Podiatric Surgical Complications

Our experts discuss dealing with less than perfect results.

By Marc Haspel, DPM

It often has been said that a podiatric surgeon who claims to not have surgical complications is simply not performing that many surgeries. Surgical complications unfortunately occur to a certain extent in all podiatric surgical practices. Recognizing and handling them in a swift and effective manner is one of the true measures of a podiatric surgeon’s ability. The causes of surgical complications are widespread—from surgical expertise, patient compliance, and infection to neurologic injury, surgical settings, and problems of structural deficit. Of course, knowing how to counsel patients who are experiencing these complications is a necessary skill unto itself.

Podiatry Management Magazine has asked five leading podiatric surgical educators to discuss this aspect of surgical practice. Each has generously offered advice on how to deal with the full measure of unwanted events stemming from podiatric surgery.

Joining this roundtable panel:

Andrew J. Meyr, DPM is associate professor in the Department of Surgery at Temple University School of Podiatric Medicine, podiatric director of the Temple University Hospital Limb Salvage Center, and assistant residency director of the Temple University Hospital Podiatric Surgical Residency Program.

Don Peacock, DPM is in private practice in his hometown of Whiteville, North Carolina. He has been in practice for eighteen years. He was traditionally trained in podiatric surgery and is board certified by the American Board of Podiatric Surgery. He is a fellow and associate professor in the Academy of Ambulatory Foot and Ankle Surgery. He has a particular interest in exposing the podiatric medical community to the use of minimally invasive foot surgery. He believes that combining the skills of both traditional and minimally invasive surgical techniques has the potential for improved outcomes.

Tip Sullivan, DPM is past president of the Mississippi Podiatric Medical Association and was the first podiatric surgeon to become board certified in Mississippi in 1990. He also was the developer, builder and owner of the first single specialty outpatient surgery center for podiatry in Mississippi.

George Wallace, DPM is the chair of the Podiatry Department at University Hospital, Newark, NJ, a level one trauma center and the primary teaching hospital of Rutgers New Jersey Medical School. He also

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Weil: In my opinion, the number one factor is surgical expertise. It is the predominant factor. As for appropriate settings, many of us have operated in distressed countries under the worst conditions and have seen the complication rate to be marginal. The second factor would be patient compliance. We often see patients who were just not given detailed written instructions that might mitigate complications. I do feel that very minor complications are a known product of foot and ankle surgery and are not a direct result of any of the factors mentioned.

Wallace: A turn of the century surgeon was quoted as saying that complications are a fact of life that every surgeon must face. In other words, if one doesn’t want any complications, one should not do surgery. A well-trained surgeon with total patient compliance can still have a complication. I believe the keys lay in recognition. Once one recognizes that a complication is occurring, then it’s time to tell the patient and offer practical solutions.

Meyr: I try to blame myself for surgical complications as much as possible. It’s certainly relatively eas-
There are certain things that I have learned to do to ameliorate complications during those times. Here are my recommendations during all stages of the period following surgery.

Pre-operatively, I spend time with the patient, and whoever else to blame external factors or label patients as being non-compliant, but, in a lot of cases, that’s taking the easy way out. It doesn’t help my own self-education/improvement nor stop me from making a similar mistake in the future. I would say that surgical complications generally fall into one of three broad categories: improper patient selection, improper surgical course, and simply because “stuff happens”.

Both experienced and inexperienced surgeons are at risk for improper patient selection. Inexperienced surgeons may generally be a little more at risk for matching the wrong patient to a given surgical indication, but experienced surgeons may also be at risk for trying to shoe-horn the wrong patient into a surgical procedure, one with which they feel more comfortable.

Generally, all podiatric surgeons tend to under-appreciate certain risks inherent to the patients. I usually assure my patients that “no one has ever died from a bunion before” when those patients choose to undergo surgery. Specifically, however, primarily based on Wukich’s work, it is relatively rare that I recommend elective surgery for diabetic patients with an HbA1c over 8%, for example (Pubmed ID#: 21816974). It’s just not worth the risk in my practice. Similarly, it is relatively rare that I recommend major rearfoot reconstructions for patients with a BMI greater than 40. In truth, I know that orthopedists normally don’t recommend total joint arthroplasty in patients who are morbidly obese because of the associated risks, and I feel the same way about applying those restrictions upon procedures on the foot.

Lastly, I prefer to blame my own patient education technique and ability before labeling a patient as non-compliant.

**Sullivan:** Generally I would say that non-compliance, by far, is the most common factor in post-operative complications. The only way that I have found to decrease the compliance problem involves spending time with the patient and explaining as many of the peri-operative issues as possible. All patients say that they will be compliant before surgery, but few are. It makes sense to me that a discussion about post-operative complications and solutions should be divided into stages, similar to how we divide wound healing into stages. There are certain things that I have learned to do to ameliorate complications during those times. Here are my recommendations during all stages of the period following surgery.

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is going to help them following the procedure. I assure the patient of my years of experience and that I will handle any problems that may come up. I make sure they know that I can be contacted at all times following the operation. I also always ask the patient what type of pain medicine has worked in the past, and prepare the patient for the worst in terms of pain, with the patient often returning saying the pain was not as bad as expected. I make sure to coordinate with other physicians involved regarding medical issues, have the patient get post-op medications before the day of surgery, make sure that the patient knows how to use crutches or other devices prior to the surgery, and overall explain to the patient not to expect to have a perfect surgery, and overall explain to the patient what type of pain medicine will be helping care for them in the post-op period. I make sure that the person helping post-operatively is physically present at all times with the patient until the local anesthetic wears off. In medically appropriate cases, I try to incorporate a multimodal approach to pain management. I usually combine narcotics, anti-inflammatory, and anti-nausea medications, which usually aid in sleep. I personally call the patient on post-operative day 2-3, and ask about potential complication signs. I have a routine set of a post-operative questions. I will often call the patient the night of the surgery, especially when the patient lives out of town to make sure the patient got home without a problem. I must emphasize that I never hesitate to seek medical help if there is a suspicion of a problem.

Intra-operatively, I believe that procedural choice is crucial. I believe in doing appropriate surgeries at the appropriate locations. For example, my rule of thumb is that all bone surgeries are done in the operating room, not office. Likewise, I feel that the people that I work with can make or break my surgical success. Accordingly, I recommend performing foot surgery only at a facility with members who are familiar with instruments and personal preferences. I always visually watch the prep and draping, even if I do not personally participate. I recommend using some sort of intra-operative imaging technique to confirm fixation before breaking sterile field to ensure surgeon’s satisfaction. I recommend closing under a wet field. I have done this both ways over the years and find that getting good hemostasis in the operating room on closure reduces edema greatly. When balancing a slightly longer surgery time with the difference this makes in reducing post-operative edema, the increased surgical time is justified by the improved results.

Immediately post-op, I use the mantra: elevate, medicate, and refrigerate. These instructions should be beaten into the patient as well as the patient’s significant other, who will be helping care for them in the post-op period. I make sure that the person helping post-operatively is physically present at all times with the patient until the local anesthetic wears off. In medically appropriate cases, I try to incorporate a multimodal approach to pain management. I usually combine narcotics, anti-inflammatory, and anti-nausea medications, which usually aid in sleep. I personally call the patient on post-operative day 2-3, and ask about potential complication signs. I have a routine set of a post-operative questions. I will often call the patient the night of the surgery, especially when the patient lives out of town to make sure the patient got home without a problem. I must emphasize that I never hesitate to seek medical help if there is a suspicion of a problem.

Later on, in the post-operative period, I usually find the patient starting to feel better and tending to be over-active. I generally keep the patient, even with a tiny draining wound at one week, on either local wound care or antibiotics, depending on his/her medical status and clinical appearance. At this point, I recommend being straightforward with the patient if there is a problem with healing, developing a plan, and sharing it with the patient. I always advise that the doctor take out the sutures/staples. I don’t like delegating that to a nurse. At the very least, I recommend sitting and talking to the patient as the sutures or staples come out.

Only after several weeks later do I assess the choice of procedure/s that were made. During this period, I try to tell the patient what I feel are good points in the surgery and which points that I am not as happy with, again pointing out that there is no such thing as perfect surgery.

In summary, I believe that podiatric surgeons are all trained to care for post-operative complications from a technical standpoint, but are not well prepared to deal with the patient who is experiencing a problem. I feel that preparation for dealing with the human element of complications should begin before the surgery with good patient preparation. When complications do occur, I recommend being honest as well as compassionate with the patient. Finally, I recommend having a good team of other specialists who can be depended upon to help with complications.

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Q: How do you determine whether a post-operative infection needs hospitalization in lieu of continued outpatient treatment?

Meyr: Although they are specifically designed for the diagnosis and treatment of diabetic foot infections, I generally use the Infectious Disease Society of America (IDSA) recommendations when making decisions with infections in the foot (Pubmed ID#: 22619242). They point out how expensive in-patient hospital admission is, and how there really needs to be a good reason to bring someone in-house. Based on their categories and definitions of “mild,” “moderate,” and “severe” for foot infections, they generally recommend that only “moderate” (defined as cellulitis extending >2cm, lymphangitic spreading, spread beneath the superficial fascia, deep-tissue abscess, gangrene, or involvement of muscle/tendon/bone/joint) or “severe” infections (defined as patients with systemic toxicity or metabolic instability) require hospitalization. I like their definition of “moderate” infections because it highlights anatomy, and the likely need for surgical intervention. If I’m bringing someone into the hos-

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pital, it is almost always because they need some type of urgent surgical intervention, whether it be a decompression, debridement, or revision.

Wallace: I subscribe to the following criteria for in-hospital management of a post-operative infection: failure of oral antibiotic management, systemic signs of an infection, cellulitis more than 2 cm from the site, lymphangitis, lymphadenopathy, dehiscence with exposed hardware, wound probing to bone, gas in the tissue, acute osteomyelitis, and an abscess requiring incision and drainage. Whenever one is in doubt of whether or not to hospitalize, I recommend that one take the more conservative route, which would be to admit the patient.

Weil: I was very fortunate to have a brother-in-law who was an infectious disease physician and dean of a medical school. His advice for me was to not just treat an infection, but to attack an infection. If a post-operative patient has an obvious cellulitis with a fever of 100 degrees or greater, I would typically perform an incision and drainage procedure in the office, culture the wound and admit the patient to the hospital for intravenous antibiotics and further debridement as necessary. I find that three-to-four days should be sufficient for a healthy patient. Moreover, I always advise calling in an infectious disease physician to choose the antibiotic based on the culture that I have provided.

Peacock: I believe that most post-operative foot infections are easily handled in the outpatient setting. This would include, for the most part, all of our healthy patients and uncomplicated diabetics. The need for hospitalization is more likely to occur with patients exhibiting significant comorbidities at the outset. These patients raise the red flag for hospitalization.

PM: What recommendations do you have for patients who demonstrate signs and symptoms of post-operative complex regional pain syndrome, aka CRPS?

Weil: Our policy with a patient with signs and symptoms of complex regional pain syndrome is that the patient should first be made aware of the condition and told that it is not the fault of the patient, but rather that the body sometimes acts in strange ways. If it is very early and newly diagnosed by us, we recommend physical therapy, low-level pain medication and counseling to keep the limb active. If the condition has been present for some time, a referral to a pain specialist is the more favorable course.

Peacock: I, too, believe that it’s important to recognize this complication as early as possible. In the early stages, medications such as anti-inflammatories, opioid pain medications, antidepressants and anticonvulsants...
I generally become suspicious for CRPS when my patient displays any type of autonomic dysfunction. I measure a lot of skin temperatures in my practice with comparison to the contralateral extremity, and will often ask patients to carefully pay attention to their limbs in the shower to evaluate for swelling/color changes when in different water temperatures.

If I become at all suspicious in the early post-operative course, than I forego cast immobilization and carefully initiate range of motion exercises as early as humanely possible. This takes a lot of patient education and trust certainly, but I'd much rather get them moving than continue rigid immobilization.

Sullivan: CRPS/RSD in my practice seems to be less common these days as opposed to fifteen years ago. It seems like the symptom of intratable pain out of proportion is more

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common, but the clinical signs of early CRPS/RSD (vascular instability, swelling and limited motion) still are as rare as they have always been. For several years CRPS was a popular diagnosis, but I don’t think the true incidence has changed. It is extremely rare for me to see patients with late stage CRPS. When I have that patient with a different affect who is on multiple psych medications and has even the least hint of CRPS, I send for aggressive physical therapy, and get a pain management consult, if there is no improvement within three to six weeks.

Wallace: Anyone with symptoms of a post-operative deep venous thrombosis immediately is sent for noninvasive vascular studies. Post-operative patients are always asked about calf pain, and the calf is briefly examined. I like to offer the following analogy. Chest pain in the emergency room warrants an EKG even if the patient is just having indigestion from a really big meal. Likewise, symptoms or findings at the calf warrant immediate venous studies. If these tests turn out to be positive, then the patient is promptly referred for management.

“Similarly” effective treatment for compartment syndrome falls under the rubric of index of suspicion. One should not necessarily wait for the five “P’s” of pain, pallor, pulselessness, paresthesias and paralysis to be fully present in this condition, although the more P’s present, the greater probability of a compartment syndrome. Pain out of proportion upon manipulation of involved joints can point one in the direction of a compartment syndrome. Finally, measurement of intra-compartmental pressures are obtained as well as delta P values. A patient who has severe pain, forefoot edema, from a simple metatarsal fracture or something more, or a history of a crush injury, yet still has normal pressures, should be monitored closely with sequential pressure measurements.

Meyr: I would consider both of these conditions beyond the scope of office treatment. Although I have diagnostic ultrasound in my clinic, I’m not going to diagnosis patients with a DVT myself, nor would I consider measuring compartment pressures in the office. These patients are referred to the emergency department of my hospital center, where I and my residents can keep close tabs on them.

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Peacock: I believe that foot surgery will rarely lead to deep venous thrombosis. Again, however, no surgery is without risk. The most devastating consequence of deep vein thrombosis following foot surgery is pulmonary embolism. It is estimated that less than one third of patients with deep vein thrombosis following surgery have classic signs. As a result of this fact, it’s important that one be certain to recognize which factors in the patient’s overall health may lead to this condition. In patients with these contributing factors, appropriate prophylaxis is recommended. Regarding that patient who is already being treated with anticoagulants, cooperation with the internist prior to the surgery is certainly advisable. In a case where DVT is definitively diagnosed, treatment with heparin is the typical protocol. Post-operative graded compression in such patients who may have a tendency to develop DVT is also a good idea, along with early ambulation.

In the case of compartment syndrome, the only treatment, I feel, is to relieve the pressure in order to prevent neurological and circulatory damage. This would require deep fascia release of the tissues.

Weil: These are two different conditions and require different actions. Firstly, symptoms of deep vein thrombosis should be treated like a heart attack; after one gets a quick history of the location of the pain, these patients are urged to immediately go to the emergency room to have a diagnostic ultrasound to rule it out. I always recommend explaining the urgency of the situation. I am fond of saying that the hope is that I am wrong in presuming a clot, but if not, a positive finding will most likely save that patient’s life.

As far for acute compartment syndrome, this condition is not ordinarily seen without a history of severe trauma, but if that diagnosis happens to be made and there is severe swelling and pain, this is an emergency surgery in the hospital to decompress the muscles involved. Actually, I have seen chronic compartment syndrome in athletes from time to time. Unlike its acute counterpart, this condition is not an emergency situation. If chronic, a muscle compartment fasciotomy is performed, once the diagnosis has been assured.

PM: What criteria do you use to determine whether implanted surgical hardware needs to be removed or not?

Sullivan: I make that determination dependent on what post-operative phase the patient is in. During the immediate peri-operative/post-operative period, in the face of exposed hardware with possible infection, I believe it’s time for hardware removal. Even this basic standard—if it looks infected take it out—which I was taught as a resident can be bent. Over the years, I have had several wound problems with exposed hardware and, only with the blessing of an infectious disease specialist, have treated the patients with intravenous antibiotics, local wound care to cover over the hard-
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Determining hardware stability is really done via an intra-operative stress test, and I suspect that we are all different in our intra-operative evaluations and decision-making.

I like to say that I generally err on the side of caution and that if I judge some of the hardware to be unstable, then I consider it all to be unstable and remove it all. With that being said, however, if I were to judge the hardware to be stable, then I would be pretty aggressive with negative pressure wound therapy and synthetic grafting to obtain coverage.

Weil: I believe that the only reason to remove hardware would be if it has loosened and is creating pain. This can be manifested in several ways. If the hardware has broken and there is a chance that it can injure important soft tissue or protrude through the skin; if there is an infection in the area and there is noted

Wallace: Internal fixation is removed if, in the presence of an infection, it is loose. Certainly, removal creates an unstable osteotomy or fracture which bacteria love, so stability has to be supplied, most likely with an external fixator. Generally, hardware can be removed if it starts to back out, if it causes pain, if the patient prefers, if the patient has an allergic reaction to the metal, or if osteomyelitis is suspected as well as if implant failure is determined. Again, other modes of fixation would become necessary if osseous healing is not complete.

Meyr: This is a tough topic, and one where we, as a profession, could really use a bit more evidence. I would say that I generally follow the recommendations of the Southeast Fracture Consortium (PubMed ID#: 20360504), who state that hardware can be safely retained until fracture union if the hardware is stable and the infection is treated by other means. This specifically deals with acute fractures as opposed to elective reconstructions, but I think the same principles generally apply.

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loosening of the hardware; or if the hardware is prominent and irritable because of the lack of subcutaneous tissue to protect the skin, such as an old ankle fracture plate in a septuagenarian with thin skin on the fibula. At the risk of sounding facetious, I think an invalid reason for hardware removal is to garner added revenue from the additional procedures afforded by doing it.

**PM**: How would you treat a patient with cuboid syndrome, following a plantar fasciotomy procedure?

**Weil**: A complication of plantar fasciotomy resulting in cuboid peroneal syndrome is well known and occurs in up to forty percent of patients undergoing that procedure. The condition can take up to four months to resolve, but the great majority finally do get better. Knowing this, however, I recommend considering some of the alternatives such as partial plantar fasciotomy, extracorporeal shockwave treatment, which carries an eighty-two percent success rate, platelet rich plasma, Topaz micro fasciotomy, and, of course, the mainstay of all podiatric medicine, a good orthotic device.

**Peacock**: This is a situation where an ounce of prevention is worth a pound of cure. Patients who have a flexible rearfoot and flexible forefoot are not good candidates for plantar fascial release. These patients do better with subtalar joint stenting for plantar fasciopathy. Many of our patients have a rigid rearfoot and a flexible forefoot, and these patients may do well with plantar fascia releases, if the first ray has a normal supinatory end range motion. In other words, they do not reveal a hypermobile first ray. If one chooses patients for plantar fascial release based on the patient’s biomechanics, I am confident that one should rarely need to treat cuboid syndrome.

In those patients who do experience cuboid syndrome, orthotics and Sarapin injections can be helpful.

**Sullivan**: I have not had a case of post-operative cuboid syndrome since the papers came out by Barrett and Day, in the early 1990s, which advocated partial resection of the fascia. I have, however, treated referred cases with intra-articular injection of local anesthetic and steroids, immobilization, physical therapy, and cuboid paddings.

**Wallace**: To begin, plantar fasciotomies are rare in my practice, with maybe only one or two of those procedures performed annually. When they are performed, they are done via an open, small medial incision approach with complete fascial release.

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I find, likewise, that cuboid syndrome is rare and, if it does occur, orthoses are prescribed. I believe I have seen this syndrome maybe only once or twice in a thirty-year plus career.

Q PM: What recommendations do you have for physicians and staffs when counseling patients who are experiencing surgical complications? At what point would you consider referral to another specialist or perhaps another podiatric colleague in your community?

Meyr: My group recently published a piece on the application of the five stages of grief to diabetic limb loss and amputation (Pubmed ID#: 25128314), and we really learned a lot about physician-patient communication in the process. One of these stages is anger, and we found that patients become angry with physicians for fairly predictable reasons. They almost always point toward a lack of trust with the physician and usually report that they were given misinformation throughout the process. This is the fault of physicians and speaks to an inability to effectively educate patients. I think the easiest way to mitigate this is simply by spending more time in the room answering questions. When I have a difficult patient who is experiencing some type of complication, I almost always start the patient interview by asking if the patient has any questions before I start talking. I ask if that patient has any questions anytime I talk for longer than thirty seconds, and I never leave the room until that patient explicitly tells me that I have answered all of the questions. Then, I certainly encourage the patient to write down any questions the patient may have and call me if any questions pop up. A patient having an understanding of what is going on with the process is less likely to be angry.

I would consider referral before taking a patient back into the operating room for any type of revision that wasn’t obviously caused by gross patient non-compliance. If the revision is required at all because of my decision-making or surgical performance initially, then it can’t hurt to get another opinion before I make still another decision. This is a confidence thing for me. I think those who are hesitant to refer generally lack confidence, and are fearful of the unknown when sending a patient away for a second opinion. I am confident in my surgical decision-making and surgical ability, but that doesn’t mean that I don’t make mistakes or have complications. Complications are a part of surgery, and if one cannot mentally handle the fact that there will be complications, more importantly, provide treatment in a timely fashion. I agree that referral to a colleague is appropriate when one senses dissatisfaction from the patient and/or the post-operative treatment is not succeeding. I think that one should make sure to follow up with the referrals and obtain periodic updates to be included in one’s medical records.

Sullivan: Usually my staff is aware of a potential problem before I am. When experiencing a bad result,

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Weil: The first recommendation I have is for the surgeon to show empathy. I recommend telling the patient how badly the doctor feels about the situation and assure the patient that the doctor will do everything possible to get the problem resolved.

I also recommend not pointing blame. The physician should not blame the patient for the problem—such as, say, getting the bandage wet and creating further damage from walking through a swamp, which was clearly against medical advice and instructions, thereby making it the patient’s fault.

Lastly, in the event of a poor result, I recommend that the physician address the patient directly about the current state of the condition and offer appropriate solutions; for example, if a bunion has recurred, offering a less invasive procedure like tightening up ligaments to get the toe in a straighter position. Furthermore, I do recommend not charging for the additional revision and accepting insurance as full payment as a concession.

Wallace: This is one of the hardest jobs in the profession, to level with a patient that there has been a surgical complication. I think the earlier one does it, the better. One should offer cogent explanations and then one probably shouldn’t be in the operating room to begin with.

In finishing, I find that the major part of patient satisfaction all has to do with pre-operative planning and expectations. In cases where there was a complication due to unforeseeable and/or unexpected occurrence, I feel that honesty is the best policy. In that way nobody loses sleep and whatever happens, happens. Ultimately, the bad complications which I have seen are generally not within the scope of podiatry and are better handled by the appropriate specialty. 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.