

Shoes & Podiatry



Selecting the Proper Athletic Shoe

The correct choice of footwear can enhance performance while preventing injury.

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Following this article, an answer sheet and full set of instructions are provided (p. 158).—**Editor**

By Mark A. Caselli, DPM

Athletic shoes are an important part of the equipment used by high per-

formance athletes and play a significant role in the outcome of many events. Good shoes provide cushioning and stability and can prevent injury as well as

enhance performance. Wearing the wrong shoes, ones not designed for the playing surface and condition, or those that do

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Goals and Objectives

After reading this article, the physician should be able to:

- 1) Properly fit athletic shoes for various sports activities.
- 2) Know how to modify the lacing of athletic shoes to accommodate different foot types.
- 3) Recognize the signs of excessive wear of shoes used for different sports.
- 4) Understand the characteristics of a good sock for the athlete.
- 5) Recommend appropriate running, soccer, football, baseball, basketball, and tennis shoes to athlete patient.

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not fit properly, can lead to injury.

The clinician treating athletes must be familiar with the type of footwear used by the athlete patient since the wrong shoe might very well be the cause of that patient's problem. One study by NFL team physicians and train-

Wearing the wrong shoes, ones not designed for the playing surface and condition, or those that do not fit properly, can lead to injury.

ers looked at the performance of 15 different athletic shoes on grass and artificial turf under both wet and dry conditions. They concluded that wearing shoes under conditions for which they were not designed could lead to excessive forces and cause serious knee and ankle injuries.

Sport-specific, and even sport condition-specific, shoes should be used by anyone who participates in a sport for more than three hours per week. Even though well-made, sport-specific shoes have become relatively expensive, choosing the right shoe is important and is probably economical in the long run if frequent foot injuries can be prevented.

General Considerations in Selecting the Proper Athletic Shoe

One of the most important aspects of selecting the proper athletic shoe is choosing the right size. Proper fitting sports shoes can enhance performance and prevent injuries. An ill-fitting shoe can be the root of many problems. Shoes that are

too small are one of the major causes of foot pain, and those that are too large can cause blisters and lack of stability.

Not all brands of footwear fit the same. An experienced salesperson can be of great help. He or she can help fit shoes properly to address the athlete's concerns. A good salesperson would know which brands are cut wider in the forefoot or narrower in the heel. Your patients should have their feet measured each time they purchase shoes.

As one ages, foot size often gradually changes. The measurements should include sitting, standing, and heel to toe, heel to ball, and width. In spite of obtaining a number from the Brannock device, the actual fit on the foot is the most important consideration. The measurement itself is only a general guide. The athlete should be reminded that a properly fitting athletic shoe is often not the same size

as a dress shoe. The right size running shoe is often a half to a full size larger.

Athletic shoes should be fitted at the end of the day, or after rigorous activity when the feet are their largest. Both feet should be measured since they

are often different sizes and the shoes should be fitted to the larger foot. The shoes should also be fitted with the socks that will be used during the sports activity and with any special inserts or orthoses.

Sports shoes for children should not be purchased with the thought that the next larger size will allow the athlete to grow into them. The exact size is most important. The shoes that are being tried on should be relaced, beginning at the farthest eyelet with even pressure being applied as they are crisscrossed-laced to the top of the shoe. The shoe should fit with approximately 1/4 to 1/2 inch between the longest toe and the end of the shoe. It should have adequate room for the toes. The shoe should bend at the ball of the foot. If the heel to ball fit is off, then the break will not match the foot and it will create ab-

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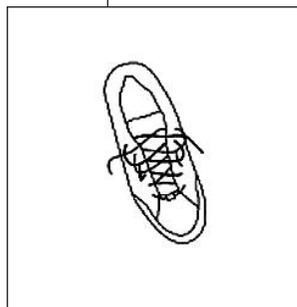


Figure 2: Lacing for Low Arches: Criss-cross lace the shoes as normal halfway up. Use the loop lacing the rest of the way.

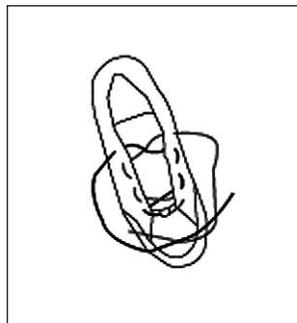


Figure 3: Lacing for High Arches: Begin lacing as normal, criss-crossing and stopping after the first set of holes. Thread the laces straight up each side, criss-crossing only before threading the last hole.

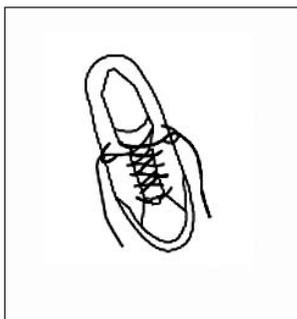


Figure 1: Lacing for Narrow Heel or Foot: Follow a normal lacing pattern up to the last pair of holes. For narrow feet, use shoes with staggered eyelets. Tighten from the outer eyelets, pulling the body of the shoe towards the center. At the last hole, tighten the laces and thread into the last hole without criss-crossing. Do not pull the laces all the way through, but leave a loop on each side. Cross the laces and thread them each through the loop on the other side before tightening and tying.

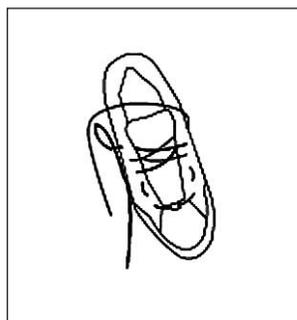


Figure 4: Lacing for Wide Feet: Thread the laces through the first set of eyelets and then straight up each side without criss-crossing at all. Continue this way for two or three holes past the forefoot, and then begin criss-cross lacing as normal.

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normal pressure and irritate the foot. The heel should be stable and not move in and out of the shoe. The shoes should be worn for at least ten minutes in the store. They should feel comfortable as soon as they are tried on. There is no break-in period. The most common error in purchasing athletic shoes, and one that cannot be corrected by padding, insole replacement, or orthotics, is buying a shoe that is too narrow in the toe box. Though these recommendations apply to the fitting of most athletic footwear, there are specific shoe fit variations for specific sports (Table 1).

Lacing System

The lacing system is an im-

portant part of the athletic shoe. It holds it all together by securing the shoe to the foot. Improper

Worn-out shoes often result in aches and pains in feet, legs, knees and hips, signaling that it is time to replace the shoes.

er lacing can cause discomfort and injury. Pulling laces too tight cuts off circulation and may cause tendinitis on the dor-

sum of the foot. If laced too loosely, the shoes fit sloppily and result in foot and ankle instability. There are three types of lacing systems: variable width with staggered eyelets to adjust width, speed lacing with plastic D-rings, and conventional eyelets. Various lacing methods, other than the standard crisscross system, can be used to meet individual needs. A narrow heel, high or low arch, or a wide foot can be accommodated by changing the way the shoes are laced (Figures 1-4).

Worn Out Shoes

Wearing worn-out shoes is a hazard in any sport. Worn-out shoes often result in aches and pains in feet, legs, knees and hips, signaling that it is time to replace the shoes. As a general rule, most running shoes provide cushioning up to 500 miles, though many runners may find breakdown in cushioning after as few as 350 miles. Shoes with compression-molded EVA mid-soles vary in durometer. This means that the cushioning elasticity and life span of each mid-sole is relative to the shoe. Most shoes with polyurethane mid-soles break down at a slower rate. To avoid injuries, it's a good idea to rotate running shoes every 200-250 miles, having two pairs of shoes to wear at all times. A running shoe's mid-sole cushioning may be worn out long before the tread shows signs of

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TABLE 1
Sport Specific Shoe Fitting

SPORT	TOE AREA	HEEL AREA
Running	Allow thumbnail's length of space between the end of the longest toe on the largest foot and the end of the shoe.	Heel can slightly move but should not slip.
Soccer	Glove-like fit while standing up straight. Allow room for toes to move comfortably.	Snug fit with no movement.
Football	Allow room for toes to move comfortably while standing up straight.	Snug fit with no movement.
Baseball	Allow room for toes to move comfortably while standing up straight.	Snug fit with no movement.
Basketball	Allow thumbnail's length of space between the end of the longest toe on the largest foot and the end of the shoe.	Heel can slightly move but should not slip.
Tennis	Allow thumbnail's length of space between the end of the longest toe on the largest foot and the end of the shoe.	Heel can slightly move but should not slip.

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wear. Since the bottom and tread of the shoe may look fine, identifying when the cushioning is no longer effective is important.

Press Test

The "Press Test" can be used for this purpose. When an EVA mid-sole is compressed, it creates visible lines or wrinkles in the mid-sole material that can be seen from the sidewall of the shoe. As the mid-sole is further compressed, the lines multiply and grow closer together. The first appearance of these lines indicates that the mid-sole is compressing normally. A simple pressure test can determine whether or not the mid-sole is compacted. Pushing the outsole upward into the mid-sole should show the mid-sole compressing into these lines. As the shoe breaks down, the mid-sole will compress less with the same amount of pressure. When the mid-sole shows heavy lines, and the press test yields a minimal degree of compression, the mid-sole has been compacted to a point where little or no cushioning remains.



Figure 5: Straight lasted motion control running shoe for over-pronators

Other Signs of Wear

Since most cleated athletic shoes have little or no mid-sole material, the integrity of the heel counter, condition of the upper, and wear of the cleats must be evaluated. A shoe with noticeably "ground down" molded cleats should be replaced. Another way of determining whether a shoe should be replaced is by trying on a new pair of the model that is currently being worn. Compare this to the current shoes. If the new shoe

feels much better than the old, then the old shoes are probably worn out. Heavy athletes and over-or under-pronators should check their shoes frequently since they tend to wear out their shoes quickly.

Socks

Socks are often overlooked as an important component of proper athletic footwear. Often, a poorly fitting sock or worn sock is one of the major causes of blis-

ters. In general, socks that fit properly should provide ample toe room, have a well padded sole, fit snugly without wrinkles, and feel comfortable. In a longitudinal, double-blind study, the effect of sock fiber composition on the frequency and size of blistering events in long-distance runners was examined. It was found that socks composed of

Running shoes strike the ground about 800 times per mile with the force of about three times the runner's body weight.

It was found that socks composed of 100% acrylic fiber were associated with fewer and smaller blisters when directly compared to socks composed of 100% cotton fiber.

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The tube sock has become popular over the last decade as one size generally fits all. Advising the athlete to wear two pairs of socks is another method of reducing friction and preventing hot spots that may become blisters. The inner sock is usually thinner and lighter than the outer sock. Lastly, clean socks are a must in warding off fungal growth and maintaining the overall health of the athlete's feet.

Resources

The practitioner treating athletes can obtain a great deal of information on athletic footwear

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Figure 6: Semi-curved lasted running shoe with gel enhanced mid-sole offering excellent cushioning characteristics



Figure 7: Multi-studded soccer shoe with numerous molded cleats offering both good support and traction

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by visiting athletic shoe stores, reading sports specific publications, and visiting the Internet. For example, Runner's World magazine publishes a "Shoe Buyer's Guide" four times a year. The American Academy of Podiatric Sports Medicine has shoe lists recommending running, aerobic, basketball, hiking, walking, soccer, and volleyball shoes on its web site www.aapsm.org. These sources can be very helpful in guiding athlete patients to the sports shoe that meets their needs.

Sports-Specific Shoes

Running Shoes

Getting a good pair of running shoes is the most important investment any runner can make. This is easy to understand when you realize that the only thing that separates the road from the runner are the shoes, each of them striking the ground about 800 times per mile with the force of about three times the runner's body weight. A properly selected running shoe can definitely decrease the number of running injuries. Each of the five major components of the running shoe: the last, outer sole, mid-sole, heel counter, and upper, should be considered in its selection.

Last Shape

The shape of the last affects the shape, fit, flexibility, and stability of the shoe. The two basic shapes used for the last are straight and curved. A straight last has little or no curve from the heel to toe and provides greater support under the medial arch. A curved last turns inward from the heel to the toes. There are variations that include slightly curved (closer to

straight) and semi-curved (closer to curved) last.

Lasting Techniques

There are three lasting techniques used in running-shoe construction: board, slip, and combination. In board lasting, the upper materials are glued to a fiberboard before they are attached to the mid-sole. Straight, board-lasted shoes aren't very flexible, but are firm and provide a good platform if orthoses are needed for excessive pronation. With slip lasting, the upper materials are stitched together and then glued to the mid-sole. This makes a lighter, more flexible shoe with a softer feel. Combination lasting uses the board method in the heel for stability and the slip method in the forefoot for flexibility. Many runners prefer combination-lasted shoes that provide some benefits of both types.

Treaded Outsoles

The treaded outer sole is designed to resist wear, provide traction, and absorb some shock. It should not wear out quickly, and will often be in good shape after the shoes are discarded due to loss of mid-sole cushioning. The outer sole should wear primarily on the extreme outer edge of the heel and in the center of the ball of the foot. There are many sole designs, most providing adequate traction. In general, soles are either hard or soft. Harder soles are heavier, offer less cushioning, and wear longer. Softer soles are lighter, have more cushioning, and wear out faster.

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Midsole Construction

The mid-sole is located between the outer sole and the foot bed. It is the most important part of the running shoe. It absorbs shock, flexes at toe-off, and adds stability to the shoe. Mid-soles are constructed from various types of foams. Air-bags, gels, and other materials may also be inserted to increase cushioning. Their shock absorbing properties deteriorate with use. Studies have shown that mid-soles may lose a significant amount of their cushioning when exposed to running in cold temperatures.

Heel Counter

The heel counter stabilizes the shoe, and therefore, the foot. A rigid counter covering the entire heel is desirable, especially for pronators. It's usually made from plastic. Above the counter is usually a cushioned ankle collar, which provides protection and helps prevent Achilles tendinitis. A heel wedge, located above the mid-sole, adds height to the heel, increases shock absorption, and reduces strain on the foot and leg.

Shoe Uppers

Most running shoe uppers are either nylon, nylon mesh, or a combination. This creates a light-weight, breathable, washable, soft shoe that is comfortable and dries fast when wet. The mesh upper also makes the shoe cooler in the summer.

Considerations

When recommending a specific shoe, it is important to de-

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termine the runner's basic foot type and any running-related complaints and injuries. Running shoes come in three basic categories, those specializing in stability, motion control, or cushioning. If the runner has a medium-arched, semi-curved foot that properly pronates, then shoes that offer stability should be recommended. These shoes should have adequate mid-sole cushioning, as well as medial support.

A straight-lasted shoe with a hard heel counter and firm mid-sole offering motion control is

best for overpronators (Figure 5). These runners tend to have highly flexible feet with low arches

Traction is not desirable when it resists shoe rotation.

and they often breakdown shoes on the inner borders. For underpronators, those runners who

have high, curved, rigid arches, curved-lasted shoes, which provide plenty of cushioning and a flexible forefoot, is recommended (Figure 6). These runners don't absorb shock well and are prone to lateral ankle sprains, stress fractures, shin splints and knee pain.

Soccer Cleats

Soccer is a game that is primarily played with the feet; therefore, the most important piece of soccer equipment is the footwear. A good pair of cleats, or boots, as they are sometimes called, is essential. There are variations of the basic soccer cleat designed for different skill levels, weather conditions, and field types.

Great care must be exercised in the selection of soccer shoes since each part of the shoe must serve a unique function. Players wear cleated shoes for better traction while running. Cleats give them increased speed and maneuverability.

The outsoles of the cleated shoe perform a dual function, providing both support and traction. Since the cleats often do not penetrate fully into the playing surface, a base of support is formed on top of the cleats. This condition is exaggerated on hard dirt. For this reason, cleated shoes should be selected such that the cleats along the shoe edges are positioned as close to the edge as possible. Sections of the sole without cleats will be relatively less supportive, especially in the

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Figure 8: Soccer shoe with exchangeable cleats and studs that can be customized for different field conditions



Figure 9: Football shoe with molded studs offering both good traction for a variety of playing surfaces and durability



Figure 10: High-top football shoe incorporating screw-in studs to deliver grip on very soft natural fields



Figure 11: Metal spikes on baseball cleats offer good traction but can cause injury when sliding.



Figure 12: Only molded baseball cleats are permitted for Little League play.

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mid-foot arch area.

Shoes with fewer cleats often include internal reinforcement. To accomplish this, a stiff synthetic or even a metal plate is added to the shoe to ensure adequate support. This practice has also been used in an attempt to reduce the incidence of "turf toe" on synthetic turf fields. The negative side-effect of this modification is a reduction of forefoot flexibility across the metatarsal heads which could result in irritation of the plantar fascia.

Traction

The other function of the outsole is to yield adequate traction on a given surface. The two modes in which traction is desirable are along the length of the shoe and in resistance to lateral motion. Traction is not desirable when it resists shoe rotation. Fixing the foot against rotation has been cited as predisposing the knee and ankle to injury.

The best method of minimiz-

ing rotational fixation is to maximize cleat number and diameter, and minimize cleat height. In general, multi-studded models are preferred by most players (Figure 7). These can be worn both on grassy fields and on hard ground.

For rainy weather, screw-in studs are better because their length can be adjusted (Figure 8). The softer the field and the taller the grass, the longer the studs. The longer screw studs should not be used on synthetic turf, as they might get caught in the fibers and cause serious knee and ankle injuries.

On synthetic turf, specially designed shoes with short studs are advisable. Since the feet and legs often end up in a tangle during the match, soccer cleats must be no less than 1/2 inch in diameter and may not project more than 3/4 inch from the sole.

Shoe Upper

The main function of any shoe upper is to center the foot squarely over the base of support. In order to accomplish this, most soccer shoes have

squarely over the base of support. In order to accomplish this, most soccer shoes have



Figure 13: High top basketball shoe offering both good ankle support and excellence for court traction

overlays along the lateral edge of the fifth metatarsal head and base, to serve as reinforcement and provide a stiff heel counter to anchor the rear-foot. A unique footwear requirement for soccer

Baseball and softball are considered low to medium impact sports where approximately four to six times body weight is transferred to the feet.

is to serve as an impact surface for the ball. To this end, extra stitching is placed along the medial and lateral sides of the shoe, which both reinforces the upper and forms a ball control surface.

Football Cleats

Football cleats are made both for the position played and the type of field played on. Football cleats come in three styles, or heights, to accommodate the varying needs of players by position. High-tops extend up the ankle to provide extra support,

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Figure 14: Low cut basketball shoes, sometimes preferred by fast players, are light but offer less ankle support

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especially for lateral movements. Linemen benefit from this support because of the pressure put on their ankles by the numerous lateral movements during the course of a game. A mid-cut shoe offers good support while still allowing maneuverability. This style best fits the game of skill players; the defensive backs, running backs, wide receivers, and quarterbacks. Low-cuts are preferred by some players because they are light-weight. The lower cut provides extra maneuverability to allow for quick cuts on the field.

Cleats are either molded or detachable. Most are designed for either grass or turf fields. If

games are played on both grass and turf, multipurpose cleats can be used. Molded cleats are permanently attached to the outsole on the shoes' bottom (Figure 9).

Turf shoes usually use molded rubber cleats to give spring and traction on the harder turf surface (Figure 10). Molded cleats are generally less expensive than shoes with detachable

cleats use studs that can be removed and replaced to fit field conditions on all types of grass, hard and dry, or wet and sloppy. Their versatility makes detachable cleats preferable for athletes who play primarily on grass. Shorter studs can be used for hard, dry surfaces and longer studs for a wet, sloppy field. Replacement cleats generally run in 1/2, 5/8-, 3/4, and 1-inch sizes. Having all four sizes gives the player more options for different field conditions.

Baseball Cleats

Baseball and softball are considered low to medium impact sports where approximately four to six times body weight is transferred to the feet. The impact can even be greater on artificial surfaces. Unlike soccer cleats, baseball cleats have a mid-sole to help cushion some of this impact. There isn't much repeated motion in baseball, but a lot of lateral (side-to-side) movement. Many players prefer a higher or mid-cut cleat to offer better ankle support. Baseball shoes are designed with either metal or molded cleats.

Metal cleats feature molded soles with several

small metal spikes designed to provide maximum traction on the field (Figure 11). These are beneficial on extremely hard fields. The shoes are usually

made of leather, have cushion mid-soles, and are fit much like a standard sneaker. Metal cleats are not permitted in Little League and instructional levels because of the potential for injury, happening most often when players

with metal cleats slide into a base and the spikes are exposed. Molded cleats feature molded soles with several small plastic cleats (Figure 12). Molded cleats are most often used on Little League and instructional levels since they are significantly less dangerous than metal cleats.

Basketball Shoes

Basketball shoes must offer durability, support, stability, and shock absorption. The constant starting, abrupt stopping, high jumps, and quick side-to-side movements involved with basketball make these features absolutely essential in a shoe. Personal playing style is also an important factor in shoe selection. Power players will need shoes with maximum cushioning and stability. They may have to play with heavier shoes to get those benefits. The all-around player can use shoes with moderate ankle support and cushioning. There are many shoes to choose from in this category, and most are fairly lightweight. The fast player will prefer a lightweight shoe that offers moderate support, cushioning, and flexibility. Shoes with a lower cut are often desired by this type of player.

Understanding Construction

Understanding the construction of basketball shoes is essen-

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The main function of any shoe upper is to center the foot squarely over the base of support.



Figure 15: Mid high cut basketball shoe offering a wraparound leather stabilizing strap to protect against ankle rollover



Figure 16: "High tech" tennis shoe incorporating an advanced cushion mid-sole, a mid- and fore-foot stability system, and a high abrasion court gripping outsole

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tial in determining which features are most important for the player. The function of the upper part of the shoe is to keep the foot snug and securely in place during play. There are three shoe cuts available, high-, mid-, or low-tops. The majority of players, around 70 per cent, choose high tops for their ability to provide maximum ankle support (Figure 13). Power players and all-around players usually prefer the stability of this style.

For players who feel restricted in high-tops, and who use speed as their greatest asset, mid-tops, which extend right to the ankle level, are their choice. Only about 10 percent of players wear low-tops for regular play (Figure 14). These shoes are lighter, but don't offer the built-in ankle support that high-tops do.

Uppers

All leather uppers have been replaced with lightweight combination uppers, mixing the stability and durability of leather with the breathability and flexibility of synthetic mesh. High-tech, all synthetic uppers, which are more durable than leather, are gaining popularity for their ability to offer stability in a super-lightweight material.

Closure System

A good closure system is necessary to keep the foot snug and secure in the shoe during the sudden stops and starts, frequent side-to-side motions, and quick turns encountered in basketball. Laces are an acceptable choice for keeping the foot stable in the shoe. Several manufacturers offer new lacing systems designed to offer greater stability. A good lacing system should lock the laces in place, making them less apt to loosen

or untie, thus increasing stability during play. Some shoes feature a strap that wraps around the upper arch of the shoe to add more stability and protection against ankle rollover (Figure 15).

Zippers are a fairly new choice for securing the foot in a basketball shoe. These are usually covered by some sort of protective material. Velcro, while good for younger players, is not reliable in terms of staying closed, and doesn't offer good support.

Midsole

The mid-sole is often considered the most important part of the basketball shoe because the construction and the materials used will impact the levels of cushioning and shock absorption and can affect the players' ability to explode off the floor. The mid-sole is usually made of EVA, compressed EVA, polyurethane, or a combination of these materials. Proprietary cushioning technologies are also found in many brands

of basketball shoes. EVA offers lightweight cushioning, but not as much stability and durability. EVA can be compressed to make it somewhat more durable. Polyurethane is a more dense and durable cushion-

ing material. It can add stability to the shoe, but also adds weight.

Cushioning Technology

Proprietary cushioning technologies are usually found in the heel and forefoot of the shoe and add an extra degree of cush-

ioning without much extra weight. Stiff materials are used in some basketball shoes on the medial or inner side of the shoe to reduce inward rolling of the foot. Heavier densities of cushioning materials may also be used in the medial area to increase a shoe's stability. The mid-sole can negatively affect stability if the cushioning materials are too thick.

Outsole

The outsole of a good basketball shoe should be flat and moderately wide to create a stable base and help prevent ankle rollover. The herringbone pattern is most common and provides enough traction to keep the player steady during quick stops and starts. Most shoes are designed for indoor play. If play is most often on outdoor courts, a shoe with a more durable outsole should be used. Some basketball shoes are designed specifically for outdoor play and feature heavier rubber outsoles

Gender-Specific

Most women should not buy men's basketball shoes. Men's shoes are built on a wider last than women's shoes and are generally too wide for a woman's foot, and do not offer an appropriate degree of stability.

Tennis Shoes

Tennis shoes are very important to the player, owing to the quick start and stopping, cutting, pivoting, and jumping that is part of the game. Tennis is a sport that is rough on shoes, particularly the sole and toe area, so finding a shoe that is durable enough is important. The shoes should have a fairly wide heel

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Proprietary cushioning technologies are usually found in the heel and forefoot of the shoe and add an extra degree of cushioning without much extra weight.

Basketball shoes must offer durability, support, stability, and shock absorption.

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and good heel counter for rearfoot control. The traction surface of the heel should be shock absorbent and of a non-slip material.

The heel cup should fit snugly, which helps prevent the foot from slipping forward in the shoe. The shoe should have a medial arch support that is appropriate for the individual's arch. There needs to be good lateral support for the forefoot. The toe-box of the shoe must not create pressure and should conform to the general shape of the foot. The vamp (upper front) of the shoe must never constrict or cause pressure across the metatarsal area or instep (Figure 16).

Other Considerations

Court surface, style of play, and foot structure should be considered when selecting a tennis shoe. A competitor, who plays mostly from the baseline, requires a shoe with a lot of lateral support to handle the side-ways motion. The shoe needs more sidewall support to stabilize the foot during the quick

Most women should not buy men's basketball shoes.

lateral, side-to-side movements that are encountered.

The baseline player also needs good support for forward and rear forces as well as a shoe with a highly durable sole.

The serve and volley player generates tremendous levels of forward forces in the forefoot or toe-box area of the shoe. These players tend to frequently charge the net and slide the back foot along the court during the serve, so a shoe with a durable toe-cap (also called a reinforced toe) is

essential. Appropriate shoe-wear for these players includes a large toe-box to provide adequate room so the toe will not slam against the end of the shoe. Without the appropriate shoe,

Court surface, style of play, and foot structure should be considered when selecting a tennis shoe.

these players are susceptible to developing tennis toe (subungual hematoma).

When playing on a hard court, shoes with more durable soles are essential. Clay and grass courts have softer surfaces which are more forgiving on shoes, so durability requirements aren't as great. ■

References

1. Academy.Com: Different types of cleats. <http://www.academy.com/index.php?page=content&target=sports_tips/baseball_softball/type_s_of_cleats>
2. American Academy of Podiatric Sports Medicine: Selecting an athletic shoe. <http://www.aapsm.org/fit_shoes.htm>
3. American Orthopedic Foot & Ankle Society: Athletic shoes and playing surfaces affect performance and injury levels. <<http://www.aofas.org/i4a/pages/index.cfm?pageid=3395>>
4. American Orthopedic Foot & Ankle Society: Selecting athletic shoes. <<http://www.aofas.org/i4a/pages/index.cfm?pageid=3393>>
5. Caselli MA: How to recommend shoes for marathon runners. *Podiatry Today* 13(7), 2000
6. Caselli MA: Getting involved with soccer. *Podiatry Management* 22(7), 2003
7. Ciullo JV, Ciullo CR: Track and Field. In Fu FH, Stone DA (eds.), *Sports Injuries*, 2nd Ed, Lippincott Williams & Wilkins, Philadelphia, 2001
8. Dib MY, Smith J, Bernhardt KA, Kaufman KR, Miles KA: Effect of environmental temperature on shock ab-

sorption properties of running shoes. *Clin J Sports Med* 15(3), 2005

9. Dick's Sporting Goods: Determining your shoe size. <<http://www.dickssportinggoods.com/info/index.jsp?categoryId=222865>>

10. Dick's Sporting Goods: How to lace athletic shoes. <http://www.dickssportinggoods.com/info/index.jsp?categoryId=690482&infoPath=222981>

11. Dick's Sporting Goods: How to tell when your shoes are dead. <<http://www.dickssportinggoods.com/info/index.jsp?categoryId=412022>>

12. Dick's Sporting Goods: How to buy football cleats. <<http://www.dickssportinggoods.com/info/index.jsp?categoryId=222820>>

13. Dick's Sporting Goods: How to buy basketball shoes. <<http://www.dickssportinggoods.com/info/index.jsp?categoryId=222834>>

14. Glover B, Glover SF: *The Competitive Runner's Handbook*. Penguin Books, New York, 1999

15. Harring KM, Richie DH Jr: Friction blisters and sock fiber composition. A double blind study. *JAPMA* 80:63-71, 1990

16. Health Link (Medical College of Wisconsin): Consider use when selecting athletic shoes. <http://www.healthlink.mcw.edu/article/999211949.html>

17. Ho SSW: Basketball and Volleyball. In Reider B (ed.), *Sports Medicine, The School-Age Athlete*, 2nd Ed, WB Saunders Company, Philadelphia, 1996

18. Quinn E: When to replace running shoes. <http://sportsmedicine.about.com/od/tipsandtricks/a/replaceshoes.htm>

19. Reider B, Belniak R, Miller DW: Football. In Reider B (ed.), *Sports Medicine, The School-Age Athlete*, 2nd Ed, WB Saunders Company, Philadelphia, 1996

20. Safran MR: *Racquet Sports*. In Fu FH, Stone DA (eds.), *Sports Injuries*, 2nd Ed, Lippincott Williams & Wilkins, Philadelphia, 2001

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See answer sheet on page 159.

1) Sports-specific athletic shoes should be recommended:

- A) Only for competitive athletes
- B) Only when engaged in a sport more than three days a week
- C) Only when used in competitive play
- D) For anyone participating in a sport more than three hours per week

2) Which one of the following is not correct concerning proper athletic shoe fitting?

- A) Feet should be measured each time shoes are purchased
- B) Athletic shoe size should be the same as a comfortably fitting dress shoe
- C) Shoes should be fitted at the end of the day or after exercise
- D) Shoes should be fitted to the larger foot

3) A running shoe should be replaced at least every:

- A) 100 miles
- B) 250 miles
- C) 500 miles
- D) 750 miles

4) Studies have shown that the best material for an athletic sock is:

- A) Cotton
- B) Nylon
- C) Acrylic
- D) Polyester

5) The best running shoe last for an over-pronated heavy athlete is:

- A) Straight board lasted

- B) Curved slip lasted
- C) Straight slip lasted
- D) Curved combination lasted

6) Which of the following is not a characteristic of the treaded outer sole of a running shoe?

- A) Designed to resist wear
- B) Primary shock absorber of shoe
- C) Provides traction
- D) The harder the material, the heavier

7) The best running shoe to recommend for an athlete with high, rigid arches is:

- A) A shoe offering maximum motion control
- B) A straight-lasting shoe
- C) A stability categorized shoe
- D) A curved combination-lasting shoe

8) The proper fitting of a soccer shoe includes:

- A) 1/2 - 3/4 inch of space between the end of the longest toe and largest foot
- B) Slight heel movement
- C) Snug, glove-like fit
- D) Fit one size larger than dress shoe

9) Which one of the following does not affect the shock absorbing quality of a running shoe?

- A) Running on a cold day
- B) Running over 10 miles a day
- C) Running in a shoe with a gel insert
- D) Both a and c

10) Soccer cleats should have longer studs when playing in

which one of the following conditions?

- A) Soft field in the rain
- B) Hard cold ground
- C) Synthetic turf
- D) Long studs should not be used for any of the above conditions

11) Which one of the following football positions usually prefers high top cleats?

- A) Running back
- B) Wide receiver
- C) Lineman
- D) Quarterback

12) A stiff plate is sometimes incorporated into the sole of a soccer shoe to reduce the incidence of which one of the following conditions?

- A) Subungual hematoma
- B) Turf toe
- C) Plantar fasciitis
- D) Ankle sprains

13) The main disadvantage of metal cleats on baseball shoes is that:

- A) They afford poor traction on hard fields
- B) They result in an increased risk of injury
- C) They can only be used in Little League
- D) They offer no cushioned mid-sole

14) Which one of the following basketball shoe cuts would be safest to recommend for most of your basketball playing athletes?

- A) High tops
- B) Mid tops
- C) Low tops
- D) It makes no difference

Continued on page 158

(cont'd)

15) Which of the following closure systems made for basketball shoes is usually the least desirable for offering good support?

- A) Laces
- B) Zipper
- C) Velcro
- D) Laces and straps

16) Stiff materials are commonly used on the medial side of the mid-sole of a basketball shoe primarily to:

- A) Increase shock absorption
- B) Reduce inward rolling of the foot
- C) Prevent ankle sprains
- D) Increase shoe life

17) The main reason why many women should not use men's basketball shoes is that:

- A) Men's shoes are too heavy
- B) The lacing system is not designed for a woman's foot
- C) Men's shoes are not permitted in women's professional and collegiate play
- D) They often do not offer an appropriate degree of stability

18) A tennis shoe without adequate toe-box room is likely to result in which one of the following conditions?

- A) Turf toe
- B) Subungual hematoma
- C) Sesamoiditis
- D) Plantar fasciitis

19) Which one of the following conditions is not associated with athletic shoes that are fit too large?

- A) Blisters
- B) Ankle sprains
- C) Instability
- D) Nerve impingement pain

20) The individual that should select the most appropriate sports shoe for the athlete is:

- A) The sports medicine doctor
- B) The athletic coach
- C) The athlete
- D) Each of the above must be involved in the selection.

See answer sheet on page 159.

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Selecting the Proper
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