

Chin-on-Chest Cervical Spine Deformity Surgery and Recovery

The main objective of surgery to correct cervical kyphosis is to achieve a straight-ahead gaze for patients. While this goal might sound simple and straightforward, the surgery and recovery are anything but.

Lee Riley, III, executive vice chairman in the Johns Hopkins Department of Orthopaedic Surgery, specializes in cervical spine revisions and deformities such as spondylosis, degenerative disc disease and severe hyperkyphoses such as chin-on-chest deformities. He says the procedures to correct chin-on-chest deformities often take 10 to 12 hours and involve a posterior approach to the neck, followed by an anterior approach, and then another posterior approach.

“It’s basically three operations under the same anesthetic,” says Riley. “Part of the challenge is determining how to execute the surgery from a technical and sequencing standpoint and understanding what you can accomplish in one sitting. You have to consider the merits of staging, and you need to anticipate complications both during and after the operation.”

To correct cervical kyphosis, Riley first uses a posterior approach to loosen the joints in the back of the neck, decompressing the nerves. He then inserts screws as fixation points. In an anterior stage, Riley makes a small incision, advances past

the esophagus, trachea and blood vessels, and removes disks or part of the bone, which allows him to mobilize the patient’s neck. He then adds structural bone, which he says acts “kind of like a doorjamb that allows the bone to heal together but also provides structural support.” In the final posterior stage, Riley repositions the neck using screws, rods and bone graft.

“The difficulty,” Riley says, “is that all of this manipulation must be performed within the constraints of how much manipulation the nerves and spinal cord can tolerate. You have to maximize the space for the nerves and the spinal cord to move in order to avoid paralysis or damage to the spinal cord.”

For patients, the six- to 12-month long recovery process can be very difficult. “Helping patients understand preoperatively what they are committing themselves to and then making a commitment to them that you will get them through the operation is really important,” says Riley.

Postoperatively, Riley monitors for instrumentation failure, infection and nerve injury. Because the patient will likely require a gastric feeding tube for a period of time after surgery, swallowing and speech therapists are involved during the early postoperative period. These therapists can help advise patients on steps they can take to avoid complications such as aspiration and pneumonia.

“We have tremendous resources available here at Hopkins—cutting-edge equipment, operating rooms, intensive care units, as well as skilled intensivists,” says Riley. “Everyone is committed to expert, patient-centered care.” ■



Lee Riley, III

POSTOPERATIVE PERIOD



Recovery takes six to 12 months



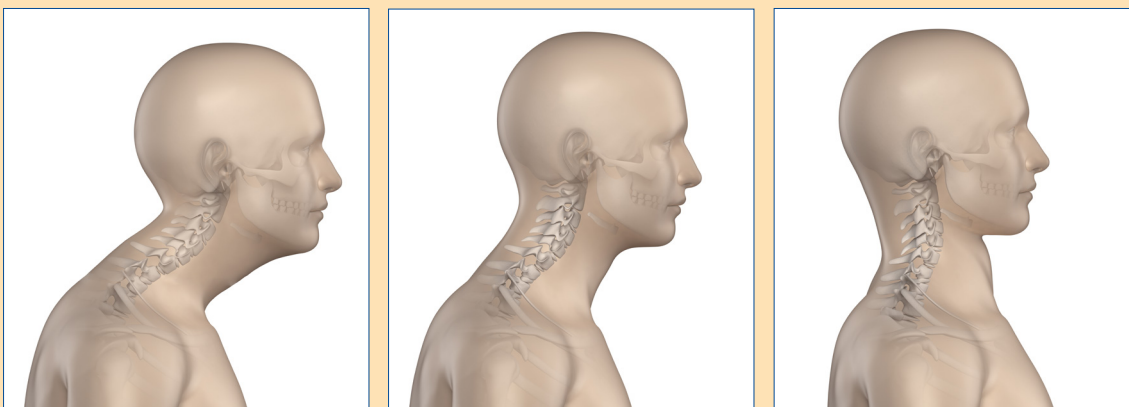
Patients are monitored closely for instrumentation failure, infection and nerve injury



Swallowing and speech therapists are involved in early postoperative period

“It’s basically three operations under the same anesthetic.”

– Lee Riley, III, orthopaedic surgeon



To correct cervical kyphosis, Lee Riley, III, uses a posterior approach to loosen the joints in the back of the neck. He then inserts screws as fixation points. In an anterior stage, he makes a small incision, advances past the esophagus, trachea and blood vessels, and removes disks or part of the bone, which allows him to mobilize the patient’s neck. He then adds structural bone. In the final posterior stage, Riley repositions the neck using screws, rods and bone graft.

Research to Advance the Approach to Pediatric ACL Injuries

Surgeons at Johns Hopkins Children's Center are no longer waiting when it comes to surgical reconstruction for pediatric patients with ACL tears. "We now try to treat these patients acutely, rather than waiting for the growth plates to close," says **R. Jay Lee**, assistant professor of orthopaedic surgery at Johns Hopkins Children's Center. Lee is working on multiple research projects and clinical trials to continue to advance the surgical treatment of pediatric ACL injuries.

While growth plates remain a concern during pediatric ACL reconstruction, even in the rare case of a resulting growth disturbance, Lee says, growth can be modulated by tethering the growth plate or, in older children, using osteotomies to correct the deformity. "We now know the longer we wait, the more instability episodes a patient may have, and the more cartilage and meniscal injuries patients develop," he says.

To reduce the likelihood of growth disturbance, Lee is studying physal maturation in the knee. "We are always trying to predict when we can safely violate a growth plate without causing complications," Lee says.

Lee has used MRI to characterize the process of physal maturation in the knee of patients from ages 6 to 19. He found that the normal human knee closes in a uniform way, which can aid surgical decision-making by showing surgeons when they can safely violate a growth plate. "When one area of the physis demonstrates early signs of closure, it indicates the physes are closing as a whole," Lee explains.

Lee is also participating in a clinical trial for patients ages 10 to 16 that will use autologous chondrocyte implantation to restore cartilage in the knee. "The goal is to see if young patients benefit from reimplantation of cartilage grown from their own cells," Lee says. Johns Hopkins is 1 of 10 centers participating in the trial, which Lee hopes will yield better outcomes than the traditional treatment of microfracture.

In addition, Lee is involved in the biomechanical testing phase of another clinical trial on the surgical technique for ACL repair. "In the future, we are going to try to avoid the physes and reconstruction entirely," Lee says. "Research points to the value of trying to retension the remaining, native tissue instead, to get the tissue to heal."

Pediatric patients can benefit significantly from the innovative research and multidisciplinary approach at Johns Hopkins, says Lee. "In addition



R. Jay Lee is leading Johns Hopkins research and clinical trials to advance treatment for pediatric patients with ACL tears.

to the physician, there are many others who weigh in with their experience. There is a depth of expertise and access to extensive resources that you don't find everywhere." ■



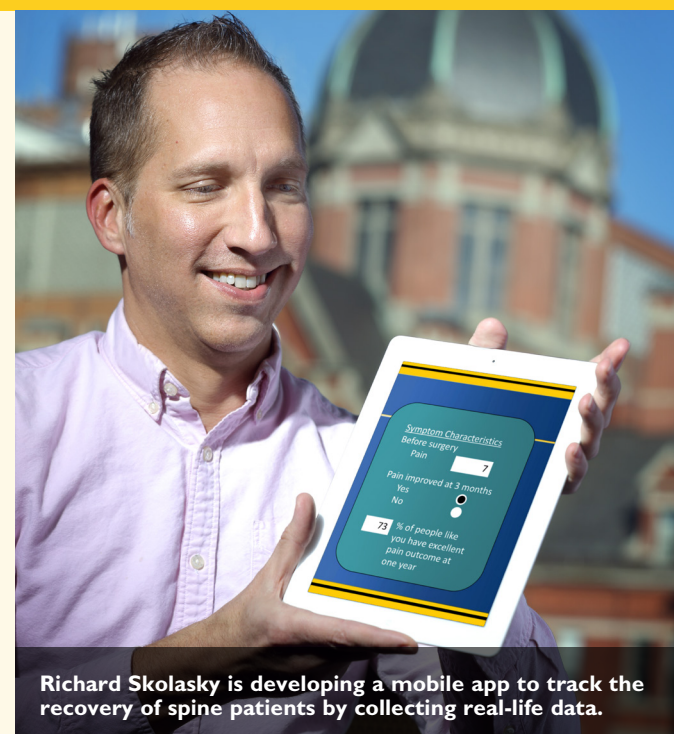
A scan shows a growth plate sparing ACL reconstruction in an 8-year old patient.

DIGITAL HEALTH

Aiming to Predict Recovery and Tailor Support for Spine Surgery Patients

Johns Hopkins team is using innovative methods to predict how patients will fare after surgery for spine degeneration and to tailor support for these patients during their recovery. **Richard Skolasky**, director of the Spine Outcomes Research Center at the Johns Hopkins University School of Medicine, aims to enable surgeons to predict, at three months postoperatively, how patients' recovery trajectories may evolve throughout the first year. This information may then help surgeons tailor support for these patients.

To do this, Skolasky and his team first determined which aspects of recovery were most important to patients. They convened focus groups of spine patients and asked them about their health-related goals, which the researchers then mapped onto the validated PROMIS (Patient-Reported Outcomes Measurement Information System) health domains. They then used the data from PROMIS health assessments to develop a risk calculator to help



Richard Skolasky is developing a mobile app to track the recovery of spine patients by collecting real-life data.

Orthopaedic Oncology for Patients with Upper Extremity Tumors of the Hand

A Johns Hopkins orthopaedic surgeon is filling the gap in care for patients with upper extremity tumors of the hand. **Sophia Strike** specializes in hand oncology and works with a team of experts to provide multidisciplinary care for orthopaedic oncology. New technological developments, advancements in chemotherapy and radiation, and specialized training all empower Strike to offer numerous surgical options.

Now, says Strike, referring physicians don't have to pick one specialty over another "Should I send my patient to a hand surgeon? Should I send them to an oncologist? You can have both in one."

After diagnosing a patient, Strike makes recommendations from a multitude of treatment options. "Every patient is just different enough from the last one that it is always a challenge to determine the best plan of care for them."

New technological developments, such as thinner sutures, and specialized training in "supermicrosurgery" have provided more surgical options, as well. Strike explains that advancements in microsurgery now allow submillimeter vessels to be repaired and to preserve more of the hand. For example, she says, "If I remove a small tumor around a blood vessel, we can reconstruct the blood vessel. The technique has become more and more precise so



Sophia Strike specializes in hand oncology and works with a team of experts to provide multidisciplinary care for orthopaedic oncology.

we can reconstruct smaller vessels than in the past, when we probably would have had to amputate."

In addition, she says advancements in chemotherapy and radiation have allowed her to save more structures. "Depending on the type of cancer, tumors can be radiated or patients can undergo systemic therapy to help us preserve more of the hand," says Strike.

Although most upper extremity tumors are

"The same thing that makes me excited about what I do is also what makes it challenging. You are not following a clear pathway where you just check a box and go in a set direction."

– Sophia Strike, orthopaedic surgeon

benign, including an enchondroma or giant cell tumor of tendon sheath, some malignant tumors can occur in the hand. These include soft-tissue sarcoma, chondrosarcoma, osteosarcoma or Ewing sarcoma. Strike says epithelioid and synovial sarcomas are the most common soft-tissue sarcomas in the adult hand, but squamous cell carcinoma is one of the most common malignant conditions found on the hand.

Diagnosis and treatment can be difficult because every case is unique. "The same thing that makes me excited about what I do is also what makes it challenging. You are not following a clear pathway where you just check a box and go in a set direction," says Strike.

Since discovering a passion for oncology during her residency at Johns Hopkins, Strike spent six months focusing on oncology during a hand fellowship with the National University of Singapore School of Medicine. "Because I was able to focus on this almost exclusively, I learned so much," she says. "It's extremely rewarding to apply this knowledge to help patients." ■

predict a patient's symptoms and functional limitations one year after surgery. These projections can guide physicians in setting realistic expectations with patients for what they will achieve in their recovery.

With support from the orthopaedic spine division, and in collaboration with the Johns Hopkins Department of Physical Medicine and Rehabilitation, Skolasky's group is beginning another aspect of this research—to develop a mobile application to track the recovery of spine patients by collecting real-life data.

"The six to 12 weeks after surgery is such an important time for patients to resume their activities, like getting up and starting to walk, and for clinicians to ensure that infection doesn't develop," Skolasky says. "These 'real-life' measurements can be very valuable during this time."

Skolasky says the application will enable two-way communication during those 12 weeks by prompting patients to do physical therapy exercises and sending

clinicians real-time updates on pain and mood levels. "They like receiving reminders via phone, as opposed to paper instructions, which can get lost," he says.

Additionally, the application will create individualized "rules" for each patient, so if their recovery deviates from what is expected, the application will alert the provider. For example, if a patient reports more limited mobility than expected, the information will be relayed to the clinician, who can address this issue in a follow-up appointment.

Another potential benefit is the immediacy of the mobile platform, which may increase reporting accuracy. "When the app asks about a patient's pain, the patient reports how their pain is affecting their life, in their natural environment, versus reporting pain in a clinical setting after having traveled to their appointment," Skolasky says.

The risk calculator is currently in the validation stages, and Skolasky and his team hope to begin development of the app in late 2019. ■

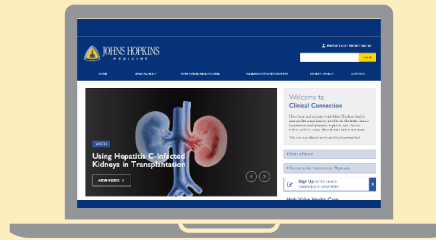




Introducing the Johns Hopkins Doctor Referral App

This new app provides a simple way for health care providers to connect with and refer patients to physicians across Johns Hopkins Medicine in the departments of orthopaedics, surgery, neurosurgery and urology. Registration required.

Visit bit.ly/hopkinsapp



Explore Our Online Resource for Physicians: Clinical Connection

Connect with Johns Hopkins health care professionals sharing insights on the latest clinical innovations and advances in patient care.

Visit hopkinsmedicine.org/clinicalconnection

Your Vital Links

Johns Hopkins Orthopaedic Surgery

Call 443-997-BONE (2663)
Visit hopkinsortho.org

Hopkins Access Line (HAL)

Your 24/7 connection with Johns Hopkins faculty in any specialty
Call 410-955-9444 or
800-765-5447

Online Referral Directory

Find a Johns Hopkins physician by name, specialty and more
Visit hopkinsmedicine.org/doctors

CME Programs

Visit hopkinscme.edu
Call 401-502-9634
Email cmenet@jhmi.edu

Clinical Trials

Visit trials.johnshopkins.edu

JOHNS HOPKINS Orthopaedic Surgery

This newsletter is one of the many ways we seek to enhance our partnership with our thousands of referring physicians. Comments, questions and thoughts on topics you would like to see covered in upcoming issues are always welcome. Please email lrademar@jhmi.edu.

Johns Hopkins Orthopaedic Surgery is published by Johns Hopkins Medicine Marketing and Communications.

Johns Hopkins Medicine
Department of Orthopaedic Surgery
601 N. Caroline St.
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*

Marketing and Communications

Lisa Rademakers, *Editor*

Kerry Kennedy, Jenni Weems, *Writers*

Kristen Caudill, *Designer*

Keith Weller, *Photographer*

For questions or comments, contact:
Lisa Rademakers at lrademar@jhmi.edu
or 443-287-2527.

Non-Profit Org
U.S. Postage
PAID
Baltimore, MD
Permit No. 5415

© 2019 The Johns Hopkins University and
The Johns Hopkins Health System Corporation



JOHNS HOPKINS Orthopaedic Surgery

Spring 2019

Inside



1

Chin-on-Chest Cervical Spine Deformity Surgery and Recovery



2

Research to Advance the Approach to Pediatric ACL Injuries



3

Orthopaedic Oncology for Patients with Upper Extremity Tumors of the Hand

