

RRAM/Summa Center for Sports Health Runners' Institute Seminar Series
Making it to the starting line: How to avoid common running injuries.
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- I. Factors with consistent evidence for increased risk of running-related injuries:
 - A. Lack of experience → Running for less than 3 years
 - B. History of previous injury → Encountering an injury within the past year
 - C. Excessive mileage → Running >40 miles per week is most important predictor in men

- II. Common running injuries: How to recognize them, how they are managed.
 - A. Achilles Tendinitis
 1. Most common form of tendinitis observed in runners; risk factors include abrupt increase in training, running on uneven or slippery terrain, and inadequate stretching
 2. Can be severe → causes up to 16% of runners to stop running indefinitely
 3. Causes pain behind the ankle; is associated with heel cord tightness; may be associated with swelling, redness, and increased warmth; ominous sign is pain at the insertion point; sometimes associated with palpable bony prominence
 4. Treatments for Achilles Tendinitis:
 - a. Relative rest through cross training for most cases
 - b. Intermittent ice massage
 - c. Calf stretching as initial treatment → Eccentric strengthening weeks later
 - d. NSAID's early in the treatment course
 - e. Heel lifts or heel cups on both sides
 - f. Avoid over-cushioned shoes, which increase eccentric loading of the calf muscle
 - g. Topical nitrate ointment for difficult cases
 - h. Cortisone injections are not recommended; PRP injections showing promise
 - B. Shin Splints
 1. Proper name is Medial Tibial Stress Syndrome (MTSS).
 2. Excessive pronation has been found to be a major contributing factor. Other risk factors for MTSS are: younger age; change in distance, frequency, speed, and surface of runs; change of running shoes; and history of previous injury.
 3. Presents as a dull ache along the lower half of the inside border of the tibia, sometimes along the outside edge of the shin; pain gradually worsens with time; early in its course, pain only at beginning of workout; in advanced cases, pain persists during activities of daily life; may see associated numbness over the 4th toe; exam shows swelling and pain along the shin and reproduction of pain with doing toe raises
 4. Conditions that may mimic MTSS and should be ruled out:
 - a. Stress fractures—suggested by intense point tenderness in one discreet area
 - b. Chronic exertional compartment syndromes—suggested by sensation changes or weakness in the foot/ankle associated with pain that worsens with activity and relieved by rest
 - c. Referred pain from the lumbar spine
 - d. Neurovascular pathology
 - e. Bone tumors
 5. Majority of cases can be diagnosed through clinical history and physical exam.
 - a. Plain x-rays are normal in MTSS and stress fractures in early stages. After 2-3 weeks, x-rays may show thickening of the medial tibial cortex; at least 4-6 weeks after symptom onset before callus formation is readily evident.
 - b. Technetium bone scan (triple phase bone scan) may show changes within a few days of injury in both MTSS and stress fractures.
 - c. MRI scan is useful in discriminating between MTSS and stress fractures—even before plain x-rays are abnormal. MRI has similar accuracy of triple phase bone scan—without exposing patients to radiation.

6. Treatments for MTSS:
 - a. RICE in early stages, with emphasis on relative rest for 2-4 weeks
 - b. For those with mild symptoms, decrease in mileage and cross training
 - c. NSAID's early in the course
 - d. Shortening stride length by 10% decreases probability of stress fractures.
 - e. Consider changing to shoes with greater cushioning.
 - f. Orthotics for runners with malalignments and leg length discrepancies
 - g. Consider running on softer surfaces or treadmill.
 - h. Physical Therapy modalities early; transition to stretching and eccentric strengthening exercises later; manual therapy in moderate to severe cases
 - i. Runners with severe symptoms are placed into no-impact training incorporating cycling, swimming, and pool running. [Running in these cases should be avoided until there is no tenderness in involved area.]
- C. Stress Fractures in General (also known as Repetitive Stress Injury of Bone or RSIB)
1. Most commonly involve the lower third of the tibia but can also occur in the metatarsals, tarsals, fibula, and sesamoid bones of the foot. True fracture line is rarely present, so majority of running injuries are "stress reactions."
 2. Origins are multiple, including increased mileage and excessive shoe wear; consider these in context of overuse; study of female track athletes with history of irregular menstruation and restrictive eating patterns → 6-8 times greater risk of stress fracture
 3. Pain is sharp in nature, focal in location, and exacerbated by weight bearing; sometimes pain is referred to distal sites; localized swelling is often noted without associated redness.
 4. MRI scan or triple phase bone scan with technetium is indicated if pain is severe or lasting longer than 10 days.
 5. Treatments for Stress Fractures:
 - a. Rest from running for 4-6 weeks is sufficient in mild cases.
 - b. Crutches may be needed if ordinary walking is painful.
 - c. Fracture shoes, boots, and casts are sometimes helpful.
 - d. Swimming, easy cycling, and pool running are encouraged to maintain conditioning. Monitored return to running program may require 4-6 weeks before resumption of pre-injury training → 8-12+ weeks for full recovery.
- D. Iliotibial Band Syndrome (also known as IT Band Syndrome or ITBS)
1. ITBS is a clinical diagnosis made in the presence of lateral knee pain in the general region of the lateral femoral condyle, with tenderness and pain upon compression of this area while the knee is flexed and extended. Tenderness in adjacent structures, including the lateral collateral ligament and lateral joint line of the knee, should not be present.
 2. In the early stages, pain might only manifest itself while running or following a run. The pain is described as an aching or burning at the lateral aspect of the knee with occasional radiation of pain up the thigh toward the hip.
 3. ITBS seems to be primarily caused by overuse in the presence of muscular imbalance. Weak hip abductor muscles are the main culprit. Other contributory causes include: tension within the IT band, wearing motion-control rated shoes that promote supination (especially in runners with neutral alignment), increased hip adduction, and increase in knee flexion at heel strike.
 4. Diagnosis is most often made on clinical history and physical exam.
 5. Treatments for ITBS:
 - a. Relative rest in early course—2-4 weeks is sufficient for most.
 - b. NSAID's and/or ice early; injection of corticosteroids or PRP late
 - c. Stretching exercises—mainly for IT band; also stretch hamstrings, hip rotators, and hip adductors
 - d. Strengthening exercises—side-lying leg lifts; standing hip hikes on one leg
 - e. Physical therapy—modalities, manual therapy, instruction in foam roll use

- E. Plantar Fasciitis (also known as Plantar Fasciopathy, Plantar Heel Pain Syndrome, and PF)
 - 1. PF is one of the most frequently found foot injuries among runners.
 - 2. PF can include pain in this region in both the absence and presence of a heel spur.
 - 3. Pain upon rising in the morning is one of the hallmarks of PF. Exam reveals pain on the inside portion of the bottom of the heel. Tenderness along the inside and outside portions of the heel bone may indicate stress fracture. Nerve entrapment may also cause pain in this area.
 - 4. Treatments for Plantar Fasciitis:
 - a. Relative rest—absolute rest is rarely indicated.
 - b. Calf stretching
 - c. NSAID's and/or ice early
 - d. Torpedo strapping of the foot
 - e. Avoidance of barefoot walking and use of flat shoes
 - f. For pain lasting longer than 6 weeks, night splints
 - g. Corticosteroid injections are controversial; PRP injections are promising.
 - h. Immobilization is rarely indicated in long-term, recalcitrant cases.

III. Keys to Preventing Running-Related Injuries

- A. Keep a training diary.
 - 1. Aides in monitoring progress, injury patterns, resting heart rate, and shoe wear
 - 2. Serves as a non-judgmental “accountability buddy”
- B. Avoid the “Terrible Too’s”: Too much, too soon, too fast, and too often.
 - 1. Use the 10% rule when making changes in training from week to week. [Some authorities recommend allowing 2-3 weeks for adaptation before making increases.]
 - 2. Remember that rest is as important as training when increasing workloads.
- C. Avoid the overtraining syndrome. Potential signs of this overuse syndrome are:
 - 1. Elevation of resting heart rate by more than 10 beats per minute.
 - 2. Increased susceptibility to upper respiratory tract infections.
 - 3. Increased vulnerability to minor injuries and “dead legs” feeling.
 - 4. Increased emotional irritability and moodiness; insomnia; and decreased mental alacrity.
 - 5. Drop in performance and increased difficulty doing previously “easy” workouts.
- D. Practice “Safe Running.”
 - 1. Always run on the side of the road facing traffic.
 - 2. Dress with focus on visibility.
 - 3. Try to train with someone else.
 - 4. Stay in areas with which you are familiar and let someone know where you will be.
 - 5. Avoid anyone who looks suspicious, but get good a look at suspicious types w/o staring.
 - 6. Leave headsets, iPods, MP3 players, and radios at home.
 - 7. If the worst happens and an attacker gets his hands on you:
 - a. Yell out a description of the person.
 - b. Yell out what your assailant is doing to you.
 - c. Yell out for someone to call 911.
 - d. Target 4 areas for a counter-attack: Eyes, Throat, Groin, and Knees.
 - e. No matter what happens, always report an attack to the police.
- E. Wear proper footwear. Beyond wearing running shoes for running, this means shoes that fit well.
 - 1. Shop late in the day, because feet swell during the day.
 - 2. Measure your feet while standing.
 - 3. Try on both shoes with the socks you will wear.
 - 4. Buy for your larger foot, as feet are rarely the exact same size.
 - 5. Allow a thumbnail’s width between the end of the shoe and your big toe.
 - 6. Choose shoes that are comfortable immediately. If they hurt, don’t buy them!
 - 7. Wear shoes around the house before using them on short runs.
 - 8. Have 2 pairs of training shoes so that you may alternate shoes every other workout.

- F. Replace shoes as needed.
1. Exercising in worn-out shoes can cause (or at least contribute to) injuries.
 2. Replace running shoes between 350-500 miles, as new shoes lose about 40% of cushioning after running about 250-500 miles. For example, if you run 20 miles per week and alternate between 2 pairs of training shoes, the recommendation is to replace your 2 pairs of running shoes after 8-9 months (unless excessive wear apparent earlier).
- G. Warm-up and cool-down properly.
1. Benefits of a proper warm-up:
 - a. Increased muscle temperature → enhanced speed and strength of contractions
 - b. Increased body temperature → improves muscle elasticity
 - c. Improved range of motion of joints
 - d. Increased production of hormones involved in the regulation of energy production
 - e. Enhanced mental preparation for the task at hand
 2. Recommendations for warm-up:
 - a. Start with gradual aerobic exercise before stretching.
 - b. Another good approach is to gradually increase the intensity of running over 10-15 minutes and then lengthen your strides and tempo as you move into the workout phase of your training run.
 3. Recommendations for cool-down:
 - a. Start by walking for 3-5 minutes to allow your cardiovascular system to come down to the resting state gradually.
 - b. Calf stretches—wall stretch and stair stretch → Hold these for 3-5 minutes (all other stretches are held for 20-30 seconds each)
 - c. Hamstring stretches—stool stretch, seated hurdler stretch, and supine stretches
 - d. Quadriceps stretch—standing stretch, grab opposite foot behind you
 - e. Hip Flexors stretch
- H. Strength train two to three times per week. Recommended exercises include:
1. Push-ups
 2. Rowing exercises with Theraband or rubber tubing
 3. Core training—crunches, planks, side planks, Superman exercise
 4. Free weight exercises—lateral raises, reverse flies, curls, and triceps extensions
 5. Quadriceps exercises—leg press, partial squats, and jumping rope
 6. Calf raises—either using weight machines or one leg at a time off a step
- I. Enjoy your running. ***“Exercise that feels like work is worthless.”*** If you find yourself dreading running, consider cross training for a couple of days. Benefits of cross training include:
1. Reduces boredom
 2. Reduces risk of injury
 3. Works some muscles while allowing others to gain relative rest
 4. Allows continuation of conditioning while injured
 5. Examples of cross training activities: Swimming, Cycling, Rowing, Stair Climbing, Jumping Rope, Skating (inline or ice), Cross Country Skiing, Court Sports