



Prescribing Athletic Footwear and Orthoses: The Game Plan



Here's a systematic approach to making these important decisions.

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The AAPSM serves to advance the understanding, prevention and management of lower extremity sports and fitness injuries. The Academy believes that providing such knowledge to the profession and the public will optimize enjoyment and safe participation in sports and fitness activities. The Academy accomplishes this mission through professional education, scientific research, public awareness and membership support. For additional information on becoming a member of the AAPSM please visit www.aapsm.org.

Introduction

This article is geared toward maximizing athletic performance and minimizing injury through the use of an appropriate prescription for athletic footwear and orthoses. Often neglected, overlooked, or misunderstood, this prescription should be the first step in the lower extremity treatment of the athlete. Overwhelming evidence is now available and has been presented, which supports the use of custom foot orthoses in the athlete.

The authors present a system-

atic approach—the game plan—for prescribing athletic footwear and orthoses, incorporating all facets to ensure maximal effectiveness. A 15-point sequential guideline (see Table 1 on page 74), customized for each athlete, will be helpful in making decisions on athletic footwear; however, it is ultimately up to the sports med-

icine practitioner to choose which shoes or which orthotic devices are most appropriate for each individual athlete.

be most appropriate. Historically, the “wet test” has been used as a quick and easy test for the lay athlete to determine arch type. A more contemporary and accurate determination of arch height and foot type can be made by either quantifying navicular drop or assessing the vertical forces beneath the foot.

Foot size may affect the choice of material and the size and thickness of a foot orthosis.

The three basic categories of foot types are: low arch (flat foot); normal arch; and high arch (cavus foot). In general, a low-arched foot is more flexible and will function with excessive pronation which will require additional medial support. A normal-arched foot will function with an appropriate amount of pronation and will not require additional medial support or excessive cushioning. A high-arched foot is more rigid foot and will function with limited pronation and will require additional cushioning and shock absorption.

Size of the foot must also be considered, as the foot size may affect proper fit of the shoe and may af-

NOTE: *This article is intended as a presentation of the systematic approach; each component of the prescription for athletic footwear and orthoses is broken down and discussed in-depth in other chapters throughout our textbook.*

1) Determine the Foot Type

Foot type can be classified by the arch height, which will provide a starting point as to how the foot will function biomechanically during gait and which athletic footwear will

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fect the choice of material and the size and thickness of a foot orthosis. Foot size can be categorized as large, wide, medium, small, or narrow.

2) Determine the Foot’s Function During Gait

Gait evaluation is an important part of an athletic evaluation. Static examination of an athlete’s foot type is a good starting point; however, a dynamic evaluation will provide more information on how the foot

functions in real-time. Based on the dynamic function of the foot, a more appropriate recommendation can be made regarding the biomechanical needs of the athletic footwear and orthoses.

Clinical evaluation of the amount of pronation during gait can be subjectively assessed by visualizing the athlete walk and run; however, a more objective and accurate gait analysis can be performed using hi-tech video analysis and force-measuring platforms or in-shoe pressure-measuring technology.

Physical size of the foot and the weight of the patient must be considered when recommending athletic footwear and orthoses.

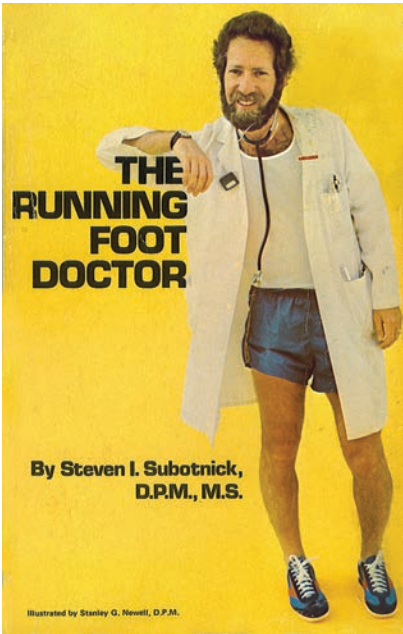


Figure 1: Dr. Subotnick shown on the cover of *The Running Foot Doctor*, published in 1977, when running shoe selection offered very few choices, features, or technology.

TABLE 1
Checklist: Prescription for Athletic Footwear and Orthoses in Sports Medicine 15 Components
<input type="checkbox"/> 1) Determine the foot type
<input type="checkbox"/> 2) Determine the foot’s function during gait
<input type="checkbox"/> 3) Consider any foot pathology and history of injury
<input type="checkbox"/> 4) Consider size and weight of athlete
<input type="checkbox"/> 5) Consider the athlete’s demands from their sport
<input type="checkbox"/> 6) Assess key features of the athletic shoe
<input type="checkbox"/> 7) Recommend athletic shoes/super shoes
<input type="checkbox"/> 8) Recommend athletic socks
<input type="checkbox"/> 9) Recommend athletic shoe laces and lacing techniques
<input type="checkbox"/> 10) Recommend over-the-counter athletic shoe inserts
<input type="checkbox"/> 11) Recommend athletic shoe modifications
<input type="checkbox"/> 12) Referral for custom foot or ankle orthoses
<input type="checkbox"/> 13) Recommend athletic custom foot orthoses and modifications
<input type="checkbox"/> 14) Recommend athletic ankle foot orthoses and modifications
<input type="checkbox"/> 15) Follow-up re-assessment for possible modifications after wear-testing

The amount of foot pronation noted during gait can be excessive, increased, biomechanically efficient, decreased, or absent (supinated). Examination of an excessively pronated foot during gait will demonstrate an internally-rotated leg, an excessively everted calcaneus, a collapsing arch, and an excessively abducted forefoot.

It is important to observe—not necessarily *how much* excessive pronation occurs, but—*when the excessive pronation occurs* during the gait cycle.

A complete biomechanical examination should note any asymmetries starting at the head and progress distally to the shoulders, back, hips, knees and patella, legs, ankles, and feet. The amount of core strength and stability should also be noted, as a weak core may predispose a lower extremity injury.

3) Consider Any Foot Pathology and History of Injury

Common foot pathology which may affect the choice of appropriate athletic footwear and orthoses includes (but is not limited to): posterior tibial tendon dysfunction, spring ligament strain, metatarsalgia, planar fasciosis, calcaneal apophysitis,

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hallux valgus, hallux limitus, sesamoiditis, stress fractures, neuromas, sinus tarsi syndrome, lateral ankle instability, peroneal tendon pathology, tarsal tunnel syndrome, and Achilles tendon pathology. A history of injury may also predispose an athlete to re-injury.

4) Consider the Size and Weight of the Athlete

Physical size of the foot and the weight of the patient must be considered when recommending athletic footwear and orthoses. Shoe volume, width, and length must be adequate. Shoe and orthosis materials need to be sufficient to accommodate the athlete without breaking down prematurely.

5) Consider the Athlete's Demands from Their Sport

Each sport has its own set of factors which may affect the choice of appropriate athletic footwear and orthoses, including the types of movement necessary. For example, distance running requires straight forward heel-to-toe motion while tennis requires side-to-side and front-to-back movements on the ball of the foot.

Sport surface also needs to be considered, whether it is a smooth court, a grassy field, artificial turf, or hard concrete.

6) Assess Key Features of the Athletic Shoe

Technologic improvements to athletic footwear and orthoses are ever-changing and the sports medicine specialist needs to be aware of advances and trends. In regard to running shoes, very few choices, features, or technologies were available during the early running boom of the 1970's—as evidenced by Dr. Subotnick shown in Figure 1 on the cover of *The Running Foot Doctor*, published in 1977—while a virtual explosion of athletic shoes, options, and technological advances has occurred since.

There has been a clear evolution in footwear design, from the soft, cushioned models of the 70's and 80's, to the motion-control emphasis of the 90's, and now to a modern focus on “functional geometry” and targeted design zones. Recent AAPSM reviews and independent research suggest that manufacturers are increasingly using zonal cushioning, tuned stiffness, and rocker geometry to guide the foot through a more natural and energy-efficient gait cycle, rather than forcible “controlling” motion. Advanced materials like carbon-infused plates and PEBA-based foams are now used strategically to enhance propulsion and reduce energy expenditure, particularly in long-distance athletes.

Footwear design is now more athlete-specific, addressing gait variability and anatomical differences through data-driven fit platforms and pressure-sensing algorithms.

Although the term “motion control” is still commonly used by manufacturers and referenced in this text, it no longer fully captures the intent or effect of modern athletic footwear. Rather than forcibly limiting motion, particularly pronation, contemporary shoes are designed to influence the timing, direction, and magnitude of motion

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in a way that supports the athlete's natural biomechanics. As noted in recent AAPSM commentary, footwear features such as stiffness gradients, variable-density midsoles, and strategic sole geometries do not “control” motion in a rigid sense but rather help to guide the foot through an optimized movement pathway, especially during high-load phases of gait. This evolution represents a shift from corrective paradigms to performance- and efficiency-enhancing strategies that adapt to the individual athlete.

The term “preferred movement pathway,” proposed by biomechanistic Benno M. Nigg and supported by AAPSM Fellow Simon J. Bartold, remains foundational but has been further refined by current research. Recent insights emphasize that athletic shoes should optimize the body's natural mechanics rather than impose rigid correction. This perspective aligns with the AAPSM's



Figure 2: Heel counter stability—Squeeze the heel to determine the amount of stability or flexibility.



Figures 4 A, B: Forefoot flexional stability—Forefoot flexibility depends on both durometer of the midsole material and the depth of the flex grooves. Deeper grooves allow more flexibility of the shoe at the forefoot. The shoe should flex at the metatarsal-phalangeal joint, not further proximal through the midfoot.

Certain foot types and pathology may be improved by basic shoe re-lacing patterns.

2024 position, which advocates for footwear that accommodates an athlete's preferred movement path while minimizing risk factors for injury. Current models often integrate asymmetrical designs, adaptive foams, and decoupled heels to accommodate real-world pronation variability and promote natural loading and propulsion. These biomechanically-informed design elements allow athletes, especially those with excessive or timing-delayed pronation, to maintain efficient movement while reducing repetitive stress.

7) Recommend Athletic Shoes/ Super Shoes

Multiple features of the running shoe have been identified as being

integral to proper foot function and comfort, some of which are listed in Table 2. Assessing the shoes' heel counter stability, midfoot torsional stability (shank rigidity), and forefoot flexional stability can provide enough information to make an appropriate recommendation for or against the shoe. (see Figures 2, 3, and 4)

So-called “Super Shoes” are an entirely new category of running shoes that have been shown to improve efficiency and, in some athletes, provide a competitive advantage. These shoes, however, have also been linked to a possible increase in running injuries.

8) Recommend Athletic Socks

Sport socks have evolved and many choices of materials, cushioning, and even sock length need to be considered, depending on the sport and application.

9) Recommend Athletic Shoe Laces and Lacing Techniques

Athletic shoe laces and lacing patterns are often not considered in the athletic footwear prescription, but should not be overlooked. Certain foot types and pathology may be improved by basic shoe re-lacing patterns, and shoe fit may be improved by using different shoe lace materials and lace-locking systems.

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Figures 3 A, B: Midfoot torsional stability (shank rigidity)—Twist the shoe while grasping the heel and forefoot to determine the amount of stability or flexibility. Midfoot rigidity is necessary for running footwear.

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10) Recommend Pre-fabricated Athletic Shoe Insoles

Athletic shoe manufacturers invest very little technology in the inserts that come with shoes. Pre-fabricated athletic shoe insoles are helpful—in addition to the appropriate athletic shoe type—when additional cushioning (soft), support (stable, with additional arch padding), or pronation-limiting features (more durable, with hard plastic shell) are required.

11) Recommend Athletic Shoe Modifications

Athletic shoe modifications can further enhance athletic shoe fit and function and should be considered for certain athletic conditions.

12) Referral for Custom Foot or Ankle Orthoses

Referral for custom foot or ankle orthoses is the next step to be taken when all of the above steps have not

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inserts that come with shoes.

TABLE 2	Objective Features of a Running Shoe
	• Interior shoe volume
	• Toe box width
	• Seams and stitching
	• Insole
	• Last shape
	• Forefoot flexibility
	• Midfoot flexibility/stability
	• Midfoot torsion
	• Midsole cushion at heel lateral and medial
	• Midsole firmness at heel
	• Heel counter
	• Heel contact shape
	• Rocker sole
	• Increased midfoot surface



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fully resolved the athlete's condition. Evidence overwhelmingly documents and supports the effectiveness of custom foot orthoses in sports medicine.

13) Recommend Athletic Custom Foot Orthoses and Modifications

The type of custom foot orthoses prescribed is dependent on a multitude of factors. Custom foot orthoses

have been proven to be an important adjunct in conservative care of the athlete, which function to decrease the risk of certain injuries and potentially enhancing athletic performance.

14) Recommend Athletic Ankle Foot Orthoses and Modifications

Ankle foot orthoses have been proven to be an important adjunct in conservative care of the athlete. As with custom foot devices, the type

of ankle foot orthoses prescribed is dependent on a multitude of factors.

15) Follow-up Re-assessment for Possible Modifications After Wear-testing

After each step above has been completed, a follow-up assessment of the athlete should be made after an adequate wear-test to assess effectiveness and to make modifications or adjustments if necessary.

Why the AAPSM Does Not Rate, Review or Recommend Footwear

In January 2010 the AAPSM Board voted to discontinue the process of reviewing, rating or recommending footwear. To date there has not been a reliable, repeatable methodology of footwear assessment that meets the standards of evidenced based medicine. For that reason the AAPSM Board felt it was disingenuous to engage in the practice of testing footwear and making recommendations based on those tests. One of the main goals of the AAPSM is to serve as an authoritative source of educational material for both the public and medical professionals.

Athletic shoe fitting is a process that must be done one-one-one with an experienced shoe fitter. Making shoe recommendations over the internet or recommending one shoe over another for the masses is an exercise in futility. Footwear's effects on comfort and performance cannot be reliably predicted for an individual using current methods of testing. The ultimate test of any shoe is the individual experience that the user has with it. Because gait patterns, biomechanics and foot shapes are so unique, individuals have to understand that they are their own expert on footwear.

The AAPSM will work to provide meaningful information for our readers so they can make informed choices but the bottom line is that the shoes must be worn and experienced in order to understand how they work for any given person.

Members of the AAPSM recommend that individuals be fit by a reputable footwear retailer and seek out a sports medicine podiatrist for concerns on injury or footwear. It is extremely difficult to accurately recommend footwear without assessing, first-hand, an individual's gait pattern, range of motion, biomechanical profile and foot type. Other factors such as injury history, body mass index, weekly miles or hours of training, training goals, training philosophy, and training surface are all important in selecting the right shoe. These things cannot be done via the internet. While unreliable forms of self-assessment have been used elsewhere, we avoid advocating these means.

Research has not validated wet paper towel tests, shoe wear patterns and the ability to rate one's own degree of pronation as reliable or meaningful in terms of biomechanics. In addition, weightbearing balance measuring devices and treadmill analyses performed outside of a professional office setting may also not be predictive of footwear needs.

Some footwear and foot type information may be helpful to those who are overwhelmed with the abundance of footwear choices but the AAPSM suggests that individuals keep in mind these caveats. **PM**

Summary

Sports medicine specialists who are knowledgeable and comfortable in recommending appropriate athletic footwear and orthoses for their athletic patients will be providing the athlete with the greatest service.

Having a solid game plan for recommending athletic footwear and orthoses for each athlete will be helpful in making critical decisions on athletic footwear. The sports medicine practitioner must ultimately decide which shoes or which orthotic devices are most appropriate for each individual athlete. **PM**



Matt Werd, DPM has led a distinguished career in sports medicine and surgery of the foot and ankle at his Lakeland, FL practice. He is past-president and Fellow, AAPSM; Fellow, ACSM, ACFAS, ACFAP, and AAPPM; and lead author and editor, *Athletic Footwear and Orthoses*

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