTH AND  
FLEXIBILITY**

**TISSUE  
OVERLOAD**

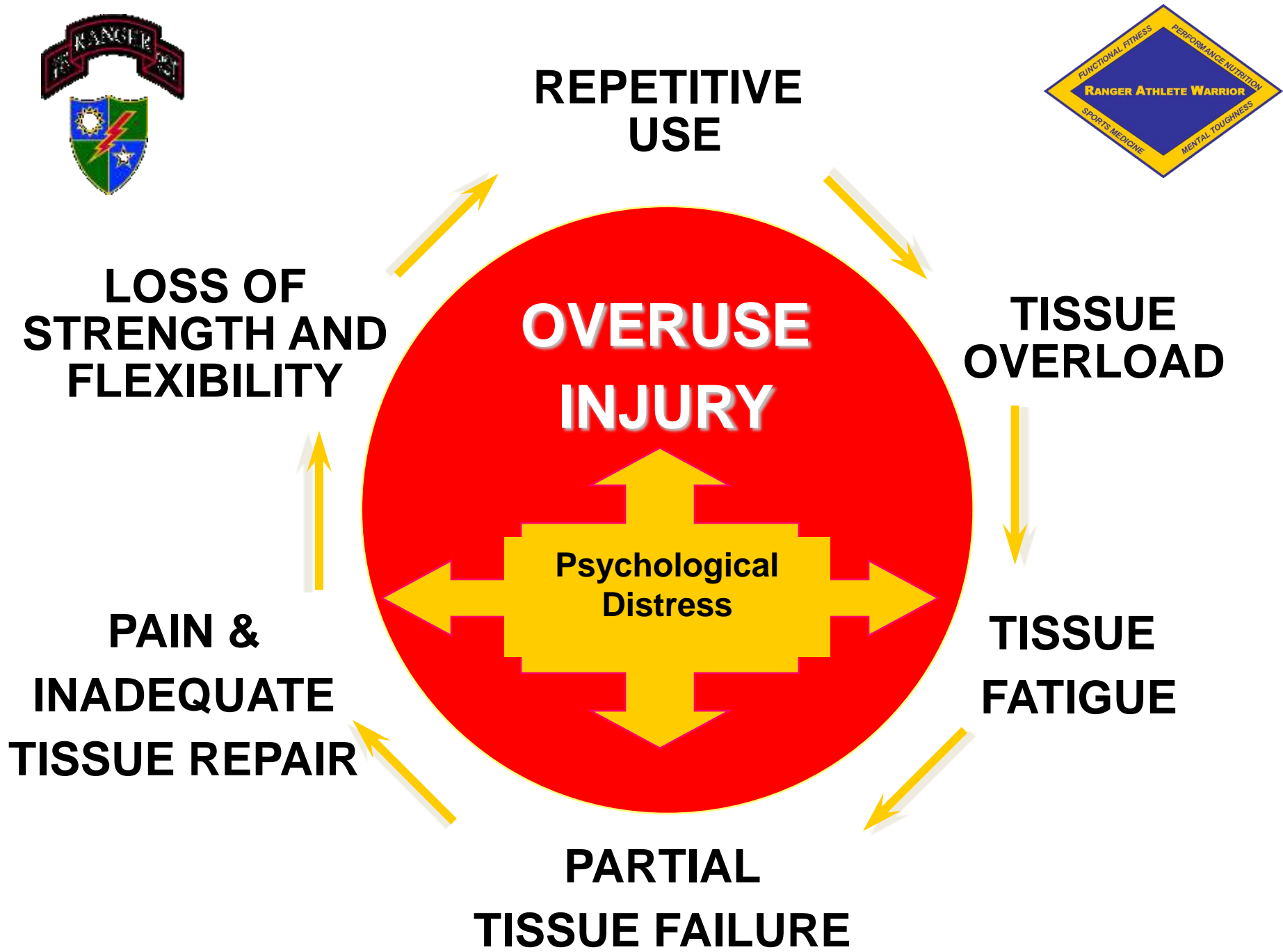
**OVERUSE  
INJURY**

**PAIN &  
INADEQUATE  
TISSUE REPAIR**

**TISSUE  
FATIGUE**

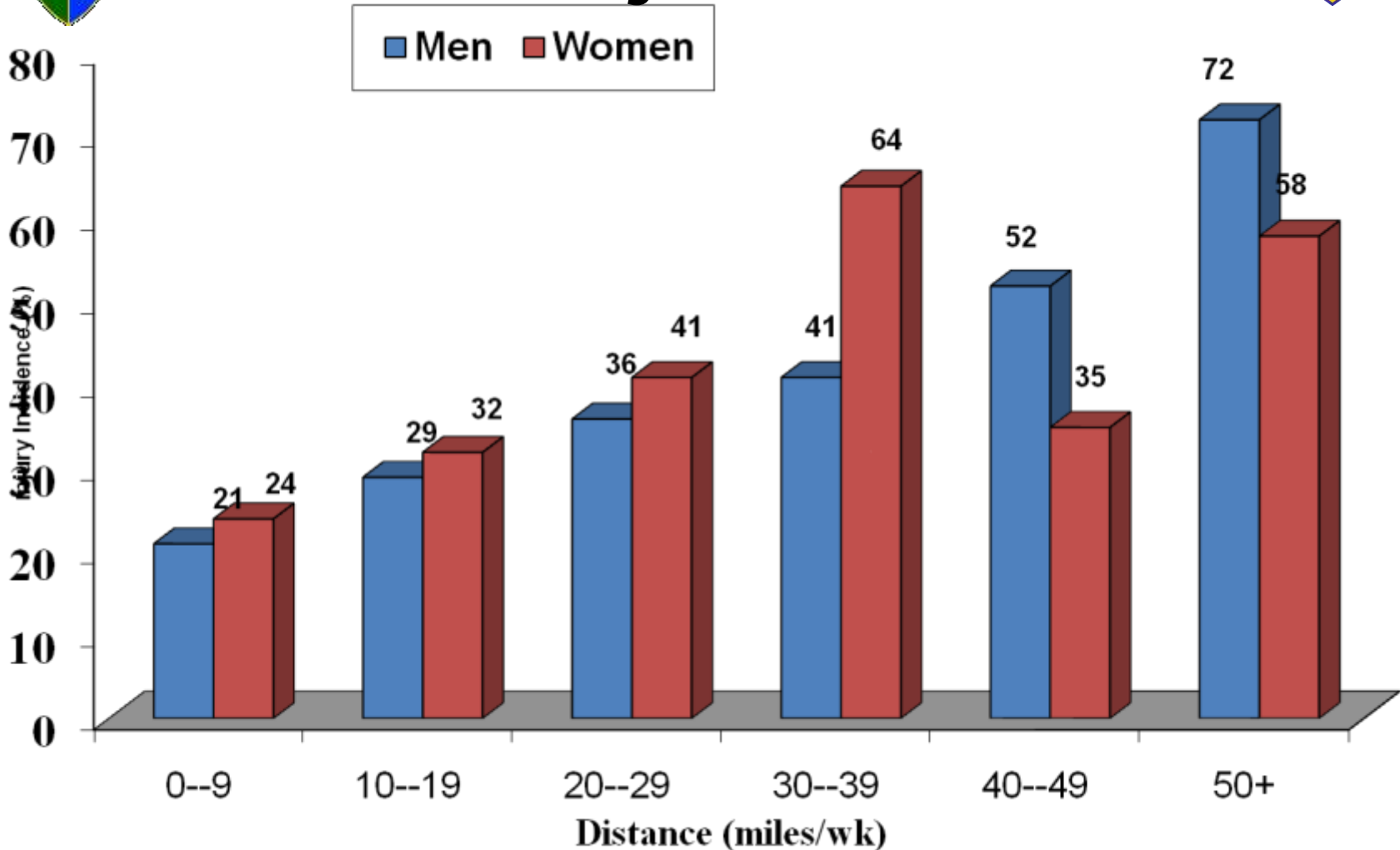
**Psychological  
Distress**

**PARTIAL  
TISSUE FAILURE**





# More Running = More Injuries





# Running Frequency, Injuries & Cardiovascular Endurance



Frequency (days/week)	Injury Incidence (percent)	Change in CV Endurance (%VO <sub>2</sub> /2-mi run)
0	0%	-3.4% / -:30
1	0%	8.3% / 1:06
3	12%	12.9% / 1:48
5	39%	17.4% / 2:24
<b>3-5 days/week</b>	<b>225% increase</b>	<b>35% increase</b> :36 faster

Pollock, ML. *Med Sci Sports.* 9(1), 1977  
Training: running 30 min, 85-90% MHR



# Running Duration, Injuries & Cardiovascular Endurance



Duration (min/day)	Injury Incidence (percent)	Change in CV Endurance (%VO <sub>2</sub> /2-mi run)
0	0%	-.7% / -:06
15	22%	8.7% / 1:12
30	24%	16.1% / 2:00
45	54%	16.9% / 2:18
<b>30-45 min/day</b>	<b>125% increase</b>	<b>5% increase</b> :18 faster

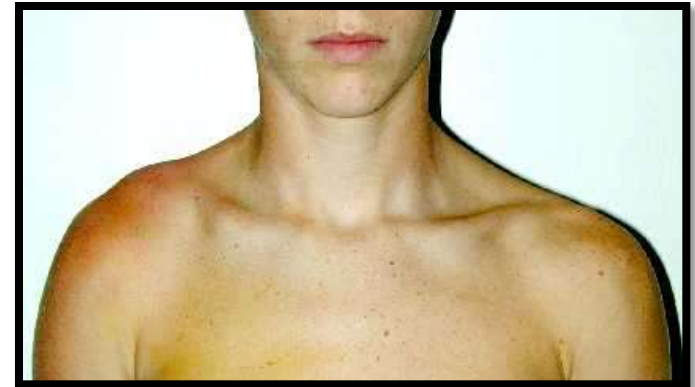
Pollock, ML. *Med Sci Sports*. 9(1), 1977  
Training: running 3 days/week, 85-90% MHR





# Acute Injury

- Moderate-high energy force that disrupts tissue
- Swelling/redness/heat/tenderness to touch
- Limping
- Lost range-of-motion





# Stages of Soft-Tissue Healing



- Inflammation (acute)
  - Generally lasts 2-3 days
  - Treatment: manage pain/swelling; protect the injury; active motion as tolerated
- Repair (sub-acute)
  - Begins toward end of first week and lasts 2-3 weeks
  - Treatment: controlled, pain-free motion; maintain overall fitness if practical
- Remodeling (chronic)
  - Variable length; tendon/ligament may take 1-2 years
  - Treatment: progressive stress until full function is restored



# Factors that Impede Healing



- Age
- ***Poor Diet***
- Corticosteroids/***NSAIDs***
- Diabetes
- Anti-coagulants
- ***Prolonged immobilization***
- Excessive soft tissue gap
- ***Excessive motion or stress/repeat injury***
- ***Smoking***



# PRICE-M Injury Treatment Model



- **P**rotection: Sling, cast, brace, crutches, etc
- **R**est: Usually not total rest. X-train if possible
- **I**ce: Apply frequently first 48 hrs
- **C**ompression: Apply evenly...don't constrict circulation
- **E**levation: Keep injured part above the level of the heart when possible
- **M**obilize: Motion prevents stiffness, but must be right amount at the right time.

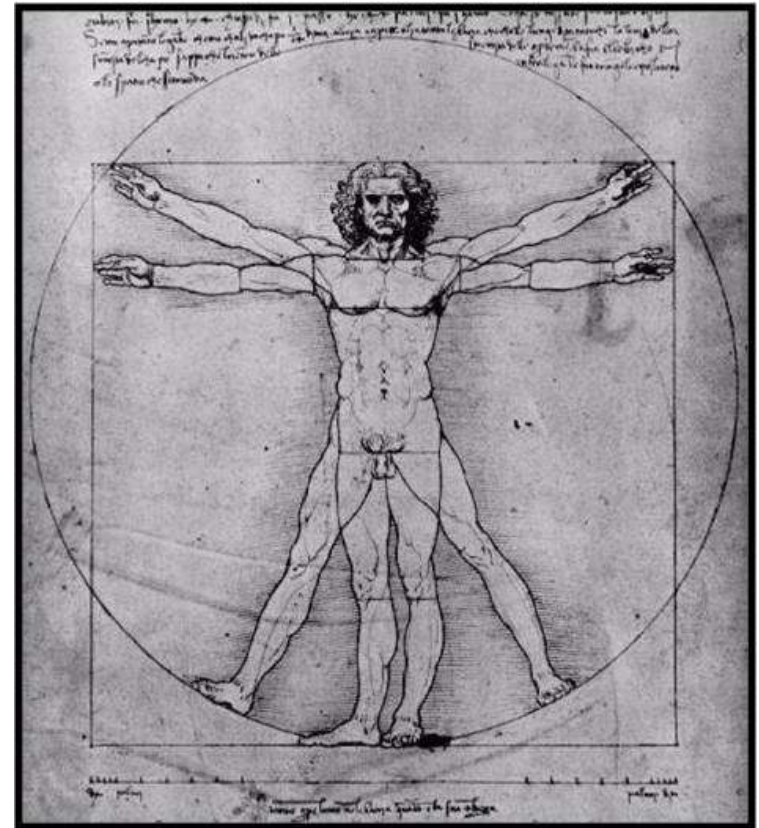




# Purpose of Rehab

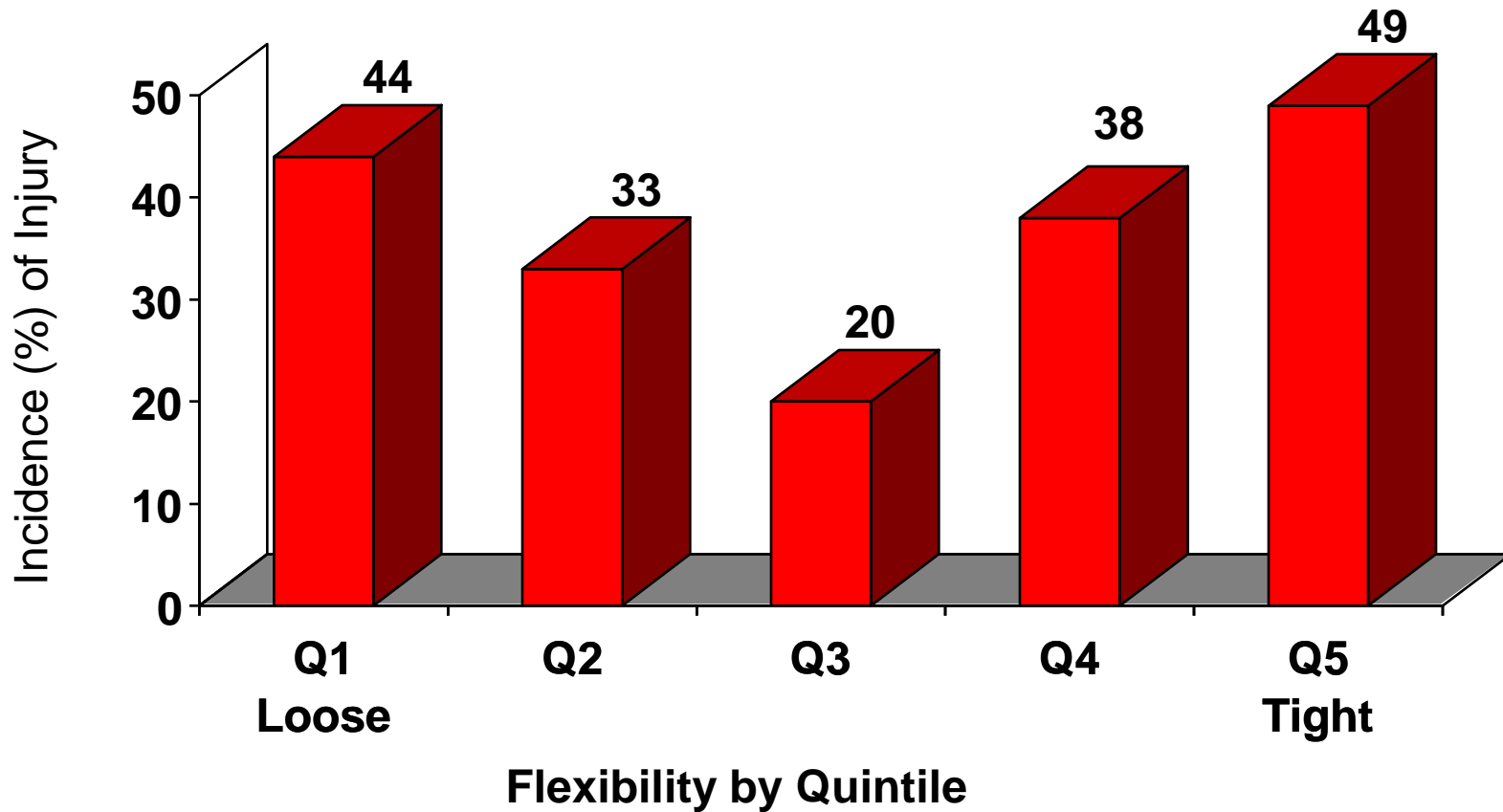


- Restore optimal movement
  - Joints must have right mix of mobility/stability
  - Muscles must have the right mix of length/strength to move the joints
  - Nerves must know when to fire the muscles





# Flexibility & Injury



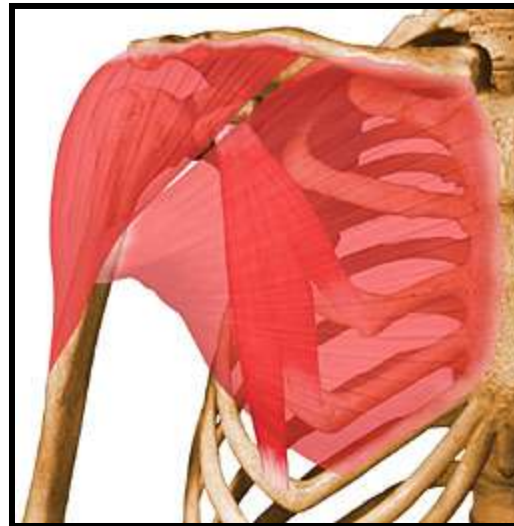


# Flexibility Culprits

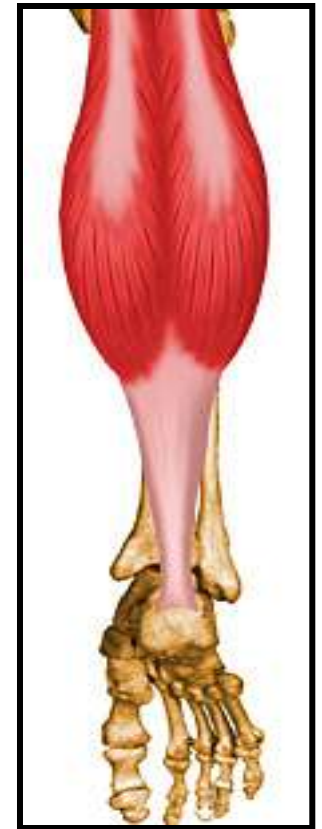
**Hip Flexors**



**Pecs**



**Posterior Calf**



*Stretch these muscle groups  
on a regular basis*



# Recovery



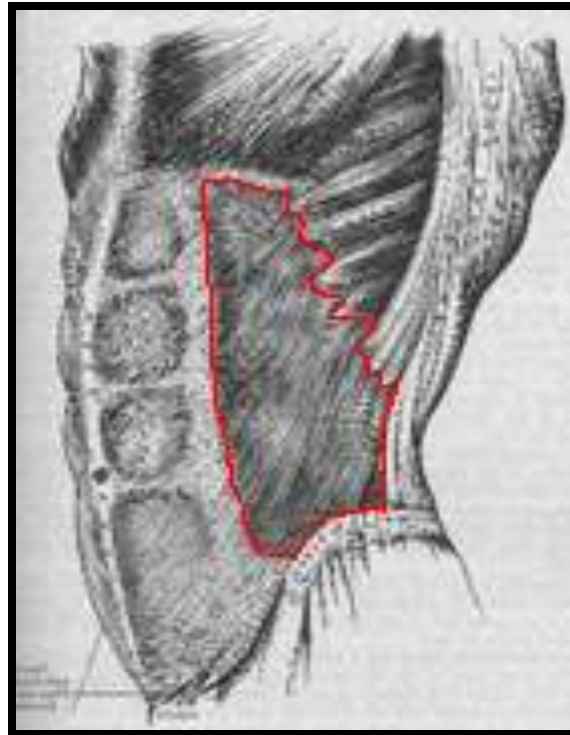
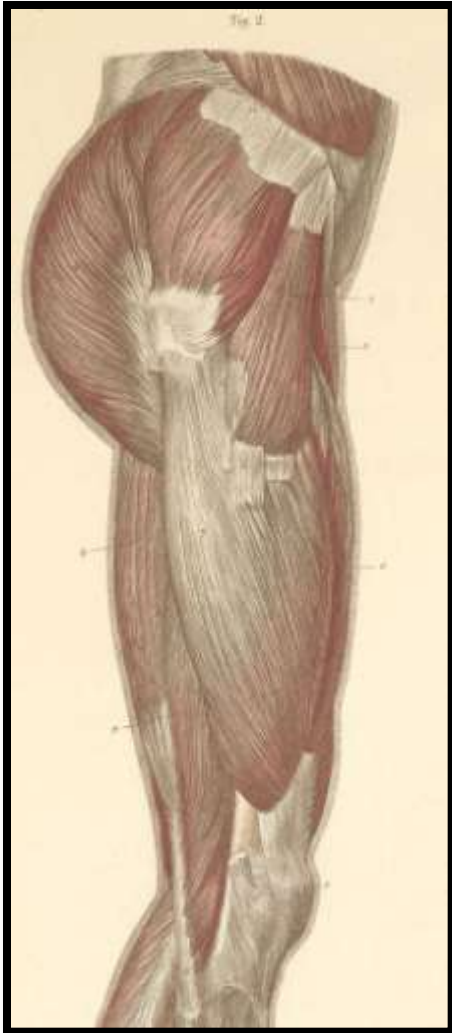
- Nutrient content and timing
- Contrast baths
  - Heat/cold alternating
- Easy motion
- Massage







# Connective Tissue

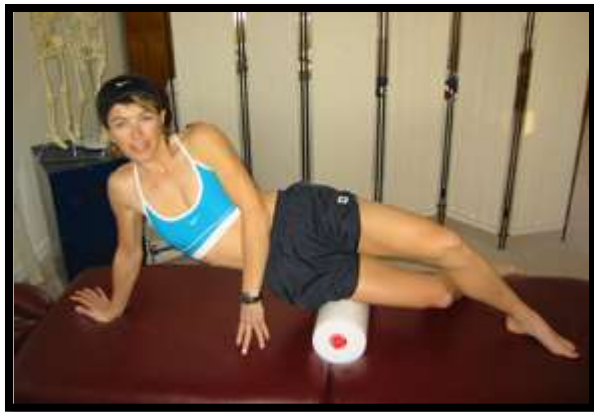




# Products to Aid Soft-tissues



- **Foam Roll**



## Massage Stick



## Swiss Ball

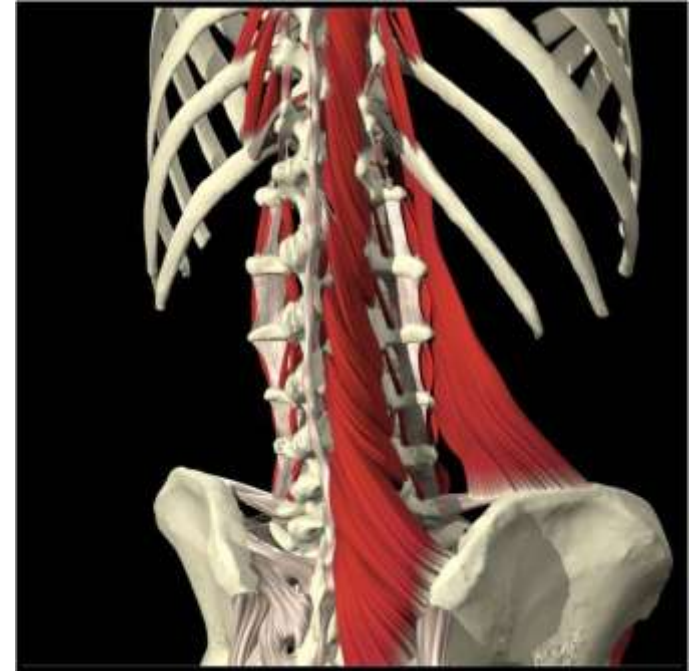
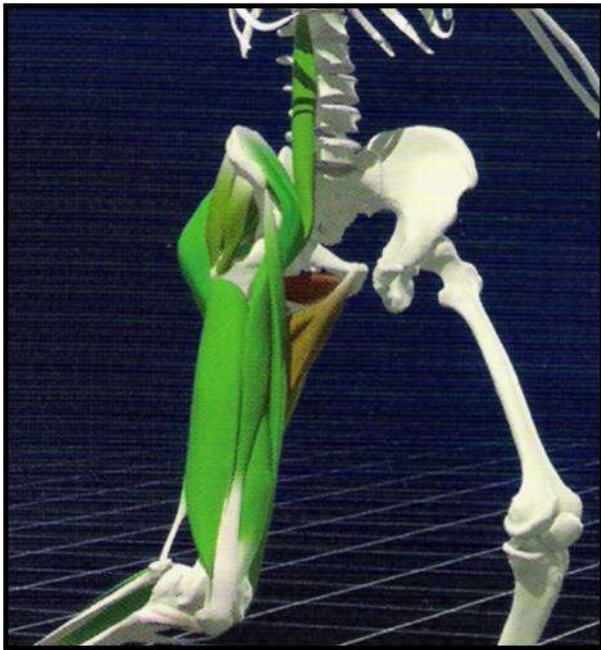




# Rehab is more than stretching and exercise with elastic bands...



*...it's about balancing mobility and stability and  
grooving movement patterns that make a difference.*





# QUESTIONS





# AGONY

NOT ALL PAIN IS GAIN.