

Interview with Dr. Sariah Khormae, CEO of SIGN Fracture Care International

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Dr. Sariah Khormae is an orthopaedic surgeon dedicated to advancing equality in musculoskeletal care as SIGN Fracture Care's Chief Executive Officer. A native of Washington state, Dr. Khormae graduated Summa Cum Laude from the University of Washington as President's Medalist/Valedictorian. She then completed her MD at Harvard Medical School-MIT Health Sciences Technology with Honors. She earned her PhD from Cambridge University, United Kingdom, in Chemical Engineering and Biotechnology, receiving the Danckwerts-Pergamon Prize for best PhD. Completing her orthopaedic residency at Hospital for Special Surgery, Dr. Khormae received multiple awards including the Distinguished Housestaff Award by HSS faculty for best graduating resident. She then finished spine fellowship at Stanford University Medical Center. Before joining SIGN, she was an attending surgeon and researcher at the Hospital for Special Surgery (HSS) and an Assistant Professor at Weill Cornell Medical College. At HSS, she led an orthopaedic surgery practice focused on patients with spine conditions and ran a research lab that received multiple awards, including from the Kellen Family Foundation, AO Spine North America, and the Kevin Zoltan Merzei Foundation.

What is SIGN's origin story? How did SIGN discover this gap in fracture care and decide to address it?

Dr. Zirkle, our founder, is an amazing human being who envisioned SIGN and then brought this vision to fruition. He is a Vietnam War veteran and was an orthopedic surgeon during the Vietnam War. Because of the inequality of care he saw between American soldiers and Vietnamese civilians, he actually petitioned to treat Vietnamese civilians while he was there, thus beginning his commitment to global orthopedics.

After the war, he traveled to different locations to teach orthopedic surgery. On one of his trips to Indonesia, a place where he had previously trained people, he saw a patient who had a femur fracture that hadn't been treated for three years because he couldn't afford the implant for surgery. Dr. Zirkle asked the surgeon why the patient had not been treated, and the surgeon explained that the family could not afford to purchase the implant. That was when Dr. Zirkle realized that education alone was not enough. He realized that implants also needed to be supplied or else the patients in the countries that he was trying to help couldn't actually get the care that they needed.

He then built a manufacturing facility and designed a new type of implant engineered specifically for environments without electricity in the operating room or access to X-ray machines, which are typically required in higher-resource settings. He designed this implant in collaboration with

Vietnamese surgeons, ensuring that it was not only something that could be donated to people in need, but also uniquely suited for the places where it would be used.

What experiences in your own training and career shaped your decision to step into this role as CEO of SIGN?

During my undergraduate education, I became interested in global health and medicine as a career because of a wonderful mentor and growing up as the child of two immigrant parents. When I got to medical school, my goal was to combine research and medical practice, and I went to Vietnam to pursue a research project focused on equalizing healthcare access for HIV.

While there, by chance, I observed a SIGN surgery. I didn't know anything about SIGN or orthopedics at the time, but I saw a young woman get her tibia fixed with this piece of metal that I was told was made in Washington State and donated free of charge to the patient, which is why she was able to receive surgery. When I learned that the implant was designed and manufactured in Washington, and the story of SIGN, I became deeply interested and looked into it more.

From that point on, I stayed in touch with SIGN throughout my medical training. I was drawn to this unique blend of creating implants and then this altruistic idea that you could donate them to someone halfway around the world, and that it would help someone with such profound impact. Throughout my training, I was always interested in finding the best ways to achieve healthcare equity, and I think SIGN does that particularly well by identifying a specific barrier to care and addressing it in a very pragmatic way.

Is there a specific patient, surgeon, or experience that really exemplifies SIGN's mission to create equality of fracture care throughout the world?

All of our SIGN surgeons exemplify SIGN's goal to create equality of fracture care through pragmatic, skilled treatment of those in need. We have many people in our network who we call SIGN surgeons, and those are the people in the countries who actually do the surgery. We empower them with education and with implants. One of our SIGN surgeons is Sammy Hulu. He's an amazing person, and he was hit in a traffic accident when he was an orthopedic resident. He actually received a SIGN nail himself. He was a SIGN patient, and now he's someone who's an orthopedic leader and teaches other people how to do orthopedic surgery. He's a prime example of SIGN's impact.

At the time of his injury, patients in his hospital often went untreated for long periods and had to remain in traction (a method for aligning fractures that uses pulleys, ropes, and weights), lying in bed for months and months with weights pulling on the leg. He was grateful to receive a SIGN nail, which allowed him to heal and continue his training. His particular story is very impactful for me,

and I got to meet him at our annual conference. He's someone who directly benefited as a patient and is now a teacher, a surgeon, and a real leader in Ethiopia.

How many countries and hospitals does SIGN work with? And how many patients have received a SIGN implant/surgery?

Currently, SIGN operates in 60 countries and is in the process of adding another, which will bring the total to 61 countries across 455 hospitals. To date, more than 480,000 patients have received SIGN implants free of charge, with surgeries performed by local surgeons in their own communities.

How do you decide where to send SIGN implants and education?

We have a committee that evaluates whether a hospital is suitable to start a SIGN program. There are several metrics, but the first step is that a local surgeon applies. That matters because we don't go in and operate on behalf of anyone. We rely on and trust local partners to be the champions and to know what is best for people in their communities.

Once a surgeon is interested, they contact our programs office and provide information about the costs patients might face beyond the surgery. It doesn't help if the implant is covered, but the rest of the hospital stay is unaffordable. We look for hospitals where a significant proportion of patients can still be treated even if they cannot pay, and where the hospital serves the public rather than only privately insured patients.

We also evaluate whether the surgeons have the necessary skills, whether there is enough patient volume to support a SIGN program, and whether basic instrumentation is available. The last thing is that we have surgeons train other surgeons, so they have to be willing to be trained in the technique, which usually takes one to two weeks. They travel to another SIGN site to learn how to do the surgery and everything associated with SIGN, because it's really a philosophy about doing right by the patient. We also emphasize follow-up, since new implants are sent out based on patient follow-up data. Surgeons have to show the patient's treatment outcomes in order to receive replenishment of implants. So they go to other sites not only to learn the procedure, but also to be exposed to the community and the philosophy of SIGN.

What advice would you give to someone interested in the global health space?

My path to this role has been very serendipitous. I think what I would advise people interested in is to maintain their goal. Your goal is to enhance equity and health, and think about where your particular skill set is. My background is in engineering as well as medicine. I would also add that you should then be open to pursuing ideas and organizations and people that you think are inspiring and are doing interesting work, and you never know where that leads you.