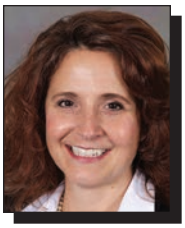

Michelle Butterworth, DPM

Patrick DeHeer, DPM

Sean Grambart, DPM

Don Peacock, DPM

Lowell Weil. Jr., DPM

David Yeager, DPM

Surgery 2016: Innovation, Education, and EBM

Our experts discuss the latest clinical innovations, emerging trends, and economic challenges in the field.

BY MARC HASPEL, DPM

With the establishment of standard three-year post-graduate training in podiatric surgery becoming the norm in this profession, the practice of podiatric surgery has never been more vibrant. Everyday new techniques and modalities are being introduced to enhance this area of practice. Despite its proliferation, however, surgical podiatry is not without some major challenges. Of course, there is a generally-acknowledged decline in surgical reimbursements (especially in light of the new MACRA regulations about to be put in place), the increased potential for medical-legal exposure, as well as the always looming possibility of surgical complications.

Nevertheless, podiatric physicians continue to operate on the general public in significant numbers (and trending toward an increase).

Podiatry Management Magazine has invited several prominent podiatric surgeons to discuss various issues related to the field. In addition to addressing some of the aforementioned topics, each has generously shared a personal podiatric surgical experience that profoundly affected a patient's life. Joining this roundtable panel:

Michelle Butterworth, DPM is in private practice at Pee Dee foot center in Kingstree, South Carolina. She is a past president of the American College of Foot and Ankle Surgeons, past president of the South Carolina Podiatric Medical Association, serves on the board of directors for the Podiatry Institute, and on the credentials and examination committees for the American Board of Foot and Ankle Surgery. She is also chief of the medical staff at Williamsburg Regional Hospital, and is a councilmember for the town of Kingstree.

Patrick DeHeer, DPM is a member of the American Podiatric Medical Association, and a fellow of the American Society of Podiatric Surgeons, American College of Foot and Ankle Pediatrics, and American College of Foot and Ankle Surgeons. He is a diplomat of the American Board of Foot and Ankle Surgery certified in foot surgery and reconstructive foot and ankle surgery, and is in private practice in Central Indiana. He is the team podiatrist for the Indiana Pacers and Indiana Fever. Dr. DeHeer serves as a trustee on the APMA Board of Trustees and is currently serving as Legislative Committee Chair for APMA. Dr. DeHeer is past President of the Indiana Podiatric Medical Association and serves as continuing education chairperson.

Sean Grambart, DPM is President of the American College of Foot and Ankle Surgeons and practices in Champaign, IL.

Don Peacock, DPM is in private practice in his hometown of Whiteville, North Carolina. He is board certified by the American Board of Foot and Ankle Surgery and is a full professor in the Academy of Ambulatory Foot and Ankle Surgery. He has a particular interest in exposing traditionally trained podiatric surgeons to minimally invasive surgical approaches to common foot and ankle deformities.

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Lowell Weil. Jr., DPM is chief executive officer of Weil Foot & Ankle USA, which has over 40 podiatric physicians in seven states. He is the Founding Partner of Foot & Ankle Business Innovations (FABI) and fellowship director at Weil Foot & Ankle Institute, which has the longest running fellowship in reconstructive foot and ankle surgery in the profession. He has served as Editor of *Foot and Ankle Specialist,* which is the only combined podiatric/orthopedic peer-reviewed journal in the world. He has published over 50 peer-reviewed papers, articles, and book chapters on foot and ankle surgery. He has lectured in 15 countries, on five continents, and 30 states on foot and ankle surgery.

David Yeager, DPM graduated from the Scholl College of Podiatric Medicine in 2000 and finished his residency at the Cambridge Health Alliance Hospital affiliated with Harvard Medical School. He is board certified in Foot and Reconstructive Rearfoot and Ankle Surgery. He is the past chair of the American Society of Podiatric Surgeons and is residency director for the KSB Hospital Podiatric and Surgical Residency Program. He recently was elected to the APMA Board of Trustees.

PM: *What role does foot surgery play in the practice of contemporary podiatric medicine?*

Weil: Unlike most surgical subspecialties, doctors of podiatric medicine have the ability to treat patients both conservatively and surgically for their problems, depending on what is best. This profession has distinguished itself among all others that treat the foot and ankle, by being able to utilize so many different treatment options. When my father (Lowell Weil, Sr., DPM) started practicing in 1965, there was very little surgery being performed on people with foot and ankle problems. Foot and ankle surgery has dramatically evolved in the ensuing 51 years. Technology, innovations, research and understanding have given foot and ankle surgeons worldwide so many tools in order to conservatively and surgically manage patients. As the premier providers of foot and ankle care, podiatric physicians will always be at the forefront of surgical care.

Podiatric surgeons, moreover, need to continue to innovate, teach and perform evidence-based research to show the rest of the world what they know. There are truly amazing people in this profession who continue to push the boundaries and question the status quo in order to create better surgical options for their patients.

Podiatric surgeons need to continue to innovate, teach and perform evidence-based research to show the rest of the world what they know.—Weil

I don't believe, however, that every podiatric medical school graduate needs to perform surgery to validate their importance to patient care. Somewhere along the way, an assumption was made that every student entering podiatric medical school was to become a foot and ankle surgeon. This is not the case in medical or osteopathic school. Only a small percentage of those people become surgeons. I believe we should re-think this aspect of our profession. Non-surgical care is inherent in the podiatric paradigm of care, and individuals should not be ashamed for that to be their calling.

Butterworth: I also believe that surgical procedures have proliferated in contemporary podiatric medicine. Advances in both technique, technology, and outcomes have improved. Also, with patients living longer and leading more active lifestyles, I believe they are opting more for surgical reconstruction of their deformities. They want to be active, be on their feet, and be as pain-free as possible.

Yeager: Foot and ankle surgery plays an integral role in the practice of contemporary podiatric medicine. As the level of care for patients continues to evolve with the progression of technology and the associated surgical procedures, podiatric physicians must continue to embrace the strong correlation between surgery and podiatric medicine.

DeHeer: The role of surgery in the practice of contemporary podiatric medicine depends on the practice. I believe with three-year surgical residency programs as the standard, more podiatric physicians will incorporate surgery into their practices to various degrees. There is a role for non-surgical podiatric physicians as well. My practice is a mix of all facets of practice, and that is the way I prefer it.

Peacock: Foot surgery is, and will, remain a major part of the contemporary podiatric medical practice. Podiatric surgeons are the most qualified medical providers to surgically manage foot pathologies recalcitrant to conservative care. This is especially true with surgical interventions in the diabetic population. Podiatric surgeons will continue to see a significant demand for their surgical services in the future.

PM: *Under what circumstances would you consider surgical treatment for plantar fasciitis? Which techniques do you employ (e.g., shockwave, platelet-rich plasma, endoscopic plantar fasciotomy, etc.) and why?*

Grambart: I think patients need to fail a good course of conservative treatment before undergoing surgical treatment. I also believe, notwithstanding, that there are two separate entities in this area: one is plantar fasciitis and the other is plantar fasciosis. Typical plantar fasciitis will

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resolve on its own. Limiting activities, anti-inflammatories, therapy, steroid injections, and proper footwear will allow plantar fasciitis to resolve; that being said, typical patients who have had pain in their heels for three months with classic post-static dyskinesia. Plantar fasciosis or degeneration, on the other hand, is a different entity. These are patients who present with chronic heel pain for well over a year, have likely tried the above-mentioned regimen, and have no redness or swelling. These patients have pain all of the time. I usually order MRIs to evaluate the extent of the degenerative processes. In the presence of thickening of the fascia with a speckled pattern of degeneration, I favor a gastrocnemius recession with injection of platelet-rich plasma. This technique has been highly successful with a good recovery. Patients are weight-bearing in a boot post-operatively, and after two weeks can start to wean off the boot as tolerated. If there is severe degeneration, then I prefer a gastrocnemius recession with open, plantar-approach plantar fasciotomy. I keep them non-weight-bearing for about ten days, and then allow them to start to wean out of the boot. This takes about four to six weeks.

Yeager: In general, patients who are seen for an initial visit for plantar fasciitis will receive a plantar fascia injection containing 40 mg of Depo-Medrol, and are educated on supportive footgear, stretching, icing, and anti-inflammatory use. In one month, patients are re-evaluated and an additional injection is considered at this time. Other treatment options, including physical therapy, custom orthotics, and surgical intervention are discussed. Patients decide if, and when, they are ready for surgery. In my practice, I choose to do an open plantar fascia release with subcutaneous skin closure. I find that this is the best way to achieve optimal results because the plantar fascia release and excision of the heel spur are clearly visible. The plantar fascia can be sufficiently released while leaving the lateral band well intact. Subcutaneous closure with dissolvable Vicryl allows skin to heal with less incidence of scarring.

Butterworth: Likewise, I will proceed with surgery for plantar fasciitis once conservative therapies have failed to relieve the patient's pain. I will give them several months before I proceed with surgery. My choice of surgical techniques is usually an instep plantar fasciotomy. It's quick and easy, and has a simplified post-operative recovery. It also produces very good surgical results. It relieves the tight plantar fascia, which is typically part of the reason for the plantar fasciitis.

DeHeer: I operate on chronic refractory plantar fasciitis patients when the patients and I are both in agreement that it is the best option for them. I attempt conservative care for at least three months but, most commonly, I employ the standard six months of therapy as a guideline. Every patient is different, so I find it difficult to apply a one-size-fits-all mentality to the decision for surgery. The surgical approach I utilize is a gastrocnemius recession. The literature is clear about the relationship of equinus to plantar fasciitis. There have been four articles published in the orthopedic literature showing excellent results for this approach. One article compared plantar fascia release with gastrocnemius recession. The gastrocnemius recession was significantly better in all measured categories. I have used this approach for the past three years with results similar to the published literature. I believe that plantar fascia release should no longer be utilized.

Peacock: I place enormous importance on foot type when considering surgical treatment for plantar fasciitis. As a general rule, patients who have a flexible rearfoot and a flexible forefoot are not good candidates for plantar fascial release. When surgical treatment is mandated in flexible foot types, I typically employ a subtalar joint implant stabilization, with or without gastrocnemius recession. Conversely, patients that have stable or rigid foot types do well with fascial releases. In fact, rigid foot types (as in cavus foot types) normally experience improvement in foot function following plantar fasciotomy. I prefer micro-debridement of the hypertrophic fascia under ultrasound guidance along with injection of biologics. This method handles recalcitrant plantar fasciitis in all foot types. Shockwave therapy is an additional viable alternative to surgical releases in many patients.

As a general rule, patients who have a flexible rear foot and a flexible forefoot are not good candidates for plantar fascial release.—Peacock

Weil: I think this question is a more complicated one than it initially appears because heel pain is frequently more complex than simply being plantar fasciitis. Podiatric physicians often think of all heel pain as plantar fasciitis, but that is often not the case. Fifteen years ago, I thought that 99% of heel pain was plantar fascia-induced, whether it was plantar fasciitis or plantar fasciosis (chronic scar tissue/damage of the plantar fascia). Today, I feel much differently. There is a combination of things that can cause heel pain, and understanding those entities is paramount to the successful treatment of plantar fasciopathy and heel pain. Utilizing evidence-based protocols, I have been able to successfully treat plantar fasciopathy at a nearly 95% success rate. Utilizing the appropriate conservative protocols will eliminate most heel pain in a matter of months. There are, however, a percentage of patients who are not responsive to appropriate and exhaustive conservative care. They fall into multiple categories including chronic plantar

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fasciopathy, neurogenically induced heel pain, calcaneal bone marrow edema, and others,

When there is chronic fasciopathy, I will discuss ESWT/EPAT, platelet-rich plasma injections, and microfasciotomy. I have been performing ESWT/EPAT for over 16 years, and when there is an accurate diagnosis of plantar fascia problems, over 90% of patients are successfully treated. This treatment is rarely covered by insurance, and is an out-of-pocket expense for patients. The benefits of this procedure are that it is non-invasive and has no complications associated with it. Patients can return to work and life immediately without interference. There is exhaustive peer-reviewed research showing its success, and there are actually twice as many papers showing its efficacy than all other research on surgical treatments for heel pain combined. The out-of-pocket cost has prevented many doctors from utilizing this treatment, but the total expense of it is less than the procedure, recovery, and complications associated with surgery. As people are now having higher and higher deductibles, ESWT/EPAT is often more cost-effective than a surgical procedure with its financial burden of operating room fees, anesthesia fees, etc.

I have used PRP over the last seven to eight years, but rarely on its own. I usually combine it with ESWT/EPAT or with a surgical procedure. Currently, there is limited evidence showing its efficacy; however, I give patients the option of utilizing it with other procedures, and discuss with them the current literature so they can make an informed decision.

If patients want to pursue surgery for financial reasons or their MRI shows pathology that I feel is too substantial for ESWT/EPAT, I utilize a percutaneous microfasciotomy procedure aided with radiofrequency coblation. This procedure allows for patients to return to limited weight-bearing immediately, and return to closed gym shoes with orthotic devices within two to three days of the procedure. In research, 72% of patients were pain free at 12 weeks post-operatively, 83% pain free at six months and 92% at one year. A prospective study of this technique versus percutaneous partial plantar fasciotomy found that only 27% of the fasciotomy group were totally pain-free at one year, versus 92% of the microfasciotomy group. Furthermore, computerized gait analysis showed that there was a change in the gait of the fasciotomy group compared to a normalized gait pattern in the microfasciotomy group. I strongly believe that plantar fascia sparing procedures are best for patients.

When there is a neurologic-induced heel pain, which I believe exists nearly 30% of the time, based on recent research, appropriate diagnosis of origin and treatment lead to better heel pain results. Sometimes, this condition requires surgery. Ten years ago, I performed one nerve release per year. Today, I am much more aware of this potential cause of heel pain, and now do approximately 20-25 nerve releases/year for heel pain.

If substantial bone edema of the calcaneus is present on MRI, I have recently started performing percutaneous injections of calcium phosphate similar to that of knee surgeons who do subchondroplasties. This has been an excellent way to speed up the healing of historically long and frustrating processes for these patients.

Q ***PM:*** *Why have reimbursements generally declined for surgical procedures, and what can be done to counteract this course of events? Furthermore, how do you feel this trend will be influenced by the new MACRA regulations?*

Peacock: Reimbursement for surgical procedures will continue to decline as more private insurances begin to base their reimbursements on Medicare schedules. The new MACRA regulations will further decline payments. Podiatric physicians should begin to expand their service offerings to include modalities that are not covered by insurance companies. Self-pay therapy models such as laser nail treatments, biological injections, shockwave, cosmetic procedures, and other non-covered services, will need to be emphasized. Lastly, podiatric physicians should transfer most of their surgical cases to office settings and learn techniques amendable to these environments, such as minimal incision procedures.

Grambart: Insurance companies as well as hospitals are cutting costs. Decreasing revenue is an easy

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way of doing it. More systems are also moving to RVU reimbursement, which does allow hospitals systems to control physician reimbursement more closely. One of the vital ways that surgeons can help control this is through publishing quality outcome studies. For example, there is discrepancy with insurance companies about length of hospital stay for an ankle arthrodesis. Some allow it, others will not cover a hospital stay. This profession needs to produce the data to show companies what is optimal for surgical outcomes, and what is best for their patients. It needs to be on the forefront in these publications.

The new MACRA will change the playing field quite a bit. My hospital system is already aggressively planning for that. One of the metrics being graded, like many other hospital systems, is patient satisfaction and outcome. It all comes back to quality outcome studies for all parties involved.

Butterworth: While reimbursements for podiatric surgical procedures have declined (as is also the case for many other medical providers), podiatric physicians must continue to be on the forefront of political endeavors for equality of payment. MACRA and quality measures will dictate payments in the future. Research and outcome studies are necessary to validate treatments and procedures.

Yeager: Actually, I find that reimbursements for surgical procedures have not declined. The Medicare Part B Physician Fee Schedule has seen a 0.5% increase in each of the last couple of years and is scheduled to continue to increase by 0.5% each year through 2019. Most private payers follow Medicare's fee schedule to some degree.

MACRA has no impact on the fee schedule. The fee schedule will continue to increase. As most, or all, podiatric physicians will be participating in MIPS when MACRA begins January, 2017, each of the MIPS scores will reflect either a positive, negative, or neutral adjustment to the fee schedules. With the flexibility of MIPS, and the ability for podiatric physicians to demonstrate quality care in many different areas, it will not be difficult to achieve a MIPS score that will actually result in a positive adjustment to their fee schedules, up to a 4% bonus the first year, and rising to a potential 9% bonus in the fourth year under the proposed rule. The surgeries that podiatric physicians perform are often preventative in nature, and aimed to salvage limbs and prevent amputations. In a model that rewards quality and cost-saving care, podiatric physicians are poised to succeed under MACRA and actually increase reimbursements for their work.

DeHeer: On the other hand, I do not think anything can be done to counter declining reimbursements. Ancillary sources of income like surgery centers, pathology labs, and physical therapy partnerships can help to offset declining reimbursements. Additionally, dispensing durable medical equipment in offices not only provides a great service for patients, but is also excellent practice management.

Weil: Surgical procedure reimbursement has gone down in the same way that reimbursements have gone down with all medical care. With the rising costs of healthcare in the United States, government insurance plans have to cut costs. Since surgical procedures have historically been highly reimbursed, they were an easy target to reduce reimbursements. Realistically, very few surgical procedures have been evaluated in high-level evidence-based research. Surgery of the foot and ankle is among the least studied areas of musculoskeletal surgery. As a result, government insurances and private payers utilize that lack of evidence to reduce fees. Physicians in the United States, including surgeons, have allowed that to happen. There has been minimal unified voice to stand up for the rights of surgeons.

When it comes to reducing reimbursement of foot and ankle surgery, the best course of action would be that the podiatric leadership and the foot and ankle orthopedic leadership come together to help improve the payments for all foot and ankle surgeons. Currently, there is very little dialogue between the disciplines. It would be helpful to have a unified voice to combat these problems.

While reimbursements for podiatric surgical procedures have declined (as is also the case for many other medical providers), podiatric physicians must continue to be on the forefront of political endeavors for equality of payment.—Butterworth

When it comes to things like MACRA, it is really difficult to understand how they will determine positive outcomes, especially when it comes to surgery. There are so many factors that come into what success,ncluding psycho-social factors, which are now being measured better in evidence-based research. I believe that MACRA will not only be delayed, but its utilization in surgery will be much later in implementation than in other types of medicine where outcomes are more easily measured. It is important that outcomes be incorporated in the future of reimbursements. I believe the future of medicine is outcome-based payment. It rewards the physicians who perform the best care. The problem is creating measurement tools that are reliable and fair.

PM: *Under what circumstances do you consider external fixation, internal fixation, or non-fixation of osteotomies? What are the potential medical-legal ramifications of any of these options?*

Yeager: Like most things in medicine, there is a time and place for all

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of these types of fixation. The key to avoiding medical-legal ramifications is to know the indications and contraindications for them.

I will use, as an example, treatment of an ankle fracture. I typically use internal fixation using plates and screws on the average adult. If the patient is diabetic, however, and the fracture is from Charcot arthropathy of the ankle joint, I will use a combination of external fixation plus internal fixation. Furthermore, for a pediatric ankle fracture, I use temporary fixation across growth plates with k-wires or even an external fixator as well.

The potential for legal ramifications typically arise when there are poor outcomes, and patients do not feel they have received adequate care. That is why it is so important to counsel patients on what they can expect after surgical intervention. This includes a detailed discussion of general risks like the potential for infection and incision complications, swelling, and loss of limb, loss of life, damage to their nervous systems, and the need for possible additional procedures in the future.

While these complications can mostly be avoided by correct patient selection, it is always important to make patients aware of the risks, and their role of compliance in the healing process. Discussing complications for hours with patients means nothing unless physicians document the risks discussed, and that patients fully understand these complications. In this way, if litigation ever arises, physicians are protected by what was discussed prior to surgery.

Butterworth: I use internal fixation for the majority of the osteotomies I perform. I will use external fixation for callus distraction techniques. I will also use external fixation for some difficult fracture repairs. I do feel that osteotomies need to be fixated to try to get the best surgical outcomes. I believe fixation is the standard of care, and if not utilized and the patients experience poor outcomes, those could certainly lead to legal ramifications. Certainly, there are so many options available now for fixation that the question is really what to use, not whether to use or not.

Peacock: Some procedures require fixation, and some do not. More importantly, it depends on both the patient and procedure. The decision to use fixation lies mostly in what the goals are for the foot correction. For example, I generally will not fixate minimal incision percutaneous lesser metatarsal osteotomies. Contrary to conventional wisdom, permitting metatarsals to float without fixation combined with percutaneous techniques yield outstanding results. The medicallegal ramifications of not fixating osteotomies is obvious. The majority of foot surgeons in the United States do fixate osteotomies, so the question of standard of care may arise. Fortunately, medical- legal issues only arise when complications are not resolved. It is imperative that surgeons obtain the skills to handle potential issues that may arise whether the procedures require fixation or not.

Weil: First, I never consider the medical-legal ramifications of any care I provide, but rather consider what is best for the patient. The philosophy I have always tried to adhere to is that I would do the same treatment for my family member with the same problem. I believe that is the best way to practice medicine and surgery.

Though I have limited experience with external fixation, most of my surgery is with internal fixation when necessary for fixation of osteotomies or fusions. I believe that historical research shows that fixation is helpful in the stabilization and healing of many of the procedures that I perform. There is, however, more recent interest in procedures that do not require fixation. These procedures are typically minimally invasive, and reduce soft tissue injuries, which can lead to faster and less complicated healing. I employ a very limited amount of minimal invasive surgery in my practice, but understand the motivation of foot and ankle surgeons to explore this interesting surgical area.

Q ***PM:*** *How does cosmetic foot surgery fit into today's practice of podiatry?*

DeHeer: That's a tricky question. I do not perform cosmetic surgery without associated symptomology. The majority of foot deformities typically have associated symptoms, so in my opinion, the role of cosmetic surgery is limited.

Peacock: Cosmetic foot surgery is a noble pursuit in the practice of podiatric surgery, but it carries clear limitations. I believe that correcting a displeasing cosmetic deformity is a legitimate reason for surgical correction. If, however, cosmetic surgery is defined as altering a normal foot, it should be undertaken with extreme caution. Several "Cinderella" procedures are gaining popularity with the goal to allow patients to wear narrow, high-heeled designer shoes. While I do not object to podiatric physicians performing such procedures, I feel that it is mandatory that patients are aware of the extreme risk in pursuing this aim.

The majority of foot deformities typically have associated symptoms, so in my opinion, the role of cosmetic surgery is limited.—DeHeer

Yeager: The role of cosmetic foot surgery in today's practice of podiatry remains largely controversial. Typically, I choose not to operate on patients for cosmetic reasons alone. I often advise patients to avoid fixing deformities if they don't hurt. We have all heard about colleagues in the podiatric and orthopedic fields, however, who do offer cosmetic procedures like the "Cinderella proce-

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dure" to prevent bunion deformity, or toe shortening surgeries to fit into tight shoes. Proponents of the cosmetic procedures claim that these procedures are evolving the field of foot and ankle surgery, and the benefit of aesthetic foot surgery is not only a more attractive foot, but also pain relief in different footgear. It may also be argued that enabling a patient to have a more attractive foot also caters to the patient's psychological well-being. Clearly, opponents point out that the risks involved with surgery, like infection, deformity, and chronic pain, often do not outweigh the benefits. All in all, while cosmetic surgery may be growing in popularity, it is important to keep in mind the best interests of patients and communicate with them about potential risks and complications before proceeding with any surgical interventions.

Butterworth: I think any surgery has inherent risks, so I do not proceed with surgery purely for cosmetic purposes. There are many things that can happen with surgery such as infection, scarring, nerve problems, anesthesia complications, and loss of digits, limb, or even life. I agree that it boils down to the risk versus benefit ratio. I do consider, however, cosmetic appearance when making my incision, dissection technique, and wound closure.

Q ***PM:*** *What are your most feared surgical complications (e.g., hallux varus, osteomyelitis, non-union, reflex sympathetic dystrophy, recurrence of deformity, etc.) and discuss treatments from conservative to surgical measures for one or more of these complications?*

Weil: My most feared complications are any complications. Complications to patients are big deals to them. Podiatric physicians might have things that are more medically catastrophic that they fear, but all complications, no matter how minimal, negatively impact the patients.

I do a considerable amount of forefoot reconstruction, and going into any surgery, especially this type of surgery, I make sure my patients are aware of the most common complications. With most of the forefoot reconstruction that I perform, patients are not crippled, but their problems affect their desired daily lifestyles. In many ways, I find this type of surgery more challenging than what is considered complicated rear foot and ankle reconstruction, for which I also have extensive experience. The expectations of patients undergoing reconstructive forefoot surgery is often much higher and more demanding. These people want to return to their fashion-

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able footgear, get back to work on their feet, and return to high level impact exercises.

It is important to set realistic expectations up front. I try to teach our fellows about telling patients what their recovery will look like from the day of surgery until final outcome. Minimizing the recovery process only sets the patients and surgeons up for problems. I have to believe that the problems patients are experiencing to consider surgical intervention must be significant enough that the realistic recovery is not nearly as bad as what they are feeling on a daily basis.

The problem I see most often is stiffness of the lesser metatarsophalangeal joint following metatarsal osteotomy to correct intractable metatarsalgia with or without plantar plate pathology. During their initial surgical consultations, I always warn patients of this potential problem, including how I am going to try to prevent it, as well as what I will do to deal with it should it happen.

For these types of surgeries, I keep patients in bandages, surgical shoes, and partial weight-bearing for one week. No matter if unilateral or bilateral, at one week post-operative, I return the patients to their athletic shoes, start physical therapy emphasizing plantarflexion strength, and have them brace their toes in plantarflexion during the night. Patients will perform home exercises taught to them by their physical therapists daily, and attend formal therapy twice per week. I will progress the time on their feet as quickly as they can tolerate, and have the therapists perform aggressive mobilization techniques. Despite all this aggressive care, patients will commonly have symptoms related to the stiffness in the metatarsophalangeal joint up to six months post-operative. When they are symptomatic, I remind them of the time frame for recovery, and that our research shows that most of that stiffness will resolve in time. In five to ten % of cases, however, the stiffness does not sufficiently resolve and patients are symptomatic. If that is the case, 9-12 months following surgery, I will recommend, and perform an aggressive manual manipulation under sedation and local anesthesia. There is usually an immediate release of tissue, and the toes will generally regain their mobility. Occasionally, the manual manipulation is not enough, and at that time, I will perform a percutaneous dorsal capsulotomy that will fully release the joints. This procedure only requires bandaids, and nearly all people experience immediate improvement. The key to the success of this is letting the patients know before the initial surgery that this may be required, so that when it does happen, they are not surprised. I feel that informed patients are happier, and will likely have superior outcomes.

Reflex sympathetic dystrophy is a devastating complication and often leads to legal ramifications.—Butterworth

Butterworth: Hallux varus, and recurrence of deformities, can be frustrating complications, but usually those can be corrected with further surgery. Reflex sympathetic dystrophy is a devastating complication and often leads to legal ramifications. Patients often endure arduous medical treatments and have to live with chronic pain. Osteomyelitis can also be a devastating complication and can lead to digit, foot, or even limb loss. Even in the absence of amputation, patients usually undergo multiple surgeries and can have significant deformity as a result. These patients usually require significant hospitalization and long-term antibiotics. For these reasons, osteomyelitis is my most feared surgical complication.

There are many complications that can occur after podiatric surgery.... The most important factor is how podiatric surgeons respond and manage them.—Yeager

Yeager: There are many complications that can occur after podiatric surgery. Some of the most feared include non-unions, osteomyelitis, hallux varus, recurrence of the deformity, and Reflex Sympathetic Dystrophy (RSD). The most important factor is how podiatric surgeons respond and manage them. I have listed the following complications in terms of both conservative and surgical treatment options. Of all of these, however, I believe that osteomyelitis from surgery is my most feared complication. I would be remiss not to mention, however, the accidental cutting of the tibial artery during a tarsal tunnel release case. The legal and overall ramifications of this complication would be astronomical.

Non-unions are classified as being either hypertrophic or atrophic. Hypertrophic non-union conservative treatment includes the use of bone stimulators, while surgical treatment involves revision with stable fixation. Atrophic non-unions require surgical intervention with bone grafting. Overall, this complication is difficult but not impossible to overcome.

Conservative treatment for osteomyelitis involves antibiotic use for approximately six to eight weeks. This, however, does not guarantee the infection will be cleared. Surgical intervention involves excision of necrotic bone, and clearance fragment biopsies are taken to assure all necrotic bone is removed. Antibiotics can be mixed with poly methyl methacrylate beads, and packed into the infected area to let the antibiotic

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seep into the infected space. These beads are usually removed two to four weeks later with possible primary closure of the wound pending lab results and wound appearance. If the defect is large, a bone graft may be implemented to help restore function and prevent loss of limb.

For hallux varus, conservative treatments include taping, strapping, and splinting. Surgical soft tissue options include abductor hallucis release, medial capsulotomy, and transfer of EHL to the plantar lateral aspect of proximal phalanx with additional IPJ fusion. Surgical options include a reverse Austin osteotomy, arthroplasty, implant, or definitive MPJ fusion. Again, this a painful complication, but not an impossible one with which to deal.

Recurrence of the deformity can be treated conservatively by orthotic use, physical therapy, taping, strapping, and splinting. Surgical options include revisions, and if appropriate, fusions to provide permanent correction of the deformity. Usually, the main culprit of this complication is patient non-compliance.

Reflex sympathetic dystrophy or complex regional pain syndrome treatment goals are aimed at pain management and rehabilitation. Conservative treatments include physical therapy, medications, and nerve interference/blocks. Physical therapy offers range of motion exercises, massage therapy, and ultrasound, along with other modalities. Heat pads, NSAIDs, steroids, nerve pain medication, antidepressants, and muscle relaxants may be helpful. Nerve interference can be offered through acupuncture and TENS units. Peripheral nerve blocks can also be useful. Surgical intervention includes sympathectomy and spinal cord stimulation. The important thing to remember with this disorder is to avoid immobilization because immobilization will most likely exacerbate the issue.

Lastly, in all these situations, I recommend prompt referrals. One ought not be afraid to get a second or third opinion from another trusted physician.

DeHeer: I have been doing surgery for twenty-five years and think I can deal with any complication with the exception of vascular insult. Unfortunately, lack of blood flow that is irreversible with treatment leaves the surgeon with few acceptable options.

Grambart: I don't think I really have one that I fear more than another. They all keep me up at night. I do think that osteomyelitis is a tough one for patients to accept. I find that it's a hard thing to discuss with patients that the highly successful procedure that they had has now resulted in a hospital stay, multiple surgeries, IV antibiotics, prolonged non-weight-bearing, and a chance at some type of amputation.

Peacock: My most feared surgical complication is cutaneous nerve injury. Cutaneous nerve injury is the most common complication in foot and ankle surgery. Fortunately, most often, this complication resolves without treatment. In cases where I suspect cutaneous nerve injury, I use oral vitamin B12/methylcobalamin to effectively treat the problem.

I have treated several patients with cutaneous nerve damage after bunion corrections. The source of this pain is usually injury to the dorsal medial cutaneous nerve. To treat this, I transect the nerve and bury it into the first metatarsal base.

Furthermore, it is my opinion that some of our post-operative RSD/complex regional pain syndrome patients start out with cutaneous nerve injuries that progress. It is important to treat these conditions immediately.

One of the first things podiatric surgeons must do is avoid denial of complications. This can be done by being honest and forthright with both the patients and themselves.—Peacock

Q ***PM:*** *How do you address surgical complications with your patients?*

Peacock: One of the first things podiatric surgeons must do is avoid denial of complications. This can be done by being honest and forthright with both the patients and themselves. I have met surgeons who claim they have never had complications from certain procedures. While these fantasies may be comforting, frustrated patients will generally consult elsewhere, especially if the complications are denied by the original surgeons. Performing surgery will guarantee that complications will occur. I advise podiatric surgeons to have a backup plan in place for the inevitable complications that arise, as well as have other friendly physicians willing to help.

DeHeer: I, too, believe one has to be up front and honest when a patient has a complication. It is important to keep the discussion centered on treating the complication, making sure the patient is fully understanding of the complication and the treatment.

Grambart: I believe that patients want their surgeon to be compassionate and understand what they are going through. Moreover, they need reassurance that the surgeon has a plan for them. Naturally, it's all about good communication.

Yeager: If I have a surgical complication, I address it directly head on. First, I explain the incidence of the particular complication. Patients need to understand that they are not the only ones that have been in these situations. I believe this comforts them, and gets them to realize that it is not necessarily their fault or their surgeon's fault that these complications have arisen.

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The second thing I do is explain to them the complete treatment plans, including all unpleasant details and courses of action we, as a team, are going to take. This gives the patients goals and landmarks for their treatment, which quells some of their understandable fears. If the more serious courses of the complications develop, my patients are prepared, not fearful. In my opinion, an open and honest dialogue with patients is the key to a good outcome. In addition, I am not afraid to obtain second or even third opinions when necessary.

Lastly, I think the best thing one can do as a surgeon with a surgical complication is take a look at one's own decision-making matrix and decide if there is anything that that surgeon can learn from this experience to avoid that type of complication in the future.

Weil: I agree that it is important to be forthright about a complication and not hide it from a patient. This is far from easy. When there is a complication, the surgeon feels terrible. One might hope it will go away, but it rarely does. It is important to address the complication head on. No surgeon goes into surgery expecting a complication, but it can happen. It's an inherent risk with surgery. There should be no guilt in having a surgical complication. I recommend the surgeon telling the patient that he or she feels badly that the complication occurred and the surgeon is going to work with the patient to remedy the problem.

Q ***PM:*** *Please relate a surgical case of yours where a podiatric surgical intervention produced a profound difference in a patient's life.*

Butterworth: I had a thirteen-year-old boy with a significant flatfoot deformity. He would sit in the house and play video games all day. He would not socialize or play sports. He said his foot pain stopped him from doing most normal activities. Also, he said his feet made his knees, hips, and back hurt. I had never seen pain interfere with a child's activity level to this extent before. I did bilateral flatfoot reconstructions, and this child became a new person participating in everything. He even went on to get a basketball scholarship to college.

Peacock: Approximately five years ago, a female patient came to my office in a wheelchair. The patient had undergone nine back surgeries related to a car wreck. The condition left her with contraction of all toes in the right and left foot. She was unable to walk because the toes were contracted underneath the ball of her foot. She had sought out treatment from other providers without a clear way to correct her problem. To complicate matters, the patient had developed heart problems which made anesthesia riskier for her. I performed simple flexor tenotomies, utilizing an 18 gauge needle under local anesthetic in the office to digits one through five in both feet. These procedures allowed her toes to achieve a rectus position. Within one week, the patient was walking. The patient has continued to walk to this day. This simple fix changed her life.

On one of the more important days of her life, she and her family were kind enough to think about me, sending me the note. It really shows how much of an impact podiatric surgeons can make.—Grambart

DeHeer: The case that strikes the deepest chord with me is a clubfoot surgery I performed on a twelve-year-old boy in Haiti. Afterwards, I called to check on the patients I did surgery on the week I was in Haiti, and was told that this patient had developed a severe wound infection with exposed calcaneus. With the help of several others, we were able to get him a passport and transportation to the U.S. before an amputation was required. There was a group from Indianapolis in Haiti that was able to bring him to the U.S. I was able to get the hospital and several physicians to care for him, all for free. His infection was treated and resolved. One evening after all the regular OR cases were completed, I corrected his other foot; then a team of plastic surgeons performed a rectus abdominis flap and skin graft to cover his exposed calcaneus. He spent a total of three months in the hospital, then three more months going to a local school, while rehabbing. He healed successfully and returned to Haiti to attend a private school funded by several generous benefactors.

Yeager: A surgical procedure which resulted in a profound difference in a patient's life was a recent bilateral gastroc-soleal with tendoAchilles lengthening procedure for a seven-year-old female chronic toe walker. Prior to surgical intervention, she failed all conservative measures, and she was measured at a negative 10-15 degrees plantar-flexed with active and passive dorsiflexion at the ankle joint. Now following surgery, she is ten degrees dorsiflexed bilaterally. She is no longer toe walking, has heel to toe contact with a normal gait pattern, and full muscle strength bilaterally. Mother, father, and patient are extremely happy with the surgical outcome.

Grambart: I recently received a thank you note in the mail from a mother and daughter accompanied by a picture of the daughter signing her letter of intent to go play college basketball. She had had a horrible triplane ankle fracture-dislocation when she was 14. I remember how crushed she was when I told her what her surgery and recovery would be like. I discharged her from my service when she turned 16 and her growth plates

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were closed. Luckily, she did well. I hadn't seen her for over two years when that note and picture arrived. I can't tell you how much that thank-you note meant to me. On one of the more important days of her life, she and her family were kind enough to think about me, sending me the note. It really shows how much of an impact podiatric surgeons can make.

Weil: One that stands out for me is a woman in her early 60s who was obese, not very pleasant, and developed tibialis posterior tendon insufficiency. Her problem became so substantial that she was barely able to walk to and from her car into the school and classroom where she was teaching. She had tried orthotics, non-custom and custom bracing without success. Furthermore, her foot problem was causing her obesity to become more uncontrolled, and her cardiologist told her that if she didn't start exercising, her life would be shortened. After extensive discussion about surgery and recovery, she elected to undergo my treatment plan, and did so the day after school ended in June. I performed a calcaneal Scarf osteotomy for tri-planar correction, a flexor digitorum longus transfer, and spring ligament repair and gastrocnemius recession. She was immobilized in a cast for four weeks, then transitioned to a removable boot, started physical therapy and began weight-bearing. She returned to gym shoes with bracing two months after surgery and progressed with physical therapy. In late August, she was able to return to school and perform all of her duties, saying that she was already more comfortable than before surgery. As her recovery went on, she increased her daily activity and started an exercise routine of walking daily. Throughout the course of her recovery, which took over a year, I saw her start to lose weight, gain personal confidence, and smile regularly. Recently, I saw her as she needed new orthotics. She is now five years post the procedure, has lost 70 pounds, and related to me that she had just completed her second Avon Breast Cancer walk to support one of her daughter's friends who was a breast cancer survivor. She told me that had she not had the surgery, there was no way she could have done the walk, and said she likely might have been dead by now. She said it to me with tears in her eyes and gave me a hug. Indeed, it was an emotional moment for both of us. **PM**

Dr. Haspel is senior editor of this magazine and past-president of the New Jersey Podiatric Medical Society. He is a member of the American Academy of Podiatric Practice Management.