



Custom Orthoses: Office Tools for Effective Communication

Education is the key to patient compliance.



BY TRACEY G. TOBACK, DPM

Practice Management Pearls is a regular feature that focuses on practice management issues presented by successful DPMs who are members of the American Academy of Podiatric Practice Management. The AAPPM has a fifty-plus year history of providing its member DPMs with practice management education and resources. Visit www.aapm.org for more information.

Custom orthoses may be your best treatment plan. Therefore, why do so many podiatrists find it difficult to prescribe a custom orthotic? Most will say they believe their patients will find it cost-prohibitive. Why would a doctor pre-judge a patient who is looking for help? Here are some simple measures for a podiatric practitioner to present custom orthoses that will ultimately have their patients on board with the treatment plan.

There are many tools that can be used within the office to adequately explain the purpose and function of a custom orthotic while differentiating it from other products. If the doctor can spend three to five minutes with the patient to utilize these tools, ultimate success for the treatment plan can be established.

1) Dispense an orthotic brochure. These can be purchased from various orthotic companies, or you

can write your own. Skip the flowery presentation of smiling faces and show diagrams of how an orthotic device can better position the foot. Substitute words like “hard” or “rigid” with the word “firm” to describe a more supportive or functional device.

2) Keep samples of orthoses on hand. Patients prefer to have a visual of what you are describing. They

ated foot impressions on hand. This will present a wonderful opportunity to discuss the importance of the proper casting technique while explaining concepts such as subtalar joint neutral. The doctor can now explain that the success of the custom fabricated device will be directly correlated to the quality and expertise of the person taking the cast impression, the accuracy of the writ-

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have seen the over-the-counter products, and you now have the opportunity to differentiate your product. This discussion can include showing the various forefoot and rearfoot postings based on a patient’s needs. It is also an excellent opportunity to show the various styles of devices you prescribe such as a sport device, aerobic device, dress device, accommodative device, etc. This further differentiates your devices from those that may be prescribed by most chiropractors, physical therapists, and shoe stores.

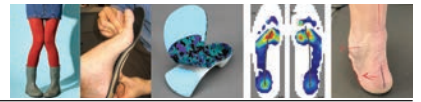
3) Effective orthotic devices start with making a “good impression”! Keep casts or computer-gener-

ated foot impressions on hand. This will present a wonderful opportunity to discuss the importance of the proper casting technique while explaining concepts such as subtalar joint neutral. The doctor can now explain that the success of the custom fabricated device will be directly correlated to the quality and expertise of the person taking the cast impression, the accuracy of the writ-

4) Keep a bone model of the foot available for patients to see and hold. This is a fantastic way to demonstrate the patient’s particular foot problem and how bones may be shifting. Once the patient has a better understanding of foot function, the custom orthotic quickly begins to make sense.

5) Review x-rays in front of the patient. This is an extremely valu-

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able and effective tool. Patients want to see their foot. They want to know why they are in pain. It is interesting to note that most practitioners of all professions do not show patients their radiographs. Sharing the review

parallel. The patient can now immediately appreciate the collapse of the foot.

Should you not be currently utilizing digital x-rays, it is imperative that you utilize 10 x 12 film in order for your patient to appreciate the entire foot. It is quite effective when

pose of reaching the common goals to diagnose and treat. Custom orthoses have been hugely successful in most podiatric practices by addressing the etiology of a patient's foot ailment. The podiatrist who is confident in this treatment plan should be equally confident in the presentation of orthotic therapy without regard to insurance coverage. Remember, we are here to be the patient's physician, NOT their banker! **PM**

Review x-rays in front of the patient. This is an extremely valuable and effective tool.

of their x-rays during the consultation will immediately differentiate you from their other practitioners and the patient will recognize you as being more knowledgeable. Use a cotton tip applicator to demonstrate the talar declination angle to the first metatarsal declination angle. If the foot is pronating, you can now snap the applicator stick, thereby demonstrating that the angle is no longer

the doctor is evaluating a hammertoe that patients can visualize and discuss why a patient has that large heel spur. One can now engage in further discussion regarding biomechanics, foot function, and the benefits of conservative treatment utilizing custom functional orthoses.

Utilizing the simple techniques illustrated above will engage the patient-doctor relationship for the pur-



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Retail Custom Foot Orthotics: The Big One That Got Away from Podiatry?

Preserving the value of podiatry-prescribed devices is of the utmost importance.

BY JASON KRAUS

Author's Note: *This article was written 10 years ago and imagined what might lie ahead for the podiatric profession, should the trends of the previous decade continue unabated. As feared, professional skills development, waning dominance of podiatry in providing prescription foot orthotics for their patients and the overall pace of innovation all have stagnated or declined further. On the supplier side, there are clear signs of distress as lab owners retire without succession plans or labs simply shut down*

set out ten years ago remains the way forward. There is still time to gain traction and recover market share, but the clock is still ticking rather loudly and action has never been more of an imperative.

There is good news and bad news when it comes to foot orthotics. The good news is that more Americans are purchasing foot orthotics than ever before. The bad news is that podiatric physicians, the

portend even greater financial challenges in the future.

It is not unthinkable that podiatry will ultimately become a non-factor in the prescribing and dispensing of custom-made foot orthotics. The rapid explosion of non-podiatric alternatives for dispensed appliances is clear evidence that podiatrists are a less and less important part of the process. The podiatric physician has retreated into the narrow end of the funnel for people seeking pain relief from functional orthotics. In stark contrast, podiatry enjoyed virtual exclusivity in this now thriving market as recently as the 1990s.

Even in its diminished state, it has been estimated that foot orthotics produce several hundred million dollars of practice revenue for the podiatric profession. Further erosion of orthotic dispensing should be a cause of great concern. A review of how prescribed functional foot orthotics evolved into “custom fit” arch supports might provide clues into how to stop further attrition and offer insight into how to regain some of the lost relevance—and revenues—of podiatric interventions.

The Golden Age of Podiatric Biomechanics

The functional foot orthotic explosion can be traced back to the late 1960's and early 1970's. At this time there was a fortuitous conflat-

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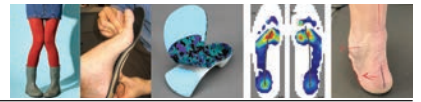
The podiatric physician has retreated into the narrow end of the funnel for people seeking pain relief from functional orthotics.

due to razor-thin profit margins. Orthotic producers have been forced by market conditions to maintain their decades-old pricing models while absorbing ever increasing costs. For the few new orthotic suppliers (Orthotica Labs, Arize), innovations surrounding AI, 3D printing and other technologies largely remain in stasis on drawing boards. The ability to reverse these deleterious trends remain much the same as ten years ago.

The original article has been mildly refreshed to reflect today's landscape. A renaissance is still within reach for podiatry and the roadmap

pioneers and developers of this important therapeutic modality, have been steadily losing market share to retail.

Retail opportunities for “custom” foot orthotics encompass both traditional brick and mortar stores and a multitude of online shops. While the volume of podiatry-dispensed foot orthotics has been relatively flat for a protracted period of time, foot devices sold elsewhere have been flying off the shelves for well over a decade. These trends represent a missed opportunity for podiatry that's almost incalculable and may



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ing of scientific knowledge and lifestyle changes. The knowledge leap in what became known as “podiatric biomechanics” was launched into the podiatric mainstream by Mert Root, DPM, John Weed, DPM, Robert Hughes and William Orien, DPM through the publishing of their seminal book, *Biomechanical Evaluation of the Foot, Volume 1*. These early visionaries attracted other pioneers in their mission to present an innovative and coherent approach to the study of normal and abnormal function of the feet.

Dr. Root’s applied orthotic techniques laid the groundwork for future developments and improvements in foot orthotic therapy. Some of his early disciples, such as Sheldon Langer, DPM became enthusiastic biomechanical evangelicals and helped launch the modern foot orthotic industry. The timing could not have been better. Americans were beginning to catch the fitness bug. The running craze of the 1970s supported by other fitness fads of the day triggered an avalanche of lower extremity injuries. Podiatrists’ newly acquired skill sets were tailor made for the moment and patients flocked into their offices.

Armed with an organized, scientific approach to the assessment and treatment of many foot ailments and a burgeoning industry ready to support practitioners, the podiatry market quickly became recognized as the leading experts in functional foot orthotics. Laboratories like Langer, Inc. began massive educational efforts to help practitioners understand and apply the evolving science of biomechanics. Other labs began springing up and emulated the early model designed by Langer. Podiatrists were taught comprehensive assessment techniques, prescription writing, proper casting and trouble shooting approaches. Labs employed expert biomechanical consultants to assist DPMs with difficult or challenging patients. The result of this partnership between podiatrists and their laboratories helped to further the podiatric leadership position in the world of functional foot orthotics.

Millions of foot suffering patients were being treated successfully by podiatrists across the country who were able to apply the principals that were being developed and taught. There was almost no reimbursement for these products during this time. Podiatrists were quite capable of explaining the benefits of these therapeutic approaches and having patients pay their fees directly. The confidence in, and passion for, the beneficial results that orthotics represented in podiatric practices was easily conveyed to the unknowing and skeptical universe of patients.

quences of this economic shift had a profound effect on the orthotics industry and led to the current explosion of lower cost, retail alternatives.

A Downward Spiral

One of the first casualties of the changing economics was lab innovation. There has always been an unusually large gap between the profit margin of the laboratories and the profit margins of the podiatrists for foot orthotics. Typically, a well-run full-service laboratory could generate net profits of between 10%-20%. So, on each pair of orthotics the labs would generate

Presenting a \$200 product to a patient and cutting out the podiatric middleman was a financial home run.

Intellectual and Economic Changes

Things began to change towards the second half of the 1980s. Some of the intellectual excitement began to fade as scientific conferences began to diminish the biomechanical content and increase the frequency of the ever-captivating surgical programs. For a brief period there was an effective balance between these two worlds. The surgical thought leaders of the time recognized the intricate connection between the biomechanical function of feet and the surgical techniques that were being developed to correct them. In time, biomechanics became the symposia step children. The profession was becoming enthralled with a less conservative, but more exciting approach to treatment. The new skills being taught were beginning to replace the foundations of knowledge that preceded them.

This was also the time when professional fees began to be reduced by third party payers. Starting in California in the mid 1980s and spreading eastward over the ensuing decades, podiatrists were finding themselves working harder and being paid less. Reduced fees didn’t discriminate. Whether you were a superstar surgeon or a biomechanical whiz, you were being paid less for your services. Several unintended conse-

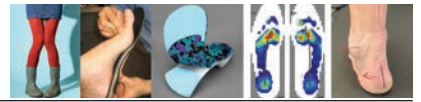
between \$8-\$20 of profit. Podiatrists on the other hand were generating approximately \$200-\$300 profit. As reduced fees began to erode overall practice profitability, podiatrists were beginning to demand price concessions from all of their suppliers, including their orthotic companies.

With virtually no barriers to entry, small new labs willing to comply with the low-price demands of their customers began popping up across the country. The larger labs, responsible for all the innovations of the 1970s and 1980s, either scaled back their product development investments or ended them altogether. This innovation vacuum opened the doors to cut-rate copycats and, accordingly, the specialization of prescribing podiatrists became less necessary.

The commoditization of orthotics had begun.

Podiatrists, too, were beginning to make behavioral changes in their prescribing habits. As the pressures of practice increased, DPMs began taking some shortcuts. Full biomechanical assessments were becoming less common. Once an integral part of a standard orthotic protocol, these exams were now becoming the exception. Casting techniques began shifting away from neutral position

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plaster slipper casts in favor of crush boxes. As the frequency of biomechanical examinations diminished, specialized prescriptions became less frequent. When casts did arrive, more and more were poorly executed and accompanied by incomplete or inadequate prescriptions. 'Plain vanilla' orthotic orders were increasing at an alarming rate.

An unsustainable downward spiral was being established. Knowledge of and attention to underlying biomechanical principals were less and less in play from practices, and manufacturers were being asked to do more and more with less revenue. Something had to give and innovation was only the first casualty. Manufacturing efficiency helped, but corners began to be cut. The level of professional support from laboratories was lost or reduced. Customer service at large suffered. Some labs even stopped producing custom products. Instead, libraries of casts or orthotic shells were developed and simply matched to the casts sent in for custom-made appliances. All of these changes contributed to reducing the need for specialized production or the associated clinical expertise.

Everyone's bar was lowered.

Other Providers and Savvy Retailers

As podiatry's focus drifted, other healthcare practitioners readily filled the void. Physical therapists, pedorthists, orthotists and chiropractors were only too willing to make the intellectual investment necessary to dispense foot orthotics. In the 2020s, it is estimated that podiatry dispenses less than 50% of the healthcare provider orthotic prescription volume.

The only thing that never diminished was the need for foot orthotics. In a culture doggedly committed to fitness, with tens of millions of baby boomers aging and living longer, the number of lower extremity problems has continued to grow.

It was only a matter of time, then, with the quality and complexity of orthotics in decline and the need for them increasing, before patients transformed into consumers.

Early efforts to provide retail solutions were mostly the work of podiatrists themselves. There were a number of entrepreneurial DPMs who connected with their laboratory to create mail order orthotic businesses. With the advent of crush foam boxes, these businesses were able to create a nationwide mail order business using traditional advertising. Laboratories, too, were seduced into what was thought to be a very lucrative market. Remember, labs were only generating about a \$15 profit for a pair of custom orthotics. Presenting a \$200 product to a patient and cutting out the podiatric middleman was a financial home run.

As time and technology evolved, there were more and more ways to convey the benefits of foot orthotics to people suffering from foot pain. Infomercials, online businesses and eventually brick and mortar retailers began to dot the foot care landscape. Early on, though, if you scratched deeply enough, there was still a podiatrist or laboratory involved. But the retail orthotics opportunity was already starting to get the attention of large companies.

Whether it's one of thousands of retail franchises (Good Feet, Neovita, Foot EFX, Ideal Feet, Foot Solutions, etc.) or the New Balance Procare dealers or Costco or more recently Walmart, Americans have a plethora of lower cost, convenient places to get their 'foot orthotics'. Are they getting the same product and service that they would at the office of a competent podiatrist? Of course not. Does the public understand

this? Probably not. Does this make it more difficult for podiatrists to do a good job with orthotics? Absolutely! Patients are coming into offices every day with failed orthotics and podiatrists must walk the tricky line between telling them that they may have been misled (or worse, ripped off) and the fact that they still need a properly prescribed and crafted functional pair of foot orthotics.

It's impossible to know for certain whether and how many of these retail orthotics businesses would have entered the market if the early standards had been maintained. One thing is certain, though. Podiatry, in concert with their suppliers, made it easy.

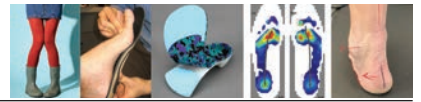
Tactics and Strategies

There are tactics and strategies that can be instituted to help maintain the relevance and value of a podiatry-dispensed orthotic. The fact remains that podiatrists are the best-trained and most highly skilled professionals to deal with foot problems. Their thorough understanding of foot mechanics, foot deformities, compensatory actions of various joints in feet and orthotic modifications must help to reestablish competitive advantages for podiatrists. Many DPMs lowered their orthotic standards partly because of the

inability to manage the compliance of their patients. Pressure over shoe styles and fees caused many practitioners to offer lower functioning (quality) devices or lower cost alternatives. These practice compromises should be minimized. Your measure of success should be based on more than simply the lack of complaints by patients. You should always ask yourself if you have done all that is possible to treat a chronic condition. The devices that your patients can acquire at retail may provide some help. But the real question is are they actually getting better or simply getting worse more slowly. If you can

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get them better, then no other consideration should trump that.

Preserving the value of the podiatry-prescribed functional foot orthotic requires:

- Maintaining or reestablishing high standards for biomechanical evaluations.
- Maintaining or reestablishing higher technical standards for proper prescriptions.
- Investing in proper research that supports the efficacy and safety profile of foot orthotics.
- Supporting companies that invest in product innovation and comply with generally accepted manufacturing standards.
- Gaining greater control over patient compliance.
- Investing in educational efforts geared to enhance the understanding of biomechanics.
- Maintaining high standards of

biomechanics in podiatry schools and residency programs.

The Laboratory Relationship

The laboratory relationship is also a key element in holding onto the position of preeminence for dispensing foot orthotics. Reward producers for innovation. Yes, that means paying a higher price for a better product. Resist the temptation to flee or negotiate when they need to raise their prices to cover increased costs. The distribution of the profit margin is still highly in favor of the practitioner. This will avoid further corner-cutting and diminution of quality in professional foot orthotics. Seek suppliers who still conform to the evidenced-based approach to orthotics and who continue to incorporate good manufacturing practices. Laboratories that help fund research efforts and provide professional consultative services should also be rewarded with your patronage. It's everyone's job to ensure that

the bar is not lowered any further.

Familiarize yourself with key research and convey this to your patients. Learn, or re-learn about the orthopedic management techniques. Don't duck when patients ask you to explain the differences between 'custom fit' products those they see in stores and online and the 'custom-made' product that you want to prescribe to them; made from their cast and based upon sound biomechanical principals. Your fundamental belief in their therapeutic value will be conveyed to your patients and return valuable dividends to you both. **PM**



Jason Kraus is the Co-Founder of Orthotica Labs. Over the decades, Mr. Kraus has been a senior executive and owner of many podiatry corporations, a prolific podiatric educator and *Podiatry Management Hall of Fame* Inductee.



Evidence-Based Medicine (EBM) and Orthotic Therapy

EBM supports orthosis modifications and troubleshooting.

BY LAWRENCE HUPPIN, DPM

Editor’s Note: This article was originally run in *PM* several years ago, and we felt that Dr. Huppin’s message remains so relevant and his examples so salient regarding EBM and orthotics that the article deserved to be repeated.

Orthotic therapy has changed considerably in the past decade as new studies have provided evidence on the efficacy of foot orthoses in treating many of the most common pathologies seen in podiatric clinics. Research has not only shown efficacy but has also indicated how orthotic prescriptions should be written in order to achieve optimum clinical outcomes for specific pathologies.

Unfortunately, many podiatrists—and orthotic laboratories—have not kept abreast of recent literature and continue to practice less than optimum orthotic therapy. This leads to a “chicken or the egg” scenario where the following occurs:

- Doctors do not practice evidence-based treatment when prescribing orthoses, resulting in ⇔
- Poor clinical outcomes, resulting in ⇔
- Doctor frustration with orthotic therapy, resulting in ⇔
- Doctors ignoring research and education that can help them achieve better clinical outcomes.

EBM

Evidence-based medicine (EBM) shows that orthoses do work to treat many of the common problems seen in podiatric clinics. But practicing EBM also may require that



Figure 1: For many of the pathologies most commonly treated with orthoses, studies indicate that orthoses that conform closer to the arch of the foot are more effective than those that gap from the arch. This orthosis is gapping from the arch of the foot.



Figure 2: This “total contact orthosis” conforms tightly to the arch of the foot.

Evidence-based medicine (EBM) shows that orthoses do work to treat many of the common problems seen in podiatric clinics.

doctors alter how they approach orthotic therapy. This includes ensuring that negative casting follows what the literature demonstrates are the most effective methods, orthotic prescriptions that follow EBM tenets, and choosing orthotic labs that are able to fill these prescriptions accurately.

In addition, podiatrists who follow EBM must often upgrade their orthotic troubleshooting skills. Those practitioners who practice evidence-based orthotic therapy by capturing EBM based images of the foot, writing EBM prescriptions, using labs that can fill EBM prescriptions and have excellent orthotic troubleshooting skills will be the most successful at providing relief to their patients and building a successful orthotic therapy practice.

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Evidence-Based Orthotic Prescriptions

Evidence in the literature indicates what the most effective orthotic prescriptions are for specific pathologies. For example, a number of studies have shown that orthoses that conform very close to the arch of the foot are more effective for many of the pathologies most commonly treated with custom orthoses. Let's look at a few examples of those pathologies and their associated studies.

Metatarsalgia

Researchers out of George Washington University studied the effect of a total contact insert (TCI) and a metatarsal pad (MP) on metatarsal head peak plantar pressures and pressure-time integrals. Their conclusion was that the total contact insert and a metatarsal pad caused substantial and additive reductions of pressures under the metatarsal heads. The TCI reduces excessive pressures at the metatarsal heads by increasing the contact area of weight-bearing forces. The MP acts by compressing the soft tissues proximal to the metatarsal heads and relieving compression at the metatarsal heads.¹

A 2000 study by Chalmers compared the effects of semi-rigid and soft orthoses worn in supportive shoes, and supportive shoes worn alone, on metatarsal phalangeal joint pain in patients with rheumatoid arthritis. Their results showed that semi-rigid orthoses had significant effect on pain. Soft orthoses did not show a significant effect on pain, nor did shoes alone, showing that semi-rigid orthoses worn in supportive shoes were an effective treatment for metatarsalgia. Supportive shoes worn alone or worn with soft orthoses did not provide pain relief for metatarsalgia.²

Plantar Fasciitis

A 1996 cadaveric study by Kogler demonstrated in 1996 that orthoses which conform closely to the arch of the foot more effectively reduce plantar fascia tension.³ A follow-up study in 1999 found that valgus forefoot wedging decreased tension on the plantar fascia, while varus wedging increased

pressure. This study showed that the most effective way to decrease strain on the plantar fascia is to use orthoses that conform close to the arch of the foot and to evert the forefoot.⁴

Hallux Limitus

Roukis, et al. found that prevention of first ray plantarflexion resulted in decreased first metatarsophalangeal joint (MPJ) dorsiflexion (hallux limitus). Subsequently, they also found that when the first ray was allowed to plantarflex, there was an increase in available first MPJ dorsiflexion.⁵ This is indicative that orthoses that prevent first ray dorsiflexion (orthoses that conform close to the arch when the

scribed by podiatrists are made in such a way that the orthotic shell does not conform closely to the arch of the foot. There are several situations that can lead to an orthosis that does not adequately conform to the arch of the foot. These include:

- **Using foam box casting technique:** McPoil, et al. compared non-weight-bearing (NWB) vs. semi-weight-bearing (SWB) casting of the feet (plaster negative suspension casts vs. foam impression casts). The authors found that NWB plaster casting was superior to foam box SWB casting since the SWB casting resulted in artificial varus in the forefoot.⁷ Laughton and McClay-Davis

For an orthosis to conform closely to the arch of the foot, the doctor should prescribe a minimum fill.

first ray is dorsiflexed) enhance windlass function. In a 2000 study, Harradine found that increasing eversion of the heel, which acts to dorsiflex the first ray as the medial forefoot is jammed into the supporting surface, decreased available dorsiflexion of the first MPJ.⁶ These studies indicate that orthoses which prevent first ray dorsiflexion (orthoses that conform close to the arch when the first ray is dorsiflexed) enhance windlass function.⁶

Other pathologies with peer-reviewed evidence of the efficacy of foot orthoses include adult-acquired flat foot, rheumatoid arthritis foot, pes cavus, patella-femoral dysfunction, osteoarthritis of the medial knee, tarsal tunnel syndrome, and lateral ankle instability.

Evidenced-Based Orthotic Prescriptions May Change Your Orthoses

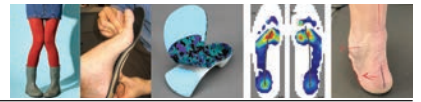
One of the common factors found in writing orthotic prescriptions is that, for many pathologies, studies indicate that orthoses that conform closer to the arch of the foot (Figure 1) are likely to provide better clinical outcomes than those that gap from the arch (Figure 2). It is critical that podiatrists be aware of this as many custom orthoses pre-

did a similar study comparing two casting techniques, NWB plaster vs. SWB foam impressions.⁸ They found that NWB casting had good agreement with the clinically measured forefoot-to-rearfoot relationship. SWB foam impressions had poor forefoot-to-rearfoot agreement and the SWB foot resulted in an artificial increase in varus, likely resulting from first ray dorsiflexion due to weight-bearing. This study recommended NWB foot imaging as the most reliable and valid technique.

- **Improper Prescriptions:** For an orthosis to conform closely to the arch of the foot, the doctor should prescribe a minimum fill. Any medial arch fill greater than minimum will lead to a device that gaps from the arch.

- **Overfill of the medial arch by the lab:** Maintaining close contour also requires that the orthotic lab not overfill the medial arch. To achieve this, practitioners must carefully evaluate the work of their lab to ensure that their prescription is followed (Figure 3). Labs may sometimes overfill the arch in reaction to demands from their customers. Podiatrists who lack skill or desire to troubleshoot orthoses demand that their labs manufacture a

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“no adjustment necessary” orthosis. Labs respond by overfilling the medial arch of the positive cast to make orthoses that have lower arches. The result is a device that rarely causes arch irritation but also rarely provides optimum clinical outcomes.

Close arch contour can be achieved with an orthosis prescription that includes minimum cast fill and mild inversion.

Podiatrists who do not capture an image or cast of the foot that follows EBM criteria, who do not write prescriptions with minimum cast fill, or use orthotic labs which routinely overfill the medial arch will supply their patients with orthoses that do not conform well to the arch of the foot and provide less than optimum clinical outcomes for many of the most common pathologies treated with foot orthoses.

Orthoses that conform closer to the arch, are wider or have deeper heel cups, or have additions such as metatarsal pads are also more likely to require occasional adjustments and troubleshooting. It becomes imperative that in order to provide the best possible outcomes with orthotic therapy, practitioners must not only write prescriptions that follow best practices but also have troubleshooting skills and optimally be able to make orthotic adjustments in their clinics.

In summary, practitioners who write orthotic prescriptions based on evidence in the literature and only use labs that will fill their prescription as written are likely to see:

- Improved clinical outcomes
- Orthoses that tend to have higher arches, wider widths, deeper heel cups, and require more modifications.
- Orthoses that will occasionally have need for adjustment.

Podiatrists’ Options for Orthosis Troubleshooting

If a podiatrist is going to practice EBM orthotic therapy, certain basic

proficiencies are required. Orthotic prescriptions must be written to treat the pathology, not to eliminate any need for orthotic adjustment. Occasional troubleshooting and adjustment of orthoses will be necessary for those practitioners who follow EBM when prescribing orthoses. When deciding whether to follow EBM in their orthotic therapy and whether to make orthotic adjustments in their offices,

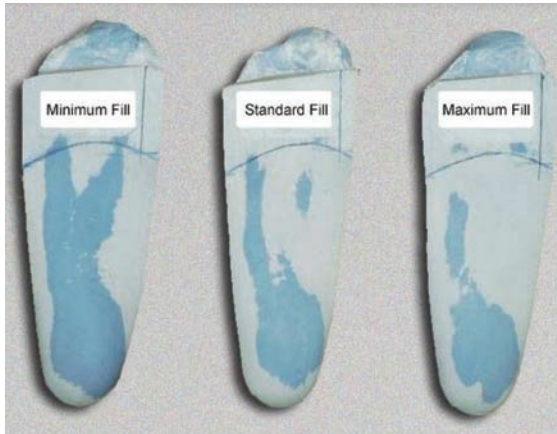


Figure 3: An orthosis made from a cast with minimum fill will conform closer to the arch of the foot than one made from a positive cast with standard or maximum fill. (Photo courtesy of LER, *Recent Advances in Orthotic Therapy*, 2011)



Figure 4: A grinder is an essential tool for orthotic practitioners. Among other uses, it can be used to thin the arch of the orthosis to increase flex and reduce reactive force applied to the plantar aspect of the foot.

podiatrists can choose one of the following scenarios:

1) Prescribe orthoses that rarely, if ever, require adjustment. These tend to be orthoses with arches that don’t conform well to the arch of the foot, and thus do not adequately address the pathology. This occurs when practitioners write orthotic prescriptions with standard or maximum arch fill or when orthotic labs overfill the medial arch. In effect, this choice

is to ignore EBM and prescribe a less effective orthosis. This choice is a disservice to your patients and to the profession.

2) Follow EBM and prescribe better orthoses but ship the orthoses back to the lab when adjustments are necessary. This is workable, but a time-consuming, inconvenient, and expensive option. On an online heel pain forum, one patient, whose feelings likely represent those of most patients, had this to say about her podiatrist who followed this scenario:

“My custom orthotics are still uncomfortable after four weeks.... I still feel like I have two golf balls shoved up under my arches. I made an appointment with the podiatrist who made the mold. If there are any adjustments that need to be made, the nurse said they will need to be shipped back to the lab where the orthotics were made; the podiatrist is not going to make them. YIKES! I am already perpetually in a state of ‘waiting’ for relief. The turnaround will be at least two weeks. My question is... can I bring my orthotics to a local pedorthist and have modifications made, or do they only work on their own fabrications? I am feeling a little panicky because I am a teacher, and I am hoping to get this plantar fasciitis under control before school starts. The idea of sending off my orthotic doesn’t sound like a quick procedure.”

3) Follow EBM, prescribe better orthoses, and develop orthotic troubleshooting and adjustment skills.

4) Refer orthotic therapy to colleagues who will follow EBM and prescribe more effective orthoses and have the ability to modify these devices in their offices.

Prescribing for Modifying

The most common patient complaint when prescribing EBM orthoses is an arch that feels too high. With some simple adjustments to your prescription, this is an exceed-

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BIOMECHANICS

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ingly easy problem to troubleshoot effectively in the office. These simple changes to your prescriptions can make these adjustments easy to perform:

- Prescribe Polypropylene orthoses for a majority of your devices. Polypropylene is the easiest material to adjust, especially when arch irritation is present. Simply use a grinder to thin the planter surface of the arch of the orthosis (Figure 4). This increases the flex of the device and reduces orthotic reactive force on the arch. It is a quick and easy adjustment. The arches on carbon fiber devices can also be adjusted but require heating the device and lowering the arch. This is not only more

The most common patient complaint when prescribing EBM orthoses is an arch that feels too high.

time-consuming, but you run a significant chance of altering the shape of the orthosis.

- Prescribe wider orthoses. Wider devices act to spread force over a larger surface area, thus decreasing the force applied per square inch and decreasing the likelihood of arch irritation (Figure 5). In addition, wider orthoses tend to offer greater control over excessive pronation and arch collapse. The downside is that shoe fit may be more of an issue, but adjusting for size by grinding the orthosis narrower or the heel cup shallower are some of the easier orthosis modifications.



Figure 5: Wider orthoses spread weight over a larger surface area and are less likely to cause arch irritation. This orthosis is the full width of the foot.

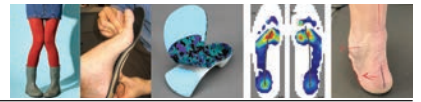
- Ask your lab to glue your covers “posterior only” (Figure 6). This allows for easy adjustments to the distal portion of the orthosis, including the addition of modifications such as metatarsal pads.

- Do not prescribe bottom covers. Bottom covers make modifications much more difficult to perform and can be easily added to the orthoses at a later date, once you and the patient are sure the orthosis is working as it should.

Patient Education

When prescribing more effective orthoses that are not made from positive casts with excessive medial arch

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fill, it is critical that patients understand ahead of time that some adjustment may be necessary. When it is explained correctly, you will find that not only do they understand, but they appreciate that you are making a superior orthosis for them. Let's use metatarsalgia as an example. As noted earlier, a number of recent studies have demonstrated that very specific orthotic modifications reduce pressure under the metatarsal heads.^{1,7} These include total contact orthoses (orthoses that conform very close to the arch of the foot), metatarsal pads, and cushioning under the met heads. A very effective method to explain the benefits of orthotic therapy, how your orthotics work better, and what problems patients might experience and how you will deal with them is to explain the effects of pressure on their feet. An explanation on orthotic choices for a patient with metatarsalgia might go like this:

"In order to relieve your pain, a number of studies have shown that we have to reduce the pressure under the ball of your foot. We do this by putting an orthotic inside your shoe that will transfer the pressure off of the ball of your foot and onto the arch. These studies show that the tighter an orthotic hugs your arch, and the wider it is through the arch, the more pressure it takes off the ball of your foot."

Because of this, I need to advise you that in a small number of cases, patients may initially feel the arch of the orthotic pushing too hard on their arch or they may have some problems with shoe fit. If this occurs, it takes just a couple of minutes to make an adjustment for you here in the office, and we always guarantee you will be comfortable in your orthotics. If I were to go the other direction and err toward orthotics that were too low or too narrow, they may never have a chance to bother you, but they are also unlikely to provide you the best pain relief.

In addition, you'll notice that when you first get your orthotics, the cover may not be glued down on the front. This is to allow me to easily

make adjustments to your orthotics. Once you are sure they are working as they should we'll glue the cover down, and put vinyl on the bottom so that they slide easily in and out of shoes."

Orthotic Troubleshooting 101

Unfortunately, most podiatric medical schools and podiatric residency programs spend little time teaching orthotic troubleshooting techniques. In addition, orthotic therapy, in general, and orthotic troubleshooting, in particular, are poorly addressed at most podiatric continuing education programs. It therefore can be problematic for a practitioner to gain the training necessary to become expert in orthosis modifications. There are, however, at least a few good methods to acquire this information:

- 1) Visit the offices of podiatrists who are experts at orthotic modifications and troubleshooting.
- 2) Use orthotic labs which offer expert consultation, including instruction on orthotic modifications and troubleshooting.
- 3) Attend seminars that incorporate a strong orthotic therapy component.

Basic Troubleshooting Skills

At a minimum, every orthotic practitioner who follows evidence-based orthotic therapy should



Figure 7: When working with glues, a hood or fume filter, such as this "Fume Buster" brand, are essential equipment. It functions as both a work surface and a fume filter.



Figure 6: Prescribing an orthosis with the cover glued "posterior only" will make it easy to add metatarsal pads and make other adjustments to the anterior portion of the orthosis. (Photo courtesy of LER, *Recent Advances in Orthotic Therapy*, 2011)

be able to perform the following orthotic modifications:

- Adjust for arch height/rigidity
- Adjust for shoe fit, including orthotic width and heel cup height
- Add covers
- Add metatarsal pads, metatarsal bars, forefoot cushion, apertures, Morton's extensions, reverse Morton's extensions, and varus/valgus wedges.

Materials and Equipment

In order to perform these basic adjustments, some standard equipment and materials are needed. These include:

- Grinder
- Ticro Polishing cone (to polish polypropylene after grinding)
- Hood or fume filter (Figure 7)
- Solvent to remove covers (Non-toxic solvents such as Orange-Sol are very effective and safe to use)
- Korex to use for Morton's/reverse Morton's extensions, varus/valgus extensions, aperture
- Poron to use for cushion
- Self stick metatarsal pads
- Self stick wedges

Podiatric medical supply houses and orthotic labs can help you find necessary equipment, materials and supplies.

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Conclusion

Anecdotal evidence has always existed to support the effectiveness of custom foot orthoses in reducing foot pain. Now, there is peer-reviewed scientific evidence to confirm not only the efficacy of orthotic therapy but also how orthotic prescriptions should be written to best treat specific pathologies. Studies demonstrating the effectiveness of specific orthotic prescriptions are available for many pathologies including plantar fasciitis, metatarsalgia, hallux limitus, adult acquired flat foot, rheumatoid arthritis foot, tarsal tunnel syndrome, and lateral ankle instability.

For individual podiatrists and the profession of podiatric medicine to maintain a reputation as experts and leaders in providing orthotic therapy, podiatrists must provide their patients with evidence-based orthotic therapy. To do so means that certain basic proficiencies must be met. This includes critical evaluation of foot image capture, whether by traditional plaster methods or via optical scanning; following evidence-based protocol in writing orthotic prescriptions and developing in-office troubleshooting skills that will allow practitioners to alter orthoses to improve function and comfort. To ignore any of these proficiencies is to choose to provide patients with orthoses that do not optimally address their pathology. **PM**

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Building Your Sports Podiatry Practice

Five past presidents of the American Academy of Podiatric Sports Medicine weigh in with advice.

BY JOLYNN TUMOLO

When Robert M. Conenello, DPM, FACFAS, talks about what it takes to achieve success in sports podiatry, the words he uses could just as easily apply to the athletes he treats: Drive. Commitment. Perseverance. Grit.

“You always have to do more than expected to get to the next level,” said Dr. Conenello, owner of Orangetown Podiatry in Orangeburg, NY, and host of the podcast RPM2.



Dr. Conenello

He has served as the global clinical advisor of Special Olympics International and was president of the American Academy of Podiatric Sports Medicine (AAPSM) from 2012-2013. “You have to be willing to work hard to get the things you want.”

For podiatrists like Dr. Conenello, a deep love of the game and of podiatry makes sports medicine a slam-dunk specialty. For these clinicians, spending a Saturday afternoon on the sidelines isn’t a hardship. Speaking to groups of amateur athletes is community outreach at its most natural. And calling the organizer of an upcoming sporting event to volunteer medical services is likely to generate the same level of eagerness on both sides of the line.

“I just love sports, and most people who go into sports medicine

love sports,” said Tim Dutra, DMP, MS, MHCA, FACSM, FAAPSM, an assistant professor and clinical investigator at the California School of Podiatric Medicine at Samuel Merritt University, Oakland, CA, and a podiatric consultant for intercollegiate athletic teams at the University of California, Berkeley. “As a sports podiatrist, you have the opportunity to be around a lot of different activities,



Dr. Dutra

who was AAPSM president from 2006-2007. “I got into podiatry because it’s the perfect specialty area for sports medicine. It’s a natural fit.”

All-Star Match

Foot, ankle, and lower extremity expertise, combined with biomechanics proficiency, leaves podiatrists with much to offer athletic patients.

“The majority of sports out there

“As a sports podiatrist, you have the opportunity to be around a lot of different activities, on-site events, and games. You can be on the field, and you can work in the clinic.”—Dutra

on-site events and games. You can be on the field, and you can work in the clinic. At Cal Berkeley, we have over 30 teams. It’s fun as an athlete and an active person to actually see a lot of different activities and be involved in the treatment of injuries. We get to go to a lot of great sporting events.”

If this sounds like piece of action you want in on, Dr. Dutra has good news: There is plenty of opportunity out there in athletics, and podiatrists are especially well-suited for the job.

“I was an athlete, an athletic trainer, and a coach,” said Dr. Dutra,

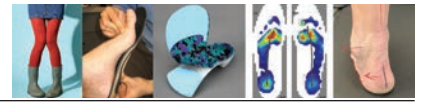
are very much influenced by being on our feet,” said Dr. Dutra. “Even athletes who may not be on their feet for their sport, like swimmers, do cross-training and may have foot problems. The other thing that makes podiatrists unique is our biomechanics background. The study of human movement, and things like walking gait vs. running gait, is really the foundation of a lot of what we do.”

“Our specialty concentrates on the anatomy, physiology, biomechanics and mechanisms of foot and ankle injuries,” added

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Dr. Ross



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sports podiatrist Jeffrey A. Ross, DPM, MD, FACFAS, an associate professor at Baylor College of Medicine, Houston, TX. “We just don’t ‘fix’ the problem. We recognize the etiology of the injury, trace it back to the biomechanics, and intercede to prevent recurrence of those overuse injuries.”

Doug Richie Jr., DPM, FACFAS retired and past owner of Seal Beach Podiatry Group, agreed that podiatrists are a step ahead of many sports clinicians, especially when it comes to conservative approaches.

such as the American Academy of Podiatric Sports Medicine and the American College of Sports Medicine, sports podiatrists advise. Attend local and sports medicine seminars. Ask seasoned sports podiatrists and biomechanics experts to allow you to shadow them or even potentially serve as mentors. (“It worked for me,” said Dr. Ross.) For those with the time and money, formal sports podiatry fellowships are also an option.

“Never stop learning,” advised Stephen Pribut, DPM, FACFAS, a

tioner must also consider current practice models and trends,” added Dr. Pribut. “You are not likely to do this alone, but rather as part of a group practice. The group may be an all-podiatrist group, a “supergroup” or it could be a multi-specialty group. To become a go-to person for sports medicine, it is essential to collaborate with others in your group and within the field. Strive to make yourself a valuable team member.

Start with the amateurs, the experts coached, and gradually work your way up to higher-level athletes. Volunteer your services to youth club and school sports, which, according to Dr. Dutra, are some of the most fun and rewarding gigs anyway.

“They’re very excited to be treated like an athlete. The kids see how professional and elite athletes are treated and can identify with that,” he said.

Offer to provide free medical services at local runs and races. Get to know the coaches, trainers, and participants—better yet, become one, too.



Dr. Pribut

For podiatrists looking to further their sports-specific skills and know-how, a number of options are available.

“Understanding lower extremity function and then implementing biomechanically oriented treatments with foot orthoses, footwear modifications, and home-directed treatment programs, the podiatric physician stands above all other specialties in providing unique and valuable service to the athlete,” said Dr. Richie, who developed the Richie Brace for athletes and other patients in 1996.



Dr. Richie

“You have to be able to recognize how abnormal gait can lead to overuse injuries. Having an understanding of computerized gait and pressure analysis is essential,” continued Dr. Ross, who served as AAPSM president from 1995 to 1996. “Having a working knowledge of various sports and their potential impact for developing foot, ankle, and lower extremity injuries is a must. It also helps to have that knowledge so the podiatric physician can communicate more intelligently with patients involved with those sports.”

For podiatrists looking to further their sports-specific skills and know-how, a number of options are available. Join and be active in groups

sports medicine podiatrist in private practice in Washington, DC.

Getting in the Game

To get your name out in the athletic community, join sports organi-

zations you’re interested in and offer help where needed.

“The ideal first step is to participate in sports. Sports participation is great preparation to help you understand the dynamics of movement. Participation may also help you understand the mindset,” said Dr. Pribut, who served as AAPSM president from 2005-2006. “Service is better than marketing. Participation and volunteering is a sincere way to become known while being helpful to the sporting community.”

“Today’s sports medicine prac-

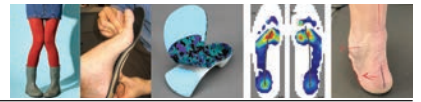
“Understanding lower extremity function and then implementing biomechanically oriented treatments with foot orthoses, footwear modifications, and home-directed treatment programs, the podiatric physician stands above all other specialties in providing unique and valuable service to the athlete.”—Richie, Jr.

“Just participating yourself, running 10K races and marathons, will expose you and your name to the running public,” said Dr. Ross, who has more than a dozen triathlons and 25 marathons under his belt.

Dr. Conenello’s rise to global clinical advisor of Special Olympics International began with a stint volunteering in his community to provide free Healthy Athletes screenings and services to participants who are underserved.

“I started out on the local level

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helping out, and they saw my passion and my motivation to keep going and asked me to help out at the state level. I was picked to be a national adviser, and then went on to become the global adviser,” said Dr. Conenello, who recently stepped down from his global duties due to other commitments. “I got the opportunity to travel to so many different venues across the world—Korea, Japan, China, Ireland. It’s been amazing. What a great ride it’s been.

“Now I’m the clinical director for the state of New Jersey, and we’re having state games in 2 weeks. It’s so much fun. It’s pure athletics. Those are the purest athletes you can see who are just doing it for a love of the sport.”

Seasoned sports podiatrists also recommend promoting your expertise through informational talks to local athletic groups on relevant topics like injury prevention for specific activities and treatment for common injuries. Write educational articles for print and online sports publications, or start your own blog online. Social media posts offering worthwhile ad-

Above all, persevere. And don’t make the mistake of expecting big opportunities and payback early on.

“There are very few paid opportunities in sports podiatry. Whether at the Olympic level all the way down to youth soccer, your participation as a podiatrist will be volunteer,” said Dr. Richie. “It’s always reward-

athletes are paid to play, but it can also be an issue at the youth level—especially when the grown-ups involved harbor unrealistic views of the treatment process.

“Parents and coaches can influence expectations and goals, so their compliance and support is very important,” said Dr. Dutra. “Many parents

“The average athlete is very involved with their treatment plan and in getting well.” —Ross

ing, but do not expect this to immediately bring patients into your office.”

Motivated, Demanding—and Appreciative

When athletes do present for care, expect a slightly different breed of patient. Athletes are typically more educated, motivated and positive than other patients, and they often have higher incomes and a willingness to pay out-of-pocket for services or orthoses insurance doesn’t cover. With that, however, can come greater demands, more worries, higher ex-

think their child is going to become the next superstar Olympic athlete, and you have to help them see the overall perspective of what we’re trying to do: help them get better, keep them active, and not rush them back to the sport only to get reinjured.”

Under-promise and over-deliver is a patient care philosophy that Dr. Dutra said has served him well in his dealings with athletes.

“Don’t make promises and timelines that aren’t realistic,” he said.

If possible, avoid surgery in favor of more conservative treatments, Dr. Ross recommended.

“The athlete who requires surgery can even be more challenging,” he said. “Attaining the ‘perfect’ result is something they will expect. Attaining reasonable goals, again, is a topic for discussion with patient.”

But help athletes succeed in their quest to return to activity, and you’ll see some of the most grateful patients possible.

“I’ll give you a great example that happened this week,” said Dr. Conenello. “I have a Division II female basketball player who was getting nowhere with her doc. She came to see me, and I did something for her that was very different from what everyone else tried, and she was able to get back on the court right away. She came in my office, surprised me with a card and a small gift, and said ‘Thank you for making a difference in my life so I can get back to doing what I love.’ When athletes can’t participate, it’s devastating for them. That gesture really touched my soul.”

“Being able to see and treat pa-
Continued on page 95

“I started out on the local level helping out, and they saw my passion and my motivation to keep going and asked me to help out at the state level. I was picked to be a national adviser, and then went on to become the global adviser.” —Conenello

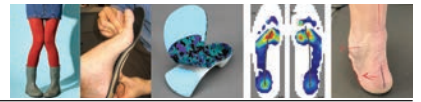
vice have the potential for a global reach. Finally, don’t overlook your local independent sports outfitters and running retailers. After 26 years in practice, Dr. Conenello is still a familiar face at his local running store.

“I volunteer there once a month. Patients come in, and we have the opportunity to just talk,” he said. “When they leave, they say, ‘You know, you’re a good person to talk to. I got some answers from you. I’m going to go visit you.’ That’s how you get involved. You market yourself and become a sports medicine doctor by doing and being real.”

expectations, and longer appointments.

“The average athlete is very involved with their treatment plan and in getting well,” said Dr. Ross. “They typically will take more time during that office visit; they can be very needy. You need to be patient with them and make yourself available. If you aren’t willing to spend the time, then don’t treat athletes. But the reward is so worth it in the final analysis.”

An eagerness to return to activity is common but can turn problematic when it overshadows a sports podiatrist’s treatment plan. This isn’t unusual at the professional level, where



Sports Practice (from page 94)

tients over the lifetime of a practice is special, and nothing beats that,” Dr. Pribut reflected. “Today I saw a patient that I had not seen in 18 years, since he moved to the West Coast. We’ve been in touch through Facebook for the last few years. He just completed a local 100-mile ultra race and was in this area long enough to see me for a visit before heading back home.”

Oh, the Places You’ll Go!

Appreciative patients and complimentary admittance to all sorts of events aside, sports podiatry can lead to once-in-a-lifetime thrills that enrich an already rewarding career.

For Dr. Conenello, advancing his ultramarathon education let him right to the Sahara Desert, where he observed a RacingThePlanet event he will never forget.

“I spent 2 weeks out in the Sahara learning all about training these ultramarathoners,” he said. “I’ll be honest with you, I never camped a day in my life before that. But I camped out there in the Sahara Desert under the stars, and the next thing you know, I have all these ultramarathoners coming to see me because I have experience with it and know what they’re going through. That was definitely one of the most amazing events I got involved with.”

For Dr. Pribut, watching his patients retake their playing fields after overcoming injury has been as interesting as it’s been gratifying.

“It has been fun to go backstage at the ballet and to go into professional locker rooms. It has also been memorable to see your athletes participating in events as diverse as ballet to track and field,” he said. “To see a ballet dancer perform a role, an actor able to move around the stage athletically, and an athletic opera singer sing, jump, and duel in ‘Don Giovanni’ have been great experiences.”

Dr. Dutra relishes the opportunity to promote a healthy lifestyle among young and old alike—his sports-minded clientele has included Senior Olympians in their 80s and 90s.

“It is truly inspiring to be around such active, passionate people. It’s a

fun career,” he said. “You meet a lot of great athletes of all age levels. It’s been fun because I love kids, I love older people, and I love everyone in between. It’s perfect.”

Dr. Ross counts among his fondest moments running the Austin marathon and half-marathons with former Texas Gov. Rick Perry and the Marine Corps, as well as participating in Little Rock Marathons with former Arkansas Gov. Mike Huckabee.

“Seeing my father at the end of the Boston and London marathons and my mother at Tavern on the Green at the finish of the New York City Marathon were other memorable moments,” he said. “What a great

the American College of Sports Medicine as well, the largest sports medicine organization in the nation, made up of academic, clinical, and research members. Becoming a Fellow is a great opportunity and there are too few of us currently. The ABMSP has a board certification in podiatric sports medicine, and the ABPM has a CAQ in Podiatric Sports Medicine. Those young podiatrists wishing to be team podiatrists need to demonstrate advanced training and certification if possible to stay current with our sports medicine colleagues.”

But the bottom line seems to be: sports podiatry does not disappoint, the podiatrists agree.

“Being able to see and treat patients over the lifetime of a practice is special, and nothing beats that.” —Pribut

outlet to a well rounded podiatric medical career. I would do it all again in a heartbeat.”

Sports Podiatry and Biomechanics

Dr. Dutra offered some additional thoughts about the changes in sports podiatry that have taken place in recent years. “Sports podiatrists have progressed from treating mainly runners to treating athletes from all sports, which I think is huge. Biomechanics has set us apart, as we have a great understanding of motion, demands of the sports, and sport-specific orthotics in treating and preventing injuries. We are hoping to address evidence-based sports medicine research and teach this in our podiatry curriculum. We have been utilizing our Motion Analysis Research Center for biomechanics and sports medicine-related research studies, utilizing biomechanical faculty with PhD to help us collect data and work with us on studies. And we need to publish research from our colleges of podiatric medicine.”

Cultivating a relationship with other sports medicine organizations is another strong recommendation from Dr. Dutra. “I found it very important to be involved in more than just your specialty organization and I recommend that you get involved in

“I still encourage any student or resident I meet to seek further training in sports medicine,” said Dr. Richie. “It is the best part of podiatric practice.”

About the AAPSM

The American Academy of Podiatric Sports Medicine serves to advance the understanding, prevention and management of lower extremity sports and fitness injuries. The AAPSM believes that providing such knowledge to the profession and the public will optimize enjoyment and safe participation in sports and fitness activities. Their aim is to accomplish this mission through professional education, scientific research, public awareness, and membership support.

For questions on membership benefits or any other aspects of the AAPSM, please contact Executive Director Rita Yates at ritayates2@aol.com. PM



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