Injury Prevention: Just the Facts

Preventing Army Training-Related Injuries

FACT SHEET 12-022-0319

What are Army training-related injuries?

Army trainees are at higher risk of injuries than Active Duty Soldiers.[1-5] This is often due to the quick introduction and repetition of intense physical activities and harsh environments in initial entry training (IET). IET trainees become "Soldiers" after an initial 10-week basic training phase, but have to complete additional weeks of training for their specific occupation. Most trainees conduct initial Basic Combat Training (BCT) at one location and advanced individual training (AIT) at another location. Others complete all IET at One Station Unit Training (OSUT).

IET trainees experience various injuries that require medical evaluation. "Training-related injuries" or "TRI" are lower body injuries, since the majority (80%) of injuries are to the *knees, legs, feet, ankles, hips, pelvis, and lower back.*

Most TRI happen to musculoskeletal (MSK) tissues (muscles, bones, tendons, ligaments, joints).[1-7] Foot blisters, severe enough to be debilitating, are also common and, if not treated, can lead to serious infection. Some TRI are instantaneous acute injuries (e.g., ankle sprains, fractures), but the majority (>75%) are overuse injuries, which occur days or weeks after repeated activity. Most TRI overuse injuries are diagnosed as pain syndromes to a specific body part. Pain in the knees is most common, but so is pain in the foot, leg, and lower back.[1-2] Pain in joints or bones is often a warning of a more serious injury. Injuries that progress to specific diagnoses include patellar tendonitis (runner's knee), plantar fasciitis, and stress fractures (*Figure 1*).

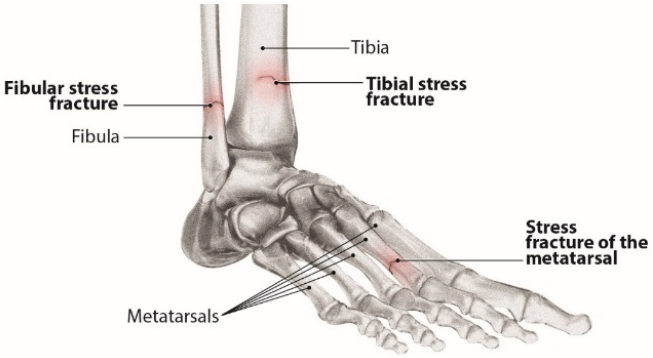


Figure 1. Lower extremity stress fractures

Though "TRI" only includes injuries to the lower body, trainees also require medical treatment for broken teeth and upper body injuries (e.g., shoulder dislocations or nerve pain). In addition, because IET training sites are in southern locations (Ft Benning, Georgia; Ft Jackson, South Carolina; Ft Leonard Wood, Missouri; Ft Sill, Oklahoma), trainees are at high risk of exertional heat injuries (heat exhaustion, heat stroke). Because they can be fatal, the Army emphasizes prevention of heat injuries and monitors them separately. Fortunately, they represent a very small portion (less than 3%) of injuries among trainees.[1,2]

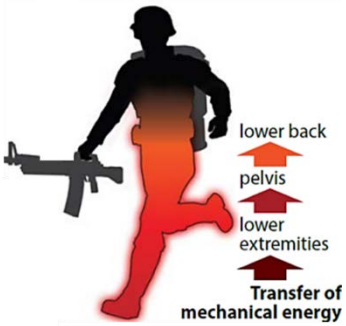
Why is the Army concerned?

Training-related injuries have been described as "the single most significant medical impediment to military readiness."[5] The medical encounters and lost training time for BCT trainees cost an estimated $200 million dollars annually.[1] Some injuries (e.g., pelvic and hip stress fractures) are exceptionally costly to repair, and may result in medical discharge.[1, 8]

Because of these impacts, the Army routinely monitors TRI to assist when updating doctrine and sharing information with training unit leaders.[1] Unit leaders are encouraged to follow training regimens that reduce injury risk and determine when injuries increase so that procedures can be adjusted, personnel are retained, and expenses minimized.

What causes training-related injuries?

The first week of IET is an intense period of adjustment. After this week, the distances, weights, intensity (speed), and frequency of activities are gradually increased. Much time is spent on foot: running, patrolling, and foot marching up to 12 miles per session. The repeated stress on the lower body causes microscopic tears to tissues that the body repairs in order to rebuild and become stronger. This is referred to as adaptation. If the body does not have time to repair accumulated tears, the damage can become an overuse injury.[1,2] Though the IET program is designed to allow for adaptation to reduce injury, each trainee has personal characteristics or behaviors that may increase or decrease his or her injury risk level.



What factors increase a trainee's injury risk?

The more the following factors occur, the greater the risk of TRI:

- Poor fitness and sedentary lifestyle prior to IET.[3-5,7,9]
- Existing injury or illness during IET.[6,7]
- Poor aerobic fitness (slow run times) during IET.[3-7]
- High body fat as indicated by body mass index (BMI) or exceedance of Army height-weight (H-W) standards. [3-7, 10]
- Very thin with very low BMI, i.e., below Army H-W standards.[10]
- Smoking (interferes with body's ability to repair tissues).[3,4,6,7]
- Very high motivation (ignoring pain, pushing body past limits).[6,9]
- Running or marching distances on same or adjacent days.[3,9,11]

Though women have been found to have more stress fractures and higher injury rates (e.g., 1.5–2 times that of men),[1,6,7,11] injury risk is more similar between sex when fitness levels are equal.[2,3] Hotter weather may increase risk due to greater fatigue, impaired healing, or altered gait.[7] Genetic, racial, or age may increase risk of some injuries, but are not primary risk factors for TRI.[5,6]

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How do you reduce training-related injuries (TRI)?

BEFORE starting IET -

Individuals planning to enlist should be aware of the injuries that are commonly experienced by IET trainees (*Figure 2*) and prepare their bodies to minimize their chance of experiencing these injuries. So *before* starting IET one should—

- Eat healthy; aim for Army H-W standards.[12]
- Improve aerobic fitness to develop cardiovascular stamina (for example, aim for 2-mile run times less than 15½ minutes for men and 19 minutes for women).[3-6,9,13]
- Improve strength and MSK endurance through safe resistance training. [6,9,14-15]

Stop using tobacco or nicotine products (including smokeless) and eat healthy, nutritional foods to maximize MSK tissues' ability to heal quickly and rebuild properly.[3,9]

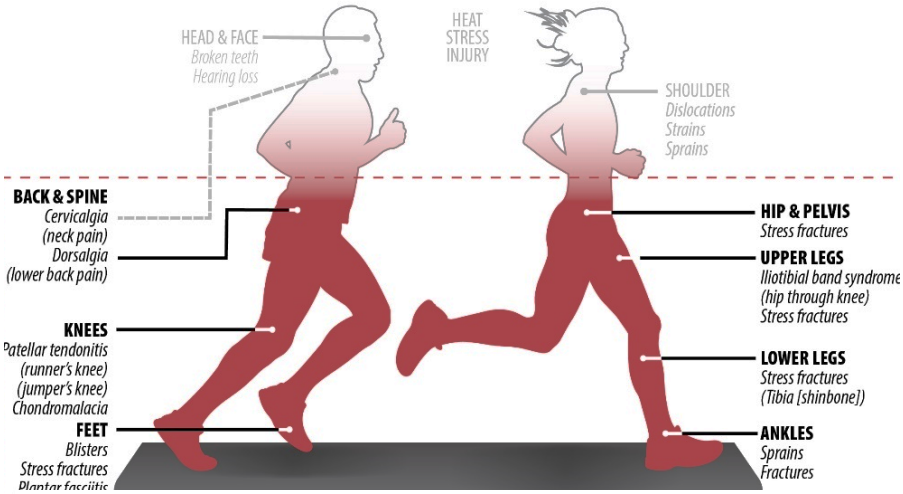

Figure 2. 80% of injuries during training are to the lower body

DURING IET, both Trainees and Unit Leaders have responsibilities -

Individual Trainees

- Drink fluids and rest at allotted times – and don't smoke.
- Expect muscle soreness as the physical activities will stress your body to rebuild properly, *but* -
- Seek medical evaluation for unusual pain that is in a joint, foot, knee, shin, or hip. Without time to heal this pain can become increasingly debilitating with a more serious diagnosis. A few days or a week of limited physical activities is better than being disabled for multiple weeks or months.

Unit Leaders and Drill Sergeants

- Educate trainees about TRI, risk factors, and warning signs of injuries.
- Monitor trainees' injury status. Injury rates tend to be high during the first week and increase to a peak in the third week, then gradually decrease.[7] Comparing monthly or quarterly unit TRI reports can indicate trends and potential problems between or within units over time.
- Implement training activities that minimize TRI and the costly impact to the Army by following doctrinal physical training regimens and guidelines: Field Manual 7-22[14] and Technical Bulletin – Medical (TB-Med) 592[15] to reduce injury risk. In particular, minimize overall activity time on feet. Avoid replacing distance runs with long foot marches. Do not require distance runs or foot marches over 2 miles on back-to-back days. Replace distance runs with other aerobic activities, such as interval sprint runs (less overall distance and time on feet). Ensure trainees do not run when carrying loads during foot marches.
- Do not use additional physical training activities or marching as disciplinary measures. This is not recommended as it can increase a trainee's injury risk.

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