



Principles of RAW: *Strength, Endurance and Movement Skills*

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



Ranger Strength



- What Strength do Rangers need?

– Bench 350 lbs?

OR

- Carry 100+ pound combat load during INFIL/EXFIL for 2-6 hours





Ranger Strength



It is about the movement, not the muscle.

- Rangers, like athletes, need strength for lifting, carrying, fighting, lunging, climbing, and jumping.
- The concern is for the power of the movement, not the size or appearance of the muscle.
 - Goal is mission accomplishment, not beach muscles



Benefits of Strength Training



- Performance:
 - Can you perform in full kit, over rough terrain, while controlling your weapon system
 - Can you negotiate obstacles?
 - Can you evacuate your Ranger buddy?
- Injury Prevention
 - Can your muscles control the forces acting on your body before those forces damage your joints and connective tissues?



Strength Training

How to Get Stronger:



- Improve Coordination (Neural Adaptation)
 - nerve to muscle messages improve
 - starts early in the training cycle
- Grow Muscle (Muscular Hypertrophy)
 - training stimulates bigger muscle fibers
 - usually takes a couple months of training





Strength Continuum



Low

High

“Resistance”

“Repetitions”

High

Low

ENDURANCE

STRENGTH

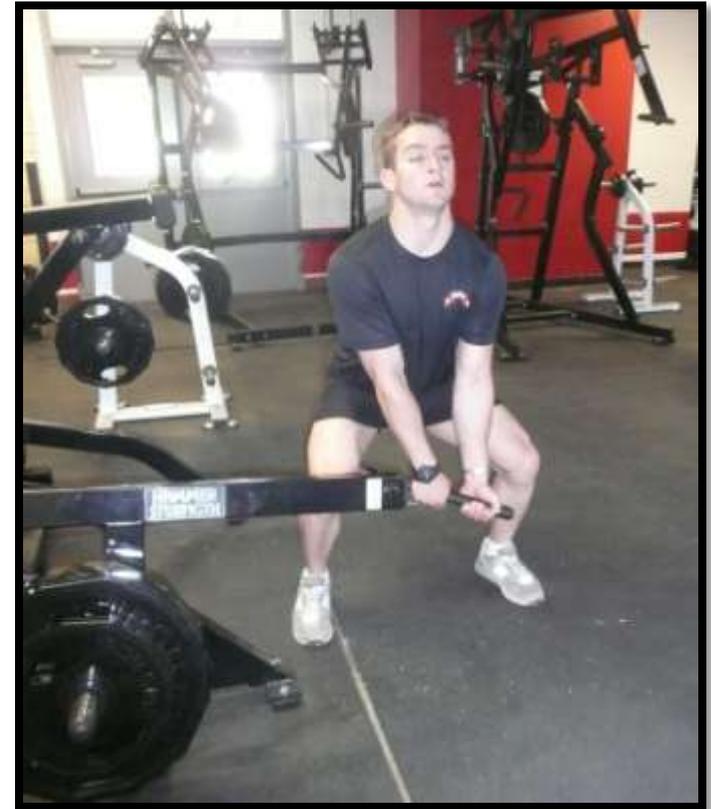


Strength Training

What is Functional Strength?



- Strength in 3D versus a single plane
 - Examples: Turkish Get Ups, Lunges with rotation
- Multiple-joint, multi-muscle
 - Examples: Squat, Ground Base
- The exercise looks like the task and presents similar balance demands
 - Example: Deadlift





Stabilization



- Prerequisite for all training
- You should be able to support internal resistance (body weight) before you use external resistance
- Control core muscle group before loading external muscle groups
- Proximal stability before distal mobility





Power



- Power means creating force rapidly
- Form is **IMPORTANT** for performance and safety
- Requires *Stabilization*

Example: Rising from the ground and sprinting to the next covered position.





RAW Functional Fitness End State



- **Strength** sufficient for
 - load carriage
 - Individual movement
 - Climb
 - Crawl
 - Sprint
 - Squat
 - Lunge
 - Plant/cut
 - Jump/land
 - CASEVAC





Strength Training

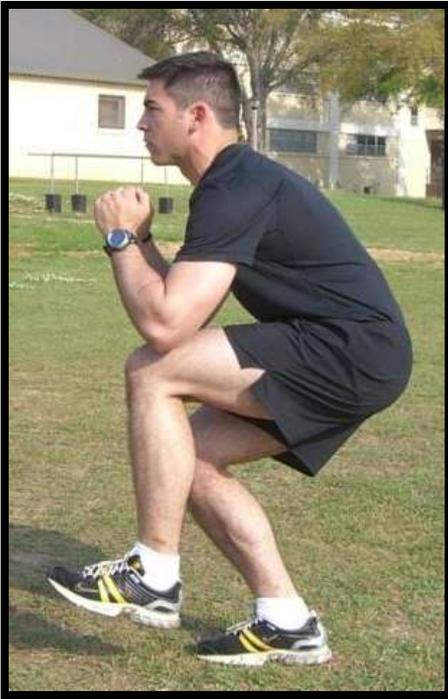


- Heavy Resistance
 - Traditional push/pull lifts
 - Based on 4-rep max
- Power Endurance
 - Mid-level reps/resistance
 - Ground Base equipment
 - Functional positions
- Muscular Endurance
 - Body-weight
 - Higher reps
 - Calisthenics, ropes, etc





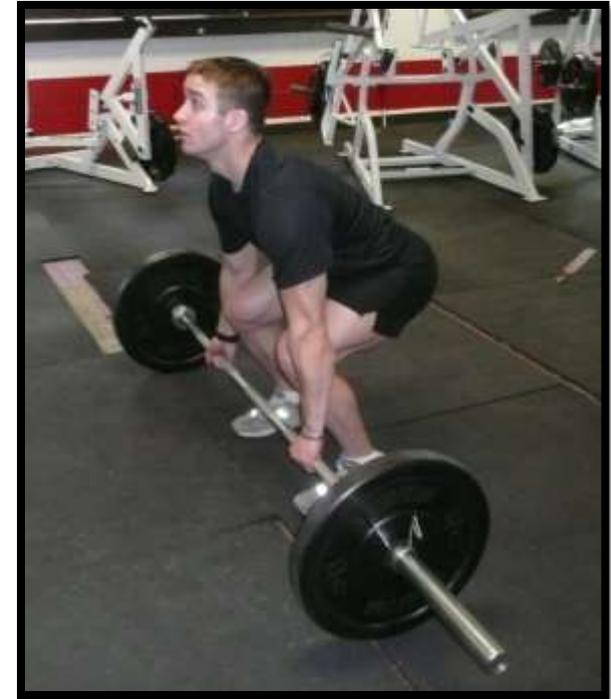
Essentials of RAW *Strength Training*



Muscle Endurance
-Body-weight Resistance



Power-Endurance
-Medium Resistance
-Ex: Ground Base



Heavy Resistance
-Traditional lifts
-Push, Pull, Upper/Lower Body
-Based on 4RM



Ranger - Athlete – Warrior

Endurance Training





ENDURANCE

Aerobic vs. Anaerobic

- Endurance = ability to sustain activity
- Aerobic Activities are:
 - Sustained, sub-maximal
- Anaerobic Activities are:
 - Intermittent, near maximal to maximal effort





Endurance Training



Aerobic

- Continuous
- Low-Mod Intensity
- Distance Running, Roadmarching

Anaerobic

- Intermittent
- High-Intensity
- Intervals, calisthenics, jumping, lifting

Most activities are a combination of the two.



ENDURANCE

Energy System Continuum



Activity	Aerobic	Anaerobic
440 yards sprint	5%	95%
1 mile run max effort	25%	75%
2 mile run going for broke	60%	40%
10k run personal best effort	80%	20%



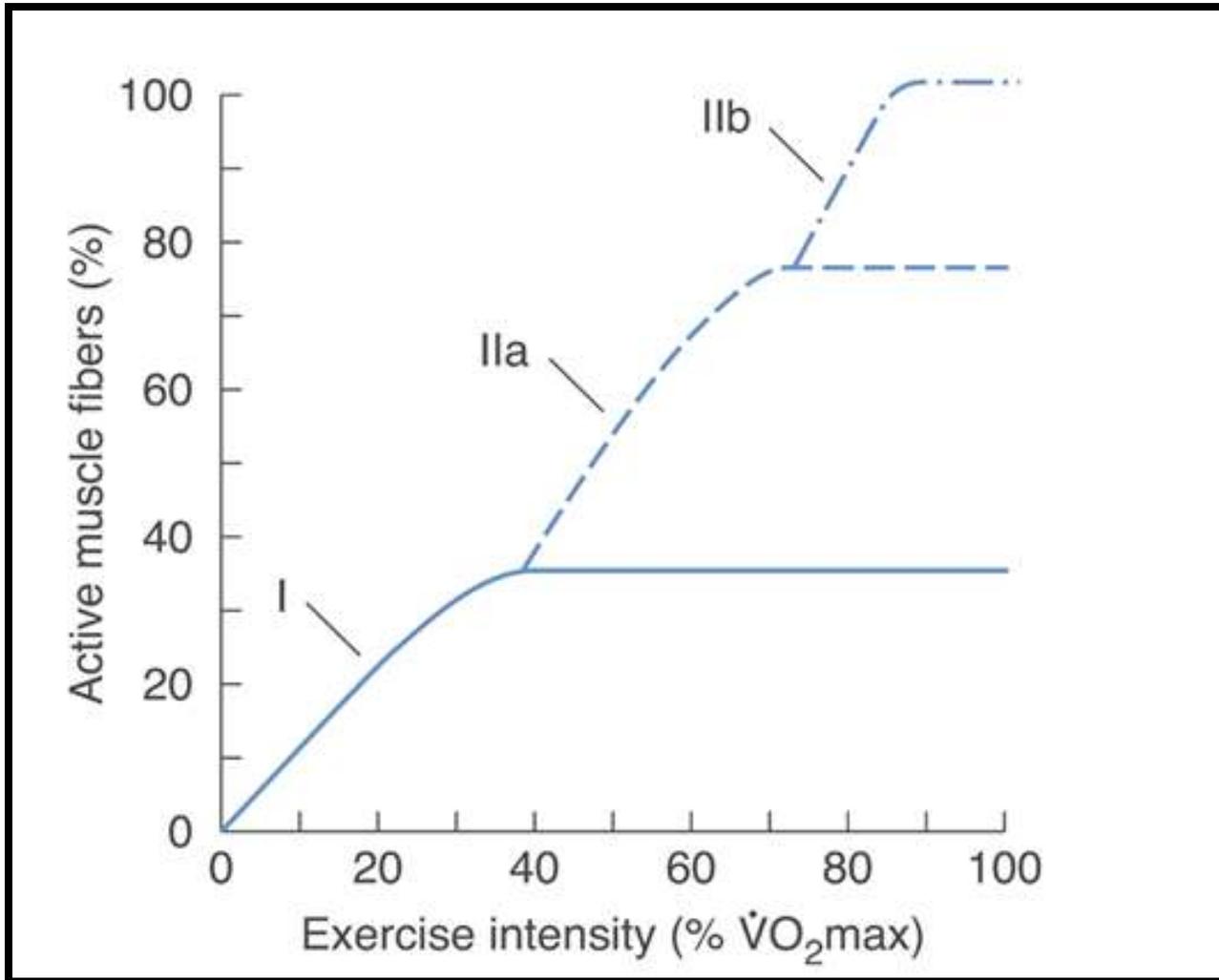
ENDURANCE

Aerobic vs. Anaerobic Training

- Aerobic training does little to enhance anaerobic capacity
 - Marathoners get winded quickly playing basketball, soccer, etc
 - However, aerobic fitness improves recovery from anaerobic events
- Anaerobic training does enhance one's aerobic capacity.
 - Power-endurance intervals improve 5-mile run time.

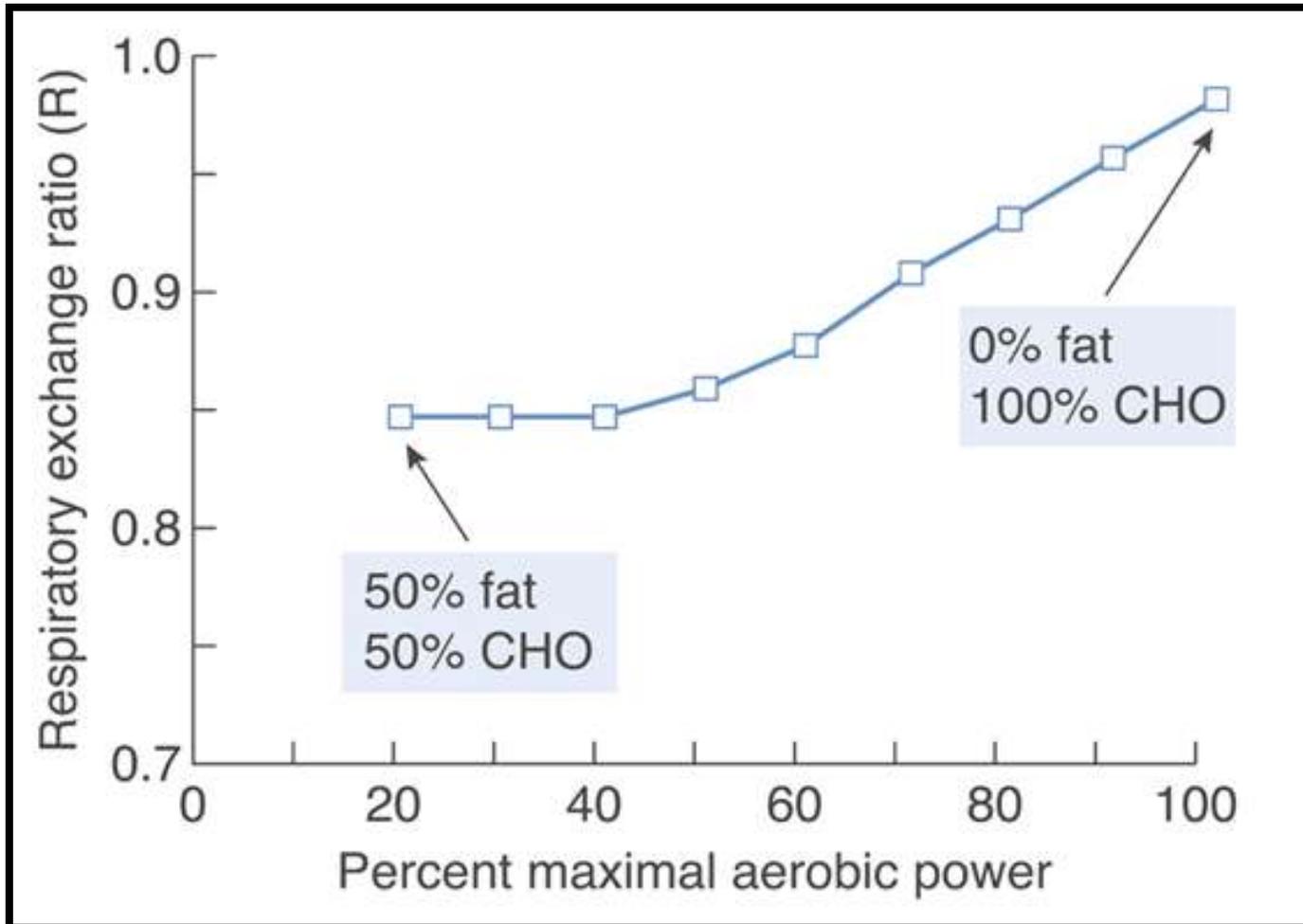


Muscle Recruitment by Fiber Type



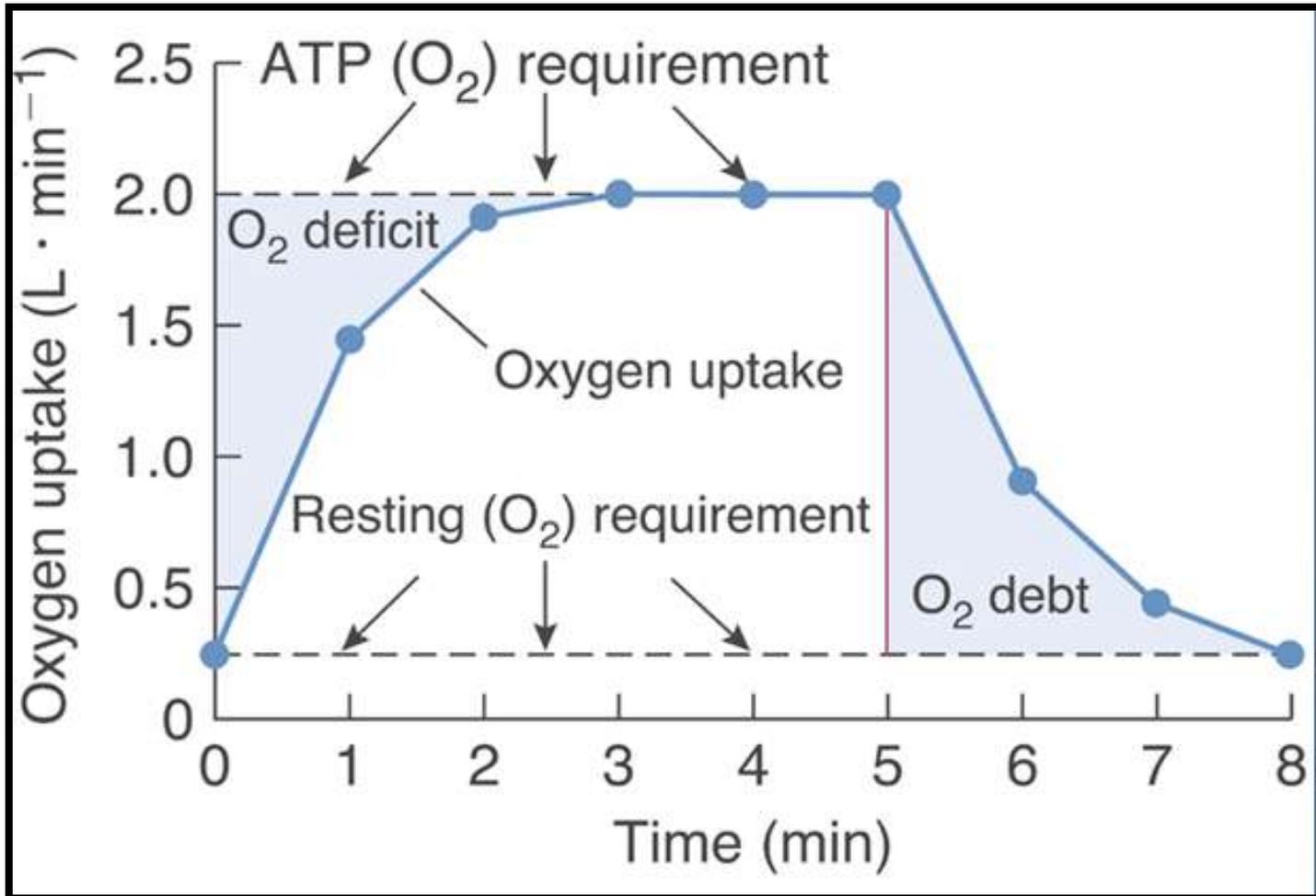


Effect of Exercise Intensity on Metabolism





Oxygen Deficit and Oxygen Debt

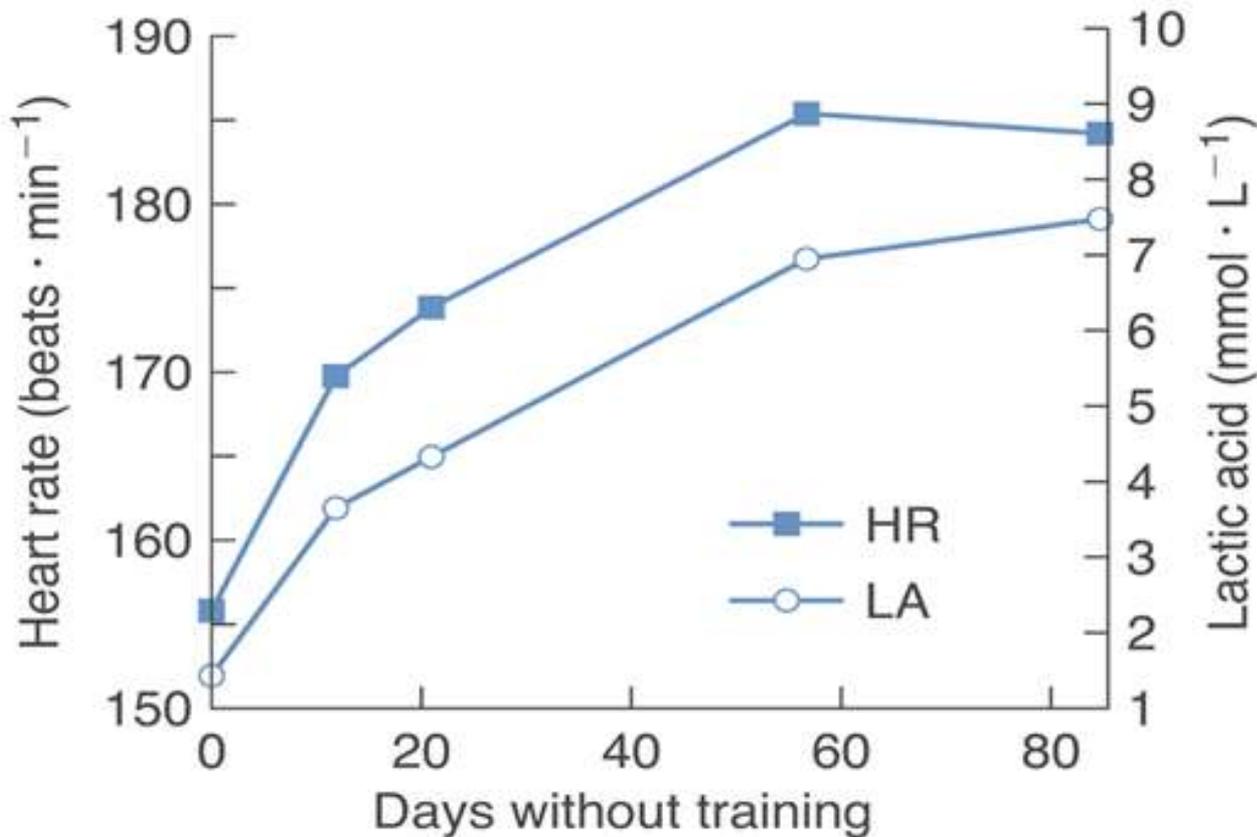




Effect of Detraining



HR and LA increased for the same submaximal work test during detraining.





Essentials of RAW

Endurance Training



- Intervals
 - 30/30s, 400M, 800M
 - Tabata intervals
 - 20s work/10s rest
 - Repeat x8
- 30-60 min. Sustained Runs
 - Fast Continuous (tempo run)
 - Slow Continuous
- Fartlek Run
- Foot March
 - Traditional
 - Short, fast, light
- Swimming
- Cardio Machines
- Hybrid Drills
 - Power + Endurance
 - CrossFit, Gym Jones, etc.



Sample Hybrid Workout



- Turkish Get-Ups
 - 8-12 reps with each arm
- Ground Base Combo Twist (L/R, 3x20s)
- Kettle-Bell Swings (3-4x15)
- MedBall Throws (variable parameters)
- AirSquat/Push-ups/Pull-ups
 - 15/10/5 reps per minute x 15-30 minutes
- Anaerobic Big Finish (race pace)
 - Row (500M), Run (400/800M), Bike (max distance in 2-minutes)



Lower Extremity X-Training



- Pool (swimming and deep-water running)
 - Benefit: Unloads the skeleton while strengthening the running muscles
 - Drawbacks: Relatively slow speed
- Bike
 - Benefit: Allows for fast movement at light or moderate resistance
 - Drawbacks: Seated posture is unlike most other athletic movements



Lower Extremity X-Training



- Step
 - Benefit: Low stress on joints; improves endurance/strength of climbing muscles
 - Drawbacks: Short stride
- Elliptical
 - Benefit: Low stress on joints; allows striding
 - Drawbacks: Finding correct stride; some machines feel “too easy”



Ranger - Athlete – Warrior

Movement Skills





Movement Skills



- Balance
- Coordination
- Lunge
- Squat
- Lifting
- Pushing
- Pulling



- Climb
- Crawl
- Plant and cut
- Jump and land
- Run efficiently
 - Throwing
- Core Stability



Movement Skill Training



- Teach technique; demand proper execution
- You need to be fresh to master complex movements
 - Don't smoke your guys and then expect them to do well with agility/power drills or with obstacles.
- Schedule movement skills training right after Movement Prep



The effect of mobility and stability on power



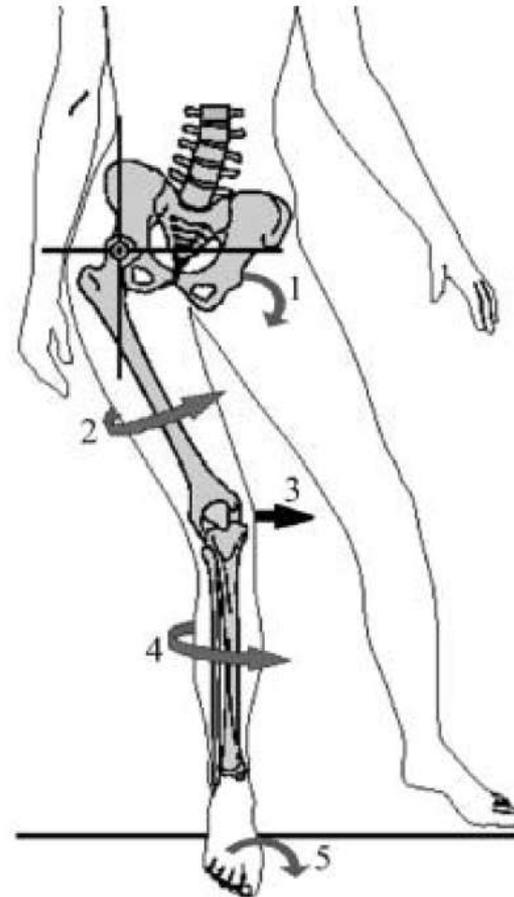
Load.....in order to..... Unload



LE Chain Effects

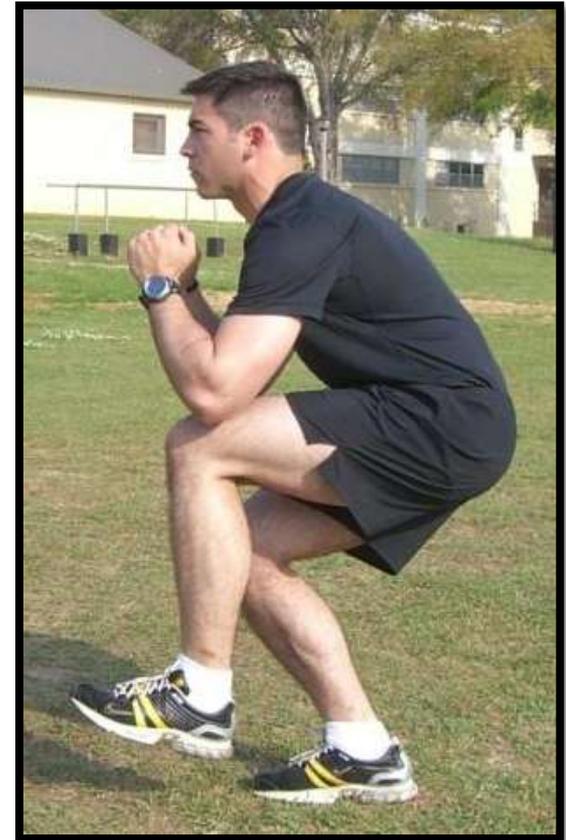
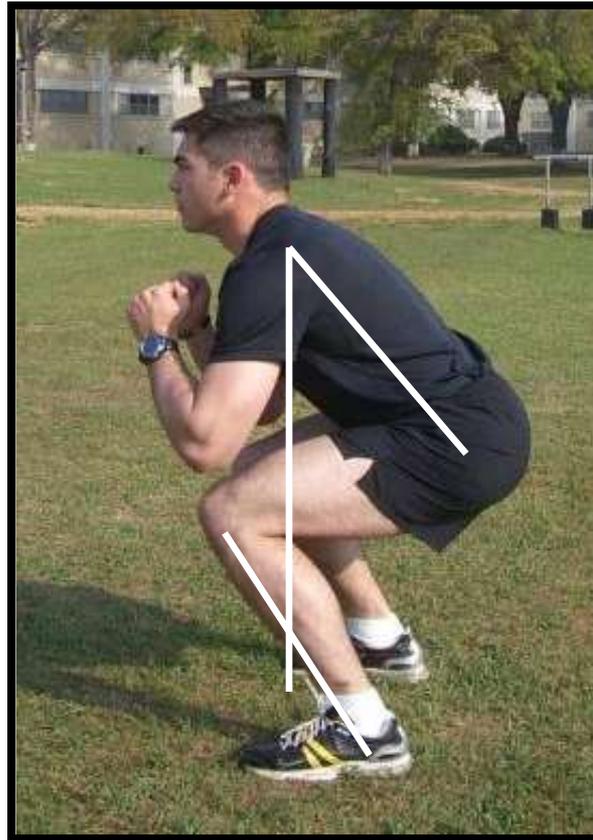


1. Poor pelvic stability
2. Femoral IR
3. Knee valgus
4. Tibial IR
5. Foot pronation





Balance



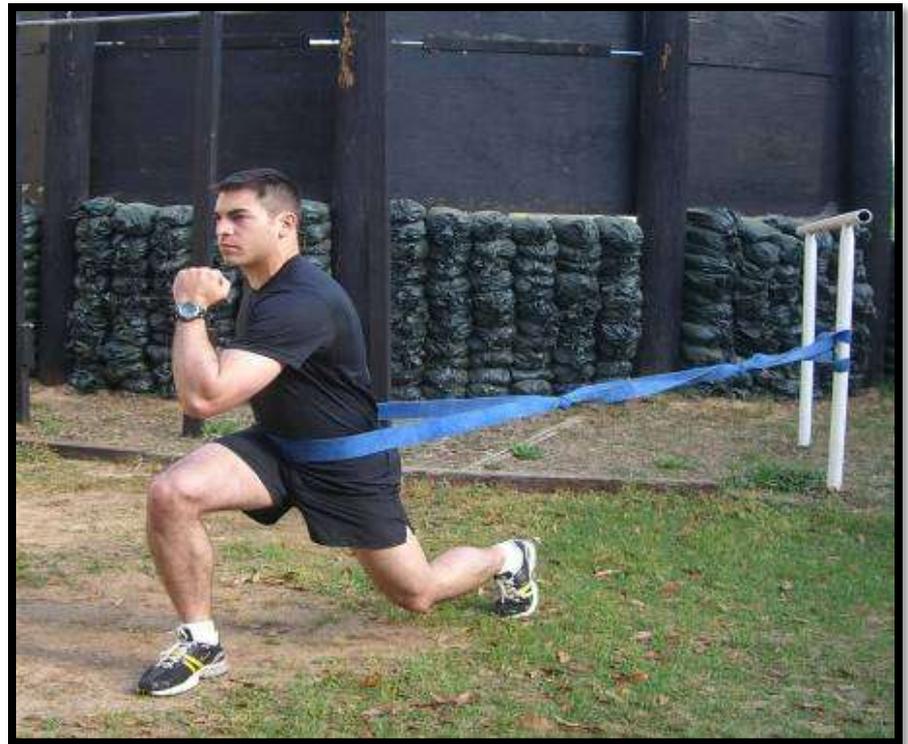


Stability on the Ground



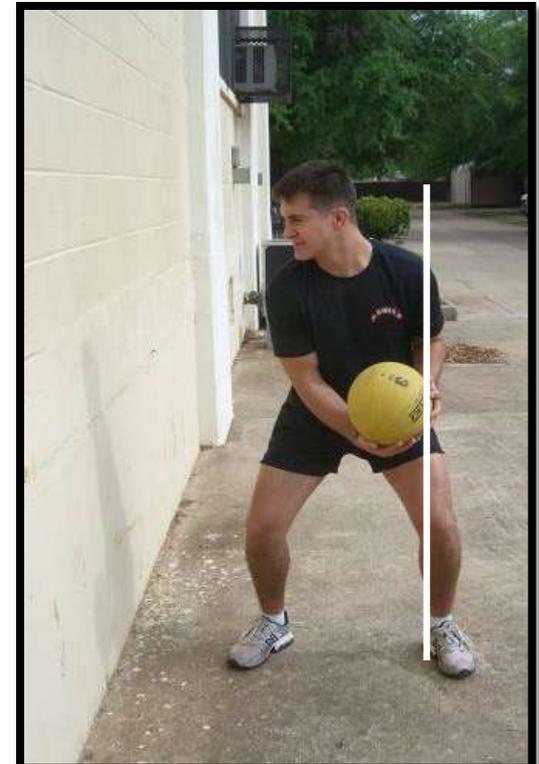
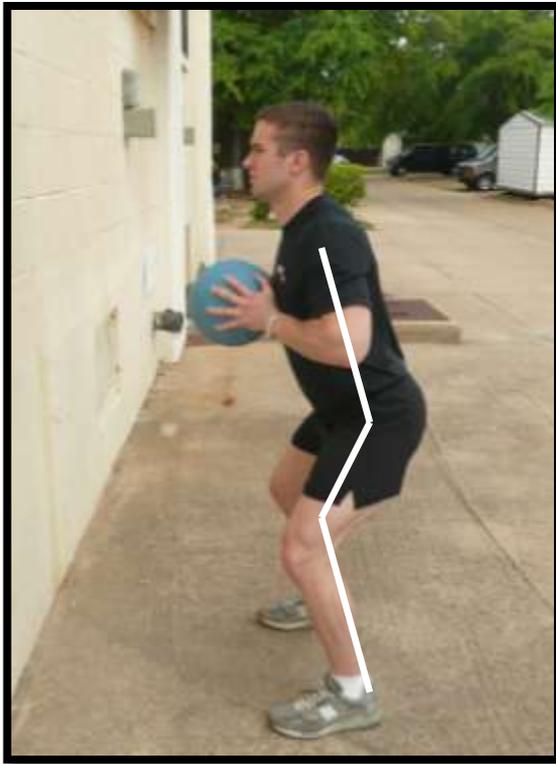


Stability on Your Feet



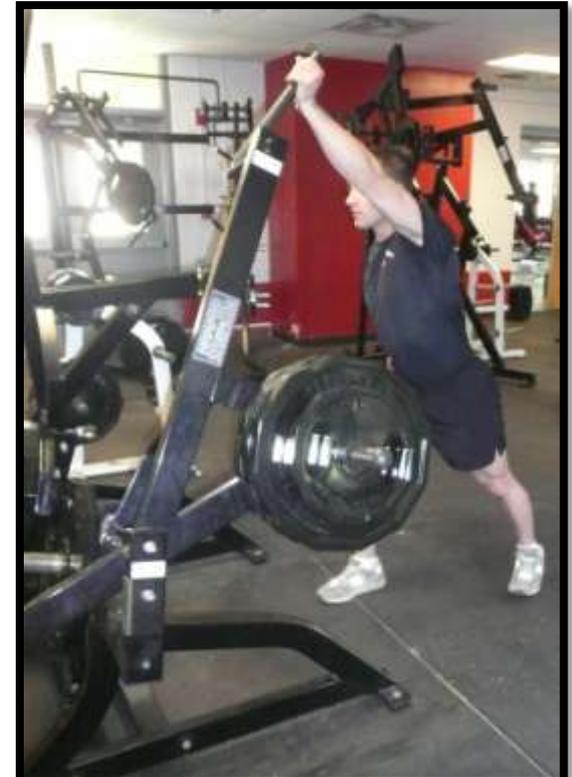


Reactive Stability





Integrating Mobility & Stability



Lifting from the Ground to Overhead



Integrating Mobility & Stability



Turkish Get Up



Kettle-Bell Swings



Agility



Mastering body lean...integrating legs and trunk



Triple Extension





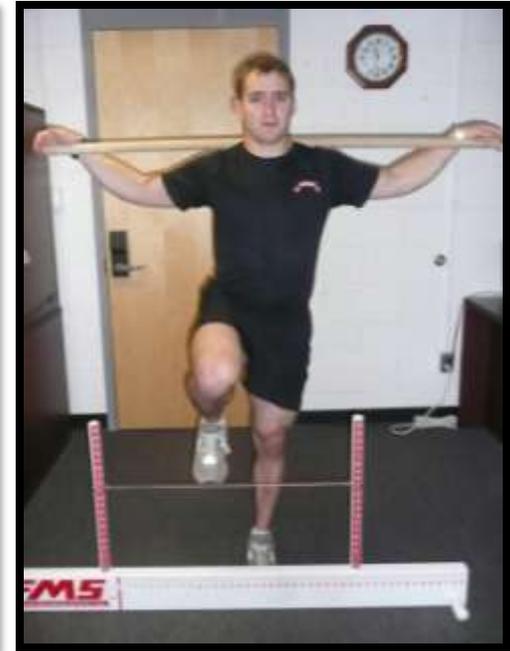
Mobility-Stability Assessment



- Assesses kinetic chain function
- Evaluation is an on-going process
 - all exercises are evaluated all of the time
 - execution of the movements and overall response to the training challenges determines the direction of future rehab events.



Deep Squat



Hurdle Step

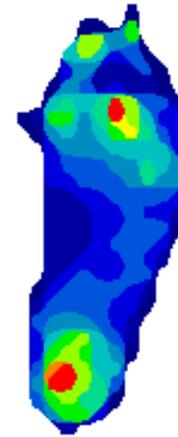
- Tools such as the Functional Movement Screen (FMS) can be useful
 - If you don't score a "3" on the deep squat, you shouldn't overhead squat



Foot



- Primary stability deficit:
Control of pronation
- Mobility is seldom an issue
 - Key exception: Extension of hallux
- Key interventions
 - Single-leg stance activities
 - Bare feet increases the sensory stimulus
 - Train lateral movements
 - Systematically train on uneven terrain





Ankle



- Primary mobility deficit:
Dorsiflexion
- Primary stability deficit:
Control of inversion
- Key interventions
 - 2-part, multi-planar calf stretch
 - Single-leg stance activities
 - Bare feet increases the sensory stimulus
 - Systematically train on uneven terrain





Knee



- Primary stability deficit
 - *Control of medial collapse*





Knee



- Key interventions
 - Integrated stimulus to trunk, hip and knee stabilizers
 - Single-leg activities





Hip



- Key interventions
 - Single-leg stance activities
 - Lateral steps with resistance bands
 - Lateral hops
 - Lunges with rotation
 - Systematically train on uneven terrain



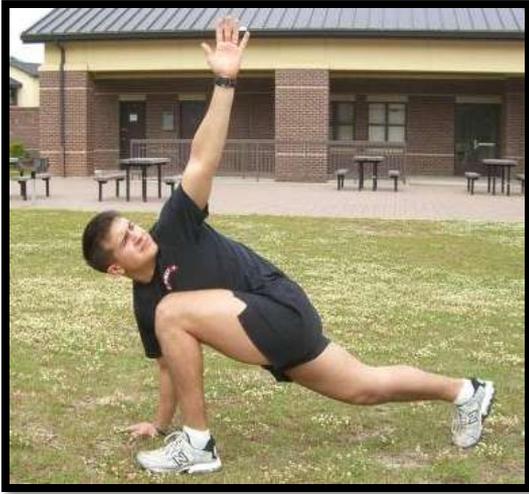


Low Back



Key interventions

- Awareness of neutral spine position
- Awareness of bracing maneuver
- Awareness of breathing and modulation of stiffness





Thoracic Spine



- Primary mobility deficit
 - *Thoracic rotation*
- Stability of this region is generally not a concern
- Lack of mobility forces other segments to compensate
 - L-spine, GHJ
- Primary Intervention
 - Use of foam roll, stretching, or manipulation

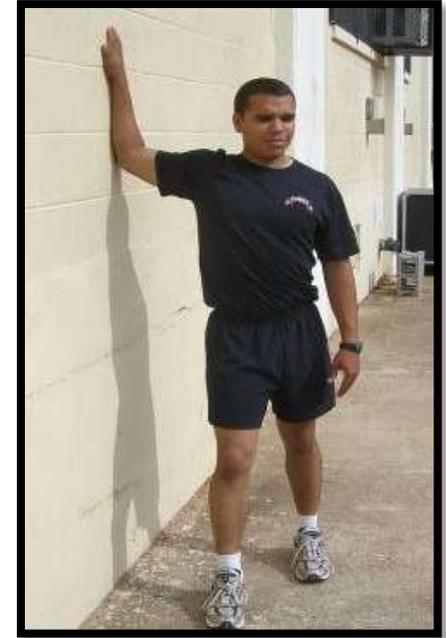




Shoulder Girdle



- Stability Demands
 - Control of the shoulder blades
 - Control of the ball in the socket



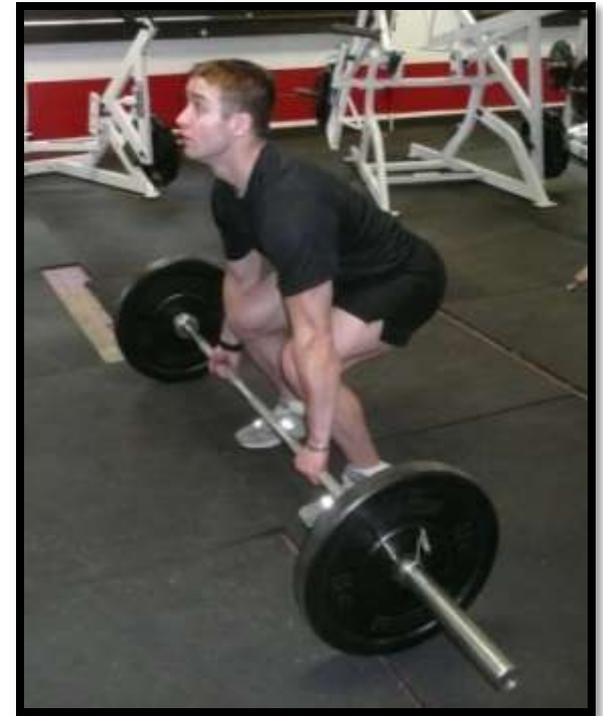


Shoulder Girdle



Key Functions:

- *Transfer of power from legs, through the trunk, to the hands*
- *Stabilize a load*





Summary



There are many ways to succeed...and there are a few ways to fail.

If you understand and apply the principles of training, you will succeed.

