



## The Pradhan Chair in Spine Surgery: A Legacy Continues

**T**hrough creation of endowed professorships, Johns Hopkins Medicine donors can help the Department of Orthopaedic Surgery attract and retain the brightest researchers and most skilled surgeons from around the world. The Department is grateful for a recently established one: the Sachin N. Pradhan, M.D., Ph.D., & Sikta Pradhan, Ph.D., Professorship in Spine Surgery, funded by several donors, including Sikta Pradhan, who contributed more than \$2 million.

Sikta Pradhan and her late husband, neuropsychopharmacologist Sachin Pradhan, have demonstrated their commitment to others' higher education and biomedical research throughout their careers. Pradhan explains that her husband "was always trying to do more to help his patients." He left a legacy of philanthropy in their home country of India, having established the S. N. Pradhan Centre for Neurosciences research facility at the University of Calcutta, in 1998. The facility is one of a few of its kind in India.

Sachin Pradhan arrived in the United States during an early wave of immigration — after having grown up in a rural village in West Bengal without running water or electricity. He would go on to become a distinguished professor of pharmacology at the Howard University College of Medicine in Washington, D.C. Valued as a gifted teacher and skilled researcher, Pradhan supported many medical students and postgraduate and postdoctoral researchers by funding scholarships and providing housing for those in need.

In search of an ideal way to honor her husband, who passed away in 2009, Sikta Pradhan says, "I knew I



Sikta Pradhan (left) chose Jay Khanna (right), vice chair of orthopaedic surgery and professor of orthopaedic surgery, neurosurgery and biomedical engineering, as the ideal person to honor her and her husband's legacy.

had to do something for neuroscience." She selected **Jay Khanna**, vice chair of orthopaedic surgery and professor of orthopaedic surgery, neurosurgery and biomedical engineering, as the ideal person to honor her and her husband's legacy. Pradhan was pleased with her spine surgery outcome, Khanna's surgical skill and his manner with patients.

During the past several years, Pradhan's relationship with the department and university has deepened, as has her interest in supporting Khanna's work and that of the division of spine surgery. Khanna has been approved by the Johns Hopkins University Board of Trustees to be the inaugural holder of the new Pradhan Professorship in Spine Surgery. "I am honored that Dr. Pradhan has chosen to support not only me, but also our department and university, and Suburban Hospital," he says. "I look forward to making her proud and hope that my current and future work will inspire other patients to support our faculty and institutions."

Khanna has a track record of clinical excellence, research innovation, education, entrepreneurship and translational work in collaboration with the Department of Biomedical Engineering. In addition, his role as the department's vice chair of professional

development allows him to support his fellow faculty members as they leverage their own strengths and interests to achieve the Johns Hopkins missions of clinical care, education and research. The Pradhan professorship will allow Khanna to scale his efforts in supporting faculty members' professional development.

"I am fortunate and blessed to be able to care for patients like Dr. Pradhan," says Khanna. "It's amazing that I get to do this type of work, and I am greatly appreciative, not only of this gift, but also of the support from the division of spine surgery, under the leadership of **Dr. Kal Kebaish**; the department, led by **Dr. James Ficke**; the Johns Hopkins National Capital Region group, led by **Dr. Dan Valaik**; Suburban Hospital, led by Jacky Schultz; and numerous other leaders at Johns Hopkins Medicine." ■

To make a tax-deductible gift, please visit [bit.ly/orthogift](http://bit.ly/orthogift), call 410-955-6936, or send a check payable to Johns Hopkins Orthopaedics at 601 N. Caroline Street, Suite 5251 Baltimore, MD 21287.

# New Protocol Reduces Opioid Use by Up to Two-Thirds in Trauma Patients

For the past year and a half, orthopaedic trauma surgeon **Babar Shafiq** has implemented a pain alleviation protocol for trauma patients that has reduced opioid prescriptions by approximately two-thirds, and he plans to further reduce that number by half in an upcoming prospective study. “It has been very successful,” says Shafiq, who is also an assistant professor of orthopaedic surgery. “Before this protocol, many people were prescribed up to 120 pills on discharge, and now we are prescribing them

42. Patients are not dissatisfied, as some would expect. We have also noticed that patients are not requesting refills as much as they used to, despite being given far less of these medications, because we have incorporated multimodal treatment.”

During the height of the opioid epidemic, Shafiq recognized the need for a standardized way to treat orthopaedic trauma patients, so he partnered with anesthesiologist **Marie Hanna**, director of Johns Hopkins’ Acute Pain Service and the Perioperative

Pain Clinic, to create a new pain-alleviation protocol. Together, they developed what Shafiq describes as “a full complement of effective pain alleviation strategies” that can be implemented easily by providers.

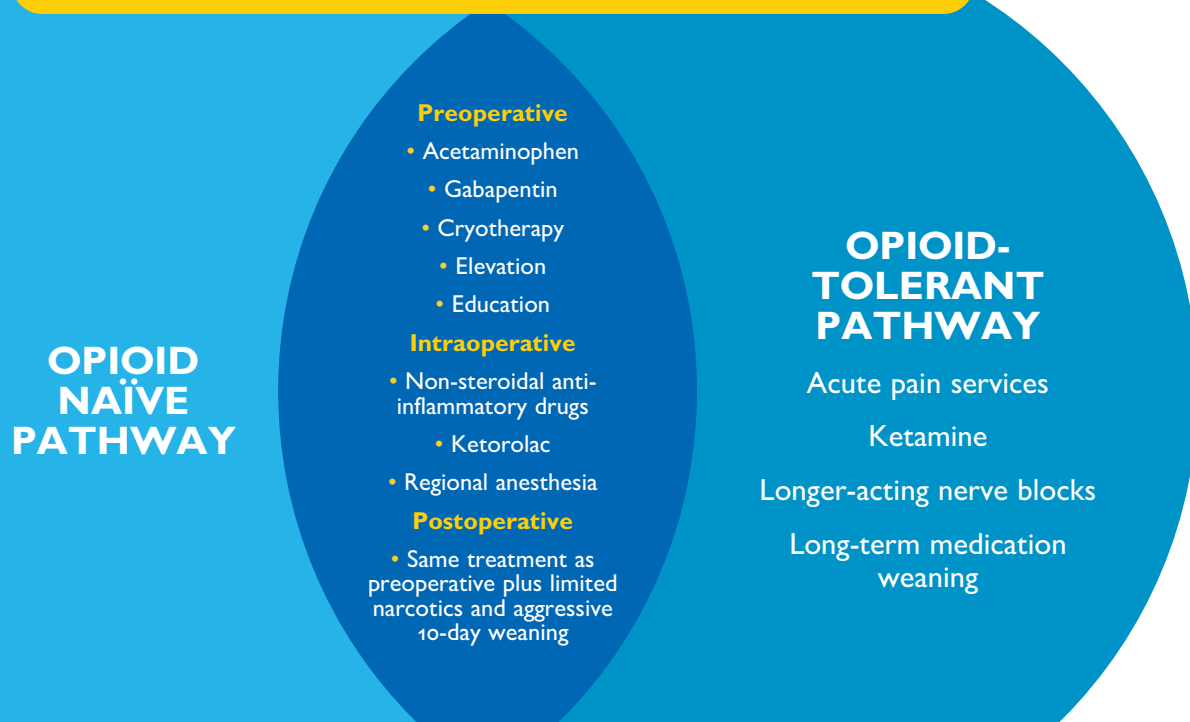
The pain alleviation protocol involves two pathways, one for opioid-naïve patients (patients without significant prior opioid history) and another for opioid-tolerant patients (patients with chronic opioid use and those with dependence on illicit opioids). These protocols involve preoperative multimodal treatment with acetaminophen, gabapentin, cryotherapy and elevation, as well as patient education. Intraoperatively, patients receive non-steroidal anti-inflammatory drugs, ketorolac (which is very effective for pain relief) and regional anesthesia. The treatment pathway for opioid-tolerant patients uses this multimodal approach but also incorporates acute pain services, ketamine and longer-acting nerve blocks. Postoperatively, patients receive the same multimodal regimen as preoperatively, with limited narcotics and an aggressive 10-day weaning schedule. “We give them prescriptions that will last two weeks, but I meet with each patient and explain that I really want them to stop these medications in three to seven days,” says Shafiq.

For opioid-tolerant patients, the Perioperative Pain Program led by the anesthesia department assists with long-term medication weaning, with the goal of returning patients to their baseline narcotic use or no narcotic use at all. “Patients are very happy with this program,” says Shafiq. “It helps provide opioid-tolerant patients with individualized pain alleviation strategies postoperatively when their pain was often under-alleviated before. Before the protocol, opioid-tolerant patients would be prescribed the same prescription as opioid-naïve patients, but they would use it all very rapidly. This was problematic, but we have a program for them now. We have a solution.”

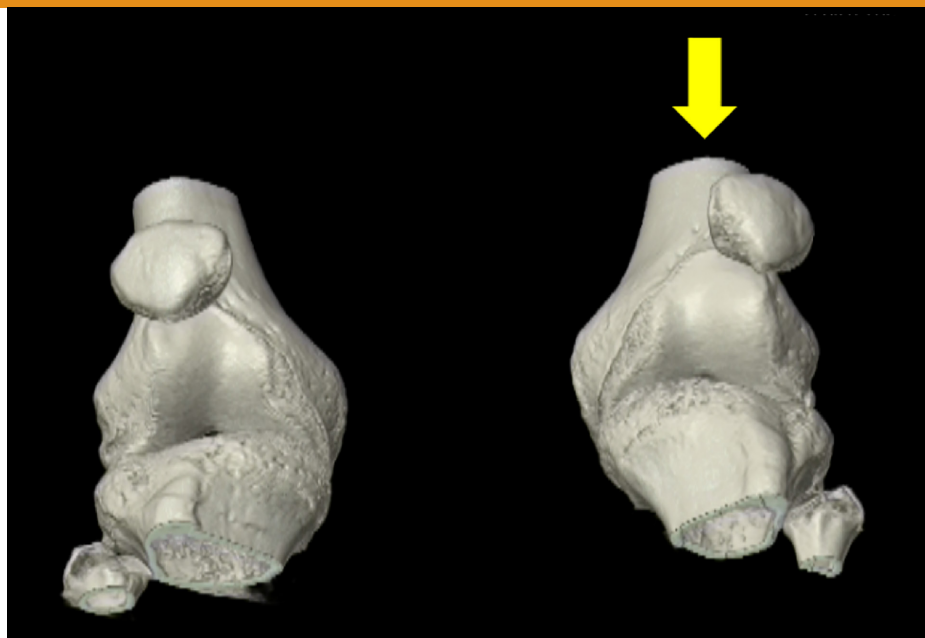
Shafiq’s future research will focus on multi-center studies to help understand the ethical issues regarding pain alleviation in orthopaedics and to develop best practices that include medication-related

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## PATHWAYS OF THE NEW PREOPERATIVE PAIN PROTOCOL



## HIGHLY SKILLED EXPERTISE



A static image captured from a dynamic 4DCT scan demonstrates unilateral patella maltracking in a 19-year old patient who has a history of recurrent patella dislocations.

## Innovating Treatment for Recurrent Patellar Instability

**Andrew Cosgarea** is contributing to a better understanding of patellar instability. Unlike other knee injuries that he treats — such as ACL tears, which tend to be similar in pathology — patellar instability cases “have a tremendous amount of variation from patient to patient,” says Cosgarea, an orthopaedic surgeon and professor of orthopaedic surgery. “Some patients with recurrent patellar instability have relatively normal anatomy, and others have clear anatomic abnormalities. Anatomic abnormalities and degrees of instability are all on a spectrum.”

While there are numerous operations for recurrent patellar instability — including medial patellofemoral ligament reconstruction and various types of osteotomy — Cosgarea says there is no consensus on any particular approach. With the wide range of anatomic and physiological factors that may cause instability, it is difficult to determine the most effective, individualized treatment plan. “My research focuses on using advanced imaging to identify which factors

# Combining Two New Surgery Techniques to Improve Spine Outcomes

**A**mit Jain is on the forefront of spine surgery innovation as an early adopter of minimally invasive lateral access and robotic spine surgery, or MILARS. “This specific combination of technologies — lateral access and robotics — has the potential to change our field, to move the entire field of spine surgery forward,” says Jain, chief of minimally invasive spine surgery and assistant professor of orthopaedics and neurosurgery at Johns Hopkins. “This innovative technique can really provide significant benefits to our patients.” Jain is part of a team of Johns Hopkins surgeons, including **Jay Khanna, Khaled Kebaish, and Nick Theodore**, who are developing clinical and research protocols for this combination of procedures.

As opposed to traditional open spine surgery, which involves extensive muscle manipulation, MILARS uses a different approach. “Lateral access allows us to perform spine surgery in a way that is frequently muscle sparing, which has profound implications for recovery. You can substantially minimize blood loss and the duration of hospital stays because it is not as disruptive of the physiology of the body,” Jain says.

Lateral access spine surgery allows for indirect spinal decompression, which avoids the nerve irritation that may occur with direct manipulation. These aspects combined make the procedure more efficient in terms of operating room use. “You can accomplish a goal very quickly. For example, you can perform a lateral access surgery with robotic screw placement in less than an hour, as opposed to an open approach that

could take several hours,” Jain says.

MILARS relies on a state-of-the-art robotics navigation and guidance system, which was approved by the FDA in 2017. Surgeons can use the robot to guide pedicle screw placement. “It’s precision medicine,” Jain says. “With robotics you can, in a very accurate manner, instrument the spine, making the operation safer for the patient.”

The ideal patients for this combination of techniques are those with a focused problem in one, two or three spinal levels. Patients with spondylolisthesis, foraminal stenosis or lumbar spinal stenosis can benefit greatly from MILARS. Other indications include adjacent segment disease and degenerative scoliosis.

Jain also sees the potential for major savings in health care resources. “More than a quarter million

“You can perform a lateral access surgery with robotic screw placement in less than an hour.”

– Amit Jain



**The ideal patients for minimally invasive lateral access and robotic spine surgery are those with a focused problem in one, two or three spinal levels.**

lumbar fusions are performed in the country each year, and if perhaps a fifth of them can be performed with MILARS, the reductions in blood loss, morbidity, intensive care unit stays, and hospital stays would have a substantial impact,” Jain says.

Patients will appreciate the benefits, as well, he says. “Patients love having faster recovery, better outcomes, smaller scars and the ability to go home the next day instead of a week later.” For many patients, the difference in recovery time would make traveling to Johns Hopkins, even from far away, worthwhile. “We are among a handful of surgeons nationally that combine lateral access surgery with robotic spine operations. At Hopkins, we could provide a fundamentally different surgical experience with MILARS than that of the traditional method available at local community hospitals,” he says.

Jain has published over 130 peer-reviewed journal articles focused on improving outcomes of spine care. ■



Learn more about Amit Jain at [bit.ly/hopkinsjain](https://bit.ly/hopkinsjain).

predispose patients to dislocations and to simulate different surgical interventions,” Cosgarea says.

In collaboration with **Shadpour Demehri**, associate professor in the Department of Radiology and Radiological Science at Johns Hopkins; John Elias, senior research scientist at the Cleveland Clinic Akron General; and Miho Tanaka at Massachusetts General Hospital, Cosgarea uses a four-dimensional computed tomography (4DCT) scanner to create individual models of his patients’ knees. Unlike static imaging, 4DCT captures the bones in motion. Cosgarea then takes information from MRI, which shows the thickness of the cartilage, and overlays an image of the cartilage onto the bony 4DCT model. This creates a complete, computer-generated image of the joint.

Using this model, Cosgarea and team can simulate an intervention, such as surgery or physical therapy, and, through computational analysis, compare the pre- and post-intervention biomechanical and joint-reactive forces borne by the knee to determine

whether a particular procedure achieves the desired clinical outcome. “We use the modeling to understand, at a biomechanical level, what the effect of an intervention is or would be and to study different types of interventions,” Cosgarea says. With an actual model, rather than a theoretical model, Cosgarea is able to understand the patient’s specific anatomy and more accurately predict postoperative outcomes. Over 100 patients have completed 4DCT modeling so far.

“My research focuses on using advanced imaging to identify which factors predispose patients to dislocations and to simulate different surgical interventions.”

– Andrew Cosgarea

As imaging technology progresses, Cosgarea has a vision for future research. “We aim to create models that simulate actual, functional activities,” he says. “Our modeling is currently limited to a squat, for example, so we are trying to create more sophisticated modeling techniques to capture more complex motion.”

Cosgarea is excited to share his knowledge with the greater orthopaedic community. He explains, “Johns Hopkins is one of the few centers in the world with a dynamic 4DCT scanner. My job is to take this technology and then translate my findings into knowledge applicable to clinicians without access to 4DCT.” With the resources at Johns Hopkins, Cosgarea says, “We have the ability to assess all levels of complexity, from the most straightforward to the most severe cases.” ■

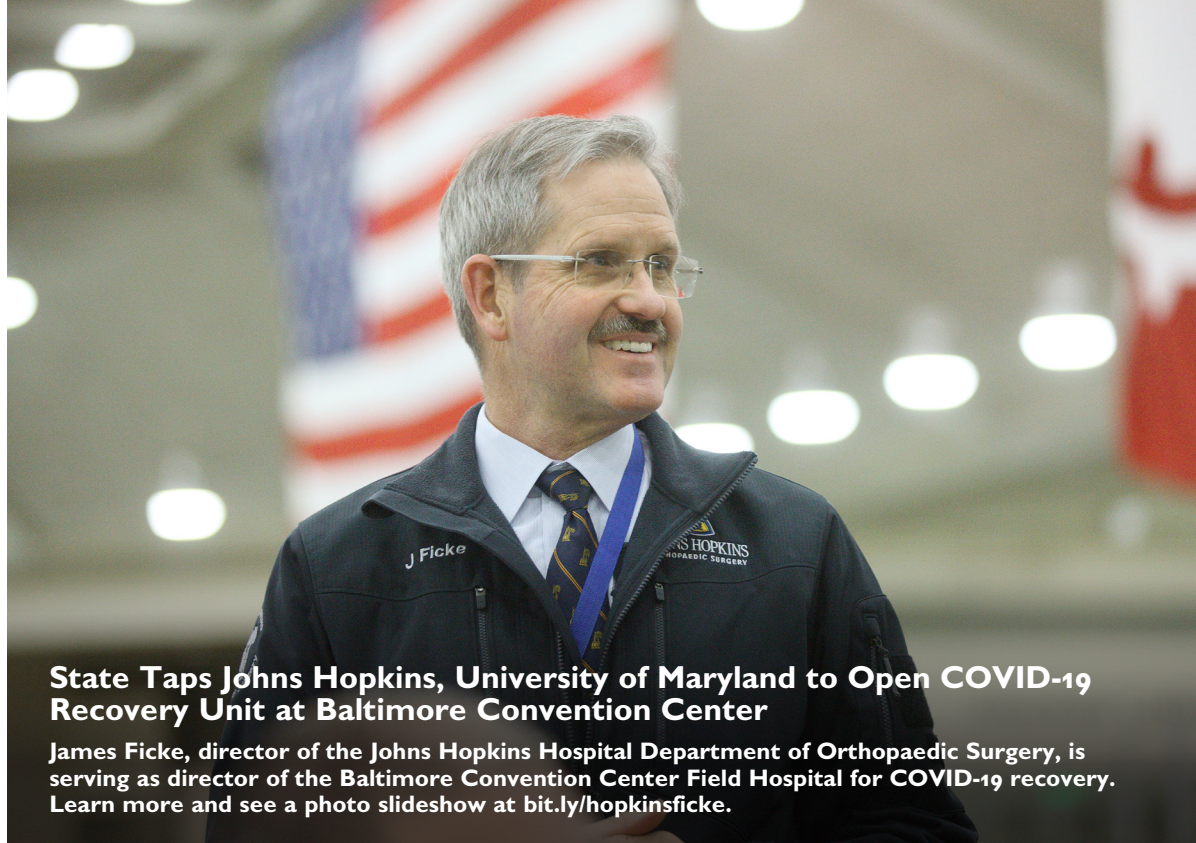
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and psychosocial treatment. Shafiq admits, "There is a psychological component to pain that we do not manage well. Self-efficacy and pain catastrophizing are important concepts that can affect a patient's recovery. These are phenomena we are starting to understand better, and I am trying to incorporate these concepts in my treatment of patients." Most importantly, he says, "We listen to the patient. We strive to treat the person, not just the fracture." ■



Learn about the Johns Hopkins Perioperative Pain Clinic at [bit.ly/hopkinsperioperativepain](http://bit.ly/hopkinsperioperativepain).



### State Taps Johns Hopkins, University of Maryland to Open COVID-19 Recovery Unit at Baltimore Convention Center

James Ficke, director of the Johns Hopkins Hospital Department of Orthopaedic Surgery, is serving as director of the Baltimore Convention Center Field Hospital for COVID-19 recovery. Learn more and see a photo slideshow at [bit.ly/hopkinsficke](http://bit.ly/hopkinsficke).

# Framework

This newsletter is one of the many ways we seek to enhance our partnership with our thousands of friends and patients. Comments, questions and topics you would like to see covered in upcoming issues are always welcome.

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Johns Hopkins Medicine  
Department of Orthopaedic Surgery  
601 North Caroline Street  
Baltimore, MD 21287

#### Orthopaedic Surgery

James Ficke, M.D., F.A.C.S., *Director*  
Thomas Clemens, Ph.D., *Vice Chair for Research*  
A. Jay Khanna, M.D., *Vice Chair for Professional Development*  
Dawn LaPorte, M.D., *Vice Chair for Education*  
Lee Riley, III, M.D., *Vice Chair for Clinical Operation*  
Robert Sterling, M.D., *Vice Chair for Quality and Safety*  
Colin Semper, *Chief Administrative Officer*

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#### Marketing and Communications

Suzanne Sawyer, *Senior Vice President, Chief Marketing and Communications Officer*  
Justin Kovalsky, *Editor*  
Lisa Eddy, *Managing Editor*  
Rachel Box, Kerry Kennedy, Jenni Weems, *Writers*  
Rachel Sweeney, *Designer*  
Keith Weller, *Photographer*  
For questions or comments, contact:  
Lisa Eddy at [lradema1@jhmi.edu](mailto:lradema1@jhmi.edu)  
or 443-287-2527.

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# Framework

Johns Hopkins  
Orthopaedic Surgery

Summer 2020

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