A Second Trauma: Navigating Infection After Orthopaedic Surgery

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Ten years ago, my journey as a survivor of orthopaedic trauma began when I (D.M.) was pinned between 2 sport utility vehicles (SUVs) as a pedestrian. I was airlifted to the R Adams Cowley Shock Trauma Center in Baltimore, Maryland, with severe, life-threatening injuries, including an open fracture of my right femur, a femoral bleed on my left side, and a collapsed lung. Due to extensive blood loss, I fought to stay conscious on my journey to the trauma center. After enduring 2 emergency surgeries in the first 48 hours, my focus became dealing with the pain of my broken bones, primarily the ones in my mangled right leg. After 48 hours, I was still in critical condition and had not seen my leg since I had been pulled from between the 2 vehicles. From my perspective, I thought medical staff and family members were simply not telling me that it had been amputated.

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Given my injuries, I underwent numerous surgeries during which my surgeon and his team worked to align and place my bones back together so that I could not only keep my leg, but walk again someday. After spending a month in the intensive care and step-down units, I was transferred to an acute rehabilitation facility that was affiliated with the trauma center. One night, after a day of intensive physical and occupational therapies, I experienced off-the-charts pain that shot all the way down to my toes on my right leg and kept me awake all night, despite receiving strong pain medication. When I went to my next physical therapy session, I asked the therapist if my foot exercises from the day before could have caused that much pain, which they let me know was not likely.

The therapist then looked toward my leg and asked, "What's with the red?"

I glanced down to see random pink blotches, to which I shrugged, "Just my skin."

This was followed by another night with off-the-charts pain that prevented me from getting any sleep. In the morning, a nurse practitioner happened to visit and saw the exhaustion in my face. After assessing my leg, she saw swelling, redness, and black marks at the site of one of my incisions. It was on the side of my leg that, with my limited mobility, I was unable to see. I realized later that this had been the skin discoloration on which my physical therapist had commented.

Being diagnosed with a postsurgical infection was now my Trauma 2.0 (or 2-point "Oh!"). After all, with the help of my medical trauma team, I had already survived being crushed, bleeding out twice, undergoing several surgeries, and facing major complications, including a pulmonary embolism. The transition to the rehabilitation center felt like one step closer to going home to my young daughter, who had witnessed my trauma and whom I had to leave on the side of the road when I was airlifted (Fig. 1). Now, having an infection and dealing with the uncertainty felt like 2 huge steps backward in my recovery timeline. I was sent back to the trauma center for additional surgeries to address the infection, which involved removing the internal hardware, temporarily placing an external fixator, and ultimately implanting new, permanent hardware (Fig. 2).

I tend to have an optimistic outlook, but the pain from the infection took my breath away and caused my anxiety to skyrocket. My thoughts raced and I began questioning: "If the infection is at the skin level of my upper thigh, does the pain in my foot mean that it has traveled that far?" "Does the black mark mean I am going to lose my whole leg?" "Is the infection so bad that I won't just lose my leg, but my daughter will lose her mother?"

Fighting the infection complicated my recovery far more than I could have ever imagined. The pain from the infection caused not just physical exhaustion but, to my frustration, intense brain fog. How could I, a certified speech-language pathologist, now require all my energy to concentrate when being spoken to or struggle to say the correct words in the simplest of sentences? Having an infection also led to even

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Fig. 1
Debra and her young daughter shortly after the accident (August 2015).

more medical appointments, as I had to be followed by an infectious disease specialist for almost 2 years. The nurse practitioner who spotted the infection even gave me the title of "frequent flyer winner" for how frequently I was forced to return to the rehabilitation center after my initial surgeries. Finally, despite taking a very strong antibiotic for more than 6 months, I was told that the infection could remain dormant in my body indefinitely, meaning that it will always be treated as contagious during future procedures and will continue to impact my life forever.

The infection has also caused me to experience moments of sadness socially. Even though I am forever grateful to have my leg, the removal of more tissue and muscle in the area made my mangled leg more noticeable. Now, even when I forget about my injury, when others see my leg, their expressions remind me of its appearance and my trauma.

Besides the impact that the infection had on my physical, mental, and emotional well-being, it also caused me considerable economic stress. During my recovery from infection, I was informed that my antibiotic medication was very expensive because it is normally given intravenously and not in pill form. Even with my good health insurance coverage, I had to pay hundreds of dollars out of pocket to get my medication. To be honest, due to the cost, I had thoughts of not obtaining a refill and playing Russian roulette with my infection. I cannot imagine how hard it must be for patients who have no choice but to pay even more money for something so critical to their health care. I hate to think that my fleeting thought of whether to fill the prescription or not might be a financial reality for some patients who do not have the economic stability to purchase their own prescriptions.

After one of my last surgeries, my orthopaedic surgeon approached me to ask if I would be interested in becoming a "patient partner" for a patient-centered study called "PREVENT CLOT"[1,2]. As a patient partner, I would review this new study and provide feedback on details that might be important to patients with experiences like mine. Immediately, I told my surgeon, "Yes!" I wanted to repay the hospital that saved my life, and selfishly, I wanted to give my life purpose again since I could no longer work in my profession with my permanent injuries. A year later, my surgeon recommended me to his colleague for another clinical research program, PREP-IT[3-5], which included the PREPARE and the Aqueous-PREP trials. The goal of these trials was to reduce the risk of infection in patients who have a fracture that requires surgery. My motivation to be a patient partner in clinical research was to improve the outcomes of future fracture patients. I felt especially passionate about helping to prevent other patients from experiencing the devastating complication of infection after their fracture surgery (Fig. 3).

When the PREPARE trial concluded, I was excited to hear the results, knowing that the study team, including myself, had invested years of arduous work to help patients like me. The results showed that patients with closed fractures who had 0.7% iodine povacrylex in 74% isopropyl alcohol applied to the skin before fracture surgery had fewer surgical site infections than patients who had 2% chlorhexidine gluconate in 70% isopropyl alcohol applied[5]. I was very pleased to collaborate with the study team to make a patient-friendly poster that would share these findings with patients in the community. The results made me emotional, thinking of the potentially thousands of future patients undergoing fracture-

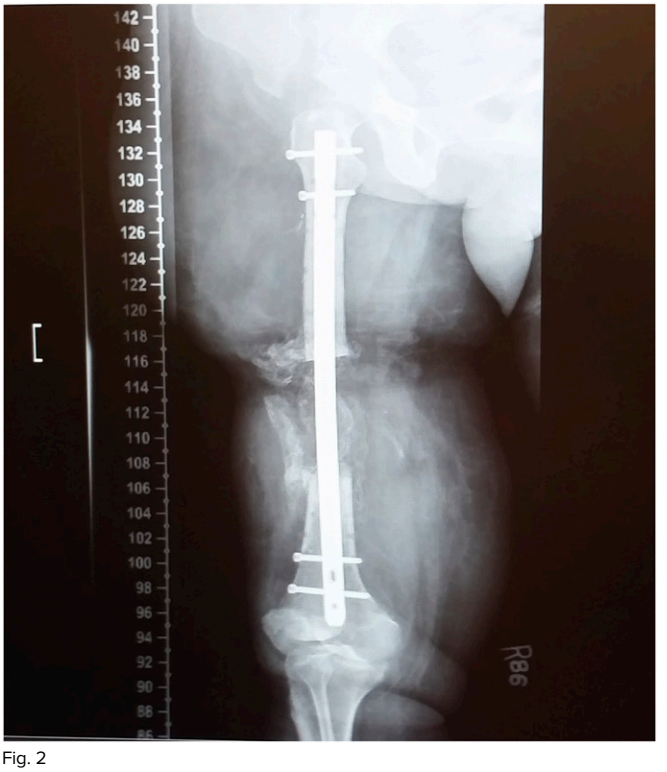

Fig. 2
Radiograph of Debra's right femur (December 2015).

Fig. 3
Debra serving as a patient partner for the PREP-IT research program. She was joined by fellow patient partner Jeffrey Wells (December 2019).

fixation surgery who might avoid a postsurgical infection and their own Trauma 2-point "Oh!" This means that fewer patients would have to experience the pain, fevers, exhaustion, brain fog, additional surgeries, and financial stress that a surgical site infection can bring. Future patients would be able to keep their injured limbs and, most importantly, go home to their loved ones.

It has now been 10 years since my trauma and the start of my involvement with patient-centered research. I continue to be a patient partner because I know that I am one of the fortunate ones whose infection was caught early. In terms of my health, I can say that my road to recovery will never be a clear path, but I am grateful to still be here. While it has not been easy, it has given me the chance to impact others' lives in ways I never had imagined. I am a survivor of 2 life-changing health events: a motor vehicle injury and a serious infection. I am a mother, a friend, and, now, a patient partner helping to reshape patient-centered research. My infection is one part of my injury story, and while I carry the physical scars, I refuse to let it leave a negative mark on my outlook. ■

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