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ROUND TABLE:

Orthotics and Decision Making

Our experts discuss techniques and policies for the use of orthotics.

By Marc Haspel, DPM

The practice of prescribing, casting for and dispensing custom-made orthotics is an essential part of podiatry. Some patients have insurances which cover this service. Those who don't have insurance coverage are often willing to pay for orthotics themselves. With some education provided by their doctors, patients have little trouble understanding the benefits of using orthotics. Once they have agreed to order the devices, their podiatrists have a series of decisions to make to render the treatments successful, e.g., what lab to use, what casting technique to select, what materials to employ, even what to do in the event the patient is dissatisfied.

Podiatry Management has invited several leading orthotic practitioners from here and abroad to share their thoughts on the choices they make during the process of orthotic therapy. Joining this month's panel are:

Joseph Agostinelli, DPM is in private practice with Orthopaedic Associates of Ft. Walton Beach, FL. He is a Colonel, USAF, retired following 23 years of active duty. He is a fellow of the American College of Foot and Ankle Sur-

geons, a fellow of the American College of Foot and Ankle Orthopedics and Medicine, a fellow of the American Academy of Podiatric Sports Medicine, and a fellow of the American Professional Wound Care Association.

Lawrence Huppin, DPM is an Associate Professor in the Department of Applied Biomechanics at the California School of Podiatric



Medicine, is Medical Director for ProLab Orthotics and also serves as Medical Director for SHOES-n-FEET® Shoe Centers. He has a Seattle private practice specializing in biomechanics and orthotic therapy. Dr. Huppin is a member of the American Academy of Podiatric Practice Management.

R. Daryl Phillips, DPM is Director of the Primary Podiatric Medicine Residency at Coatesville Veterans Administration Medical Center and is a Diplomate of ABOPPM and ABPS. He is a member of the American Biomechanics Society and has written several re-

search articles. Dr. Phillips has been co-recipient of four Stickel Awards, as well as the Scholl Award for research.

Lisa Schoene, DPM is a sports medicine specialist who is triple board certified in Surgery, Orthopedics, and Primary Podiatric medicine, and is a fellow of the American Academy of Podiatric Sports Medicine. She is also a licensed certified athletic trainer, as well. She has treated and worked with numerous Olympic, professional, semi-professional, and elite athletes of many sports, including runners, triathletes, dancers, skaters, gymnasts, soccer, basketball, and volleyball players. She is the podiatric consultant for the DePaul University athletic department and the Joffrey Ballet of Chicago, as well as other dance companies.

Paul Gabriel Scullion, FCPodS, podiatric surgeon, graduated from Northern Ireland School of Podiatric Medicine in 1983. He was elected fellow of the Faculty of Surgery, College of Podiatrists, London in 1995. He was guest lecturer for the MSc. Sports Medicine, University of Dublin, Trinity College, Dublin from 1991 to 2001. He is a director and consultant for Biomechanics Foot Lab-

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oratory Ltd. established in 1987. He is now in his twenty-third year in private practice at The Castleknock Clinic, Dublin.

Robert Scott Steinberg, DPM graduated ICPM in 1976 and serves as surgical instructor at Norwegian American Hospital, Chicago, IL.



PM: *What are the key factors to developing a strong orthotics practice?*

Phillips: The most important factor is practitioner awareness of the tools one has. That starts with taking a good history. It is not just important to find out about pain and injuries in the feet, but also take a good lower extremity and spinal history. Problems that might be identified include knee problems, back problems, super-structural joint replacements, and night cramps. It's amazing the number of people who will benefit from orthotics who have never had a foot symptom.

Next is to make sure that the new patient evaluation includes a postural and gait evaluation. Not all people who have postural and gait abnormalities need treatment, but many abnormalities can be picked up. The patients can then be informed, so that they are aware that if they begin to experience symptoms, they can begin treatment. Perhaps they have a friend, who is experiencing similar symptoms, whom they can refer.

When people bring family members into the clinic with them, make sure they get free foot screenings as well. I tell patients, there are few individual foot problems; most of the problems are family foot problems.

Schoene: I certainly agree with Dr. Phillips. I feel having a strong understanding of the biomechanics of the foot and ankle as it relates to and affects the kinetic chain is very important. Proper musculoskeletal and biomechanical evaluations will give confidence to the patient and referral sources that you are knowledgeable in this area.

Scullion: I have always based my biomechanics work on a strong screening process. I will often use other mechanical interventions upon my patients such as foot and ankle manipulative techniques or padding routines that mimic the control of foot orthoses to establish if a trend for resolving the presenting symptoms exists. Once a trend is established, then I deliberately book patients into my clinic for a consultation on what is involved in a full biomechanical intervention. This consultation is based on a document I have produced for my patients.

With the aid of a schematic diagram, I take patients through the expected and unexpected outcomes, time scale involved, the costs that are incurred, my responsibilities and very importantly their

Not all people who have postural and gait abnormalities need treatment.

—Phillips

responsibilities in achieving a positive outcome from the treatment. Only then would I move forward to prescribing foot orthoses.

I appreciate that this is not a fail-safe method, but because of my approach, I seem to get very good results from my prescribed orthoses the vast majority of the time. As a consequence of this approach, I do get quite a number of referrals from colleagues and satisfied patients to review cases where other orthotic treatments have failed.

Steinberg: Athletes are a critical bunch. I have learned a few things from them. They do not want to see doctors, or their office workers for that matter, who are smokers or are overweight. They want to see sports medicine physicians who are athletes. When you diagnose, and then recommend prescription functional orthotics,

you have already established your credibility if you participate in the sports that have injured your patient. Before casting, my patients agree to get the shoe model that is on my recommended list, and that I will not dispense the orthotics until they come in with one of those models.

Hupp: The most important factor is knowledge. Orthotic therapy has changed significantly in the last decade as new research has demonstrated improved methods of treating pathology. Every podiatrist should be aware of "pathology-specific" orthotic prescription writing. One of the best ways to learn is to attend the annual International Conference on Foot Orthotic Therapy. Information is available at www.pfola.org. The reality is that if you understand orthotic function better, you will be more confident at recommending orthotic therapy as a primary treatment for much pathology.



PM: *What do you look for in choosing an orthotics lab?*

Hupp: I think there are two critical issues, the first being cast work. If the positive cast is poor, the patient will be better off with a pre-fabricated orthosis. One of the biggest problems in the industry is labs that overfill the medial arch in order to produce orthoses that will have less chance of requiring adjustments. Unfortunately, that also means that many patients are not getting the control they require to achieve optimum relief.

The second critical issue is consultation. Consultants should not be lab technicians; they should be podiatrists with extensive clinical experience in orthotic therapy. You won't need them on every patient, but having such consultants available will help you achieve superior clinical outcomes on your more difficult biomechanical patients.

Agostinelli: I choose a local lab that is part of a large national chain of prosthetics/orthotics labs and is located within forty-five

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minutes of our three offices. That way, any adjustments needed are taken care of locally and the fabricator of the orthotics prescribed is right there, available and customer friendly for the patients.

Schoene: I am very particular about my orthotics from the way

they function to the way they look. The most important aspect of a lab for me is the selection of device types. I also look for fast, organized, courteous and knowledgeable customer service. If the devices don't come in correctly or they take forever to fabricate, and the lab does not remedy the problem quickly, it does not matter to me if the pair of orthotics are five dollars cheaper.

At that point, cost is the last thing that I am thinking about.

Scullion: I suppose being the director of my own laboratory puts me in the position of re-evaluating my reasons for starting my company in the first place. I always wanted to prescribe good-quality, well-constructed custom foot orthoses made to my own wide range of designs. Over time, and as our lab has matured, I have attracted a number of like-minded professionals to use us. These days I am aware that these customers demand speed in production of our quality devices and they are appreciative of excellent back-up services.

For example, I will see, free of charge, any of their patients encountering a problem with one of our devices. Finally, with global warming such an international issue, having a responsible, environmentally sound manufacturing process is becoming more important to all concerned. We recycle a very high percentage of our waste; and with our 3-D laser scanning system and milling of reusable wax moulds in our positives production, we no longer use tons of un-environmentally friendly plaster of Paris.

Q **PM:** Which casting techniques do you employ for the fabrication of custom-made orthotic devices? In your opinion, which technique is superior to the rest?

Phillips: If I am utilizing an orthotic built on the Root principle of neutral subtalar joint with a fully pronated midtarsal joint, then I do utilize the Root suspension casting technique, with the patient supine. There are some cases where I don't want to control the midtarsal joint or the subtalar joint, where a semi-weight-bearing cast will actually capture the plantar shape of the foot better. For these cases, I tell my laboratory to make the orthotic directly to the cast, and not modify that cast.

Schoene: My preferred method of casting is prone, with traditional plaster. I personally cast each patient with this method. I find the

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foot is more relaxed and I can evaluate the forefoot alignment and hold the foot in neutral easier. I feel the supine suspension technique potentially can plantar-flex the fourth and fifth metatarsals, making it harder to fight gastrocnemius equinus.

Huppin: For functional orthoses, a number of studies support the use of a non-weight-bearing neutral suspension cast taken with the first ray plantar-flexed. Weight-bearing casts and scans do not allow the lab to determine the forefoot-to-rearfoot relationship and will not result in quality functional orthoses.

Scullion: Wrong casting techniques do exist. Several years ago, I banned the use of foam boxes submitted to our laboratory by practitioners. When done with care and attention, neutral position plaster of Paris slipper casting the foot is still a gold standard in my books. I

am very much aware of the pluses and minuses for this technique.

In 1995, I was the professional responsible for the first-ever scientific study on the reproducibility of the neutral position slipper cast. I had one of my MSc. sports medicine students, for his degree thesis, study the variations within and between practitioners neutral casting the same subject. The results of this study caused a great stir when I presented them at international conferences in Dublin and Vancouver.

Even though variations can happen with the neutral plaster slipper cast technique, I still believe the contoured shape of the non-weight bearing foot in itself has a positive prescription effect even before the laboratory creates intrinsic or extrinsic prescriptions.



PM: *How do you select what material to use for the shell of the device? When do you order thermoplastic material over leather?*

Phillips: Unfortunately, the profession knows almost nothing about the behavior of all the various orthotic materials under load. Twenty-seven years have passed since I graduated and I feel more confused about materials now than I did then.

I have come to the conclusion that it is easier to make an orthotic more stiff than it is to make it softer, so if I err, I do it on the side of softness.

Thermoplastic materials offer the greatest hope for control of the foot, so I usually prescribe one of those types; however, I want to make sure that the patients' soft tissues have normal mechanical properties. If they have atrophy of the soft tissues or peripheral vascular disease, I will usually prescribe a cork & leather or a #3 plastazote material. If their feet are uncontrollable, for example with highly medially displaced subtalar joint axes, I will usually prescribe a leather type of device.

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Steinberg: I feel that cork and leather hits the ground with a thud. I do not use it. When I think of a functional device, I also expect the material to function in a manner that enhances biomechanical efficiency. For sport devices, I use polypropylene with an external rear foot post. For dress shoes, I use a carbon fiber composite with internal posts. For alpine ski boots, I direct mold, using a sandwich of a softer thermoplastic, form, and thin top cover.

Scullion: I will use leather orthoses, particularly when I want to influence the propulsive phase of gait. For example, the rigid plantar flexed first ray is encountered in the extreme cavus type foot of polio cases. There is no thermoplastic shell that will properly control this foot type because thermoplastic shells always must finish behind the metatarsal heads. I know others will attach extension padding and valgus wedging to their thermoplastic shells; however, these extensions of man-made materials wear out sooner rather than later. I find the full-length leather superior for any prescription control beyond the metatarsal heads.

Huppin: Whatever material you use must resist excessive deformation. If it deforms excessively under body weight, the device cannot apply force to resist forces that lead to pathology. Many materials, including thermoplastics and leather, can work but cork and leather devices will wear out much faster.

Q **PM:** How do you choose the correct posting for custom made orthotic devices? Is there a formula you use to determine the degrees of posting in the devices?

Schoene: I perform a biomechanical exam with my tractograph for every orthotic patient; I feel that prescribing a device is a mix of science and art. I post the rearfoot and forefoot/midtarsal joint based on my measurements, rarely having the same corrections on each side. I

only post the forefoot if the biomechanical exam dictates it. I find that most patients for whom I make devices need more than the typical 4 degree varus post, so I incorporate the multi-axial posting that my lab offers for many of my devices.

I feel full length tops with the appropriate padding and accommodations are critical. For example, I can adjust a plain simple shell that a patient brings into the office that the patient is not wearing, which was made by another doctor, by tweaking the correction a bit, adding the appropriate padding and applying a full length soft top cover. Suddenly, the patient likes the device, wears the device and is pain free, demonstrating what I feel is the artistic side of orthotic therapy. Lastly, I always make sure the

If the positive cast is poor, the patient will be better off with a pre-fabricated orthosis.
—Huppin

patient is in the proper shoe gear as this will make or break orthotic satisfaction.

Agostinelli: I choose the correct posting for my orthotics by “test padding” with orthopedic felt and Spenco metatarsal/heel pads. The origin of test padding technique was taught to me expertly by Dr. Alan Whitney during my years at TUSPM. I do not use a specific formula other than my test padding results and the patient response to that plan.

Huppin: If we are talking about the correction in the orthotic shell, balancing is a better term. Posting should refer only to an external rear foot or, rarely, forefoot post. How the device is balanced depends on the pathology. For example, if the patient is experiencing first MPJ pain due to a func-

tional hallux limitus, we recommend balancing the orthosis inverted a few degrees. By doing so, we elevate the base of the first ray, allowing greater first ray plantar flexion and enhancing first MPJ dorsiflexion.

Steinberg: My formula changes with different applications. Most runners get a four degree external rear foot post. I want to correct as much of the forefoot deformity as I can and still fit the device in the shoe, but if they are older, or arthritic, I might correct only half of the full varus or valgus. Interestingly, my cycling orthotics do not have anything under the heel except the top cover. My forefoot posting is aimed at creating good knee alignment over the pedal.

We should also consider arch fill as posting. Arch fill can give a fudge factor, or make a patient’s first pair of orthotics easier to get used to. But, using little to no arch fill will let you know immediately if your casting, or any impression technique, is accurate.

Q **PM:** What instructions do you give the patient at the time of dispensing a pair of orthotic devices? When do you have the patient return for a follow-up examination?

Schoene: My policy is to have the patient break the devices in, slowly wearing them and increasing the usage by one hour daily. I request that the patient not wear the devices for exercise until I have personally checked them. I follow up at approximately three weeks because I feel this is the time it takes for most patients to get used to them. At that time, they can make constructive and objective comments on the fit and comfort.

Agostinelli: I tell patients to wear the orthotics as long as they can, or in other words, “ambulate to tolerate” in running-type or dress-type shoes. I follow up these patients after six to eight weeks of wearing the orthotics.

Scullion: I insist on a return visit eight weeks following my
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biomechanical examination. This allows two to three weeks to disperse the devices and four to five weeks to break them in. I also recommend the usual break-in period on a one-hour build-up each day until full-time wearing. I am also strict on having my patients comply with any prescribed stretches or strengthening routines over this eight week period, and I point out that I will test for compliance during follow-up visits. After the initial follow-up, I will further see patients once yearly for an orthoses check-up. I determine the necessity of refurbishment or new pairs during these long-term follow-ups.

Steinberg: I do it differently. I tell patients to use the devices everyday unless there is a problem. If they have problems, I will first have them wear the orthotics every other day. A week later, I will have them in for a follow-up exam and adjust the devices, if necessary. I have

found that on the off-days, they begin to miss the support and will then wear the orthotics and tough it out until their feet break in.

Huppin: Besides the standard

The financial policy regarding orthotics is always discussed, understood and signed by every patient.

—Schoene

break-in instructions, the most important thing we tell patients is that they should not expect orthoses to fit the shoes they currently own and that they will need to purchase appropriate shoes. Certified shoe fitters will ensure that the patients find shoes that fit their

feet, fit the orthoses, and support my treatment.

Q

PM: What is your policy in the event that the patient is dissatisfied with the orthotic devices?

Phillips: Before beginning orthotic therapy, there must be realistic expectations by the patient. There are several things that the patient must understand before beginning this process.

First, the prescription of orthotics is not yet an exact science. The profession is doing everything it can to make it more scientific, but there are many variables that cannot be measured or calculated. Furthermore, I do the best I can with the initial prescription; however, I may need to make course corrections, depending on the response by the patient.

Second, I am not selling orthotics. I am selling service. The major part of the cost is the time I

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spend in fitting them and following up with the patient. Sometimes, I make money, and sometimes I lose money. Patients cannot be held responsible for a lack of knowledge in the prescribing and fitting on my part, and I don't hold them responsible. I just try to bill an equitable fee that will make it so I don't lose money on most of the patients.

Of course, as with surgery, there are going to be some patients upon whom I fail. That does not mean that they owe no money. Moreover, they know up-front that the only thing I am going to guarantee is that I'm going to give their case the maximum effort. I do encourage patients to complain. If I don't know something isn't working, I can't fix it. I make sure that patients on whom I do eventually fail fully appreciate the service.

In regard to orthotic work, I work in an HMO, which means that the organization wants to save money. For that reason, almost everyone who has a custom made or-

thotic starts with an inexpensive over-the-counter device. I carry a number of different brands and sizes of OTC orthotics, and try to fit the size and shape, and also modify those to make it function as close as possible to a custom made device. It's amazing the number of times I can fully satisfy my patients with this type of approach.

Schoene: I tell and demonstrate to the patient that I am serious about making the orthotics perfect and I will see patients back as many times as needed, without charge. The financial policy regarding orthotics is always discussed, understood and signed by every patient. If the orthotics are not satisfactory to me or the patient, I or the lab will adjust them or occasionally remake them. Due to this policy, I have found good success in patient satisfaction; therefore I do not refund the insurance or patient for the devices.

Steinberg: I always tell pa-

tients that if their feet do not adapt over a two month period, even after I adjust the orthotic, I will refund their out-of-pocket payments.

Hupp: We offer a complete guarantee on orthotic comfort, making clear that it is not a guarantee on clinical outcomes. We require at least two attempts at modification and a redo of the orthoses before any refund is granted. If patients are still not comfortable in the devices, we will refund them and/or their insurance for the cost of the orthoses. It happens a few times per year, but I think a lot more patients follow our treatment recommendations due to the comfort guarantee. ■



Dr. Haspel is Senior editor of this publication.