

The Injured Runner



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KEYWORDS

- Running • Injury • Lower extremity • Medial tibial stress syndrome
- Compartment syndrome • Stress fractures • Achilles tendinopathy

KEY POINTS

- As more individuals participate in running-related activities to improve their health, clinicians need to be increasingly aware of common injuries.
- Training errors leading to overuse are the most common cause of running-related injuries.
- Obtaining a detailed history and performing a focused examination leads to most running-related diagnoses, with imaging reserved to differentiate among diagnoses with similar clinical presentations or to determine the degree of injury.

INTRODUCTION

Exercise is recognized as a fundamental aspect of good health. The risks of being sedentary are numerous, highlighted by the ever-increasing prevalence of obesity in the United States. Approximately 36% of adults in the United States are obese, and an additional 33% are overweight.¹ Clinicians are increasingly recommending aerobic exercise, particularly running, for the health benefits.

The American College of Sports Medicine recommends that all healthy adults 18 to 65 years of age participate in moderate-intensity aerobic (endurance) physical activity for a minimum of 30 minutes, 5 days each week, or vigorous-intensity aerobic physical activity for a minimum of 20 minutes, 3 days each week.² Adults older than 65 years have similar recommendations with modification of intensity depending on the person's overall health and recommendations to focus additionally on flexibility and balance.³

RUNNING

Introduction

In the past, running was mostly considered an elite sporting activity for competitive men in the United States.⁴ However, 10% to 20% of Americans now run regularly.⁵

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Throughout communities within the United States, recreational road races and long-distance running comprise a significant percentage of sports activities. There has been a major increase in the number of road races linked to community celebrations, weight loss programs, memorial events, and charitable fundraising. As many as 30% of Americans participate in these events, and around 20% run regularly for fitness.⁶

The benefits of running are numerous, and they include lower risks of early death, coronary artery disease, cerebrovascular disease, hyperlipidemia, hypertension, type 2 diabetes mellitus, metabolic syndrome, colon cancer, and breast cancer. Additional benefits of running include weight loss, prevention of weight gain, prevention of falls, and improved mood.⁷ Vigorous exercise in middle and older ages has been linked to reduced disability later in life as well as a notable survival advantage.⁸

However, running can be a hazardous sport. Every year, 19% to 79% of runners are injured.⁹ Fifty percent of runners experience an injury that takes them out of running for a period of time during any year, and 25% of runners are injured at any given time.⁵ The patterns of injuries that affect runners as well as the overall demographic of the running community have been changing.¹⁰ No longer are marathons run by predominantly male participants. In 1980, women accounted for 10% of marathon participants. In 2005, 40% of all marathoners were women.¹¹ In addition, marathons and half-marathons are now run by individuals who do not have the typical body habitus of a competitive marathon runner. Heavier runners are affected by impact injuries at shorter distances compared with elite runners. However, only total running distance (more than 65 km [40 miles] per week) and a history of previous injury have shown strong statistical correlations with the prediction of running injuries.^{10,12–15}

Most running-related injuries are caused by overuse. Risk factors for running-related injuries are numerous and generally are classified into 4 categories¹⁶:

1. Systemic (gender, weight, knee alignment, arch type, flexibility)
2. Running/training related (training frequency, alterations, terrain, race distance, running experience, shoe age, and running pace)
3. Health (previous injuries, medical problems)
4. Lifestyle (sedentary work, tobacco, cross training)

Injury frequencies per anatomic site based on a compilation of running studies suggests that, in order of increasing involvement, runners present with injuries of the (1) lower back, (2) hip and pelvis, (3) upper leg, (4) ankle, (5) foot, (6) lower leg, and (7) knee.¹⁰ In a study of more than 2000 running-related injuries, the most common leg injuries included medial tibial stress syndrome (MTSS), Achilles tendinopathy, and tibial stress fracture.¹⁷ However, the differential diagnosis for leg pain in a runner is broad (**Table 1**).¹⁸

Body System	Possible Diagnosis
Skeletal	MTSS, stress fracture
Musculotendinous	Tendinitis, tendinopathy, calf strain
Vascular	Exertional compartment syndrome, popliteal entrapment, venous thrombosis
Neurologic	Nerve entrapment, lumbosacral radiculopathy, neurogenic claudication
Infectious	—
Neoplastic	—

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