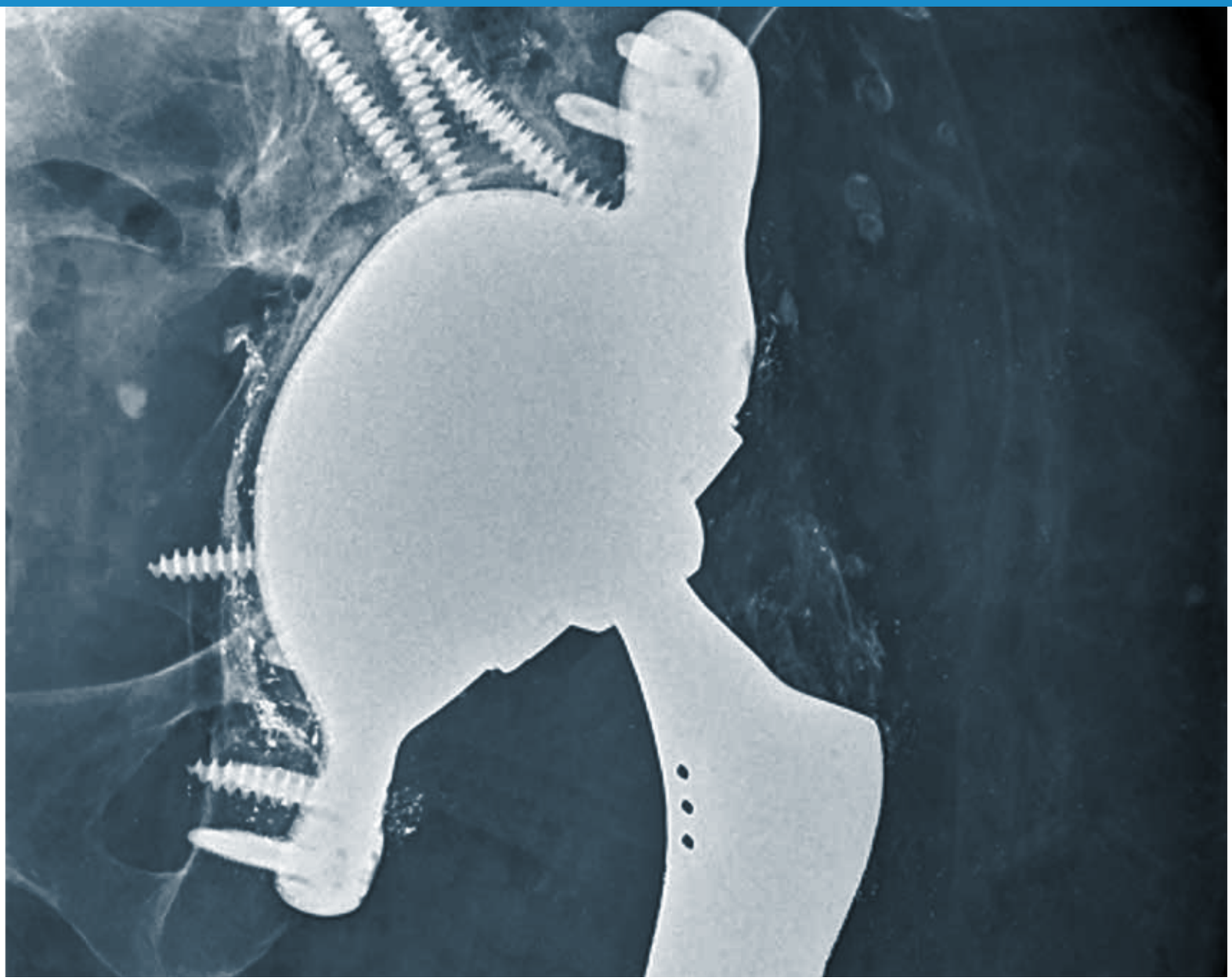
Cleveland Clinic

ORTHOPAEDIC INSIGHTS

WINTER 2023

NEWS AND INSIGHTS FROM
THE DEPARTMENT OF ORTHOPAEDIC SURGERY



Dear Colleagues

Innovation is one of the hallmarks of treatment in Cleveland Clinic's Department of Orthopaedic Surgery. For conditions as common as patellar instability or as unusual as a softball-sized chondrosarcoma, our orthopaedic providers are driven to identify and deliver the best therapy, even therapy that is one of a kind.

In this issue of *Orthopaedic Insights*, we highlight the novel orthopaedic care recently provided at Cleveland Clinic. Articles explore topics including:

- Custom 3D-printed implants for patients with severe hip defects that cannot be repaired using conventional methods — or even with other custom implants (p. 3)
- A unique case involving the reconstruction of a sternum and sternoclavicular joints using a cadaveric femur, aortograft and ankle-fixation cord (p. 6)
- The unorthodox use of surgery for younger patients with first-time patellar dislocation — and why it should be considered more often (p. 9)
- A new orthopaedic/endocrinology program that is helping surgery candidates reduce high body mass index an average of 3-6 kg/m^2 and decrease high hemoglobin A1c an average of 1%-3% in just three months (p. 11)
- Unconventional therapy that speeds the relief of frozen shoulder with a combination of brisement, nerve block and immediate physical therapy (p. 13)

Achievements and advancements such as these regularly occur throughout the Orthopaedic & Rheumatologic Institute. We are always looking for the next improvement in clinical care and welcome collaboration with you and your practice. If you have a challenging or unique case, I encourage you to contact me or any of the providers in this publication.

Sincerely,

BRENDAN M. PATTERSON, MD

Chair, Orthopaedic Surgery

216.445.4792 | patterb2@ccf.org

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ORTHOPAEDIC INSIGHTS | WINTER 2023

Orthopaedic Insights is published by Cleveland Clinic's Department of Orthopaedic Surgery to inform musculoskeletal specialists about advances in diagnosis, medical and surgical management, and research.

Brendan M. Patterson, MD
Chair, Department of Orthopaedic Surgery

Kate Rein | Managing Editor

Michael Viars | Art Director

Beth Lukco | Marketing Manager

3D-Printed Implant Reconstructs Hip in Patient with No Proximal Femur or Pelvis

CUSTOM COMPONENTS OFFER BETTER OUTCOMES WHEN CONVENTIONAL OPTIONS FAIL

Revision arthroplasty of severe acetabular defects has entered a new era thanks to additive manufacturing (3D printing) of custom implantable components.

For more than two decades, we in Cleveland Clinic's Department of Orthopaedic Surgery have worked with implant manufacturers to custom-design components milled out of titanium. Most recently, we have collaborated with Stryker Corp. to establish a 3D-manufacturing program that produces customized titanium components with a porous surface, similar to cancellous bone, to facilitate bony ingrowth.

This technology has helped improve outcomes for patients with severe hip defects that cannot be repaired using conventional methods — or even with other custom implants.

Case study: Multiple failed hip replacements

For example, one patient came to Cleveland Clinic after having multiple failed hip replacements. She presented with a loose implant and a pelvis full of metal debris (Figure 1). We removed the loose implant and inserted a temporary hip and a bone graft while we explored long-term treatment options. Because the patient's hip had a huge defect, with no proximal femur and no pelvis, permanent reconstruction was not possible with existing implants and standard technology.

We submitted CT scans of the patient's hip to the implant manufacturer, who used them to render a 3D model. We then began an iterative design process (Figure 2); the surgical and manufacturing teams held virtual meetings to discuss shapes to fit the model. Next, the teams worked together to determine the placement of porous surfaces. This was based on careful evaluation of the detailed CT scan and a virtual pelvic model that could be manipulated in real time. By identifying the most robust and healthy remaining pelvic bone, we were able to create surfaces on the custom implant to interface with the patient. These bioactive porous surfaces were designed to allow ingrowth of host bone into the custom component.

The actual design process for these 3D-printed titanium implants takes eight to 12 weeks. At this time, the longest and most tedious portion of the design is the regulatory process and compassionate release of the implants through the Food and Drug Administration (FDA) and Cleveland Clinic's Institutional Review Board. This is necessary to ensure safety and appropriate use of this type of implant. The actual print time for the implant is approximately four to five days; it then requires further processing and machining before it can become a final implant that is shipped and ready for implantation.

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Viktor Krebs, MD
krebsv@ccf.org
216.445.3834

Figure 1. X-ray showing a loose implant in a patient with multiple failed hip replacements.

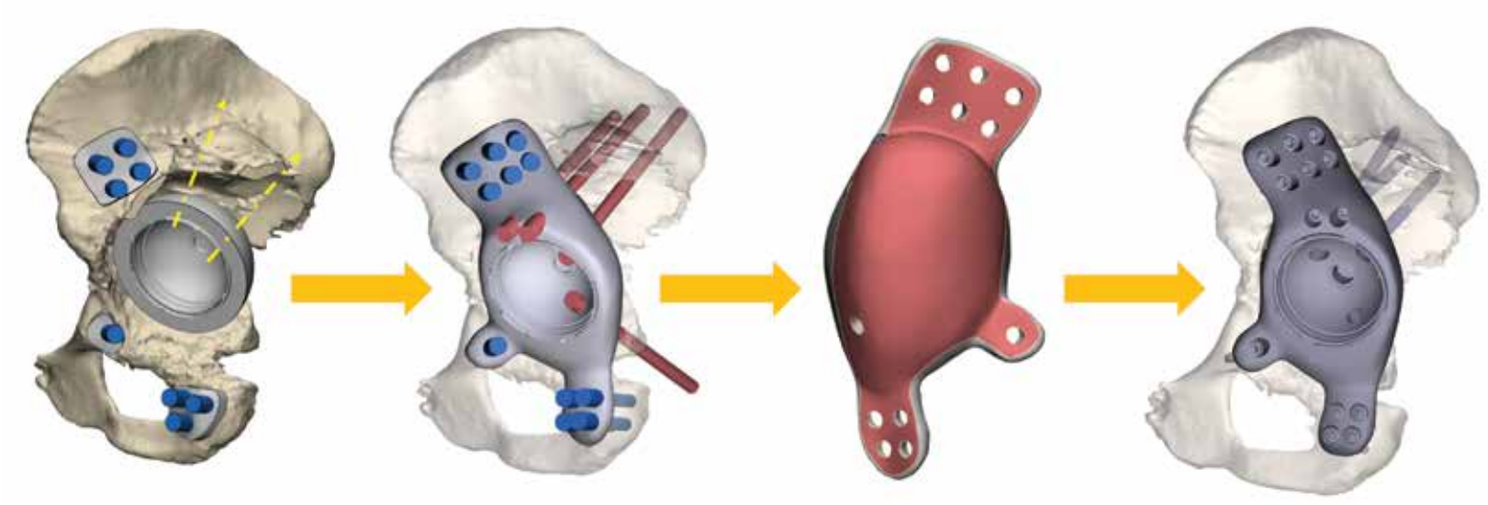

Figure 2. The iterative design process, from concept to implant. Graphics courtesy of Stryker Corp.

For the patient in this case, the result was a custom 3D-printed pelvis (Figures 3-5).

The surgery is a major revision hip procedure and requires extensile exposure and detailed knowledge of pelvic anatomy. These procedures can last from five to eight hours and are a significant stress on the patient. Because of the proximity to major neurovascular structures during the entire procedure, the surgical techniques are cautious and precise to avoid complications. We also use evoked nerve monitoring to help protect the sciatic nerve, which is often in the surgical field.

Now two years after surgery, the patient is walking without pain. Figure 6 shows final placement of the implant.

Porous surface more amenable to biologic fixation

Since 2020, we have designed and implanted custom 3D-printed acetabular prosthetics for multiple patients, including those with no anatomy to support conventional implants and no ability to walk.

Alternative custom implants are available. However, most have a gritted titanium surface rather than a porous surface and, therefore, often fail to biologically integrate into the patient's bone, causing a higher risk of loosening. We have not observed these issues with 3D-printed porous surfaces in the short term, and we believe that they will have the opportunity to provide lasting biologic fixation and better long-term outcomes.

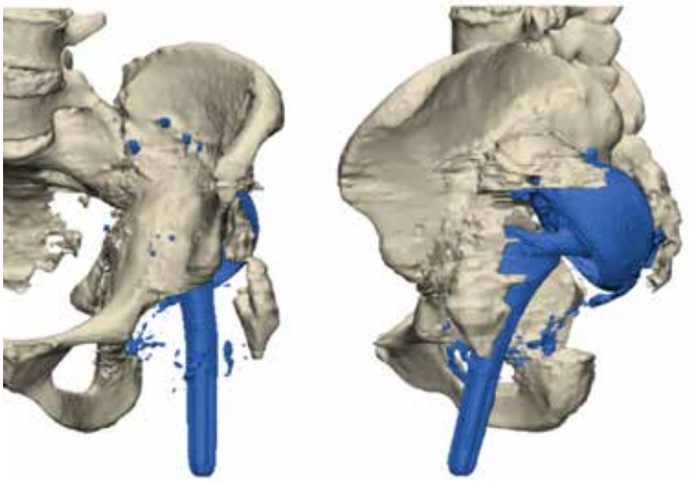

Figure 3. The patient's initial condition and placement of original implants.

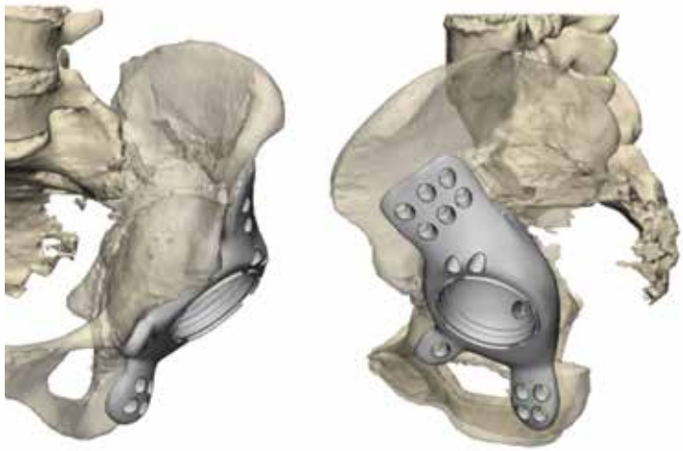

Figure 4. Final implant plan developed by the surgical and manufacturing teams.

SINCE 2020, WE HAVE DESIGNED AND IMPLANTED CUSTOM 3D-PRINTED ACETABULAR PROSTHETICS FOR MULTIPLE PATIENTS, INCLUDING THOSE WITH NO ANATOMY TO SUPPORT CONVENTIONAL IMPLANTS AND NO ABILITY TO WALK.

FDA allows compassionate use

Technology for 3D printing of joint implants has become widely used in Europe over the past five years. Now the FDA grants expanded access for compassionate use in the U.S. From diagnosis to Institutional Review Board approval, FDA approval, design, manufacturing and surgery, the process currently takes about three months.

Cleveland Clinic is one of few centers in the U.S. to offer this novel service and has among the highest patient volumes. Using custom 3D-printed components has become standard at Cleveland Clinic for the treatment of failed joint replacements when conventional reconstructive options are not possible.

Dr. Krebs is Vice Chair of Cleveland Clinic's Department of Orthopaedic Surgery and Director of Cleveland Clinic's adult reconstruction fellowship program. His specialty interests include complex adult reconstructive surgery, robotics and total joint replacement. Dr. Krebs is a paid consultant for Stryker Corp. and receives royalty payments for implants and inventions commercialized through the company.

Figure 5. Final manufactured implant.

Figure 6. Final placement of the 3D-printed implant.

Team Reconstructs Sternum, Sternoclavicular Joints with a Cadaveric Femur, Aortograft and Ankle-Fixation Cord

INNOVATIVE CONSTRUCT RESTORES FUNCTION AFTER RESECTION OF SOFTBALL-SIZE CHONDROSARCOMA

Nathan Mesko, MD
meskon@ccf.org
216.444.4603

Daniel Raymond, MD
raymond3@ccf.org
216.636.1623

A 59-year-old patient presented with a 14-centimeter tumor on his sternum (Figure 1). He noticed the lump after a motor vehicle accident 13 years earlier. Over the years he had been told that the lesion was benign, but it had continued to grow, becoming larger than a softball. CT imaging of the tumor detected characteristics of a bone lesion containing cartilage, a concerning finding in an adult, whose growth plates have long been closed (Figure 2). Needle biopsy led to diagnosis of a chondrosarcoma.

Chondrosarcoma is the most common bone sarcoma in adults and the third most common bone sarcoma in humans, after osteosarcoma and Ewing sarcoma, which are more prevalent in younger populations. There is a spectrum of chondrosarcoma subtypes, some indolent (as in this case) and some aggressive. More aggressive subtypes have significant prognostic implications, with survival lasting potentially just a few months. Chondrosarcoma tumors rarely respond to chemotherapy or radiation therapy, so treatment typically is resection alone.

Even if the tumor in this case had been benign, it still would have required resection as it had begun to compress the trachea, the esophagus and the left carotid artery.

The tumor did not appear to involve deeper thoracic structures; however, its removal would be a formidable challenge. Along with most of the sternum, both sternoclavicular joints — the only skeletal attachment between the arms and axial skeleton — would need to be resected and then reconstructed.

Planning for a challenging reconstruction

Reconstructing the sternum is critical for protecting the heart and other thoracic organs, for re-creating anterior support for the spine (to prevent kyphosis) and for providing an anchor for arm mobility. However, because removal of the sternum and sternoclavicular joints is so rare, reconstruction requires a novel approach that balances the need for stable fixation with allowances for subtle motion. There are only limited descriptions of this type of reconstruction in medical literature. There is no established standard of care, and artificial implants do not exist.

Typical reconstruction techniques using plates and screws or other fixation devices are not appropriate for sternoclavicular anatomy as this anatomic location must accommodate motion when arms are moved or lifted,

Figure 1. A 59-year-old man presented with more than a decade of reported growth of a sternal lesion, now measuring larger than a softball.

Figure 2. CT imaging showed a cartilage tumor expanding the sternum, suspicious for a chondrosarcoma. This was later proved following a biopsy procedure.

Figure 3. A femoral allograft was obtained from a national bone bank and prepared to fit the sternal defect.

or when breathing expands and contracts the chest. In this case, the challenge was to re-create chest wall anatomy while permitting mobility.

Thoracic and orthopaedic surgeons collaborated to design a new construct using a cadaveric femur in place of a sternum. The femur would be suspended from both clavicles using a combination of technologies including a synthetic aortograft (a flexible but tough polyethylene tube used to treat aortic aneurysms), polyethylene terephthalate suture and Syndesmosis TightRope® (Arthrex) fixation (a polyethylene cord used for ankle stabilization).

Before the construct could be built and the surgical procedure attempted, an appropriately sized femur was obtained from a bone bank (Figure 3).

Resection and reconstruction, step by step

During the procedure, the thoracic surgeon removed the tumor and sternum while the orthopaedic surgeon fashioned the new construct (Figure 4). The cadaveric femur was anchored to the remaining sternum via a scarf joint, secured with sutures (Figure 5). To build the sternoclavicular joints, the TightRope fixation devices first were placed to anchor the sternum to the clavicles. The aortograft, which had been affixed to the femur with cables, was wound around the cut ends of the clavicles and anchored with additional cables. Finally, polyester sutures were woven between the clavicles by means of a cannulated screw in the femur (Figures 6 and 7). The construct was covered with mesh, which would prevent lung herniation in the small lateral defects as well as provide an additional layer of support.

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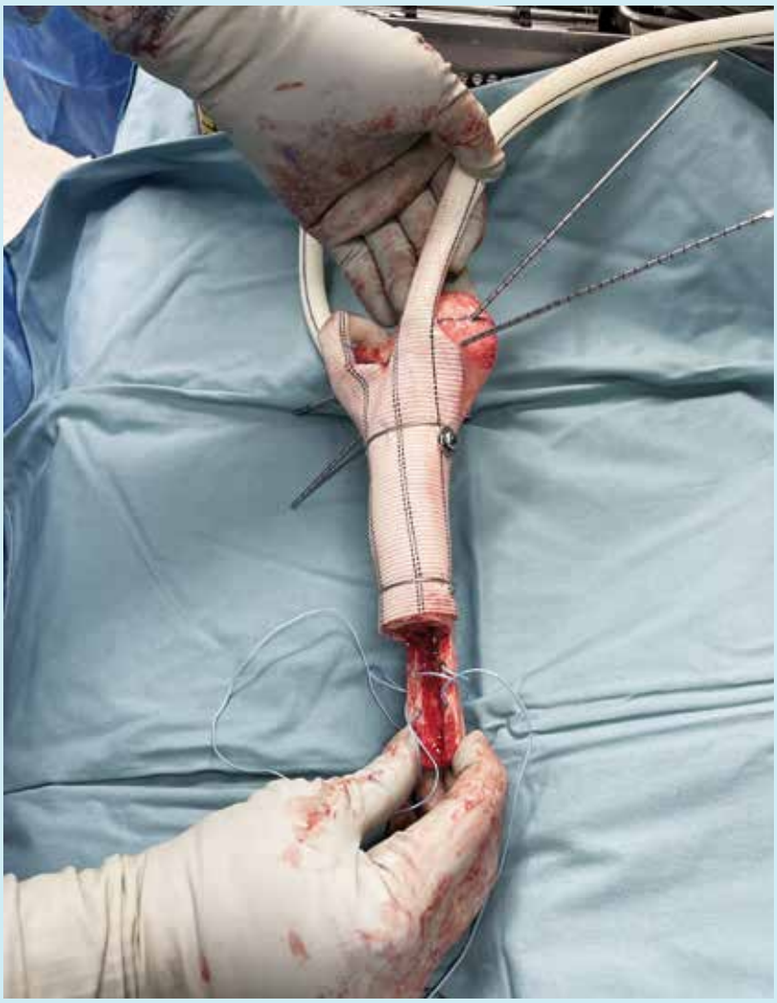

Figure 4. After the femoral allograft was fashioned to planned specifications, it was overwrapped with a synthetic aortic graft and fixated with a combination of cables, cannulated screws, ultrahigh-molecular-weight polyethylene core suture and polyethylene terephthalate tape.

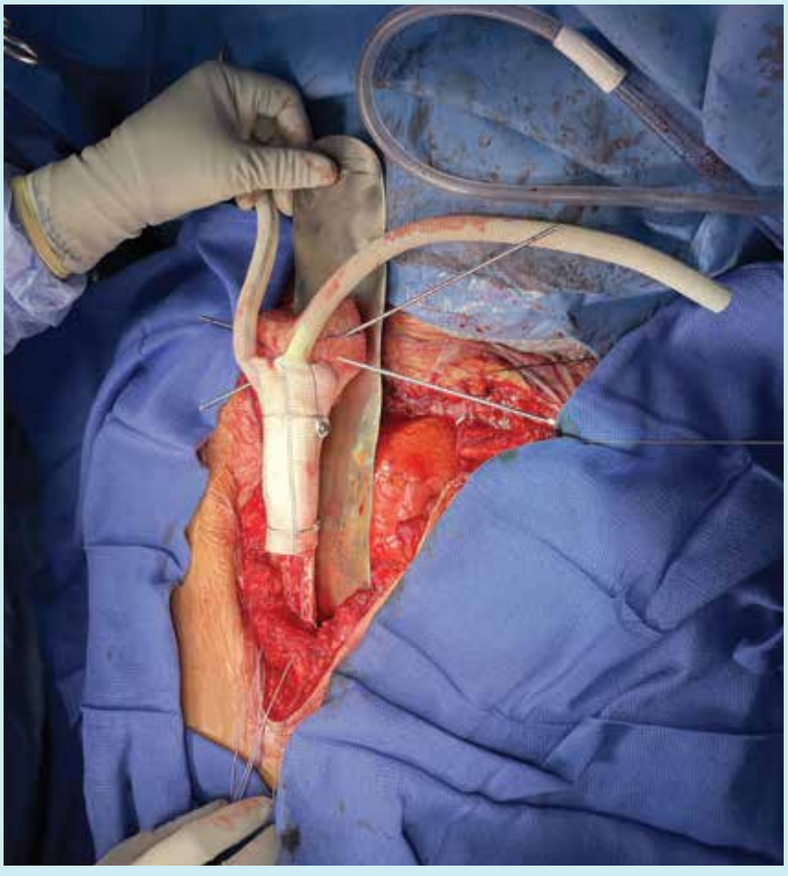

Figure 5. The reconstructed allograft implant was inserted into the sternal defect, using the scarf joint to slide under the remaining lower (distal) part of the native sternum bone.

Figure 6. The completed reconstruction was suspended between the clavicles using a suspensory technique involving a mechanism normally used for fixing ankle fractures and high ankle sprains. The aortograft material was wrapped around the clavicles and further supplemented with polyethylene terephthalate tape suspension.

Figure 7. A chest X-ray shows the final sternal reconstruction.

Outcome

Three months after surgery, the patient was pain-free and back to work. He has been advised to avoid heavy lifting. He will be followed closely and watched for scoliosis and any change that may affect the construct, especially once he is able to lift his arms above 90 degrees. Scar tissue will further anchor the construct.

Due to the clean resection of the chondrosarcoma, the patient is expected to have a normal life span. For chondrosarcoma in general, survival is 70%-75% at five years. With nonaggressive chondrosarcoma, as in this case, survival can be 99% at five years.

A synergy of thoracic and orthopaedic surgery

This case highlights a novel approach to reconstructing a challenging anatomic site. Existing alternatives, such as 3D-printed anatomy and other custom-built implants, would require a lengthy approval process not preferable for a patient with cancer. In addition, even custom implants cannot readily solve the dilemma of balancing the need for motion with durable fixation and reconstruction. The cadaveric femur construct, incorporating an aortograft and ankle-fixation mechanism, leverages technologies readily available and provides durable fixation with robust materials while allowing for motion as needed.

The construct also showcases the synergy of skill sets required to develop innovative solutions for challenging cases. In this case, the collaboration of thoracic and orthopaedic surgery experts led to a unique approach — combining a cadaver bone, cardiovascular technology and an ankle suspension mechanism — that never would have evolved without multidisciplinary teamwork.

Dr. Mesko is Center Director, Orthopaedic Oncology, and co-Director of Sarcoma Care at Cleveland Clinic. Dr. Raymond is a thoracic surgeon in the Sydell and Arnold Miller Family Heart, Vascular & Thoracic Institute at Cleveland Clinic.

Surgery After First-Time Patellar Dislocation May Be the Right Approach in Younger Patients

YOUTH AND OPEN PHYSES ARE TWO FACTORS THAT INCREASE RISK OF RECURRENCE

Patellar instability is quite common, with incidence estimated at 5.8 per 100,000 in the general population. In the 10- to 17-year-old age group, the incidence can be as high as 29 per 100,000. The rate of recurrence following a first-time patellar dislocation has been estimated at anywhere from 15% to 44%.

Historically, patients with first-time patellar dislocations have been treated without surgery due to expected low rates of recurrence and high rates of success with nonoperative treatment. However, more recent literature suggests that benign neglect may not be as benign as once thought, and recurrent dislocation may be very high in certain patient populations.

It is now known that patients treated conservatively may have significant disability following nonoperative management of patellofemoral dislocation. Straume-Næsheim et al. showed that patients with recurrent lateral patella dislocation had more pain and dysfunction and worse quality-of-life scores than patients with anterior cruciate ligament-deficient knees.[1]

Several factors have been associated with pain and poor function following patellar instability. We recently showed that higher body mass index, female sex, older age and lower mental health scores were associated with higher pain scores in patients with patellofemoral instability.[2]

Some patients are at higher risk of re-dislocation

Some of the disability in patients treated conservatively following first-time patellofemoral instability may be related to the presence of recurrent dislocation and/or subluxation. While the risk of recurrent dislocation following an index patellar dislocation is low (approximately 33%), the risk is much higher in some patients.

In a systematic review by Huntington et al., the risk of recurrent dislocation was higher in patients who are younger and/or have:

- Open physes
- Trochlear dysplasia
- Elevated tibial tuberosity-trochlear groove (TT-TG) distance
- Patella alta

Of these factors, trochlear dysplasia was found to be the most important factor implicated in patellofemoral instability, with an odds ratio of 4.15. When no risk factors were found, the risk of dislocation was 7.7% to 13.8%. When two risk factors were present, the risk increased to between 29.2% and 60.2%. The risk of re-dislocation with three risk factors was 70% to 78%.[3]

Determining the risk of recurrent dislocation is important to help patients and families make the best decision about further management. Explaining to an older patient with no radiographic risk factors that the risk of re-dislocation is less than 13% often has a different impact than telling a skeletally immature patient with additional risk factors that the risk of recurrent instability is greater than 80%. The latter may be more inclined to consider surgical intervention.

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Figure 1. Caton-Deschamps index. The distance from the inferior articular surface to the anterosuperior corner of the tibia (B) is measured by length of the patellar articular surface (A).

Lutul Farrow, MD
farrowl@ccf.org
216.518.3620

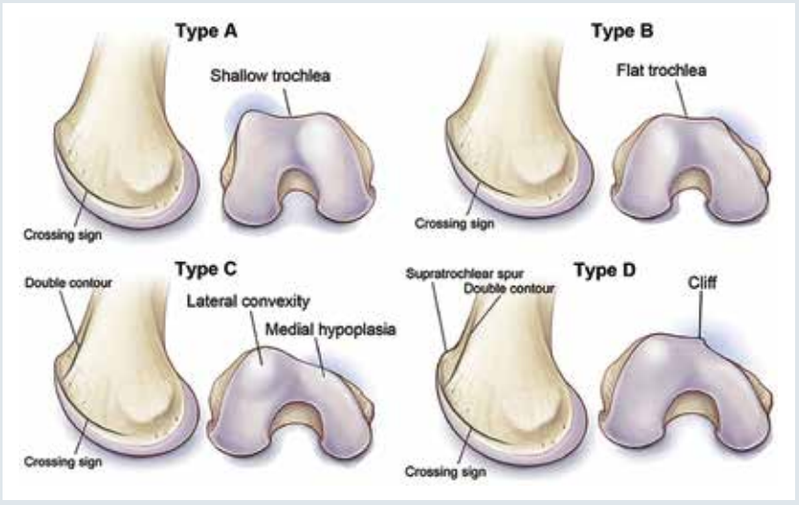

Figure 2 (left). Illustration of the Dejour classification system.

Figure 3 (below). Radiographic examples of Dejour classification. Dejour Type A trochlea **(A)**, Dejour Type B trochlea **(B)**, Dejour Type C trochlea **(C)**, Dejour Type D trochlea **(D)**.

Plain film imaging and MRI assess risk factors

In order to determine recurrent dislocation risk and best counsel patients, we have more recently become proponents of obtaining MRI at the time of the index patellar dislocation. Along with plain films that are acquired for every patient, MRI is used to assess key risk factors.

We generally use plain X-ray to evaluate patellar height and trochlear dysplasia. We use the Caton-Deschamps index to evaluate for patella alta (Figure 1). A value above 1.2 is considered abnormal. Trochlear dysplasia is best seen on a perfect lateral X-ray and graded using Dejour classification (Figures 2 and 3).

Trochlear dysplasia is not uncommon. In a recent epidemiologic study, we showed that trochlear dysplasia was present in 39% of knees. However, moderate to severe dysplasia was present in only 17%.[4]

MRI is the modality of choice to determine TT-TG distance. TT-TG values greater than 20 mm are considered abnormal. Patellar height also can be determined on MRI by using the patellotrochlear index (PTI). When less than 18%, the PTI is considered abnormal.

Early surgery for younger patients can be considered

Even without abnormal indices on imaging, our skeletally immature patient population is at an increased risk of recurrent dislocation as they, by definition, present with two risk factors: age and open physes. With the addition of one or two other risk factors, these patients have a greater than 80% chance of recurrence.

Knowing the increased pain, disability and lower quality-of-life scores that are caused by symptomatic patellofemoral instability, it is reasonable to consider early surgery for young patients at high risk of recurrent dislocation rather than pursuing conservative management. Patellofemoral stabilization surgery, including medial patellofemoral ligament reconstruction, is extremely successful, with high rates of patient satisfaction and improved function.

Dr. Farrow is an orthopaedic surgeon at Cleveland Clinic Sports Medicine Center. He also serves as Director of Clinical Operations for Sports Medicine.

References

1. Straume-Næsheim TM, Randsborg PH, Mikaelsen JR, et al. Recurrent lateral patella dislocation affects knee function as much as ACL deficiency - however patients wait five times longer for treatment. *BMC Musculoskelet Disord*. 2019 Jul 8;20(1):318.

2. Corey RM, Rabe J, Yalcin S, Saluan P, Farrow LD. Factors associated with pain and function before medial patellofemoral ligament reconstruction. *Orthop J Sports Med.* 2022 Aug 26;10(8):23259671221116150.

3. Huntington LS, Webster KE, Devitt BM, Scanlon JP, Feller JA. Factors associated with an increased risk of recurrence after a first-time patellar dislocation: A systematic review and meta-analysis. *Am J Sports Med.* 2020 Aug;48(10):2552-2562.

4. Onor GI Jr, Yalcin S, Kaar SG, Pace JL, Ferrua P, Farrow LD. The evaluation of trochlear osseous morphology: An epidemiologic study. *Orthop J Sports Med.* 2021 Apr 2;9(4):2325967121994548.

‘Osteobesity’: How We’re Optimizing Patients with High BMI, Diabetes for Orthopaedic Surgery

NEW PROGRAM BRIDGES ORTHOPAEDICS AND ENDOCRINOLOGY

“Osteobesity” is the intersection of osteoarthritis and obesity. Body mass index (BMI) is often a contributing factor in inflammation and joint wear and tear. To thoroughly treat joint conditions, weight loss should be addressed, especially when surgery is anticipated. Patients with a BMI over 40 are at higher risk of poor surgical outcomes, including infection. Higher BMI also increases stress on the prosthesis, causing it to wear out sooner than joint replacements in patients with a lower BMI.

Patients with poorly controlled diabetes mellitus also are more likely to have unfavorable outcomes from orthopaedic procedures. Those with hemoglobin A1c above 8% are at higher risk of infection after joint replacement (not just around the prosthetic, but also at the incision site) as well as elevated blood sugar after steroid injection.

Optimizing patients with obesity or diabetes for orthopaedic interventions requires more than advising them to modify their diet and increase exercise. Most patients don’t know how to do those things on their own. They could benefit from personalized coaching by their provider.

Prescribing a diet or exercise regimen should be similar to prescribing medication. Patients need the right dose of the right type of exercise — including the right stretching, resistance training, cardio training and recovery period — with the right fuel at the right time. Exercise is medicine. And the best exercise prescription is specific to each individual patient.

Program designed to reduce risk of poor surgical outcomes

To better prepare patients for orthopaedic interventions, Cleveland Clinic’s Orthopaedic & Rheumatologic Institute introduced the Get Ready program in 2021. Patients with a BMI of 40 or higher, or hemoglobin A1c above 8%, are fast-tracked to a specialized team in Cleveland Clinic’s Endocrinology & Metabolism Institute through a custom order set in Cleveland Clinic’s electronic medical record.

Orthopaedic providers specify:

- Reason for referral (obesity, diabetes or both)
- Time to intervention (e.g., four to six months for a total joint replacement, two weeks for amputation below the knee)
- Preoperative goals (typically to achieve BMI below 40 and/or A1c below 8%)

The Endocrinology & Metabolism team then provides priority scheduling with obesity medicine and/or diabetes specialists.

The overall goal is to reduce patients’ risk of poor surgical outcomes. However, the Get Ready program also benefits patients not anticipating surgery who simply want to improve their health to reduce symptoms of joint conditions.

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Matthew Kampert, DO
kamperm@ccf.org
216.518.3480

Improving strength-to-weight ratio is key

Diet and exercise changes in this patient population aren't easy and aren't always successful. Joint pain, and the resulting immobility, adds complexity.

Providers in the Get Ready program overcome these challenges with resilience and a specialized understanding of physiology and bioenergetics.

Anti-obesity medications may be an initial step, until patients become able to sustain mobility and a meaningful caloric deficit. But increasing exercise capacity, building muscle and improving patients' strength-to-weight ratio are key.

If a patient is too heavy to get up out of a chair and walk, a joint replacement won't help. Leg muscles that are weak due to underuse only get weaker with downtime after surgery, especially if the patient is older and doesn't build new muscle easily. Helping patients build muscle before surgery offsets the atrophy that naturally occurs after surgery. Providers in the Get Ready program understand how to achieve this while managing or preventing joint flare-ups.

ANTI-OBESITY MEDICATIONS MAY BE AN INITIAL STEP, UNTIL PATIENTS BECOME ABLE TO SUSTAIN MOBILITY AND A MEANINGFUL CALORIC DEFICIT. BUT INCREASING EXERCISE CAPACITY, BUILDING MUSCLE AND IMPROVING PATIENTS' STRENGTH-TO-WEIGHT RATIO ARE KEY.

There is no "standard" routine, but I often prescribe upper body exercise (e.g., chest press, seated row, shoulder press, bicep curl) because it will not worsen a patient's knee or hip pain. I also may prescribe lower body exercise. While walking can put unwanted stress on knee and hip joints and cause pain, patients may be able to tolerate lifting weights with their legs (e.g., leg press, knee extension, hamstring curl) because exercise machines can control the external load. Patients typically perform three sets of 12-15 repetitions and increase the weight slightly once they can perform 15 repetitions during all three sets.

I also encourage low-impact aerobic exercise, including aquatics, cycling and using elliptical machines, rather than walking or jogging on a treadmill. We try to gradually increase cardio by about 10% each week.

Early outcomes and cases

Between June 2021 and July 2022, 159 patients were referred for medical optimization through the Get Ready program (101 for obesity, 12 for diabetes, and 46 for both obesity and diabetes). Outcomes after three months of care in the program averaged:

- 3-6 kg/m^2 lower BMI
- 1%-3% lower hemoglobin A1c

For example:

- A patient with bilateral knee osteoarthritis and lupus lost 122 lbs. (36% of initial weight) over 14.5 months. She is no longer having knee pain and has stopped taking methotrexate and prednisone.
- A patient with bilateral knee osteoarthritis lost 55 lbs. and reduced BMI from 51.67 to 41.52 in 12 months. She has stopped taking labetalol, chlorthalidone, spironolactone and furosemide and had total knee arthroplasty.
- A patient lost 30 lbs. in five months in preparation for total knee arthroplasty, then lost an additional 12 lbs. after surgery. Over nine months, the patient reduced BMI by 12 kg/m^2.
- A patient lost 25 lbs. (13.9% of initial body weight) and reduced hemoglobin A1c from 10.5% to 6.6% over five months, in preparation for total knee arthroplasty.
- A patient lost 27 lbs. (11.4% of initial body weight) and reduced hemoglobin A1c from 9.7% to 6.1% in four months, in preparation for Charcot foot surgery.

Adding quality health years

The Get Ready program does more than optimize patients for orthopaedic treatment. It adds quality health years to these patients' lives.

Ideally, patients wouldn't wait until they are facing orthopaedic surgery to address high BMI or uncontrolled diabetes. But joint pain is sometimes the wake-up call. Orthopaedic providers can take the opportunity to refocus patients on health rather than disease management.

Dr. Kampert, formerly an exercise physiologist, is now a sports and exercise medicine specialist at Cleveland Clinic, with dual appointments in the Orthopaedic & Rheumatologic Institute and Endocrinology & Metabolism Institute.

Combination Therapy Speeds Relief of Frozen Shoulder

INNOVATIVE TREATMENT COMBINES BRISEMENT, NERVE BLOCK AND IMMEDIATE PHYSICAL THERAPY

Frozen shoulder (adhesive capsulitis) occurs rather randomly in 2%-5% of the U.S. population. The joint capsule adheres to the shoulder joint, causing pain and decreased range of motion. The condition is typically idiopathic but has been associated with diabetes (especially poorly controlled diabetes), some rheumatoid conditions and periods of inactivity (e.g., after surgery).

There are three phases of frozen shoulder:

1. Freezing. Patients most often present during this phase due to worsening shoulder pain.

2. Frozen. This phase is marked by pain and poor range of motion. Eventually the pain subsides, but the decreased shoulder motion remains.

3. Thawing. In this phase, motion gradually improves.

The three phases can occur over 18 to 36 months. If you don't treat frozen shoulder, it typically does resolve on its own. Treatment just helps it resolve faster and with less pain.

Conventionally, physical therapy has been the mainstay of treatment, sometimes accompanied by injection of steroid into the shoulder joint to relieve pain. For patients with severe cases, surgical manipulation can release adhesions manually.

Brisement, another therapy for frozen shoulder, involves injecting a large volume of fluid into the joint to stretch out the capsule. It typically uses 20 mL of fluid, including steroid (to reduce inflammation), lidocaine (to reduce pain) and sterile water (to increase volume) (Figure).

At Cleveland Clinic Sports Medicine Center, we have begun using a variation of brisement and have seen it provide relief to patients faster than conventional treatments. Some patients recover from frozen shoulder in weeks to months rather than in months to years. For some providers in our center, this variation has become our first line of treatment for frozen shoulder.

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Caitlin Lewis, MD
lewisc6@ccf.org
216.839.3785

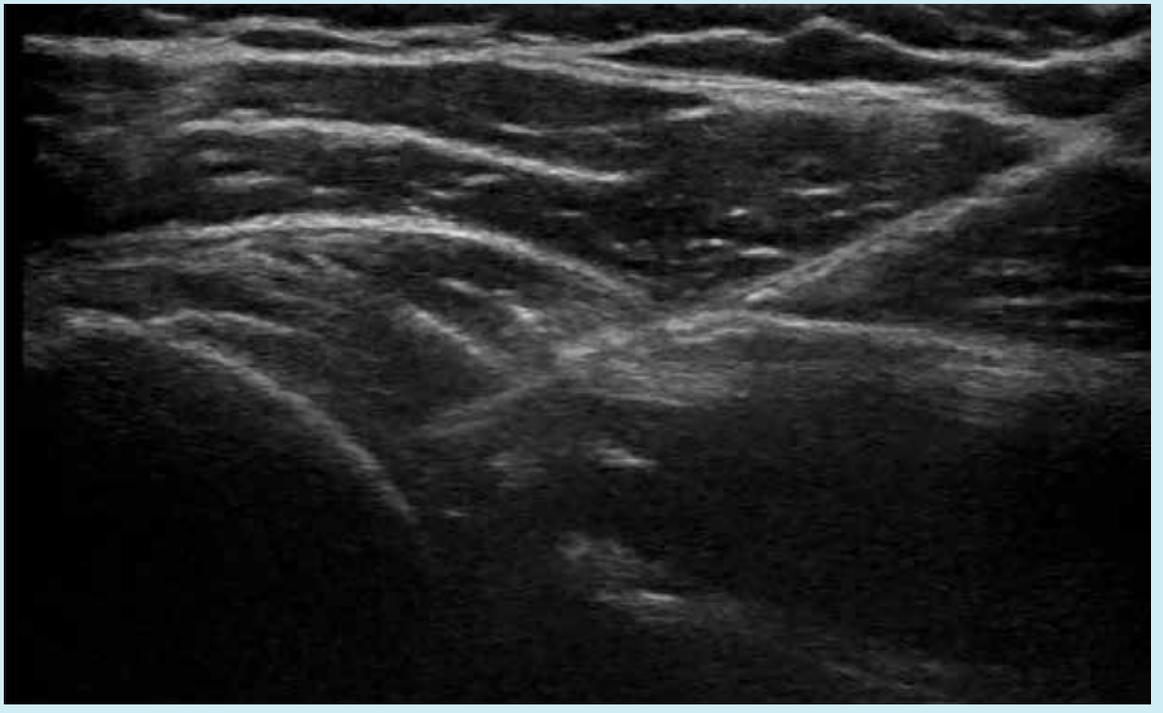


Figure. During brisement therapy for frozen shoulder, a needle is introduced into the glenohumeral joint capsule. Ultrasound imaging helps the sports medicine specialist monitor expansion of the capsule as fluid is slowly injected.

I USED TO REFER PATIENTS FOR PHYSICAL THERAPY FIRST AND THEN PERFORM BRISEMENT IF NECESSARY. NOW I'VE REALIZED THAT WE CAN EXPEDITE THE PROCESS BY COMBINING THOSE STEPS.

Addressing pain and range of motion concurrently

The variation involves applying a nerve block to the suprascapular nerve, to reduce pain during the brisement procedure. Next, brisement is performed, with an ultrasound-guided 20 mL injection into the shoulder joint. Immediately following brisement, the patient undergoes physical therapy manipulation to further stretch the shoulder capsule.

With this treatment variation, we address pain and range of motion at the same time. Other frozen shoulder treatments address those problems separately.

Following this treatment, most patients have an increase in both active and passive range of motion by at least 10 degrees in each direction. That kick-starts the physical therapy regimen to follow.

Patients still need to continue physical therapy — mostly home exercise — to see further improvements after the procedure. However, compared to patients having traditional treatments, these patients seem to progress much faster. They seem to need far less physical therapy overall.

Best for patients presenting earlier

This treatment variation is best for patients who present earlier in the disease process, in the freezing or frozen phase, when pain and range of motion are at their worst. Patients in the later, thawing phase may benefit from physical therapy alone because they are already improving.

Patients with diabetes may experience a rise in blood sugar due to the steroid injection and, therefore, may not be candidates for brisement.

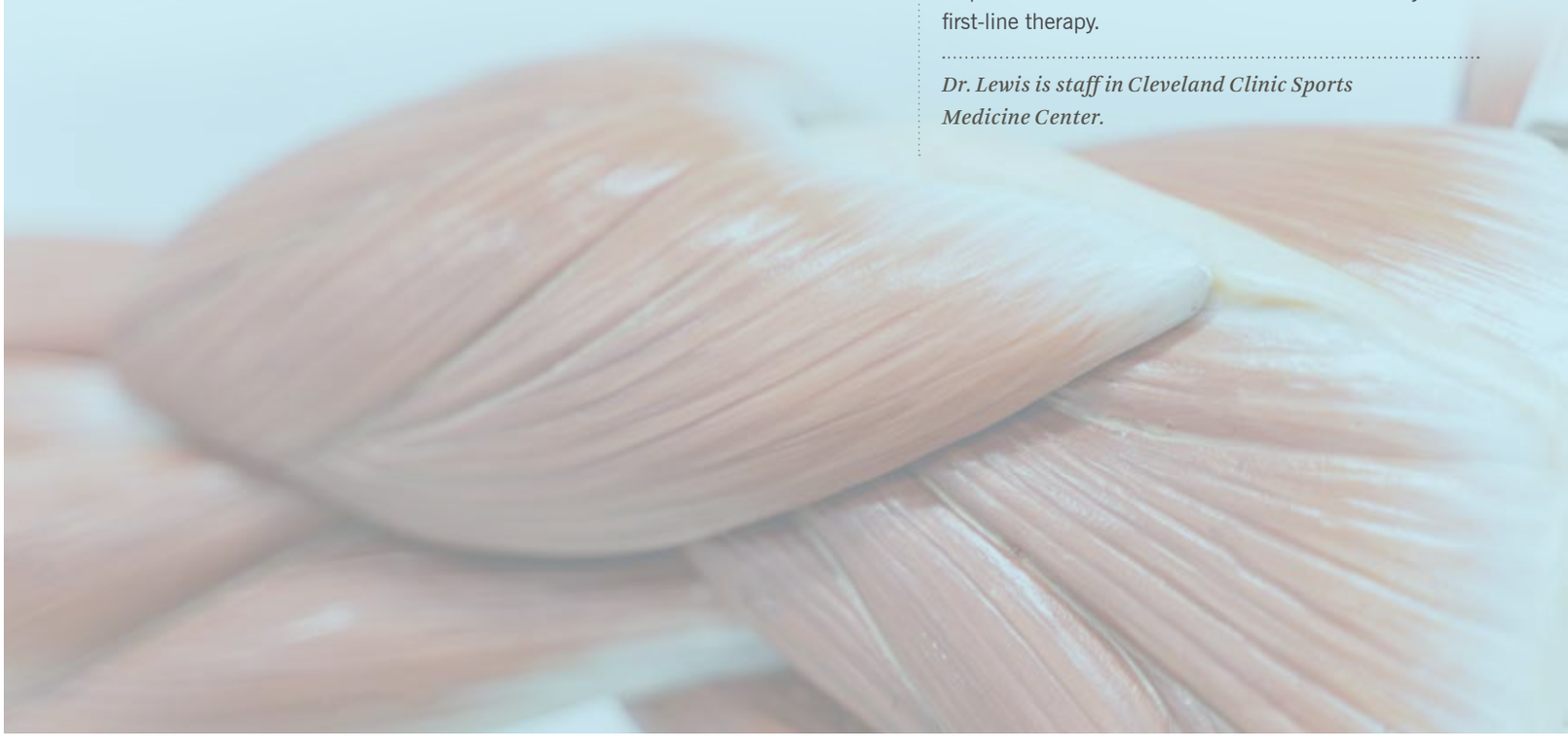
Large-volume injections without steroid haven't worked as well. We are still exploring treatment options for patients with diabetes.

Consider as first-line therapy

The combination of nerve block, brisement and physical therapy is an intermediate treatment option for frozen shoulder, between physical therapy alone and capsular release surgery.

I used to refer patients for physical therapy first and then perform brisement if necessary. Now I've realized that we can expedite the process by combining those steps. This combination treatment has become my first-line therapy.

Dr. Lewis is staff in Cleveland Clinic Sports Medicine Center.



Residency Update 2022

I had been there before. The days were warming, the mist was clearing, and I knew it wasn't just a "déjà vu all over again" Groundhog Day moment. Unmasked, unfettered and fully vaccinated, we were truly celebrating resident graduation 2022 and partying like it was 1999. As they say, it was good to be back.

Granted, COVID-19 isn't gone, and we still don't see colleagues' teeth while at work, but we are making solid progress — progress that may pale in comparison to that which our nine graduating orthopaedic surgery residents have made over the past five years.

Congratulations to our 2022 graduates

Like dewy-eyed parents at prom pictures, we fondly recall the arrival five years ago of the now-graduated chiefs. They have passed the tests, cleared all the hurdles and earned the right to be called orthopaedic surgeons. Granted, all nine have gone on to fellowships, but we know they could easily be out working on their own.

This year, as in the past, our residents have dispersed across the country to some of the most sought-after postgraduate training programs, to wit:

Kevin Bailey, DO, has headed to Allegheny Hospital in Pittsburgh to do a fellowship in orthopaedic sports medicine. Apparently, his group doesn't take care of the Steelers, given that the Browns beat them in their first meeting this year.

Morad Chughtai, MD, who has been wearing loupes full time for the past 18 months, is in a hand fellowship at the University of Florida in Gainesville.

Jessica Churchill, MD, is following in the anatomic surgical choices of her father, Sean Churchill, MD, (R'00) and is engaged in the shoulder fellowship here at Cleveland Clinic.

Michael Firtha, DO, is enjoying the warmth of the California sun if and when he leaves the UC Davis Children's Hospital, where he is a fellow in pediatric orthopaedic surgery.

Dan Kana, DO, is another drawn to the world of surgery via fiber optics. He is currently a fellow in orthopaedic sports medicine at the University of Illinois/Illinois Bone & Joint Institute in Chicago.

Sania Mahmood, MD, is one of three program grads focusing on adult reconstruction of the hip and knee. She is representing us at Emory University in Hotlanta.

Erin Ohliger, MD, whose youthful vision allows her to be intermittently loupe-less, is also engaged in a hand and upper extremity fellowship, hers at the Rothman Institute in Philly.

Alex Roth, MD, like the good Dr. Churchill, was not required to hire movers as he has stayed on as an adult reconstruction fellow in the efficient and familiar ORs at Cleveland Clinic.

Finally (we like alphabetical order), **Nick Scarcella, MD**, is the current "Pete Surace, MD, Fellow in Adult Reconstruction" at Duke. Working hard there, he is intent on having the fellowship name changed by mid-March.

Welcome to our new residents

As the graduates headed off, the Greyhound bus pulled to a stop, coughed some diesel fumes, and opened the door to allow our new med school grads to disembark and commence their careers in orthopaedic surgery. This exciting, scholarly and super-solid group is composed of:

Colin Brown, DO, from Nevada's Touro University Medical School

Ahmed Emara, MD, a graduate of Ain Shams Medical University in Egypt

Lauren Grobaty, MD, a Case Western Reserve University grad

Rebecca Haley, MD, a product of Emory

Cole Johnson, MD, here from the University of North Carolina Medical School

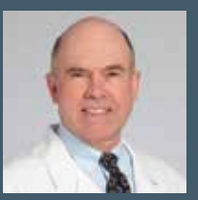
Dimitri Mabarek, MD, of Loyola Medical School

Landon Reading, DO, hailing from the West Virginia School of Osteopathic Medicine

Pieter Wiemken, DO, late of Kansas City University College of Medicine

… and lastly (the curse of alphabetical sequences and likely a common part of life for this guy), **Matt Zielinski, MD**, from Indiana University School of Medicine.

Here's looking forward to a great year for all involved and a steady progression to a visibly smiling workplace in the not-too-distant future.



Thomas Kuivila, MD
kuivilt@ccf.org
216.444.2741

Dr. Kuivila, a pediatric orthopaedic and scoliosis surgeon, is Vice Chair of Education in the Orthopaedic & Rheumatologic Institute and Director of Cleveland Clinic's orthopaedic residency program.

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The Orthopaedic & Rheumatologic Institute brings together medical and surgical specialists, therapists, researchers and engineers to pursue excellence and innovation in the care of patients with joint, bone, muscle, connective tissue and immune disorders. It is part of Cleveland Clinic, a nonprofit, multispecialty academic medical center integrating outpatient and hospital care with research and education for better patient outcomes and experience. More than 4,500 staff physicians and researchers provide services through 20 patient-centered institutes. Cleveland Clinic is currently ranked as one of the nation's top hospitals by *U.S. News & World Report*.
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