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

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

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

- **Mental Toughness**
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 worldwide 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 evidence-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 commo 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

"The Human Factor"

Increasing Exposure (i.e. time or mileage)

Stop increasing training here!
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

![Bar chart showing 4 categories of injuries:
- Overuse
- Trauma Run
- Trauma PT
- Other

The bar chart indicates the number of injuries in each category. Overuse has the highest number of injuries, followed by Trauma Run and Trauma PT, with Other having the least.]

MECHANISM OF INJURY
Training Assessment

• Most Jump Injuries secondary to PLFs
  – Increased Distance Running
  – No Implemented Plyometric Training
  – Minimal Agility Training
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 - 751 days (5%) a drop in 8%
    • Decrease due to unit injury prevention training and early intervention for injuries sustained
Training Assessment

• OEF II 2002 (1st six weeks): 31 overuse injuries/16% of Company’s combat strength degraded
  - Running daily (sometimes twice a day)
  - Improper Lifting

• OEF III 2004 (1st 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 pre-dispose individuals
- Principles of exercise are usually violated
REPEETITVE USE

LOSS OF STRENGTH AND FLEXIBILITY

OVERUSE INJURY

PAIN & INADEQUATE TISSUE REPAIR

PARTIAL TISSUE FAILURE

TISSUE OVERLOAD

TISSUE FATIGUE

Psychological Distress
More Running = More Injuries

Kolpan, JAMA 248: 3118, 1982
### Running Frequency, Injuries & Cardiovascular Endurance

<table>
<thead>
<tr>
<th>Frequency (days/week)</th>
<th>Injury Incidence (percent)</th>
<th>Change in CV Endurance (%VO2/2-mi run)</th>
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<tr>
<td>0</td>
<td>0%</td>
<td>-3.4% / -:30</td>
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<tr>
<td>1</td>
<td>0%</td>
<td>8.3% / 1:06</td>
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<tr>
<td>3</td>
<td>12%</td>
<td>12.9% / 1:48</td>
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<tr>
<td>5</td>
<td>39%</td>
<td>17.4% / 2:24</td>
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<tr>
<td>3-5 days/week</td>
<td><strong>225% increase</strong></td>
<td><strong>35% increase</strong></td>
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<tr>
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<td>:36 faster</td>
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</tbody>
</table>

Pollock, ML. Med Sci Sports. 9(1), 1977

Training: running 30 min, 85-90% MHR
# Running Duration, Injuries & Cardiovascular Endurance

<table>
<thead>
<tr>
<th>Duration (min/day)</th>
<th>Injury Incidence (percent)</th>
<th>Change in CV Endurance (%VO2/2-mi run)</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>0%</td>
<td>-.7% / -:06</td>
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<tr>
<td>15</td>
<td>22%</td>
<td>8.7% / 1:12</td>
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<tr>
<td>30</td>
<td>24%</td>
<td>16.1% / 2:00</td>
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<tr>
<td>45</td>
<td>54%</td>
<td>16.9% / 2:18</td>
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<tr>
<td>30-45 min/day</td>
<td>125% increase</td>
<td>5% increase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>:18 faster</td>
</tr>
</tbody>
</table>

*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

• **Protection**: Sling, cast, brace, crutches, etc
• **Rest**: Usually not total rest. X-train if possible
• **Ice**: Apply frequently first 48 hrs
• **Compression**: Apply evenly...don’t constrict circulation
• **Elevation**: Keep injured part above the level of the heart when possible
• **Mobilize**: 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

Jones, et al, MSSE Vol. 25 (2), 1993  Sit and Reach Test
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.