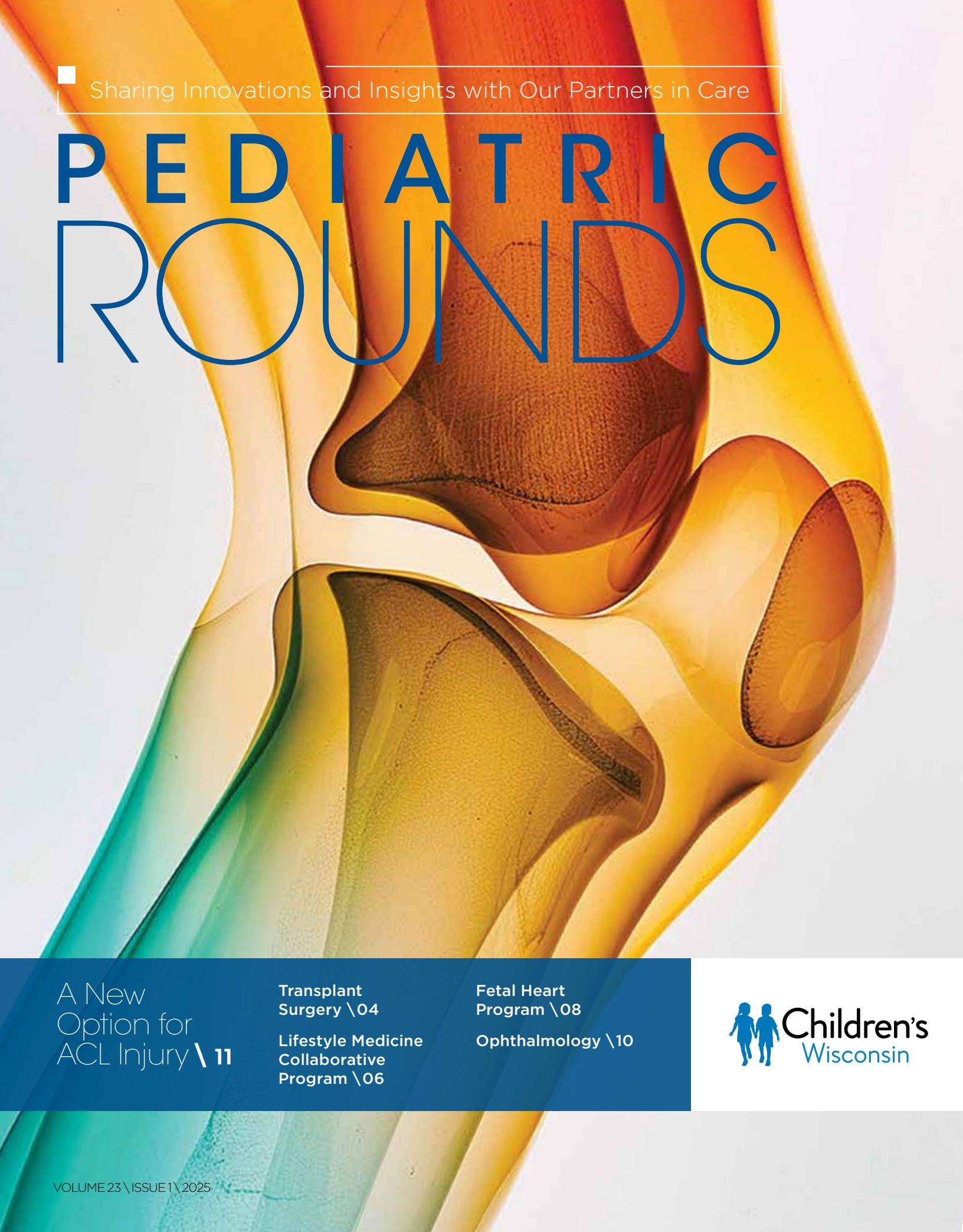
Sharing Innovations and Insights with Our Partners in Care

PEDIATRIC ROUNDS



Children's Wisconsin

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To refer a patient, call (800) 266-0366.

Innovation Means More

We're dedicated to finding new ways to serve children and families

BY JASON A. JARZEMBOWSKI, MD, PHD

At Children's Wisconsin, everything we do is focused on making the kids of Wisconsin the healthiest in the nation. This is our vision, driving us to do more to meet the unique needs of every child and family we serve.

In this issue of *Pediatric Rounds*, you'll read several examples of our focus on integrating the breadth and depth of our services to advance our vision. From the cover story on a new option for ACL repair to our Fetal Heart Program to our Lifestyle Medicine Collaborative Clinic, you'll see how our pediatric subspecialists are reimagining care.

On page 3, you'll see how Jeffrey King, DC, uses his expertise to treat children and adolescents with spine-related pain.

And on page 10, you'll meet Aparna Ramasubramanian, MD, a Pediatric Ophthalmologist and Ocular Oncologist, one of just a handful of such physicians with this training in the United States. She is helping make a difference in the treatment of retinoblastoma — an extremely rare eye cancer occurring in infants and young children. At Children's Wisconsin, we are a community of dedicated professionals who share an unwavering passion for caring for children in new and innovative ways.

JA Jarzembowski, MD, PhD

Jason A. Jarzembowski, MD, PhD, Chief Executive Officer, Children's Specialty Group; Medical Director, Pathology and Laboratory Medicine, Children's Wisconsin; Vice Chair and Professor, Department of Pathology, and Senior Associate Dean of Clinical Affairs, Medical College of Wisconsin

Center for Child Development

New location, new services

The Center for Child Development has moved its services to a specially designed facility with a neurodiverse-friendly environment. This move allows the team to provide expanded services in a single location.

In addition to developmental pediatrics, speech therapy, psychological evaluations and international adoption evaluations, the Center for Child Development now offers autism evaluations and physical and occupational therapy.

FIND THE CENTER FOR CHILD DEVELOPMENT:
Address: 1250 N. 113th St., Ste. 200 in Wauwatosa
Phone: (262) 432-6600
Online: childrenswi.org/childdevelopment

SYUZANNA GUSEYNOVA/GETTY IMAGES

Committed to Mental Health Services

Craig Yabuki Mental Health Center takes innovative and comprehensive approach

The Craig Yabuki Mental Health Center at Children's Wisconsin provides comprehensive mental and behavioral health care services for kids as young as 6 months through adolescence and into early adulthood, with a focus on supporting the whole family.

Earlier this year, Children's Wisconsin announced the designation as a center. Becoming a clinical center at Children's Wisconsin involves meeting requirements related to clinical outcomes, quality, education and outreach, research and innovation, and philanthropy. The Craig Yabuki Mental Health Center is now the umbrella for all mental and behavioral health services and research at Children's Wisconsin.

Our pediatric experts in psychiatry, counseling, psychology, neuropsychology and psychotherapy provide mental health services to kids and families at mental health walk-in clinics in Milwaukee and Kenosha, all Children's Wisconsin primary care locations, the Children's Wisconsin Milwaukee Hospital, regional clinics, family resource centers, schools and beyond.

Learn more about the Craig Yabuki Mental Health Center at childrenswi.org/mentalhealth.

Chiropractic Care at Children's Wisconsin

Dr. King aids the evolving role of chiropractic care in pediatrics

Jeffrey A. King, DC, a Chiropractor at Children's Wisconsin, works closely with health care providers at the AIM Spine Center to deliver comprehensive care for adolescent patients with spine pain and other musculoskeletal conditions. In the united states 49% of adolescents report back pain that occurs atleast once per month. One study showed that 25% of adolescents report back pain lasting greater than 4 weeks and 20% of those with pain report 3 or more episodes per year.

Jeffrey A. King, DC, Chiropractor at Children's Wisconsin, Associate Professor neurosurgery and spine at the Medical College of Wisconsin

"We're seeing [spine pain] is fairly common. It isn't always short-lived, and it can become recurrent," said Dr. King. "Even in the young, back pain is causing disability."

COMPREHENSIVE AND EVIDENCE-BASED CHIROPRACTIC CARE

Dr. King's practice emphasizes the treatment and management of various conditions, including neck pain, low back pain, cervicogenic and tension headaches, radiculopathy, sacroiliac joint pain, and other musculoskeletal disorders. His approach also seeks to address misconceptions about chiropractic care, promoting its evidence-based application for spine and joint-related conditions.

Research highlights chiropractic care's effectiveness, with studies showing benefits such as reducing opioid use by approximately 50% when used as a non-pharmacological intervention. Key conditions like cervicogenic headaches and low back pain respond particularly well to chiropractic care. "The World Health Organization states that when employed skillfully and appropriately, chiropractic care is safe and effective for the prevention and management of several health problems," said Dr. King.

Dr. King underscores the importance of integrated care. Case studies show positive outcomes for adolescents when chiropractors collaborate with other health care providers.

STURTI/GETTY IMAGES

Matthew Cooper, MD, Medical Director of Solid Organ Transplant, Children's Wisconsin, Chief and Professor of transplant surgery, Medical College of Wisconsin

Making Miracles Come True

How Children's Wisconsin is making one of the most comprehensive pediatric transplant programs in the United States even more innovative

The Solid Organ Transplant (SOT) Program at Children's Wisconsin has offered world-class transplant hepatology and nephrology services since 1986, when the first kidney transplant was performed.

This was followed by the first liver transplant in 1988 and the first heart transplant in 1991. Children's Wisconsin surgeons have gone on to successfully complete hundreds of such procedures.

EXPANDING LEADERSHIP

SOT is a collaboration between Children's Wisconsin, Froedtert & the Medical College of Wisconsin and the Versiti Blood Center of Wisconsin. "The SOT service line, which includes heart, kidney and liver programs, was the first that transcended the different organizations," said Matthew Cooper, MD, the Medical Director of SOT at Children's Wisconsin.

In recent years, Dr. Cooper has welcomed new leaders to the program: Raj Prasad, MBBS, the new Director for pediatric liver transplants, comes from Leeds, United Kingdom. Ty Dunn, MD, the new Director for pediatric kidney transplants, comes from the University of Pennsylvania. "Both are world-class surgeons and esteemed international leaders," said Dr. Cooper. They bring decades of surgical experience in transplants for complex pediatric recipients, living organ donation and hepatobiliary procedures to Children's Wisconsin.

The heart transplant team, led by Medical Director of Pediatric Cardiothoracic Surgery Micheal Mitchell, MD, and Steven Kindel, MD, Pediatric Cardiologist, continues to accept some of the most critically ill patients in the region. "All SOT programs share the vision of making Children's Wisconsin a destination transplant program for patients and families locally and in our region," said Dr. Cooper.

MAXIMIZING KIDNEY TRANSPLANT OUTCOMES

Although the deceased donor allocation system prioritizes SOT patients, the kidney team at Children's Wisconsin has also been investing significant effort and resources toward living donation education and identification, specifically encouraging pairs to consider entrance into the Paired Kidney Exchange (PKE) program. "This opportunity allows for an improved eplet-matched donor to maximize patient and allograft survival and immunosuppression minimization known to increase the risk of infections and malignancies, especially over

Since the inception of the Solid Organ Transplant program at Children's Wisconsin, we have performed:

266 kidney transplants

175 liver transplants

245 heart transplants

This makes Children's Wisconsin one of the largest comprehensive pediatric transplant programs in the United States.

the lifetime of these young recipients," said Dr. Cooper.

Similarly, the liver transplant team is interested in reinvigorating the live donor liver program to provide greater access to high-quality allografts and reduce waiting time.

TEAMWORK MAKES IT HAPPEN

Quality and outcomes remain the guiding light for all SOT programs at Children's Wisconsin. This means multidisciplinary post-transplant care is critical. "The ongoing collaboration of our critical care, radiology, infectious disease and countless consultant teams, as well as our coordinators, nurses, APPs and social workers, remains the heart and soul of all our transplant programs," said Dr. Cooper.

He sees a bright future for the SOT programs at Children's Wisconsin, with new faces and an unchanging commitment to providing critical services to the children who need them. "While we must never forget that every transplant starts with a donor, it's thrilling to see that every donor can make a miracle come true," he said.

Learn more about transplant programs at Children's Wisconsin at childrenswi.org/medical-care/transplant-programs.

Nurse Practitioner Spotlight

Allison Duey-Holtz, **MSN, CPNP-PC**

There are 13 advanced practice providers (APPs) administering pediatric orthopedic care at Children's Wisconsin. Among this group of highly skilled professionals is Allison Duey-Holtz, MSN, CPNP-PC, a Nurse Practitioner (NP) who's been at Children's Wisconsin for two decades.

During her time at Children's Wisconsin, Duey-Holtz has served as the lead APP in orthopedics and participated in several orthopedic research projects. She also worked closely with Children's Wisconsin collaborative co-management medical team, hospital medicine and complex care partners to develop a co-management program to help improve postoperative outcomes for patients with medical complexities who undergo major musculoskeletal procedures.

AT A GLANCE

NAME: Allison Duey-Holtz, MSN, CPNP-PC

POSITION: Nurse Practitioner

DEPARTMENT: Orthopedics

EXPERIENCE: 25 years in specialized pediatric orthopedic care

EXPERT CARE: Duey-Holtz provides pediatric care for children experiencing underlying spinal conditions, neuromuscular complexities, musculoskeletal trauma and fractures.

BACKGROUND

After earning her degree as a certified pediatric nurse practitioner, Duey-Holtz spent two years specializing in pediatric orthopedics at Children's Medical Center Dallas. From there, she spent three years in primary care in Appleton with Thedacare Pediatrics. In 2004, she joined the Orthopedics Program at Children's Wisconsin.

LEADING FUTURE APPS

Outside of patient care, Duey-Holtz plays a significant role in developing and training APPs at Children's Wisconsin. She directs the Advanced Practice Provider Centralized Pediatric Fellowship, which helps APPs gain a year of clinical experience and professional expertise across a range of pediatric specialties.

Denise M. Kilway, APNP, Pediatric Gastroenterology Nurse Practitioner, Children's Wisconsin, Assistant Professor of pediatrics, Medical College of Wisconsin

A Collaborative Effort

Providing patient-centered care to children with obesity and associated co-morbidities

According to a recent study, up to 45% of children with overweight or obese status will suffer from at least one comorbid condition, and many have multiple concurrent comorbidities. The Lifestyle Medicine Collaborative (LMC) Program at Children's Wisconsin was created to care for these children and teens.

"Our goal is to provide patient-centered, comprehensive care to children with obesity and associated co-morbidities," said Denise M. Kilway, DNP, RN, APNP, LMC, Co-Director, based in the Division of Pediatric Gastroenterology, Hepatology and Nutrition at Children's Wisconsin, and Assistant Professor of pediatrics at the Medical College of Wisconsin. That care helps "optimize their health and quality of life, minimize complications and weight stigma, and ensure the safest and best care possible utilizing up-to-date, evidence-based medicine and increased access to care," she said. In addition to co-directing the clinic, Kilway is an obesity specialist.

The LMC began with an endocrine, hepatology and lifestyle-focused clinic in July 2023 and added cardiology in February 2024. Now, it features a multidisciplinary team of hepatologists, cardiologists, endocrinologists and lifestyle medicine providers. They include:

Hepatology
Cara Mack, MD, LMC Co-Director
Bernadette Vitola, MPH, MD
Stacee Lerret, PhD, APNP

Endocrinology
Brittany Siemiawski, DNP, APNP
Elizabeth Dabrowski, MD

Cardiology
Daniel Beacher, MD
Joseph Block, MD

Lifestyle Medicine
Denise M. Kilway, DNP, RN, APNP, Co-Director of LMC

Dietitian
Ashley Aegerter, RD, CD

Nursing support
Christine Matson, RN

Clinical support
Brenda Garcia, MA

Scheduling
Angela Lynch, CTA

HOW IT WORKS

- The LMC welcomes patients ages 2 to 19 who have a body mass index (BMI) above the 85th percentile for their age and sex and also have an elevated alanine transaminase blood level >1.5x upper limit of normal (-ALT>40) or known fatty liver infiltration

LJUBAPHOTO/GETTY IMAGES

- Liver disease PLUS one of the following: Prediabetes or Type 2 diabetes not dependent on insulin
- Elevated lipids (triglycerides>300 or LDL cholesterol>190)

"Many issues that are weight-based are interrelated," said Kilway.

At the first LMC visit, providers see patients and their families in the clinic to review lab work, address their questions and discuss how they feel. "We want to know how their body is doing with the BMI they are at," she said. "We use shared medical decision-making to work with patients and families to focus on goals that will help decrease the stress the weight is having on their body."

In follow-up visits, patients see providers for a series of visits. These include: an appointment with the registered dietitian (RD), followed by one with the RD and an LMC pediatric nurse practitioner and then a visit with the entire LMC team every six months. Some patients may also see an endocrine or cardiology provider between these visits. When needed, they are referred to a mental health provider to address anxiety and depression, which are common in this patient population.

TREATING PATIENTS AND FAMILIES

The LMC program gives insights the entire family can benefit from. "It's easy to tell someone what to do, but we try to make it practical," said Kilway.

For example, they teach busy families how to make good choices at the grocery store and at home, such as topping a frozen pizza with chicken for extra protein and adding a side salad and fruit for a quick nutritional meal. They also provide guidance on how patients and their families can move more and sit less.

"The fact is, they hear the same advice from everyone, but we make sure they understand it. Sometimes, hearing it in the multidisciplinary clinic helps to drive it home. It can be very impactful," said Kilway.

The LMC also helps families by allowing them to see different types of providers in one place, a "one-stop shop," so to speak. "They don't have to do four different appointments in four different places," said Kilway.

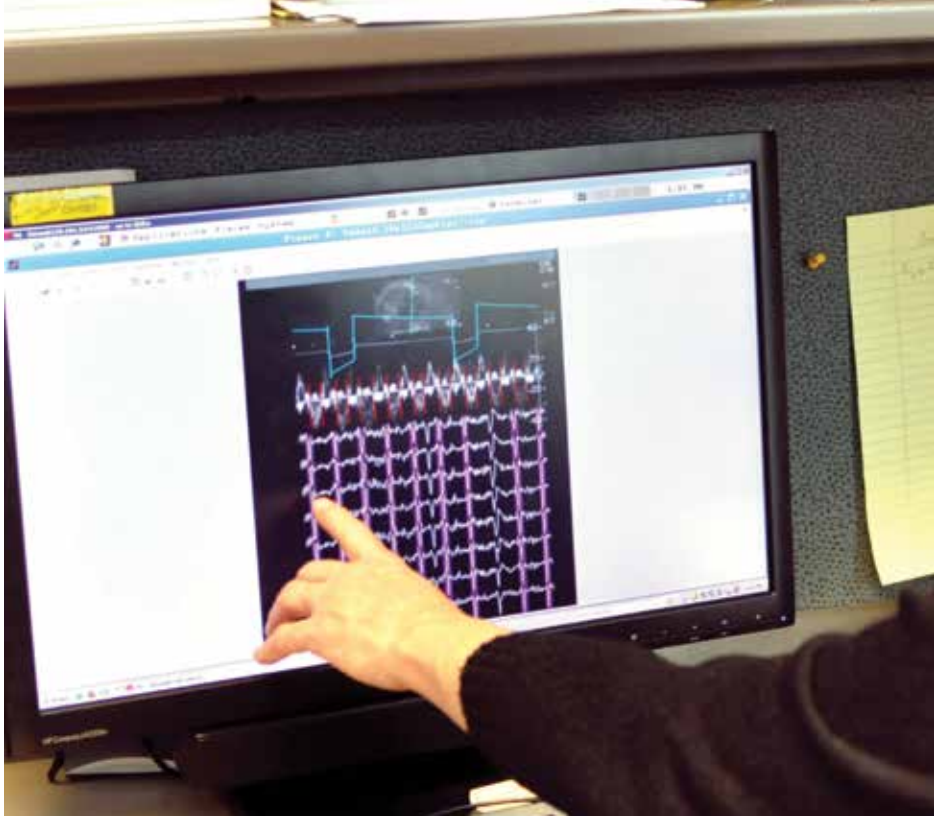
MAKING AN IMPACT

While the clinic is still gathering efficacy data, Kilway has seen progress in individual patients. "Especially in the younger kids who are growing, we are seeing a decrease in BMI percentile," she said. This usually reduces comorbidities such as fatty liver and prediabetes and increases the quality of life. Ideally, their participation in the LMC program will also help reduce the risk of chronic health conditions later in life, as well as give them the information and tools they need for ongoing health.

The LMC has grown substantially in year one, from one clinic a month to now three clinics a month, which is a response to patient needs. In the future, Kilway aims to find ways to support additional services, such as a dedicated psychologist and a physical therapist/exercise physiologist for the team. Furthermore, Kilway would like to partner with the industry in pediatric trials of medications currently approved to treat obesity in adults. She's also interested in research on children and adolescents with obesity and their comorbid issues and program outcomes.

As the number of kids and teens affected by obesity grows, the LMC is there to help. "We recognize that obesity is a chronic disease. We feel strongly that pediatric subspecialists should work together to optimize care and outcomes safely in accordance with national obesity care guidelines for children in the state of Wisconsin," she said. "We not only say that kids deserve the best but we believe they deserve the best of what we can offer."

To refer patients to the LMC Program through EPIC, go through the NEW Kids referral and put "LMC" in the comments if you feel a child is a good fit. Look for a specific referral to LMC coming up later this year. Referrals can also be made by contacting (414)-266-8496. Contact the LMC at (414)-266-2107.



Detecting Fetal Arrhythmias

Developments in technology and holistic care for high-risk pregnancies

Many of the 21,000 stillbirths each year in the United States are likely due to unrecognized fetal heart conditions, according to Janette Strasburger, MD, a Pediatric Cardiologist at Children's Wisconsin and Professor of pediatrics and biomedical engineering at the Medical College of Wisconsin. In the Fetal Heart Program within the Herma Heart Institute at Children's Wisconsin, Dr. Strasburger, in partnership with the University of Wisconsin School of Medicine and Public Health, has pioneered the use of fetal magnetocardiography (fMCG), a groundbreaking technology that helps to identify life-threatening arrhythmias in the fetus, allowing for early intervention. "Our long-term goal is the prevention of, or at least the reduction of, stillbirth," she said.

HELPING MOMS AND THEIR BABIES

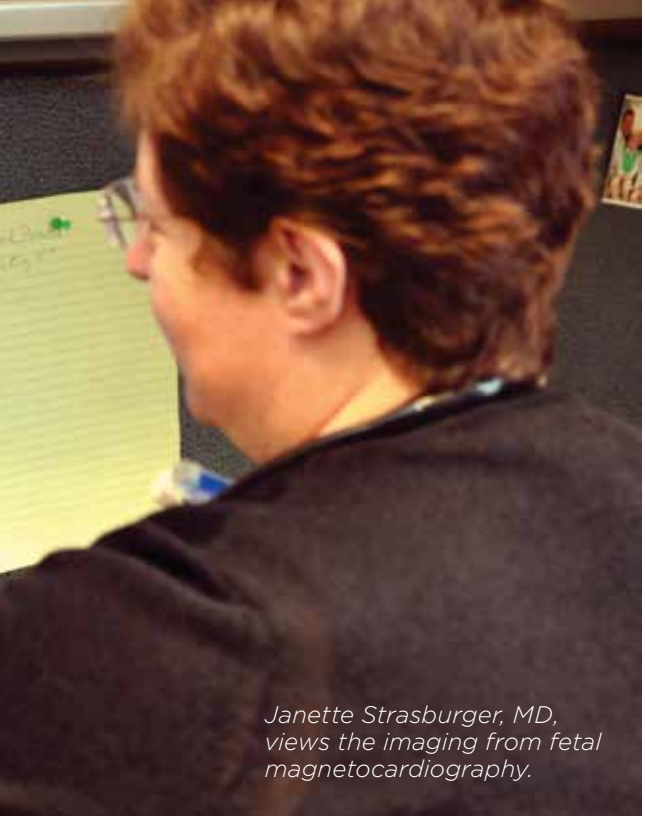
The Fetal Heart Program at Children's Wisconsin sees about 700 patients (pregnant women and their babies *in utero*) a year — most at 15 to 40 weeks' gestation — and partners closely with the Children's Wisconsin Fetal Concerns Center. "Usually, there is some kind of congenital heart concern, and many are being referred due to specific diagnoses," said Sara Creighton, MD, a Pediatric and Fetal Cardiologist with Children's Wisconsin and an Assistant Professor of pediatric cardiology at the Medical College of Wisconsin.

The Fetal Heart Program uses a standardized tool to indicate the level of care that will be needed once a child is born, whether the delivery takes place at the Froedtert Hospital Birth Center, which is co-located with the Children's Wisconsin neonatal intensive care unit (NICU), or elsewhere. The level can range from a typical newborn nursery to a NICU to dual operating rooms for a baby to have surgery immediately following a C-section. Such standardization helps remove the burden from medical centers so they know how to respond right away, and it also helps improve the system for moms so they know what to expect after delivery. "We are a model for other programs about how to approach care at a distance for patients who may not live near the main campus," said Dr. Creighton.

The program is also a model for how to treat patients. "The multidisciplinary collaboration with our Fetal Concerns Center and our ability to provide regional care for our patients are two things that set our program apart," said Dr. Creighton. Once fetal heart issues are identified using ultrasound, sometimes augmented by fMCG technology, "we can provide comprehensive services for patients that can help predict the safest care for them. It can bring the mom, baby and medical component all together with a holistic experience that takes care of them as a family."

Janette Strasburger, MD, Fetal Cardiologist, Children's Wisconsin, Professor of pediatric cardiology at the Medical College of Wisconsin

Sara Creighton, MD, Associate Medical Director, Project ADAM, Children's Wisconsin, Assistant Professor of pediatric cardiology at the Medical College of Wisconsin



Janette Strasburger, MD, views the imaging from fetal magnetocardiography.

HOW CHILDREN'S WISCONSIN USES FMCG

With fMCG, "we can do fetal arrhythmia assessments for any high-risk pregnancies, including those with congenital heart disease and genetic concerns, such as trisomy 21/Down syndrome, or a family history of cardiac disease" and "have found that with patients who come to be evaluated, there is at least a 50% chance we will find something in addition to or that will alter a diagnosis that has been made by ultrasound, and that leads to changes in management in almost 25% of patients," said Dr. Strasburger.

Knowing more about a baby's heart issues while in utero helps parents better prepare for life after birth. The Fetal Heart Program, which includes Dr. Strasburger, Dr. Creighton and three other fetal cardiologists, as well as ultrasound and nursing staff, works with obstetricians to discuss fetal concerns. When appropriate, they refer patients to social workers, lactation consultants, child life specialists and other ancillary services for pregnant and postpartum women. This helps patients find the care they need, either at Children's Wisconsin or their home hospitals if they have traveled for their fetal heart care. Patients have come from as far away as Hawaii, Florida and Alberta, Canada.

INNOVATION BEYOND CHILDREN'S WISCONSIN

Looking ahead, Dr. Strasburger wants to see more mothers and their babies benefiting from fMCG technology. To do so, she, her collaborator in medical physics, Ronald T. Wakai, PhD, from the Biomagnetism Laboratory, University of Wisconsin, Madison, and her team are involved in research to make it accessible to more pediatric cardiologists and maternal-fetal medicine specialists. Currently, the Fetal Heart Program uses a Superconducting Quantum Interference Device (SQUID) to detect fetal heart arrhythmias using fMCG technology. The FDA-approved device is cooled with liquid helium, which is both costly and rare. As a result, this fetal heart monitoring can't be universally implemented.

Dr. Strasburger's lab is collaborating to develop a similar, more affordable device called optically pumped magnetometry (OPM) with a $1.66 million National Institutes of Health small business innovation research grant. The OPM device would replace the SQUID device, making fMCG technology easier to offer in more locations around the world. Doing so would help identify fetal cardiac issues in more babies in utero and would, in turn, likely lead to a reduction in the current stillbirth rates, said Dr. Strasburger.

Having more fMCG available would also help mothers get the care they need closer to their homes, said Dr. Strasburger. "Over two-thirds of our patients are coming to us from farther than 100 miles away to get this test," she said. "It's important that we get this technology in other hospitals so we can get these moms off the road and into the safest place for them to be."

Learn more about the Fetal Heart Program at childrenswi.org/fetalheart

Retinoblastoma Program Seeks to Preserve Vision

Early screening leads to better outcomes for eye cancer

Retinoblastoma, a familial cancer that produces tumors in one or both eyes in young children, has a 99% survival rate when diagnosed early in life. Timely diagnosis also helps preserve vision.

With about 300 new cases in the United States each year, Aparna Ramasubramanian, MD, wants to examine children who may have the condition as soon as possible — sometimes even in utero.

"Early detection and prompt care is very important," said Dr. Ramasubramanian, a Pediatric Ophthalmologist at Children's Wisconsin and Associate Professor of pediatric ophthalmology at the Medical College of Wisconsin. "In our center with early detection, we have noted improved outcomes."

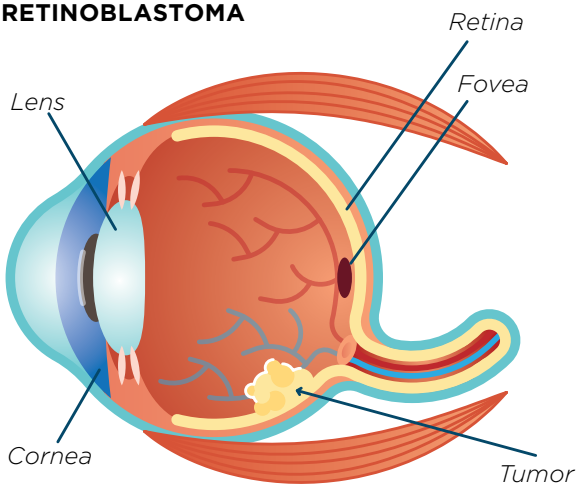
RECOGNIZING RETINOBLASTOMA

Retinoblastoma affects about 1 in 16,000 to 18,000 births worldwide[1]. It is usually diagnosed before age 5.

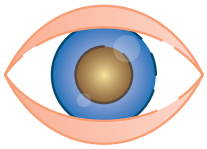
Treatment varies based on whether retinoblastoma is found in one or both eyes and the extent of the tumor. Generally, it is treated with chemotherapy, either systemic through the bloodstream or directly into the eye. Advanced cases may require removing the eye.

Retinoblastoma may be detected when a pediatrician performs a red reflex exam during a well-child visit. If a symmetric red glow of the retina isn't observed, the pediatrician should refer the child to a pediatric ophthalmologist for further testing, such as an ultrasound, fluorescein angiography and MRI.

RETINOBLASTOMA



RETINOBLASTOMA SYMPTOMS



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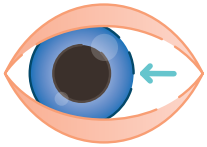

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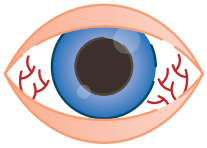


Ocular inflammation

GENETIC INHERITANCE

The condition can be passed on when there is a family history. In such cases, couples can do genetic testing before trying to conceive. If one or both parents are carriers, they may consider using pre-implantation genetic testing and in vitro fertilization. Some couples may choose to test for the genetic mutation during pregnancy via amniocentesis or chorionic villus sampling. Fetal ultrasounds during the third trimester of pregnancy may detect retinoblastoma tumors in utero.

The retinoblastoma program at Children's Wisconsin has a multidisciplinary team, with an ocular oncologist, pediatric oncologist, radiation oncologist, radiologist, neurosurgeon and a geneticist to help patients with genetic testing and preconception counseling.

"Time is of the essence when it comes to eye cancer," said Dr. Ramasubramanian.

Aparna Ramasubramanian, MD, Pediatric Ophthalmologist and Director of the Retinoblastoma Program at Children's Wisconsin, Associate Professor of pediatric ophthalmology at the Medical College of Wisconsin

REFERENCE:

1. Fabian ID, Sagoo MS. Understanding retinoblastoma: epidemiology and genetics. *Community Eye Health*. 2018;31(101):7. PMID: 29915458; PMCID: PMC5998389.

Learn more about the Children's Wisconsin retinoblastoma program at bit.ly/retinoblastoma-childrenswi. Clinicians may contact the program directly at (414) 337-7330.

VECTORMINEO/GETTY IMAGES

POPOVAPHOTO/GETTY IMAGES

A New Option for ACL Injury

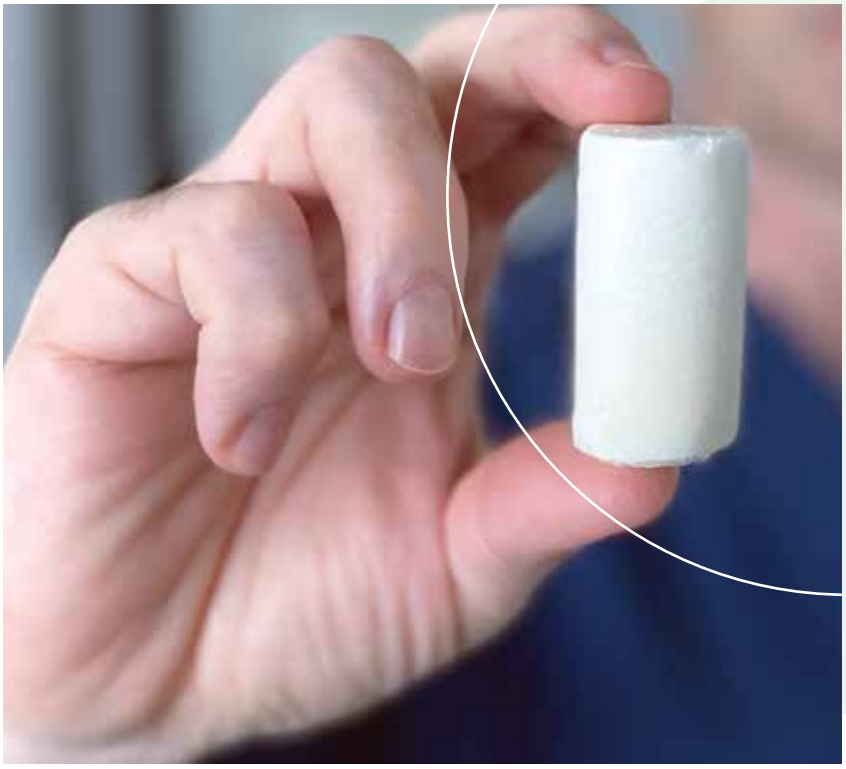
The Bridge-Enhanced ACL Restoration procedure offers advantages over traditional reconstruction surgery

BY JOHN B. ERICKSON, DO

John B. Erickson, DO, Pediatric Orthopedic Surgeon at Children's Wisconsin, Assistant Professor of Pediatric orthopedic surgery at the Medical College of Wisconsin

Bridge-Enhanced ACL Restoration (BEAR) is a surgical treatment option for patients who have sustained an ACL tear in their knee. Each year, nearly 250,000 ACL ruptures occur in the United States alone. The majority of these injuries are treated with surgery, most commonly an ACL reconstruction. ACL reconstruction utilizes a graft to create a new ACL for the patient. Graft options include allograft and autograft sources. Each of these options includes its own risk/reward profile. Autograft options typically include patellar tendon, quadriceps tendon and patellar tendon donor sites. While each of these has demonstrated good clinical outcomes, they all involve donor site morbidity in some fashion. Allograft ACL reconstructions do not include donor site morbidity, but reinjury rates have been shown to be nearly double those after autograft reconstructions. Additionally, while ACL repairs have been performed both historically and recently, healing rates and outcomes have been rather inconsistent. This is likely due to the intra-articular environment of the knee, which has been shown to inhibit fibrin clot formation, resulting in inconsistent and incomplete ACL healing.

Figure 1. BEAR Implant



The BEAR procedure utilizes a proprietary resorbable implant derived from bovine sources, primarily extra-cellular matrix and collagen.

Key points

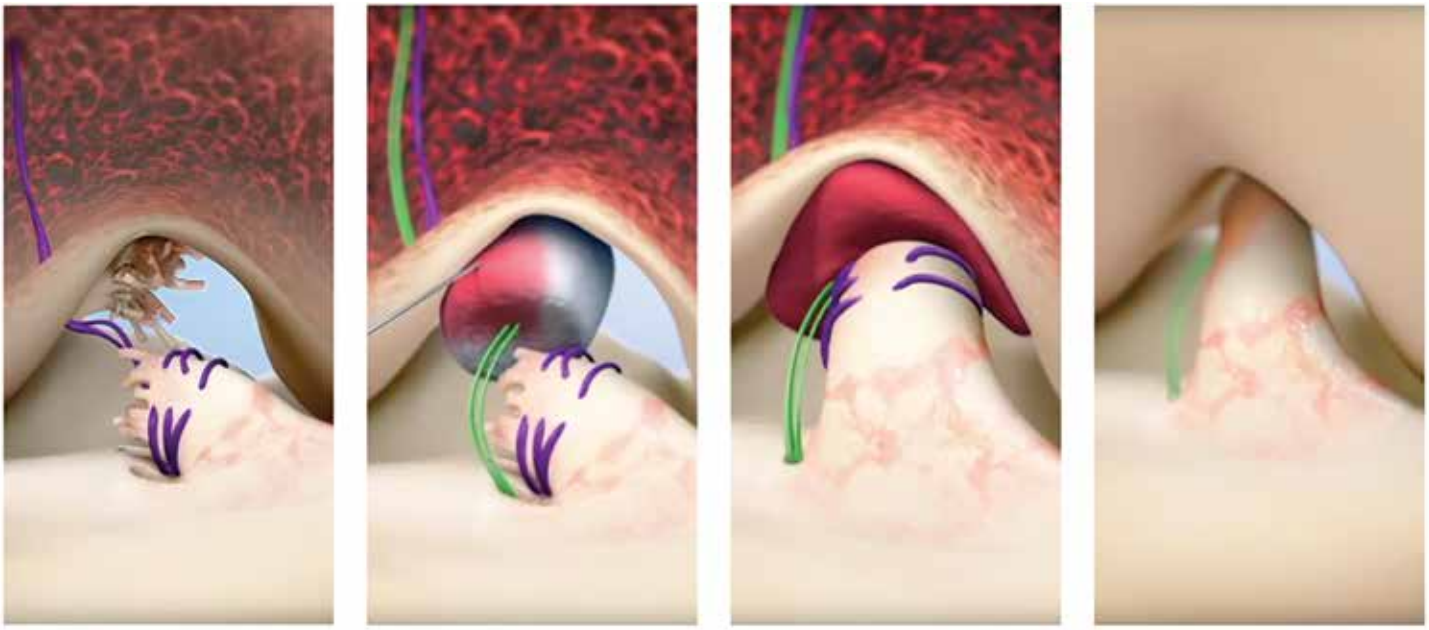
- ACL reconstruction is the most common surgery to treat ACL ruptures. The risk/reward profile of graft options must be considered.
- The BEAR procedure avoids many of the downsides of traditional ACL repair because it does not require a graft to replace the patient's native ACL.
- The BEAR procedure is FDA-approved for patients 14 years of age and older. However, it has been used safely in younger patients.
- The BEAR procedure typically is performed in an outpatient setting.

The BEAR procedure utilizes a proprietary resorbable implant derived from bovine sources, primarily extra-cellular matrix and collagen (Figure 1). The implant is placed into the patient's knee surgically, along with suturing of the injured ACL tissue back to its original anatomic location. The BEAR implant acts as a bridge, allowing a clot to form between the torn ends of the ACL, thus allowing ligament healing and restoration of knee stability and proprioception (Figure 2). All of this is accomplished without the use of a graft to replace the injured ligament while demonstrating reinjury rates and patient outcomes that are comparable or non-inferior to ACL reconstruction.

WHAT ARE THE BENEFITS OF THE BEAR PROCEDURE?

The BEAR procedure offers a number of potential benefits when compared to traditional ACL reconstruction. As previously mentioned, the BEAR procedure does not require a graft to replace the patient's native ACL. Therefore, there is no graft site morbidity associated with the BEAR procedure. This has been shown to result in significantly improved patient-reported postoperative pain scores in BEAR patients when compared to ACL reconstruction patients. Early studies have also demonstrated superior hamstring-to-quadriceps strength ratios in BEAR patients when compared to ACL reconstruction. This

Figure 2. BEAR Implant



Torn ACL

Surgeon add patient's own blood BEAR implant

Surgeon inserts BEAR Implant between torn ends of ACL

As ACL heals, BEAR implant is absorbed by the body, usually within eight weeks

has the added benefit of decreased rates of contralateral knee ACL tears, which are not uncommon in ACL reconstruction patients. One potential long-term benefit of the BEAR procedure may be a lower rate of long-term osteoarthritis progression. Most studies suggest at least 50% of patients with a history of ACL injury go on to develop radiographic evidence of arthritis. In pre-clinical porcine testing, the BEAR procedure demonstrated a significant reduction in knee osteoarthritis at 12 months post-procedure when compared to both ACL transection and ACL reconstruction. If confirmed in long-term human studies, this may indeed be the greatest advantage of the BEAR procedure.

WHO IS A CANDIDATE FOR THE BEAR PROCEDURE?

The BEAR procedure is indicated for the treatment of complete ACL tears in most patients. Current FDA approval includes patients 14 years and older with closed growth plates. However, the BEAR procedure can and has been used to safely treat ACL injures in younger patients. In these cases, a growth plate sparing technique should be utilized. The timing of the patient's injury and treatment is also important, as it is recommended to perform the BEAR procedure within 50 days from the initial ACL injury. Additional consideration should also be given to the type of ACL tear, as well as the patient's activities and personal goals. As with any injury and proposed surgery, a robust discussion of the options and shared decision-making allows for the highest likelihood of success and patient/family satisfaction.

WHAT DOES SURGERY AND RECOVERY LOOK LIKE?

The BEAR procedure is arthroscopically assisted and typically occurs in an outpatient (day surgery) setting. Postoperatively,

patients are protected in a knee brace and crutches and referred to physical therapy to work on their range of motion and strengthening. Running and sport-specific training activities are typically initiated at the four- and six-month postoperative marks, respectively. Return to sport clearance/progression occurs no sooner than nine months after surgery, with most patients returning to their usual sports and activities between nine and 12 months after surgery.

Learn more about referring a patient for an ACL injury at our physician consultation line at (414) 607-5280.

SUMMARY

The BEAR procedure offers a novel treatment option for patients with an ACL tear. Ligament preservation offers significant potential advantages over ACL reconstruction. However, much is still to be learned regarding long-term benefits and outcomes. While not the best fit for every patient, the BEAR procedure should be given consideration when appropriate.

How Common are ACL Injuries in Children?

The prevalence of ACL tears in pediatric patients is unknown. However, the following findings have been observed:

- A 2017 study found that the incidence of ACL tears in pediatric patients has increased over the last 20 years.[1]
- A Scandinavian study observed an incidence of 16 per 1,000 ACL tears in high school athletes, especially in girls with early specialization in sports.[2]
- A systematic review and meta-analysis conducted in 2021 concluded that the overall risk of ACL injuries is nearly 1 per 10,000 for female athletes, who were almost 1.5 times as likely as male athletes to suffer an ACL injury across all adolescent sports.[3]

REFERENCES

1. Beck NA, Lawrence JTR, Nordin JD, et al. ACL tears in school-aged children and adolescents over 20 years. *Pediatrics* 2017; 139(3): e20161877.
2. Vahasarja V, Kinnuen P, Serlo W. Arthroscopy of the acute traumatic knee in children. Prospective study of 138 cases. *Acta Orthop Scand* 1993; 64(5): 580–582.
3. Bram JT, Magee LC, Mehta NN, et al. Anterior cruciate ligament injury incidence in adolescent athletes: a systematic review and meta-analysis. *Am J Sports Med* 2021; 49(7): 1962–1972.

Continuing medical education

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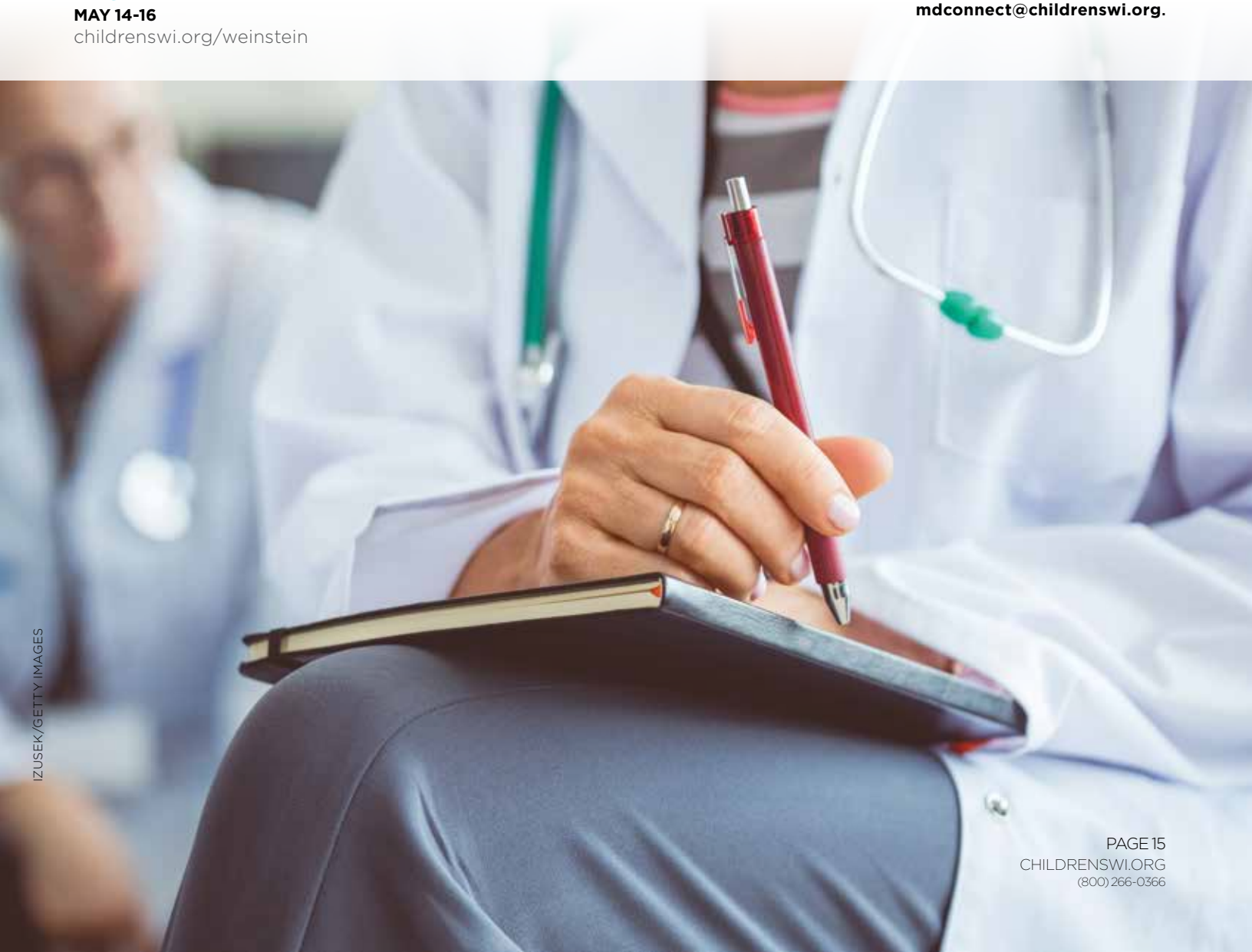
Questions? Email mdconnect@childrenswi.org.



IZUSEK/GETTY IMAGES

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Departures

Children's Wisconsin would like to thank the following providers for their contributions. We wish them well in future endeavors.

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Retirement

Children's Wisconsin thanks our providers for their years of service.

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