

Injury Prevention



UNITED STATES MARINE CORPS



SPORTS, RECREATION & FITNESS

Overview

- Risk Factors for Injury
 - CFT Injuries
 - Movement to Contact
 - Ammo Lift
 - Maneuver Under Fire
 - Heat Injury
 - Cold Injury
 - Altitude Injury and Illness
 - Prevent Injuries
 - Injury Treatment
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Common Athletic Injuries

- Acute
 - Cuts, bruises, and scratches
 - Muscle pulls and strains
 - Ligament sprains and ruptures
 - Tendon sprains and swelling
 - Dislocations
- Chronic
 - Cartilage tears
 - Fractures/stress fractures
 - Tendonitis
 - Rotator cuff
 - Tennis elbow
 - Jumper's knee
 - Iliotibial band (IT Band) syndrome
 - Plantar Fasciitis
 - Heel spur
 - Shin splints
 - Shoulder impingement



Risk Factors for Injuries

- Increasing volume of training too quickly
- Low levels of physical fitness
- History of previous injury
- High volume training
- Smoking
- Poor flexibility
- Gear
 - Shoes
 - Orthotics

Modifiable Factors

- Pre-existing injury
- Overtraining
- Decreased Physical Fitness Level
- Behavioral Factors (i.e. smoking, adverse health behaviors)

Modifiable Factors

- Research identified physical training and vigorous operational activities as the most common causes of injuries requiring patient care and limited duty.
- Research on Marine Corps recruits by the NHRC shows that reductions in the amount of running and gradual progression of intense physical training can effectively reduce the incidence of stress fractures without sacrificing physical fitness

(Atlas of Injuries in the U.S. Armed Forces Supplement to Military Medicine vol. 164, no 8 August 1999)



Modifiable Factors

- Basic trainees who have the lowest levels of fitness on entry to the military are at greater risk of injury during basic training
- Trainees who are the least physically active prior to entering the service are at greater risk of injury during basic training
- Basic trainees who smoke cigarettes experience significantly more injuries than those who do not. This has been shown to be true for infantry as well.

How to Address Previous Injuries

- Establish communication with your medical team
- Seek medical clearance for activity
- Once clearance is received, address the injury with activity per provider's orders
- Progress slowly and gradually
- Avoid activity that will increase inflammation
- Maintain pain-free range of motion (ROM)

Overuse Injury

Physiological Causes of Overuse Injury

- Placing a demand greater than the structure's physical limitations can withstand.
 - Structures = bone, muscle, tendon, etc.
- Microscopic trauma to the structure.
 - Overuse injury occurs with repetitive motion

Overall Risk factors for CFT

- Strains/sprains due to inadequate warm up
 - Sprains may also be environmental
- Weather Conditions
 - Heat: Sunburn, Exhaustion, Cramps, Stroke
 - Cold: Sunburn, frostbite, hypothermia
- Dehydration
 - Insufficient preparation
 - Leadership deficiencies

Movement to Contact

- Trips/falls at beginning or end of course
- Marines tripping on debris
- Running too close together
- Insufficient preparation
- Lower Extremity overuse injury

Ammo Lift

- Improper lift/technique causing facial injury
- Counting Marine struck by ammo can
- Upper body injury
- Lower back injury (specific to loaded lumbar flexion)

Maneuver Under Fire

- Slips/falls due to
 - Insufficient preparation
 - Improper technique
 - Wet surface
 - Rocks/debris
- Lacerations/Contusions
 - Rocks/debris
 - Repetitive knee contact w/out proper technique
- Potential Injury

Maneuver Under Fire-Cont.

- Rescuer drops “casualty”
 - Insufficient technique & preparation
- Grenade throw
 - Shoulder injury
 - Dummy grenade strikes other participant
- Finish
 - Personnel at finish line struck by ammo can of fatigued Marine

Overtraining

- Fatigue
- Anemia
- Amenorrhea
- Sleep disturbances
- Lack of motivation
- Increased Resting Heart Rate
- Muscle Spasms
- Change in mood
- Overuse injuries



How to Avoid Overtraining

- Establish current fitness level
- Group individuals with the same or similar fitness levels (Ability grouping)
- Establish short term and long term goals for each group or each individual
- Progress slowly and gradually
- Add variety

PAIN is not Weakness leaving the Body!

- Listen to Your Body
 - Pain is a sign that something is wrong
- DOMS
 - Delayed Onset Muscle Soreness - may occur 48-72 hours after event
- General Fatigue
 - Fatigue is good, pain is not
- Lactic Acid “burn”
 - With progression, your body will utilize lactic acid more effectively

Heat Injury

- Heat Cramps
- Heat Exhaustion
- Heat Stroke

Avoid heat injury by acclimatizing to heat and humidity levels.

Heat Injury

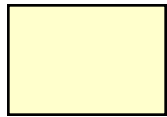
Heat Acclimatization:

- Requires more than mere exposure to a hot environment. It is dependent on:
 - Environmental conditions during each exercise session.
 - Duration of heat exposure.
 - Rate of internal heat production (exercise intensity)
- Perform low-moderate intensity workouts in the heat for 5-10 days.
 - Cardiovascular changes generally occur in the first 3-5 days
 - Sweating mechanisms generally take up to 10 days.
- Workout intensity should be reduced to 60-70% during the first few days to prevent excessive heat stress.
- Individuals in training should be alert to any symptoms and consume as much fluid as possible.

Hydration Analysis Chart



URINE COLOR



OK



DRINK 1 CANTEEN



DRINK 1 CANTEEN
OVER 15 MINUTES



DRINK 3
CANTEENS
OVER 2
HOURS



Signs of Dehydration

- Dryness in the mouth (cotton mouth)
- Shortness of breath
- Headache
- Decrease in urine and discoloration
- Nausea and/or vomiting, loss of appetite
- Confusion
- Elevated core temperature
- Seizures/coma
- Kidney Failure

Note: 1 Canteen = 1 Quart

Cold Weather Injury

- Dress in layers.
- Stay dry and keep your feet dry.
- Choose appropriate gear.
- Remember sunscreen.
- Head into the wind.
- Drink plenty of fluids.
- Pay attention to wind chill.
- Know when to call it quits.



Performance in High Altitudes

- **Cardiovascular Endurance**
 - Less oxygen in the lungs hinder endurance
 - Greater percentage of energy needs are met by anaerobic (without oxygen)
 - Increased lactic acid production
 - Rapid onset of fatigue
- **Mental Performance**
 - Brain and nervous system are comprised due to low oxygen conditions
 - Changes in memory and vision
 - Insomnia
 - Mood changes

Preventing Injuries

- Personal ORM

- Use appropriate shoes
 - Running for running, high-tops for basketball etc.
 - Replace every 300 miles
- Maintain hydration
- Train appropriately
 - Progression
 - Proper technique
 - Muscular Imbalance
 - Adequate Recovery
- Detect Injuries Early

- Operational ORM

- Check equipment frequently
- Check fields and playing areas
- Appropriate Training Schedules



Preventing Injuries

- Combination of
 - Cardiovascular
 - Muscular strength
 - Muscular endurance
 - Flexibility
 - Body Composition (% body fat)
- Exercise training should mimic physical application
- **VARIETY**

Signs & Symptoms of Injury

- Color
- Heat
- Swelling
- Pain
- Loss of function



Treating Injuries

- PRICE
 - Protect
 - Rest
 - Ice
 - Compression
 - Elevation



Questions?

