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From the editor:

Hope for hallux valgus

One of the most frustrating things about managing a patient with hallux valgus—or being one—is that so often the emphasis is on the negative. But new research suggests clinicians’ advice to patients with bunions could be much more than just telling them what not to wear.

In a study published in the November issue of *Medicine*, Spanish researchers found that the thickness and cross sectional area of the abductor hallucis and the flexor hallucis brevis muscles were significantly smaller in the feet of 10 patients with hallux valgus than in the feet of 10 controls.

Similar studies have identified intrinsic foot muscle atrophy in patients with a range of other foot conditions, and have motivated clinicians to consider intrinsic strengthening exercises to help alleviate symptoms and potentially delay disease progression (see “Importance of intrinsic muscles for foot health,” June 2016, page 15).

It’s far too early to say whether intrinsic strengthening in patients with hallux valgus might help stave off corrective surgery or even reverse the condition’s progress, or whether such interventions might be more effective in certain patient subgroups than in others.

But we know the ability to wear fashionable shoes is a priority for many women with hallux valgus (see “Most women who want to wear heels after bunion surgery do so,” page 6), even when warned that high heels and tight toe boxes will make their symptoms worse.

This highly motivated patient population, while notoriously noncompliant when it comes to what not to wear, might well be responsive to the suggestion that intrinsic strengthening exercises could allow them to more comfortably indulge in less-sensible styles, at least occasionally.

And I’m sure clinicians would welcome the chance to be more positive when advising hallux valgus patients. Because having to say no all the time is almost as frustrating as having to hear it.

Jordana Bieze Foster, Editor
Most women who want to wear heels after bunion surgery do so
But many still experience discomfort

By Emily Delzell

Most women who want to return to wearing high heels after hallux valgus surgery do so, but may sacrifice comfort for style, according to research from the University of Manchester in the UK. Clinicians in the US say many of the study’s findings—although not all—are consistent with their experience.

The orthopedic surgeon investigators identified 65 women who’d undergone corrective hallux valgus surgery between 2011 and 2013 and grouped them into two age-based cohorts. Participants completed a footwear-specific outcomes questionnaire a mean of 18.5 months after surgery (range 6.9-35.9 months). The researchers defined comfortable footwear as normal-fitting, non-prescription shoes with a heel less than 3 cm high and a wide toe box; heels were defined as tight-fitting shoes 3 cm or higher with a narrow toe box.

Almost two thirds (31) of the 50 patients who said they wanted to go back to wearing heels after surgery did so, and 24 of these women said their postoperative use equaled or exceeded the frequency of their preoperative wear. There were no differences between pre- and postoperative heel heights.

However, 58.5% of study participants reported difficulty with heel wear, and 13.9% said they had significant restriction, and couldn’t wear anything without pain but custom orthopedic shoes or slippers. Most women (86%) were able to return to comfortable shoes after surgery with minimal or no discomfort; 27.7% said their footwear choice was unrestricted, meaning they could wear both comfortable shoes and heels with minimal discomfort. The 23 women older than 65 years were twice as likely to report significant restriction as those in the younger cohort; compared by operative type, patients who had the most extensive procedures had the highest rates of restriction. The findings were published in June by the World Journal of Methodology.

Two independent experts who reviewed the study for LER: Foot Health were surprised at both the high number of women in the study who wanted to return to heels after surgery and the number who were actually able to get back into the footwear.

“I’ve seen an increased awareness among my patients of the problems tight, pointy-toed heels can cause, and my patients with hallux valgus are usually willing to take my footwear suggestions, which are definitely on the conservative side,” said Megan Leahy, DPM, a podiatrist at the Illinois Bone & Joint Institute in Chicago. This concern for foot health is especially noticeable among her younger patients, many of whom want to preserve their foot function so they can be active, she said.

Her observations echo data from the study showing the younger cohort was less likely than the older group to report preoperative high-heel use (66.7% vs 78.3%). Few women (21.1%) who weren’t wearing heels before the surgery adopted them postprocedure.

In the study, women older than 65 years were more likely than younger women to report high-heel use prior to hallux valgus surgery.

Althea Powell-Chandler, CPed, LPed, OST, owner of Powell Shoes in Vero Beach, FL, also sees fewer heel-wearers among her patients, though she noted her tropical location may influence shoe selection.

“Most seniors here usually wear comfortable athletic shoes or open-toed sandals, and they’re especially likely to stick with sandals after they’ve had bunion surgery—they want something open that they can adjust,” Powell-Chandler said. “I was surprised that so many in this study went back into heels, though I’ve noticed that people who want to be in heels aren’t changing their minds.”

The study authors touched on this phenomenon, writing, “…we suggest our finding may misrepresent genuine functional limitation,” ie, that women with a history of heel wear will accept some degree of foot pain to get back into their stilettos.

Leahy has seen this dynamic among her patients.

“If, for example, they have a job they feel really requires power heels—attorneys are one profession who often sees heels as part of their uniform—it seems that they will fight through foot pain. Some think foot pain is normal, making them much more likely to go back to that type of shoe,” she said.

Helping patients understand what kind of shoes they can expect to wear after bunion surgery should be a priority for practitioners, concluded both the authors and Leahy, who noted, “I emphasize that it takes a very long time to get into a regular shoe and that you may not ever get into a heel; women should not do this surgery to get into a heel.”

Long-time heel wearers may go back to their footwear relatively quickly, however. In addition to having higher rates of preoperative heel wear than their younger counterparts, older women also returned to heel wear sooner (mean, 16.4 weeks vs 24.1 weeks).

Both Leahy and Powell-Chandler said patients often underestimate the time it takes to heal from bunion surgery—up to a year for residual swelling and pain to resolve—and caution patients that returning to heels can increase the risk of bunion recurrence.

“Tight, narrow toe boxes and high heels can speed up progression,” Leahy said. “If you jump right back into high heels after surgery the deforming forces will be there again, and there’s chance of faster recurrence.”

Source:
Walking boot and surgical shoe negatively affect driving safety

Device wear delays braking response

By Lori Roniger

A recently published study from the Temple University School of Podiatric Medicine in Philadelphia bolsters previous research suggesting that wearing a lower extremity immobilization device on the right foot could negatively affect driving performance.

The driving-simulator study, which was published in the September-October issue of The Journal of Foot & Ankle Surgery (JFAS), found that mean braking response times were significantly slower in 25 healthy individuals while wearing a surgical shoe (.611 sec) or walking boot (.736 sec) on the right foot than while wearing their normal footwear (.575 sec).

"It's a very common question we get from our patients," said Laura E. Sansosti, DPM, chief resident at Temple's podiatric surgical residency program and one of the study's authors, about whether it's safe to drive while wearing an immobilization device on the right foot. "We typically advise that it's not safe to drive with any type of device on."

Braking response time while wearing a surgical shoe was still faster than the previously published threshold for normal reaction time of .7 seconds, but abnormally delayed brake responses were significantly more common with both the surgical shoe (18.5%) and the walking boot (55.5%) than with regular shoes (2.5%).

Although the study was conducted in healthy individuals, Sansosti said the results indicate that patients should not drive with a walking boot or surgical shoe on the right foot. The findings are consistent with those of previous studies on lower extremity immobilization and braking response (see "Driving safety: The effects of lower extremity impairment," LER, July 2015, page 18).

Notable because of its inclusion of a surgical shoe, the JFAS study is also the first of six the Temple researchers have in the works on driving and lower extremity immobilization. Three of the studies focus on diabetes, Sansosti said, while another looks at driving restrictions and guidelines for wearing lower extremity immobilization devices by state. The final study summarizes the results of the others.

In the recently published study, participants were instructed to brake when red lights appeared on the monitor of the driving simulator. The researchers also monitored for inaccurate brake responses, defined as the patient inadvertently pressing the accelerator along with the brake pedal. This occurred in 4% of cases with the surgical shoe and 18% with walking boot; only the walking boot condition differed significantly from the regular shoe condition (2% of cases).

Driving restrictions can present logistical and socioeconomic challenges for patients, Sansosti noted. However, public transportation in cities like Philadelphia can be an option, and many postoperative patients are accompanied to visits by a family member or friend, she said.

Inadvertently pressing the accelerator along with the brake pedal occurred more frequently when participants wore a walking boot.

"I feel like most of our patients do listen to our recommendation about not driving," Sansosti said.

Good compliance may be easier to come by in cases involving planned surgeries than in patients who end up with a lower extremity immobilization device after a traumatic accident. Geoffrey S. Maracek, MD, assistant professor of orthopaedic surgery at University of Southern California Keck School of Medicine in Los Angeles, works with such trauma patients and coauthored a 2013 review article in the Journal of the American Academy of Orthopaedic Surgeons on driving after orthopedic surgery.

In his clinic, he has handouts about the issue for patients.

"I try to talk to them about why they shouldn't drive," Maracek said. "I say, 'It's not about you. It's about everyone else in the road. If the neighbor's kid runs into the street after a ball, do you think you can stop?'"

Maracek agreed with the Temple authors that, if a patient can't wear a regular shoe because of surgery or injury, it's probably not a great idea for them to drive. Such patients are likely to have more impaired neuromuscular control than the healthy volunteers in the JFAS study and others, he noted.

"I think it's pretty clear that, if you're wearing an immobilization device, you shouldn't be driving," Maracek said. "You don't have tactile feedback or motion."

However, he added, a device could potentially be removed for driving in specific situations not involving a recent surgery or fracture—in the case of a patient with posterior tibial tendinitis, for example.

The brake response findings in the Temple study are particularly interesting, Maracek said.

"It's one thing to say that reaction time is impaired, but even your ability to step on the gas is impaired," he said. "That highlights the idea that even more people shouldn't be driving."

Lori Roniger is a freelance writer based in San Francisco.

Sources:
Shoe Showcase: Help your patients step out in style

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Managing foot and ankle injuries in soccer players

By Howard Kashefsky, DPM

Soccer is the most popular sport in the world, with 265 million male and female players (4% of the world’s population), and the game’s injuries are associated with a whopping estimated annual cost of US $30 billion per year. Soccer is the third-most played team sport in the US, behind only basketball and baseball/softball. Growth of the game has been steady in the US, rising from 13 million Americans in 2009 to 18 million Americans in 2012; 78% of players are younger than 18 years. In the 1990s, soccer was recognized as the fastest-growing college and high school sport in the US.

Growth has been highest among young women since the US women’s soccer team won the World Cup in 1991, 1999, and 2015. In the US, 35% of soccer players are women, one of the highest percentages of female participation in the sport in the world. Female participation in US high school soccer has risen by more than 177% since 1990.

Foot and ankle injuries in soccer

In a study by Öztekin et al of 200 soccer players on natural grass, 66 (33%) reported foot and ankle symptoms. The following mechanisms of injury were reported listed from highest to lowest incidence:

- Direct player-to-player contact (32%)
- Overuse (26%)
- Tripping on the grass (10.5%)
- Landing (7.5%)
- Jumping and jumping/landing (7.5%)
- Tackling (4.5%)
- Being tackled (4.5%)
- Shooting (3%)
- Kicking and kicking/shooting (3%)
- Sprinting (1.5%)
- Tripping on the grass (10.5%)
- Landing (7.5%)
- Jumping and jumping/landing (7.5%)
- Tackling (4.5%)
- Being tackled (4.5%)
- Shooting (3%)
- Kicking and kicking/shooting (3%)
- Sprinting (1.5%)

Of all foot and ankle injuries in soccer, ankle sprains are the most common (80%), followed by bruises (9%-49%) and tendon lesions (2%-23%). Fractures are rare, accounting for only 1% of all ankle injuries in soccer.

Soccer players with a history of ankle sprain are 4.9 times more likely to have a recurrence than those with no history. Other factors associated with ankle sprains are cavus foot type, ankle instability, joint laxity, reduced lower extremity strength, and anatomic misalignment. Approximately 80% of ankle sprains can achieve full recovery; the remaining portion may have chronic instability. Physical therapy, including positional training, may help with recovery and prevention. Acutely, a period of short-term immobilization along with rest, ice, compression, and elevation as well as nonsteroidal anti-inflammatory drugs (NSAIDs), followed by therapy, is useful in the vast majority of cases. However, some cases that remain problematic may require surgery; for example, a direct anatomic ligament repair using a modified Broström-Gould procedure.

In my experience, magnetic resonance imaging (MRI) and computed tomography may be indicated in addition to x-rays when there is a deeper nonlocalized pain and osteochondral lesions of the talus or other less common injuries of the ankle joint complex are suspected. Some studies suggest these lesions may respond to platelet-rich plasma, though this topic is controversial. In athletes that do not respond to conservative care for osteochondral lesions, defects of the talus may require repair. Surgical intervention for osteochondral lesions depends on the size and location of the defect.

Repetitive ankle injuries can lead to arthritis. Analysis shows retired professional soccer players are more predisposed to ankle arthritis than the general population.

Another more insidious injury to the ankle is anterior ankle impingement, which has been reported to affect up to 60% of soccer players. It is believed to be related to microtrauma from repetitive ball impact. The anterior tibial area may develop swelling and pain related to a bone spur blocking normal range of dorsiflexion motion. Treatment of cases that fail conservative care could include arthroscopic or open debridement to improve ankle dorsiflexion and reduce pain and swelling.

Posterior ankle impingement is associated with pain during ankle movement, particularly in plantar flexion. Possible causes include Achilles or flexor hallucis tendinopathies; retrocalcaneal bursitis; or trigonum syndrome; and bone, osteochondral, or neurovascular lesions that involve the Stieda process and fractures. About 60% can avoid surgery; operative management is typically arthroscopic.

Tendon injuries in soccer

Achilles tendon disorders account for 2.5% of all injuries and 3.8% of layoff times in men’s professional soccer, and the frequency varies considerably from country to country. The disorders are most common in older players, and most involve gradual onset of tendinopathy, with 4% involving acute partial or total ruptures. Although there may be disagreement about whether surgical or nonsurgical treatment is the best option, operation appears to be more suitable for athletes due to the faster return to previous activities and the lower rerupture rate. Although injury to the Achilles is most common, injuries to the posterior tibial tendon, flexor hallucis
Plantar fasciitis in soccer

Plantar fasciitis occurs frequently in all running-related sports; in my experience soccer is no exception. It is underreported in the soccer injury literature, and in my opinion this is likely because it is self-treated and often self-limiting. Rarely, it becomes chronic and leads to fasciosis and long-term problems.

Some soccer cleat manufacturers have now incorporated ethylene vinyl acetate (EVA) foam into the heel along with other design features to reduce trauma to the soft tissue. In addition to EVA, athletes suffering from plantar fasciitis should wear a soccer cleat with arch support to take stress off the ligament on the bottom of the foot.

Foot orthoses have been established as helpful for plantar fasciitis in the general population. Some prefabricated foot orthoses include shock-absorbing silicone and have a low-profile carbon clip for fitting into soccer cleats; in my experience this type of design has been widely accepted by trainers and athletes. Labs also can create custom orthotic devices with gel on the heel for soccer cleats; however, the shoes need to be sent to the lab along with the impressions for proper fitting into low-volume soccer cleats. Turnaround time for custom device fabrication is also a consideration, since players will want to return to sport as soon as possible.

My experience has led me to develop a plantar fasciitis kit to be used by both athletes and the general population along with training modifications. In the clinic, I have found successful outcomes often require the use of multiple modalities, and the plantar fasciitis kit reflects that. The kit includes compression, night splints, fasciitis-specific orthoses with cushion in heel, and a trigger point tool. Lee et al demonstrated that combining some of these modalities, such as the night splint and foot orthoses, can lead to better outcomes than foot orthoses alone. Of note, I recommend night splint use for just two hours per day in the evening, rather than all night, as most patients do not sleep well while wearing them; in my experience, this recommendation has not had a negative effect on outcomes. Night splint dosage has not been studied, but it may be useful.

The plantar fascia can rupture completely, and this has been reported in soccer players. Such a case was reported in 2016 by Pascoe and Mazzola. The athlete had immediate pain rather than gradual onset, which led to a high suspicion of a tear and was later confirmed by MRI as an acute tear of the plantar fascia.

An ounce of prevention

The use of foot orthoses for prevention of overuse injury remains controversial. Some studies show they clearly help, while others do not. In my personal experience, orthoses can have preventive benefits in some cases, but predicting which athletes will benefit most and determining how best to write a prescription for each individual is currently more of an art than a science.

In a recent systematic review of preventive interventions for Achilles tendinopathy, Peters et al found limited evidence to support a long-term intervention including balance training. Shoe adaptations in the form of shock-absorbing insoles could have a preventive effect on Achilles tendinopathy. Hormone replacement therapy seems to reduce the risk for structural Achilles tendon changes in active postmenopausal women. No evidence was found for a positive effect of stretching exercises.

A meta-analysis by Grimm et al of studies on ankle injury prevention programs in soccer players identified a significant reduction in injury risk. The interventions utilized included neuromuscular, proprioceptive, strengthening, and stretching exercises.

More research needs to be done to unify the multiple medical fields involved in managing care of soccer players and to develop strategies for preventing foot and ankle injuries in these athletes.

Conclusion

Soccer is a growing sport in the US, especially among young women. Lower extremity specialists need to be familiar with injuries that will occur and the data surrounding these injuries to best diagnose and manage them. With your help, the soccer players you treat will be better able to bend it like Beckham!
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Can activity monitoring improve wound healing?

Typical interventions in patients with active diabetic foot ulcers include offloading devices and a decrease in activity. And an increasing number of tools are becoming available to help lower extremity clinicians determine how well their patients are actually adhering to such interventions.

By Cary Groner

Caring for the lower extremity complications of diabetes is complex and demanding. Peripheral neuropathy affects more than half of diabetes patients and is associated with an increased risk of diabetic foot ulcers, which themselves raise a patient’s chances of infection, amputation, and death.1 And, although LER reported in 2011 on research showing weightbearing exercise is generally good for neuropathy patients and doesn’t increase plantar ulcer risk2—particularly if the regimen is consistent and avoids sudden spikes of activity3—clinicians agree exercise must be modified when an ulcer is present.

In people without diabetes, this is, to some extent, common sense: You’re less likely to go for a run if your new shoes just gave you a painful blister. But, due to decreased sensation in the extremities, patients with neuropathy often don’t realize they’re getting an ulcer until it has already formed.1

Aside from appropriate wound care, typical interventions include offloading and a decrease in activity.4 Clinicians acknowledge these two may go hand in hand, moreover, in that certain offloading strategies such as total contact casts (TCCs), by their nature, make it harder for patients to remain active. And an increasing number of tools are available with which clinicians can determine how well patients are actually adhering to such limitations, particularly when removable devices are prescribed.

Moving targets

“There’s a difference between recommended activity levels for prevention and those once an ulcer is present,” said Michael Mueller, PT, PhD, a professor of physical therapy at the Washington University School of Medicine in St. Louis. “Once a foot has an ulcer, it’s an insidious process, and the risk of subsequent ulcers and amputations shoots up. You have to protect that tissue to allow it to heal, but there lies the dilemma, because ideally you’d want that person to remain active and continue to stress the other tissues so they don’t deteriorate.”

So how to strike a balance?

“That’s the million-dollar question,” Mueller said. “Every patient

Certain strategies for offloading diabetic foot ulcers, such as total contact casts, may help promote wound healing by making it difficult for patients to remain active.
is different, and the decisions you make have to relate to their disease status, their prior activity levels, how much deformity they have, and what their peripheral blood flow is like; there’s a list of variables that create a moving target.”

For Mueller, the best clinical approach is fairly traditional: unload the area and gradually increase activity when the ulcer has healed. But questions remain.

“From a clinical standpoint, once those tissues are healed and we begin to stress them again, that’s where we know the least,” he said. “The beauty of total contact casts, as well as more recent alternatives such as the walking boot and other offloading devices, is that they allow the patient to be up and around but reduce localized tissue stress. We want to minimize what is often a high rate of reulceration, because getting it healed is a big deal, but keeping it healed is even more challenging.”

Michael Pinzur, MD, a professor of orthopedic surgery and rehabilitation at Loyola University Medical Center in Maywood, IL, agreed it can be demanding to devise treatment plans for a diverse group of patients. He emphasized, however, that offloading doesn’t mean non-weightbearing, but rather a redistribution of load over a bigger surface area, which can be accomplished in a number of ways.

“The value of the total contact cast is not only that it distributes load, but that it decreases shear, and shear is the real enemy,” Pinzur explained. “If you put patients in a TCC you control swelling, decrease shear, and distribute load. A walking boot will do nearly as well, and in some cases you can use a shoe with an elastic dressing. There are many options, and it depends on the patient’s unique combination of static and dynamic factors.”

**Complications**

A variety of issues complicate decisions about which offloading device to prescribe, partly because patients may be more active in some than in others at a time when activity isn’t necessarily a good thing. A 2013 Cochrane review concluded that nonremovable TCCs are the most effective means of healing diabetic foot ulcers. Despite such findings—and the clinicians LER spoke with were all well familiar with the research—removable cast walkers are prescribed much more often.

The problem is that, although such walkers provide offloading equivalent to that of TCCs, they’re associated with poorer outcomes, and most clinicians suspect this is because patients remove them. In fact, studies have found a direct association between wound healing and how much removable devices were actually worn, and one paper determined that unprotected standing may pose even more of a threat than walking. Investigators have shown patients tend to be noncompliant for reasons that include the devices’ weight, their effects on gait, and most important, their negative influence on postural stability.

“Total contact casts get the best outcomes,” said Ryan Crews, MS, CCRP, a clinical research scientist and an assistant professor in the Department of Podiatric Surgery and Applied Biomechanics at Rosalind Franklin University in Chicago. “But, from a practical standpoint, people are using a lot more of the removable devices.”

An issue closely related to compliance has to do with the nature of the impairments associated with neuropathy. The condition often entails more than a loss of sensory input from the extremities; it can also lead to muscle weakness and atrophy that affect motor control, and all these factors together may impair joint stability and balance. Neuropathy has cognitive implications, as well.

“You hear complaints that diabetic patients are noncompliant with treatment,” Pinzur said. “But your brain is made of nerves, and people with neuropathy tend to have cognitive and judgment deficits.”

David Armstrong, DPM, MD, PhD, a professor of surgery and codirector of the Southern Arizona Limb Salvage Alliance (SALSA) at the University of Arizona College of Medicine in Tucson, concurred.

“Diabetic neuropathy can cause serious damage to the gray matter of the brain,” he said, “which is a major component of the central nervous system involved in touch and pain perception.” These patients have lost the gift of pain, so we need strategies that accommodate differences in behavior and may even serve as sensory substitutes.

With regard to activity, those strategies include monitoring devices such as insoles that alert patients when they exceed a pressure threshold level in a high-risk region of the plantar surface, specialized mats that detect significant asymmetries in skin temperature between feet, and activity monitors that let clinicians know the extent to which patients are using their offloading devices.

Activity monitors often have been used for research, which has consistently documented poor compliance with device wear. UK investigators reported that only 22% of their patients wore their prescribed footwear all day, and a similar US study found that just 28% of patients wore theirs more than 80% of the day. Such data have obvious implications for clinicians’ activity recommendations.

“Ideally, I’d like to be able to titrate activity the way we titrate a drug,” Armstrong said. “These relatively inexpensive tools let us track activity, or modify it based on plantar temperatures.”

Not everyone agrees on the practical value of such technology, however. For example, Mike Mueller told LER that, in his experience, plantar thermometry faces challenges that may limit the extent to which it is used outside of the research setting.

“We’ve found temperature measures to be highly variable,” Mueller said. “We have people coming in every day with differences of four degrees between areas of their feet, but there weren’t any other signs of inflammation or problems. At the beginning we tried to get them to limit their activity, but it happened so frequently that people would finally say they couldn’t do it. The temperature differences didn’t seem to have any negative repercussions, so the bottom line was that, in our hands, the approach wasn’t all that sensitive.”

Mueller noted his team’s methods weren’t identical to those described by Lavery and Armstrong, which might have partly explained the discrepancy.

Armstrong, who has served on the scientific advisory boards of companies that make monitoring devices, responded that the relative usefulness of such interventions depends partly on the severity of the patient’s condition.

“These kinds of tools don’t help very low-risk patients,” Armstrong explained. “But the higher risk you get, the more event rates you get, so the less you’re crying wolf. Another benefit we’re seeing with the tools that are measuring many spots is that you can use the mathematics of machine learning to look for patterns that might be too complicated for one person to get if they’re just manually checking ten spots on each side. As with a lot of such tools, the key is to filter, to find the optimal combination of sensitivity and specificity.”

Again, in this context, the discussion frequently returns to an individual patient’s capabilities.

“I’m not saying temperature monitoring isn’t useful,” Mueller said. “But patients get easily frustrated and overwhelmed, and they’re loath to follow lots of instructions. If they can’t manage
factors such as blood glucose, how are they going to manage how many steps they take in a day?”

To address such concerns, some clinicians are collaborating to develop monitoring systems that shift some responsibility from the patient to the physician. Joseph LeMaster, MD, MPH, an associate professor in the Department of Family Medicine at the University of Kansas Medical Center in Kansas City, is working with Armstrong on such a proposal, but there’s work to be done.

“Implementation at the practice level would require facilitation of staff, including nurses and doctors, and providing support for those practices that aren’t currently in place or reimbursed, including various types of monitoring devices,” LeMaster said. “Again, though, the issue is not only can you get it reimbursed, but can you get people to use it?”

For Ryan Crews, monitoring might also be useful to bolster treatment decisions.

“If you start by default with a removable device, but you see that the patient isn’t wearing it, having those objective data could give you justification for switching to something the patient can’t remove,” Crews pointed out.

**Keep moving, folks**

One challenge for clinicians, of course, is finding ways to heal an ulcer without the rest of a patient’s body crumbling due to inactivity.

“I think we need to develop treatments that let the patient be as functional as possible, because if they heal with nonweightbearing and then break down again as soon as they’re bearing weight, you’ve wasted that whole period of their life,” Pinzur said.

He added that clinicians must assess a variety of variables to make decisions about a patient’s appropriate activity level. These include quality of diabetes control, cognitive capabilities, and wound classification.

“I use different modalities in different patients depending on my assessment of their risk,” Pinzur said.

Crews and his colleagues are developing innovative ways around the activity limitations imposed by diabetic foot ulcers.

“We want to figure out how to let patients be active but keep the wound safe,” he said. “One idea is that they could be on a stationary bike and use a nonstandard cleat to restrict the stress to the nonwounded area of the foot.”

In a recent study testing this approach in individuals at risk for developing foot ulcers, Crews reported the cleat significantly reduced forefoot plantar pressure and improved tissue perfusion without increasing foot temperature, suggesting it could now be tried in patients with active ulcers.18 The paper noted there are a number of mechanisms by which exercise could benefit ulcer healing, including improved microcirculation in the foot, which would increase nutrient and oxygen delivery to a wound and possibly enhance the body’s anti-inflammatory responses as well.

“Ultimately, our goal is to find a way for patients to stay active without making the wound worse,” Crews said.

As he and other researchers continue to develop such approaches, patients may find themselves with healing options that include more overall activity.

Cary Groner is a freelance writer in the San Francisco Bay Area.

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Popularity of high heels wanes, but issues remain

Foot health experts say that, overall, women are less enthusiastic about high-heeled shoes and smarter about wearing them in moderation. But those who still feel the need to wear heels in professional or social situations can benefit from clinicians’ advice and, at times, footwear modifications.

By Lori Roniger

Although many women no longer feel compelled to wear high heels for work or socializing, a check of the headlines indicates there are still instances in which women are required or pressured to wear them.

At the 2015 Cannes Film Festival, multiple women—some with medical conditions—were famously turned away from screening events for wearing rhinestone flats rather than heels.1 Cocktail waitresses at Foxwoods Resort Casino in Mashantucket, CT, complied with their employer’s 2-inch heel requirement for decades until their union successfully quashed it in 2013.2 A similar 2015 case in East London, involving a receptionist sent home for failing to wear shoes with a 2- to 4-inch heel, led to union involvement as well as scrutiny of prime minister Theresa May’s well-known fondness for kitten heels.3,4 And in 2013, the US Defense Intelligence Agency—helmed at the time by Lt. Gen. Mike Flynn, president-elect Donald Trump’s choice for national security advisor—included a “no flats” policy among its dress-code requirements for women.5

The good news is foot care experts say that, overall, their patients and the general population have become more savvy in recent years about the risks of high-heeled shoe wear and are prioritizing foot comfort and health more than in the past.

“I think people are becoming smarter about their shoes nowadays,” said Naleen Prasad, DPM, who is in private practice at Bay Area Foot Care in Castro Valley and Dublin, CA. “They are choosing comfort.”

Nevertheless, some women still do prefer to wear heels for work or play—whether they are pressured to do, feel certain styles are more appropriate in the workplace or at formal social events, or simply like the aesthetics of a higher heel. These footwear choices can negatively affect ankle strength and Achilles tendon structure, contribute to the development of bunions and other forefoot deformities, and alter gait mechanics in ways that can increase the risk of knee and hip osteoarthritis (see “High heels: Elevating the discussion,” October 2014, page 16).

Modifications, including foot orthoses and padding, can help adjust a fashion-forward shoe to better fit a woman’s foot, rather than forcing her foot to adjust to the shoe.
Women who come to see foot care practitioners after developing foot pain and problems due to wearing high heels are more likely to be ready to make a change than in the past, practitioners say. But practitioners also know that footwear trends related to heels and other attributes come and go and that, although they say the popularity of high-heeled shoes seems to have receded in recent years, they could come striding back.

That’s one reason why some practitioners avoid banning heels completely, instead advising moderation with regard to heel heights, styles, and time spent wearing them.

“Treat it like dessert,” said Jane Anderson, DPM, who practices at Chapel Hill Foot and Ankle Associates in North Carolina, of the advice she gives her patients.

**Style sensibility**

Anderson said she sees some professionals, such as lawyers and salespeople, who feel that high-heeled styles are the most appropriate for their work.

“Usually I will try to guide them to find something that is better for their feet,” she said. “There are some options out there and certainly sensible ways to wear high heels.”

Shoes contribute to the problem in many of Anderson’s female patients who consult her about foot pain. They may have conditions such as metatarsalgia, neuromas, or bunions. She spends a lot of time talking to her patients about the kinds of shoes that they wear.

Patients will come into her office in heels, and she advises, as do other foot-care practitioners, that they wear shoes no higher than 2 inches.

“Two inches and lower is the safest way to wear heels,” Anderson said.

She’ll ask her patients to take off their shoes and measure them in her office, and she’s found that many of them believe their heels are shorter than they are.

“People are usually off by an inch,” Anderson said.

Anderson advises patients to look for shoes with soft flexible uppers and a round toe box. A chunkier heel can be more stable than a narrow stiletto type, she said. For women with ankle instability and high arches who want to wear a heeled or dressy shoe, Prasad recommends a thick strap that wraps around the ankle.

Anderson noted that there are now many European brands and some American ones that are well made, good for feet, look polished, and come in a variety of widths and heel heights. Many are available at online stores that offer free returns to help customers find the best fit.

**Moderation and modifications**

Grace Torres-Hodges, DPM, who practices in Pensacola, FL, also helps women wear heels in ways that are better for their bodies.

“For healthy feet, my constant mantra for women regarding heels is moderation,” she said.

Anderson also recommends wearing heels for only limited periods and alternating heeled shoes with flats. Otherwise, an individual’s musculature can shorten and it can become difficult to wear flat shoes. Some of her patients can’t wear athletic shoes because they have worn heels so much.

“It’s important to switch it up,” she said.

Shoe modifications, including foot orthoses, are another trick practitioners use; such modifications can help adjust a shoe to better fit a foot, rather than forcing the foot to adjust to a shoe, Torres-Hodges said.

“If a pair of shoes is causing neuroma pain or is exacerbating the bad biomechanics already associated with bunions and hammertoes, many times a modification in the shoe can be made directly or an orthotic can be used to hold the foot in a different position,” she said.

If a patient with metatarsal pain brings in a heeled shoe to wear at a special event, Prasad may place padding in the shoe. She thinks women are being smarter about how they’re wearing heeled shoes, like taking them off to dance at a wedding rather than wearing them all night.

“It’s not like you can’t wear those high heels,” she said. “You can be smart about it.”

Likewise, Torres-Hodges said, there are some people who like to wear heels socially regardless of the pain or physical problems they cause. And, if a bride, say, has a shoe that she absolutely wants to wear, Torres-Hodges will adjust it to the patient with padding or orthoses. In some cases, a metatarsal pad can help.

But some shoes—those with a 3- to 5-inch heel, for example—simply won’t make the cut.

“My advice would be that it’s not the best designed shoe for them,” Torres-Hodges said.

And there are also times when Torres-Hodges will recommend a patient take a break from heels altogether.

“When a patient comes in for treatment, it is usually the result Continued on page 22
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of pain,” Torres-Hodges said. “If the shoes that they wear at work, such as heels, are causing their problem, I am quite frank with them that, in order to heal, they would have to discontinue wearing them for either a period of time or for good. My priority is protecting the health of the foot.”

Platform strategies
Prasad recommends platform-type heels or boots with a little wedge and said they can work well for women who want or are required to dress up.

“I am not against heels completely because there are certain high heels that will work,” she said.

She explained that the ratio of heel height to platform height is key. So, if a shoe has a 1-inch platform and a 3-inch heel, it will balance out to a heel elevation of 2 inches.

“There are many brands that make very good heels,” she said.

Torres-Hodges will also recommend platform styles for patients who feel the need to wear heels.

“Perhaps because I live in a beach community, I have not had an instance where a patient was required to wear high heels and not given options or an opportunity for modifications,” she said. “However, if their job encourages them to have a specific look, I try to work with their requirement to look for a platform shoe rather than a steep angle in a high heel.”

With her patients who prefer to wear heels, Prasad likes to look at the shoes herself.

“I ask them to bring their dressy shoes to me so we can decide what will work and not work,” she said.

Prasad recommends examining the angle of the heel of a shoe, noting that, in her clinical experience, a heel that is oriented perpendicular to the floor can contribute to back pain.

“If the heel is pointed straight up and down, it’s not going to be comfortable,” she said. “We all have back issues. It really puts pressure on our backs.”

She said that a block heel that is angled forward slightly and gradually tapered at the bottom will work better.

“Those shoes are much more comfortable,” she said.

The opposite extreme
Prasad said she doesn’t see high heels as the biggest type of shoe problem in women.

“I’m not as against heels as I am against ballet flats,” she said, referring to the type of flat shoes that lack arch support, which can affect biomechanics.

Torres-Hodges agreed that wearing flats, including flip-flops, can also be a problem.

“If you go to extremes with high heels or flats, you’re begging for some issues to occur,” she said.

While helping women find better footwear or at least modifying existing problematic shoes can prevent or improve foot problems in women, some practitioners also recommend exercises.
Torres-Hodges said the lawyers and bankers among her patients do wear sensible shoes.

“Because heels shorten the Achilles tendon, any exercise that stretches it is helpful,” she said. “This can include static dorsiflexion at the ankle. TOes raises and dips allow contraction and lengthening of the tendon. The medial and lateral aspects of the ankle joints can also use conditioning. Some exercises include drawing the alphabet with your foot, ankle circles clockwise and counterclockwise, and using a wobble board.”

Girls have now grown up with an emphasis on the importance of healthy feet and comfort and without the stereotype that women must regularly wear heels.

Choosing comfort
Overall, practitioners said the number of patients wearing heels and coming in with problems related to them has been waning.

“We’ve harped on it for a long time,” Torres-Hodges said.

While in the 1990s, women in New York City and other urban areas were just starting to commute in athletic shoes and keep dressier shoes in the office to wear during the day, practitioners said some of their patients now will slip on their heels just for business meetings.

Torres-Hodges said the lawyers and bankers among her patients do wear sensible shoes.

“That’s the one part where they’ll compromise,” she said regarding what they wear.

She said that girls have now grown up having the importance of healthy feet and comfort emphasized and without the stereotype that women must wear heels. Around five or six years ago, she said, she was seeing tweens wearing higher heels, but that trend has abated.

Prasad, who sees many pediatric female patients, agreed, noting that a few years ago, girls were also wearing flat sneaker-type shoes that didn’t have a lot of support.

“They are choosing comfort these days,” she said.

Torres-Hodges noted she will push her recommendation for proper footwear harder in tween and teen patients than in adults. Wearing platform shoes or heels at that age may not allow the foot to develop properly and can have other negative effects, she said.

I was pleased when my 10-year-old daughter said recently that heels should be worn only occasionally, for special events. She has, after all, grown up with a mom who writes about biomechanical issues and rarely wears heels these days.

But might the high-heeled footwear choices of prominent women, such as British royal Kate Middleton or Donald Trump’s daughter Ivanka, influence future fashion trends? Torres-Hodges doesn’t think so.

“I don’t predict it in my neck of the woods,” she said.

Lori Roniger is a freelance writer based in San Francisco.
References are available at lerfoothealth.com.

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