



A Quick Look at Running Injuries

Look for these common conditions in runners and joggers.

By Stephen M. Pribut, D.P.M.

This article is the third in a seven-part sports podiatry series written by members of the American Academy of Podiatric Sports Medicine. This sport-specific series is intended as a practical "how-to" primer to familiarize you with the specific needs of patients who participate in these sports, and the types of injuries and treatment challenges you're likely to encounter.

Each day millions of Americans run. From the elite athlete-in-training to the casual jogger, runners hit the trails or the track for fun, sport and health. Running is one of the most frequently employed forms of vigorous aerobic exercise. Running is often used to assist in weight control and evidence also suggests that running may ease stress, lower blood pressure and lower total cholesterol, while increasing HDL's.

Running is relatively safe and usually results in enhanced health. George Sheehan often said that he did not believe that running would make him live longer, but would help him live better and healthier. Runners do seem to be injured more often than swimmers or walkers, but most of these injuries are readily treated and often preventable. Running involves far greater forces than walking, and these forces are applied over a shorter period of time. Running is the chosen exercise for many and our job is to assist the runner in the pursuit of the sport.

Your local running community will be happy to learn of another podiatrist who is knowledgeable about both injury treatment and injury prevention. Treatment and prevention of running injuries are closely related. As your interest and skill in treating runners grows, contact local quality running stores and running clubs. Give talks to the run-

ning clubs on injury prevention and discuss the characteristics of the running shoes that you like to use for different clinical entities. Devise a referral form to be used for your shoe recommendations.

Approaching Running Injuries

The most frequent cause of running injuries is over training or what could be termed the "terrible too's." Too much, too soon, too often, too fast, and too little attention paid to pain all too often lead to injury. Recently, a new phenomena that I call the "Sudden Runner's Syndrome" has appeared. Not that many years ago, most authorities recommended that new runners consider running for one year before considering training for the marathon. Today many runners have a plan to start running tomorrow and complete a marathon in 6 months. This can result in a consid-

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erable number of injuries, even when carried out within the context of a run/walk program. This new athlete deserves respect and should be well-treated and encouraged to continue the new found exercise regimen with appropriate modifications and treatment for the injuries.

Improper running shoes are another major factor in the development of running-related injuries. Contributing to overuse injuries is the overused shoe. It is important to examine all aspects of your patient's use of running shoes from fit to design to how long the shoes have been worn to differences in training and racing shoes.

When you treat experienced runners, they will rarely want to hear the advice "stop running". Save that for severe injuries. Keep in mind the concept of relative rest. Advise your runners to avoid running to the point of pain during a run or what would create pain following the run. Review their schedule and if possible, try to determine what, if any, running is possible that will not cause a rebound increase in pain. Prescribe alternative forms of exercise that may be less stressful such as cycling, pool running, swimming, or the elliptical trainer.

Assessment of Problem:

History

The lower extremity is the area most often injured in running, with the knee, Achilles tendon, tibia and foot being the most frequently affected structures. The podiatrist is one of the most important consultants for the runner.

Besides the usual questions that you will be asking in your history taking regarding time and nature of onset, type of pain and so on, you will need to spend considerable time reviewing your patient's training schedule (log) and secondarily their training and racing shoes.

Biomechanics is only part of the problem and will only offer a portion of the solution to most running-related injuries. As we have noted, most running injuries are caused by overtraining and it is important to evaluate where the training error was made. Correcting the overtraining is not usually sufficient to treat many of the problems seen in clinical practice. Shoe changes, lower extremity strength improvement, core body strength, and stretching to enhance flexibility need to be prescribed as well as a revised training schedule. Orthotics of course do play

a role in the treatment and prevention of future running related injuries, but the other parts of the equation must not be neglected.

CHART 2 Exercise Regimen Modification

Relative or absolute rest
Strength exercises
Stretching
Footgear changes
Form changes
(including avoiding over-striding)
Orthotics

Training Evaluation And Assessment

Ask your patients to bring in their running logs. These logs should have daily and weekly mileage and brief notes on the run. Feelings of pain and discomfort are often listed. You'll be able to see when an injury began and what training preceded the injury. Look for sudden increases in mileage. Look for a large jump in the long run. Usually in marathon training, the long run will only increase by one to two miles per week. An increase of three or four miles in the long run and the absence of "easy" weeks, during which there is a decrease in mileage are red flags.

Note the time of day and the type of terrain your patient has been running on. A change to running on hills may aggravate plantar fasciitis or Achilles tendonitis. Downhill running often aggravates peri-patellar pain syndrome. Running at night or in dim light conditions may aggravate mild balance impairment. A patient recovering from an ankle injury may need to run in daylight if a proprioceptive deficit remains.

Gait changes that occur with an increase in speed work include an increase in the number of strides per minute and an increase in

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CHART 1 Risk Factors

A variety of contributing factors to running injuries should be noted:

- Overuse or training errors
 - Inexperience
 - Terrible 2's
 - * Too much, too soon, too often, too fast
 - Intensity
- Miles run per week
 - Perhaps but may be related to overuse
- Previous running injury
- Incorrect shoe
- Flexibility issues
- Strength issues
- Surface issues
- Abnormal biomechanics

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stride length. Over-striding is one of the most frequent training flaws and among other deleterious effects this may aggravate calf and Achilles tendon problems, hamstring injuries, and increase stress in the anterior tibial muscle group.

CHART 3 Outline of Training Evaluation

Check for Overtraining
Excessive racing
Running with pain
Running while injured or after injury
Terrain
Time of day

Physical Examination

The physical examination will lead you to direct knowledge of what structures are injured. You should also perform a thorough biomechanical examination and note how well-balanced is the muscle strength and what muscle groups require stretching or strengthening.

When performing a physical examination I follow the principles of "Look, Touch, Move." I start away from the area that I suspect will be most tender and then work towards it. This limits responses from the patient anticipating pain.

Shoes

It is clear to most that shoes play a role in the cause, the prevention and the treatment of running injuries. Even Abebe Bikila, the barefoot winner of the 1960 Olympic Marathon, decided to wear shoes while winning the 1964 Olympic Marathon.

Be sure to examine your running patient's shoes. How long have the shoes been worn and for how many miles have they been worn? What is the overall appearance of the shoe? Does it have appropriate pronation protection features? Has the upper shifted abnormally? Is the sole excessively worn? Is the wear symmetrical? Do the characteristics of the shoe increase the risks for the type of injury that the patient has? The vast majority of our patients are not world-class athletes and should not do much, if any, running in racing flats.

The aging shoe exhibits more than just a worn sole. The midsole compresses and loses its shock absorption. The heel may no longer sit perpendicular to the ground. The upper may have holes in it and may no longer line up properly with the rest of the shoe.

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Foot Types

Different foot types have different basic shoe requirements. The under-pronating high arched foot presents a higher lateral load to the shoe and will not do well with a spongy midsole and many pronation control devices. The over-pronating flat foot presents an excessive medial load to the shoe and often is present with the problems of medial tibial stress syndrome, peri-patellar pain syndrome and plantar fasciitis. The shape of the last should also be matched to the shape of the patient's foot. An over-pronated foot often does best in a straight lasted shoe, a high arched under-pronated foot does better in a curved last and the neutral foot is most often more comfortable in a straight lasted shoe.

An ideal shoe for an over-pronating patient should likely include a straight last, be manu-

factured over a combination, board or California last, have a firm and long heel counter, an external heel counter, a rear-foot stability post or rollbar, and a multi-density midsole.

More detail on the role of shoes and injuries has appeared in previous articles in Podiatry Management. You may also update your knowledge by attending an AAPSM shoe workshop.

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CHART 4 Shoe-Related Problems

Excessive shock absorption:

Achilles tendinopathy—eccentric overload of tendon

Plantar Fasciitis—often too unstable, with little flexural and torsional stability

Lacing System:

Met-cuneiform exostosis

Dorsal intermediate cutaneous nerve compression

Anterior ankle impingement

Lack of Heel Padding: Haglund's

Improper Fit:

Subungual hematoma

Blisters

Too Narrow Width: Neuroma pain

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Most Common Injuries

The most common running injuries reported are to the knee, calf and Achilles tendon, medial tibia, heel and lower back. The specific injuries most often reported include: patello-femoral pain syndrome, calf and Achilles tendon injury, ilio-tibial band syndrome, medial tibial pain, heel pain and sesamoid injury.

Other notable injuries include stress fractures of the metatarsals, tibia, hip and femur. The preliminary results of an online survey indicated that there has been a recent decrease in patello-femoral pain syndrome (14% vs. 25% in earlier studies) and an increase in ITB syndrome (11% vs. 3.9%) and Calf and Achilles Tendon pain (18% vs. 7.9%).

Tips On Selected Injuries

Achilles Tendon & Calf Injuries

The calf and Achilles tendon are the most often injured lower leg region. Your patients with this problem should be advised to avoid hills. They should also avoid shoes that are either too rigid or too soft and be certain to steer clear of shoes with viscoelastic compartments or soft air cells. Shoes that are too soft exhibit an excessive deformation of the heel. The calcaneus is moving downwards when it should be on solid ground. The muscles leading to the Tendo Achilles reflexively fire to control ankle plantar flexion after foot strike. The eccentric contraction causes the muscles to effectively fire earlier, longer and stronger than usual.

I recommend gentle stretching after



A variety of materials can be used in the fabrication of orthotics for runners.



a 10 minute easy warm-up and gentle stretching after running. In resistant cases, some researchers have recommended eccentric stretches. Heel lifts are often helpful, and the use of orthotics should be considered to eliminate tri-planar stress through the Achilles tendon.

During the recovery phase the patient should use relative or absolute rest. An elliptical trainer is often helpful. The treadmill should be avoided because the gait alterations that occur are not conducive to recovery from this injury. When returning to overground running a shortened stride may help avoid pain.



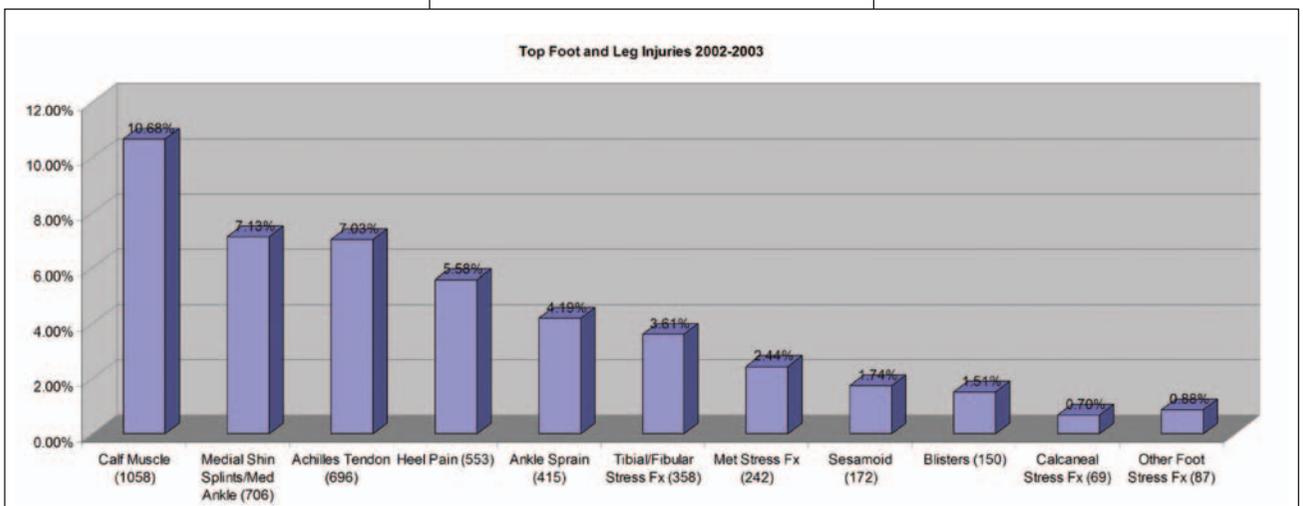
Medial Tibial Stress Syndrome

Until recently, the term "shin splint" was used to refer to many lower leg pains which included both bone and soft tissue injuries. Medial tibial stress syndrome (MTSS) is a more appropriate and specific term for what had been called medial shin splints. It must be distinguished from a tibial stress fracture. Clinical onset and location of pain help making the diagnosis. Pain is reported at the medial aspect of the leg, adjacent to the medial aspect of the tibia. Tenderness is usually found between 3 and 12 centimeters above the tip of the medial malleolus at the postero-medial as-

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The flexion stability test is easily performed. Hold the heel of the shoe and press it into a flat surface at about 45-60 degrees. The shoe should bend at the ball of the foot. If it bends proximal to this point (bottom photo), it fails the test.



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pect of the tibia. The area of tenderness is more longitudinal in the medial tibial stress syndrome rather than the

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CHART 5

Achilles Tendon and Calf Injury Treatment Outline

Relative rest

- Cut back mileage

- Lower intensity

- Avoid hills, speedwork, plyometrics

Avoid over-stretching

- Gentle stretch after warm-up

 - Start with straight leg calf stretch, build up much later to bent leg.

 - Consider eccentric stretch even later.

Ice Massage—10 to 20 minutes after exercise

NSAID's—Aleve, Motrin, etc. 10-14 days.

Check Running Shoes

- Replace if heel is worn

- Replace if excessive heel shock absorption (soft air sole cushion, excessive visco-elastic shock absorption)

- Replace if shoe is excessively stiff at the "break point" (ball of foot).

Physical Therapy Modalities

- HVGS (electrical stimulation)

- Ultrasound

- Exercise instruction: Strength and flexibility

CHART 6

Return to Running Schedule

(after injury with four-week layoff)

Week Walk/Run Schedule

- | | |
|---|--|
| 1 | Walk 10-20 min. every other day |
| 2 | Walk 20-40 min. 5 days per week |
| 3 | Jog at easy pace 10 min. + 20 min. walk |
| 4 | Jog 15 min. + 20-30 min. walk |
| 5 | Alternate for 4-5 Days of week:
Run 15 min. / Run 25 min. |
| 6 | Alternate 20 min./30 min. runs |
| 7 | Alternate 20 min./30-35 min. runs |
| 8 | Alternate 25 min./30-40 min. runs |

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often seen horizontal zone of tenderness in a stress fracture. Periostitis may occur in this location.

The injured structures usually include posterior tibial tendon and muscle; however, both the flexor digitorum longus and flexor hallucis longus may also be involved. A bone scan may be used to assist in the diagnosis. Compart-



Aged orthotics should be replaced

ment syndromes may also occur in this region, but have been covered in past issues of *Podiatry Management*.

The primary causes of MTSS are overtraining combined with excessive pronation. Running on a canted surface or excessive track training will place the higher leg (or outside leg) at a greater risk for this injury.

Your patients should be advised to diminish their training. While running on soft surfaces has been recommended for this problem, it is not likely to

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CHART 7

Pribut Pain Staging of Overuse Injuries in Athletes

Stage 0. No pain is present before, during or after activity. Minor discomfort may be experienced at various times during training or racing.

Stage 1. Pain or stiffness after activity. The pain is usually gone by the next day.

Stage 2. Mild discomfort before activity that goes away soon after exercise is commenced. No pain is present in the latter part of the exercise. Pain returns after the exercise is completed (starting within 1 to 12 hours later and lasts up to 24 hours).

Stage 3. Moderate pain is present before sport. Pain is present during sport activity, but is somewhat decreased. The pain is an annoyance which may alter the manner in which the sport is performed.

Stage 4. Significant pain before, during, and after activity. The pain may disappear after several weeks of rest.

Stage 5. Pain before, during, and after activity. The athlete has stopped his/her sports participation because of the severity of the pain. The pain does not abate completely even after weeks of inactivity.

CHART 8

Do's and Don'ts of Winter Running

- 1.** Dress in layers. Use light weight wicking fibers as the layer closest to your body.
- 2.** Do wear socks made of synthetic fibers that wick moisture away from your skin to help prevent blisters and athlete's foot.
- 3.** Remember that your head may be responsible for about 40% of heat loss. Keep your head covered and wear gloves.
- 4.** Apply skin protection using sun block and moisturizers as appropriate.
- 5.** Don't forget to replace your fluids on long runs.
- 6.** Do fit your running shoes or other sports shoes with the type of sock you intend to wear them with. Do replace your running shoes often. Replace them at least every 350-450 miles run.
- 7.** Do wear sport specific running shoes. Running shoes do not have the lateral support needed for tennis. Help yourself avoid ankle sprains and other injuries.
- 8.** Warm up slowly and gently before your runs and especially before doing speed work.
- 9.** Be careful running in low light conditions both because of road traffic and uneven pavement, and also be aware of increased balance problems.
- 10.** Don't do speedwork in bone chilling cold. You are risking injury. Most wise runners use this season for maintenance runs.

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be helpful. The foot will pronate more on softer surfaces, such as grass or sand. Packed dirt would be an ideal surface. I specifically advise against running on concrete. Motion control shoes should also be recommended. Gentle posterior stretching exercises may help, but control of pronation is directly related to the cause of this syndrome. Ice applications following running may be helpful.

Patello-Femoral Dysfunction/ Peri-Patellar Pain Syndrome

Patello-femoral pain has long been a common running problem, but has troubled fewer runners lately. The recommendations for treatment remain the same. Assess the biomechanics of your patient, including limb length. My usual recommendations include prescribing a decrease in training, avoidance of downhill running, a return to running with run/walk intervals, straight leg lifts (10 sets of 10 repetitions), if needed a motion control shoe, and possibly orthotics. ■

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About The American Academy of Podiatric Sports Medicine

The American Academy of Podiatric Sports Medicine is the second largest affiliate of the American Podiatric Medical Association. Over 150 of its 500 plus members have achieved Fellowship status in the AAPSM.

The AAPSM has a major goal of advancing the understanding, prevention and management of lower extremity sports and fitness injuries. The AAPSM believes that providing such knowledge to the profession and to the public will optimize enjoyment and safe participation in sports and fitness activities. The AAPSM accomplishes this mission through professional education, scientific research, public awareness and membership support.

The AAPSM has long been the organization looked to by the public and media for authoritative information on all aspects of podiatric sports medicine. Members of the AAPSM have all demonstrated significant interest in podiatric sports medicine and are sought out by athletic trainers, teams, and patients alike for their expertise. In general, members of the AAPSM have extremely busy practices and attract patients who are physically active and have a commitment to health and wellness.

One of the most popular sources the AAPSM has available is the website (www.aapasm.org), which offers information to the podiatric profession as well as the general public. The most popular section of the website is the AAPSM shoe evaluations. The AAPSM evaluates over 100 shoes each year in over 15 categories and they are posted on the AAPSM website.

Any practicing podiatrist with an interest in sports medicine should become a member of AAPSM. Join other AAPSM members who are dedicated to promoting the AAPSM mission statement as well as demonstrating to their own patients that they have made a commitment to this practice specialty. If you are interested in becoming a member, please contact Rita Yates, AAPSM Executive Director, at ritayates2@aol.com or call toll free at (888) 854-FEET.

For more information, circle #199 on the reader service card.

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Web Resources:

AAPSM <http://www.aapasm.org/>
Dr. Pribut's Running Injuries Site <http://www.drpribut.com/sports/sport-frame.html>

President's Challenge: <http://www.presidentschallenge.org/misc/links.aspx>

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