

# PEDIATRIC INSIGHTS

WINTER 2022 • An Update From the Division of Pediatric Orthopaedic Surgery



## Remembering the Legacy of Dr. Freddie Fu

**Freddie H. Fu, MD**, the creator of UPMC's world-renowned sports medicine program, long-time chairman of the University of Pittsburgh School of Medicine's Department of Orthopaedic Surgery, and head team physician for Pitt's Department of Athletics, died Friday, September 24, surrounded by his loving family.



Dr. Fu was one of the most recognized and beloved physicians in Pittsburgh and is acclaimed worldwide for his innovative research and teaching, leading to many clinical advancements in sports medicine and orthopaedic care, particularly in treating knee injuries. Throughout his life and career, Dr. Fu worked passionately to always set the bar higher for his local, national and international medical/surgical colleagues, thousands of medical students, surgical residents, and fellows who came to Pittsburgh to learn at one of the finest orthopaedic surgery programs in the world. He set the bar higher most of all for his tens of thousands of patients — elite, professional, Olympic, and amateur athletes from around the globe as well as non-athletes from around the corner who sought clinical care from the best. As an ardent proponent and supporter of diversity in medicine, Dr. Fu developed one of the most ethnically and gender-diverse academic and clinical departments in the country. He also is known for his enormous impact on the entire Pittsburgh

region as a deeply devoted and enthusiastic community ambassador, actively serving for more than 30 years on the boards of numerous non-profit organizations and life-enriching initiatives.

Dr. Fu is survived by his wife of 47 years, Hilda Pang Fu. A proud and doting father and grandfather, Dr. Fu is survived also by his daughter, Joyce Lok-See Fu (and husband, Chad Martin); son, Gordon Ka-Hong Fu (and wife, Ding Li); five grandchildren: Ludivine Ling-Yun Fu Martin, Alexander Zee-Yun Fu Martin, Axel Wei-Yun Fu Martin, Kendrick Kai Cheng Fu, and Kasen Kai Sheng Fu; his mother, Mabel Foo; sisters Susan Lam and Jeanette Maeba; and brothers Frank Fu and Nigel Fu. He was preceded in death by his father, Ying Foo.

With his larger-than-life presence, fierce ingenuity, and deep respect and generosity for others, Dr. Fu's professional, civic and personal priorities have had immeasurable positive influence on countless people of all walks of life.

*Continued on Page 8*

### In this issue

- Page 2** Early Vestibular Rehab for Adolescents with Concussions
- Page 3** Understanding Changes to Acetabular Coverage During Skeletal Growth Using 3D Modeling
- Page 4** Pediatric Hip Preservation Surgery
- Page 6** Faculty News and Notes  
About The Division



## Early Vestibular Rehab for Adolescents with Concussions Combined with Behavioral Management Improves Recovery

Adolescents who undergo early vestibular rehabilitation in conjunction with behavioral management treatment experience a more pronounced improvement in concussion symptoms than those treated only with a behavioral management program, according to new research led by the University of Pittsburgh and UPMC Sports Medicine Concussion Program.

The results, published online in *Journal of Pediatrics* showed significant improvements when vestibular rehabilitation was added to the treatment protocol.



“Precision interventions targeting vestibular symptoms and impairment in adolescents following a concussion are effective in reducing those symptoms and impairments, above and beyond the positive effects of across-the-board

behavioral management interventions,” says lead author **Anthony Kontos, PhD**, research director at UPMC’s Sports Medicine Concussion Program.

Vestibular symptoms and impairments include dizziness, imbalance, and vertigo. These symptoms have been associated with worse clinical outcomes and a longer recovery time in adolescents.

The researchers analyzed 55 participants between the ages of 12 to 18 years — all with a diagnosed sport-/recreation-

related concussion with vestibular symptoms/impairment. The patients were randomized into a four-week behavioral management control group with prescribed management strategies focused on physical activity, sleep, hydration, nutrition, and stress management or a vestibular intervention group that included the behavioral management program and additional prescribed precision rehabilitation exercises. Both groups experienced improvement; the most pronounced effect was found in stabilization of vertical eye movements, with the vestibular treatment group experiencing nearly double the improvement of the control group.



“These findings provide a strong foundation for new research to determine the most effective frequency, intensity, and timing for vestibular rehabilitation to better inform clinical practice guidelines,” says senior author

**Michael “Micky” Collins, PhD**, executive and clinical director of UPMC’s Sports Medicine Concussion Program.

*Co-authors include Shawn R. Eagle, PhD, Anne Mucha, DP, Victoria Kochick, DPT, Jessica Doman, DPT, Claire Moldovan, DPT, Cyndi Holland, MPH, and Nicholas Blaney, BS, all of the University of Pittsburgh.*

*The research was funded by the Chuck Noll Foundation for Brain Injury Research.*

# Understanding Changes to Acetabular Coverage During Skeletal Growth Using 3D Modeling

Pediatric orthopaedic surgeon **Michael P. McClincy, MD**, and collaborators from the Department of Radiology at the University of Pittsburgh School of Medicine published results from a new study that uses 3-dimensional computed tomography modeling to assess and characterize the size and developmental changes of the acetabular lunate cartilage at various ages during development in a cohort of adolescents aged 10 to 18 years.



The study was published in March in the *Journal of Pediatric Orthopaedics*.

“The acetabulum is a highly complex anatomic structure, and visualizing it in three-dimensional studies is difficult with traditional imaging techniques. How

the acetabulum develops over time, the morphological changes at different ages is significant for hip preservation specialists to more fully understand,” says Dr. McClincy. “A more thorough understanding of what the three-dimensional nature of acetabulum looks like at different ages during development, and if there are distinct differences based on the sex of the patient is what we sought to determine with this new study.”

## Study Highlights and Findings

Dr. McClincy’s research team created a series of 62 3-D computed tomography reconstructions of CT pelvis scans from a cross-section of children and adolescents aged 10 to 18 who had normal hip anatomy without signs of pathology (e.g., dysplasia; impingement.) They stratified the cohort into groups by sex and age — 10 to 12; 13 to 15; 16 to 18 years. The 3-D hip reconstructions were then analyzed, and the area of acetabular lunate cartilage was determined. They also examined the acetabular lunate cartilage as a whole and in sections — superior, anterior, and posterior.

Females were found to have a decrease in femoral head coverage by the acetabulum as age increased. Most of the changes in femoral head coverage occurred between the ages of 10 and 15 years. Male subjects overall did not exhibit a decrease as age increased, but there were decreases noted when examining the anterior and superior aspects of the acetabulum.

“We clearly appreciated differences in developmental changes between sexes, with female subjects displaying



greater femoral head growth when compared to the acetabulum,” says Dr. McClincy. “This was an unexpected finding, but an important one, along with the global and regional changes during aging for females and males, respectively. This information will add to the prognostic clarity of determining whether hip pathology exists towards the end of growth, and to what degree.”

## Future Studies

On a broader note, Dr. McClincy has embarked on collaborative studies with colleagues in the Department of Radiology and the 3-D Printing Laboratory at the University of Pittsburgh that combines the use of 3-D modeling and printing techniques coupled with artificial intelligence and machine learning to improve reconstructive surgical approaches of the acetabulum to maximize stability and function for patients with developmental dysplasia of the hip and femoroacetabular impingement.

## Reference

Herman M, Krivoniak A, Ruh E, Thakrar D, Bosch P, Wylie JD, Ghodadra A, McClincy MP. Acetabular Coverage Decreases at the End of Skeletal Growth: A 3DCT Study of Healthy Hips. *J Pediatr Orthop*. 2021 March 1; 41(3): e232-e239.

# Research Advances in Pediatric Hip Preservation Surgery at UPMC Children’s

## Standardizing and Improving Diagnostic Accuracy for Nonarthritic Hip Pain: Leading the Way Toward Optimal Presurgical Planning and Quality Long-Term Outcomes

Nonarthritic hip pain in young, active pediatric orthopaedic patients presents a number of diagnostic and treatment challenges to obtain optimal long-term outcomes in hip preservation. Foremost in this clinical situation is a profound lack of consensus among pediatric orthopaedic surgeons on optimal treatment approaches, particularly in cases of mild or borderline hip dysplasia. Diagnostic criteria used to determine the degree of severity of dysplasia — the current gold standard being lateral center edge angle — remain a somewhat suboptimal guide because of the inherent gray area of mild or borderline cases. Treatment approaches for mild hip dysplasia — periacetabular osteotomy and hip arthroscopy — both have benefits and downsides, but again, there is a lack of consensus on how best to apply these surgical approaches to the spectrum of cases in the mild to borderline range.

“What it comes down to is as a field we do not have a unified approach to how we diagnose these cases, nor is there uniformity or consensus on which treatment approaches are best for specific clinical scenarios. Surgeons tend to offer or recommend the procedure type they are most comfortable and experienced at performing, but I believe that approach is not optimal for our patients,” says **Michael P. McClincy, MD**, pediatric orthopaedic surgeon and hip specialist at UPMC Children’s Hospital of Pittsburgh.

To begin to grapple with these dilemmas in the field of pediatric hip preservation surgery, Dr. McClincy and collaborators from Boston Children’s Hospital led a multicenter study to lay the groundwork for developing a standardized approach to the diagnostic evaluation of patients with nonarthritic hip pain. Results from the study are currently in press and will be published in a forthcoming edition of the *Orthopaedic Journal of Sports Medicine*.

The study, “Standardizing the Diagnostic Evaluation of Non-Arthritic Hip Pain Through the Delphi Method,” pooled the resources of a panel of 18 orthopaedic surgeons (both adult and pediatric specialists) who have considerable

### More About Dr. McClincy

**Michael P. McClincy, MD**, is an assistant professor of orthopaedic surgery. Dr. McClincy earned his medical degree and completed his residency training at the University of Pittsburgh School of Medicine. He then completed fellowships in pediatric sports medicine and pediatric and adolescent hip preservation, both at Boston Children’s Hospital, before returning to Pittsburgh to join UPMC Children’s in 2018. Prior to medical school, Dr. McClincy graduated from Dartmouth College with a degree in mathematics. While at Dartmouth, he also was a member of the football team, playing four years as a defensive lineman.

Dr. McClincy’s clinical areas of focus are hip preservation surgery, arthroscopic knee and shoulder surgery, and sports medicine. Fellowship training allowed Dr. McClincy to study and practice sophisticated hip preservation techniques, such as hip arthroscopy and osteotomies of the acetabulum and proximal femur. His research is focused mainly on the study of hip pathology and improving interventional capabilities for patients with a variety of hip morphologies, from dysplasia to impingement. His interests extend to exploring the biomechanics of the hip in young athletes, especially those that fall between the spectrums of impingement and instability. Dr. McClincy has active research interests in femoroacetabular impingement and hip dysplasia surgery in adolescents and young adults.

expertise and surgical experience in nonarthritic hip pain and concomitant disorders (femoroacetabular impingement and acetabular dysplasia.)

Panelists were recruited to undergo a series of three iterative rounds of surveys based on four clinical patient scenarios chosen to cover as wide a spectrum as possible of hip pain attributed to a nonarthritic pathology or morphology. The research team used the Delphi method to sequentially hone and obtain consensus on various aspects and criteria of the presurgical diagnostic evaluation.

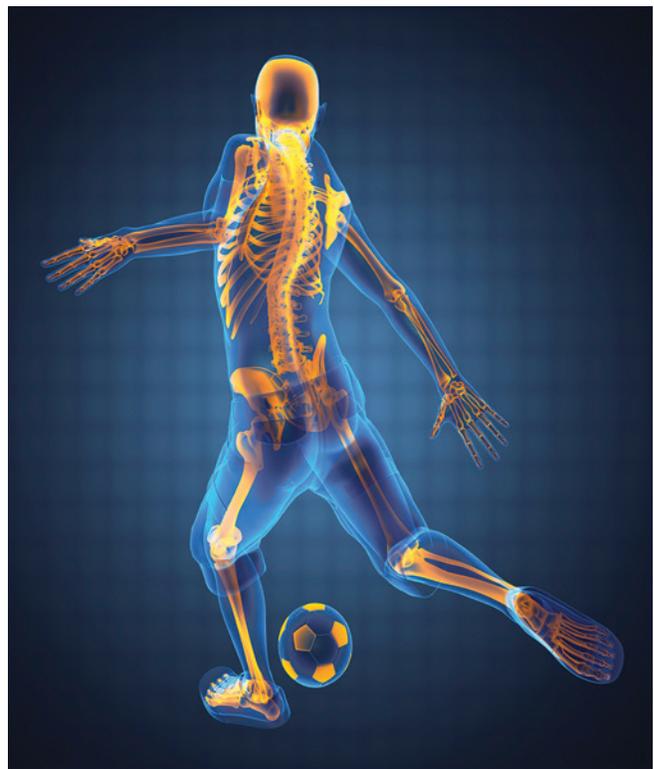
“There is very little in the literature that has been done with this patient population to establish best practices for diagnosing and ultimately treating non-arthritic hip pain, the vast majority of which is due to impingement or dysplasia. Our study is a good first salvo across the field to bring about consensus in how we talk about these patients — how we diagnose them. If we are not all working from the same set of standards and criteria, it is essentially impossible to make comparisons to determine the reliability or repeatability of diagnosis, how that translates to or informs treatment decisions, or how we conduct further research to expand the evidence base,” says Dr. McClincy.

### Highlights from the Findings

Surgeons participating in the survey process all reviewed the same four clinical scenarios, which included a short patient history and description of the pain along with an accompanying anterior/posterior x-ray of the pelvis. Each surgeon was then asked a series of six questions to elicit their responses in how they would proceed with diagnosing the patient. These questions included what historical patient information would be queried, the nature of physical examinations to perform, imaging to obtain, or other diagnostic tasks that would inform the surgeon’s ultimate diagnosis.

At the conclusion of the survey and Delphi process, clinical consensus (defined as greater than 75%) on various aspects of the four clinical cases was obtained, albeit not 100% across all four cases and all establishing criteria.

One aspect of the diagnostic evaluation that did achieve consensus across all four cases was a standardized sequence of radiographs to obtain in these cases consisting of a standing AP pelvis, 45° Dunn view, and false-positive views.



Also finding consensus across cases was the use of magnetic resonance (MR) arthrogram and computed tomography (CT) scan.

“We did realize clinical consensus across a rather broad range of the relevant patient history, x-ray sequences to obtain and their clinical interpretation, and other diagnostics. This work puts on the path to grounding our approach to nonarthritic hip pain in the same language using the same tools at our disposal in order to more uniformly, and perhaps in the end better diagnosis these cases,” says Dr. McClincy. “However, this is only the start of what will be a long process of research and development to refine and further expand our uniformity and efficacy in the diagnosis and treatment of these cases.”

### Reference

McClincy MP, et al. Standardizing the Diagnostic Evaluation of Non-Arthritic Hip Pain Through the Delphi Method. *Orthop J Sports Med.* 2020. In Press.

# FACULTY NEWS AND NOTES

## 4th Annual Hip Preservation Conference Highlights

In June, UPMC Children's Hospital of Pittsburgh, in collaboration with UPMC Orthopaedic Care, hosted the 4th Annual Hip Preservation Program Conference. The one-day conference was held virtually due to the ongoing COVID-19 pandemic on June 5.



This year's conference attracted attendees from a broad spectrum of clinical specialties.

For this year's event, course directors were

**Michael P. McClincy, MD**, (left) from the Division of Pediatric Orthopaedic Surgery at UPMC Children's, and **Craig Mauro, MD**, from UPMC Orthopaedic Care (right).

This year's conference focused on the diagnosis and management of the unstable hip in adolescent patients and featured 16 presentations from a multidisciplinary group of experts in adult and pediatric orthopaedic surgery, physical medicine and rehabilitation, physical therapy, student-athlete behavioral health and wellness, musculoskeletal radiology, and sports performance.

"We designed this year's conference with individual segments dealing with diagnosis, non-operative care, operative approaches, and postoperative care of adolescent hip patients," explains Dr. McClincy.

### Lectures and presentations from faculty delivered at this year's conference include:

- Pathogenesis of dysplasia and instability
- Anatomy of the acetabulum and proximal femur
- Biomechanics, imaging, diagnostic ultrasound, and physical exam of the hip
- Physical therapy and rehabilitation for the unstable hip
- Importance of functional movement
- Ultrasound and therapeutic injections
- Sports psychology and return-to-play
- Periacetabular osteotomy and hip arthroscopy

Featured presentations from the conference will be available for viewing and CME credit by visiting the **UPMCPPhysicianResources.com** website.

## About The Division

The Division of Pediatric Orthopaedic Surgery at UPMC Children's Hospital of Pittsburgh specializes in problems related to the musculoskeletal system, including inflammatory, congenital, developmental, neoplastic and metabolic problems. Children's hip, knee and foot problems, as well as spine deformities and limb-length abnormalities, are included in this specialty care. In addition, the orthopaedic service offers 24-hour coverage for trauma and other orthopaedic injuries through the hospital's Emergency Department.

### Faculty

#### W. Timothy Ward, MD – Division Chief

Ozgur Dede, MD

John Fowler, MD

Robert Goitz, MD

Jan S. Grudziak, MD

Jessica L. Hughes, MD

Michael P. McClincy, MD

Amanda J. McCoy, MD, MPH, FCS (ECSA)

Stephen A. Mendelson, MD

Z. Deniz Olgun, MD

# Division of Pediatric Orthopaedic Surgery Welcomes Two New Faculty Members

The Division of Pediatric Orthopaedic Surgery welcomes its two newest faculty, **Amanda J. McCoy, MD, MPH, FCS (ECSA)** and **Jessica L. Hughes, MD**.



The Division of Pediatric Orthopaedic Surgery at UPMC Children's Hospital of Pittsburgh is pleased to welcome **Amanda J. McCoy, MD, MPH, FCS (ECSA)**.

Dr. McCoy is a Pittsburgh native. After graduating from North Allegheny Senior High School, she earned her undergraduate degree in chemistry and physics with a certificate in health policy from Harvard University in Cambridge, Massachusetts. Subsequently she earned her medical degree from the Duke University School of Medicine and her Master's in Public Health from the University of North Carolina Gillings School of Global Public Health. She completed her orthopaedic surgery residency training in Boston at the Harvard Combined Orthopaedics Residency Program, and then a fellowship in orthopaedic surgery at the Baylor College of Medicine in Houston, Texas.

From 2018 until joining UPMC Children's Hospital, Dr. McCoy served as an orthopaedic surgeon at the Tenwek Hospital/World Gospel Mission in Bomet, Kenya, Africa where worked to treat a significant portion of patients with acute or delayed orthopaedic trauma. Dr. McCoy also served as the Interim Program Director of Pan African Association of Christian Surgeons (PAACS)/College of Surgeons of East Central and Southern Africa (COSECSA) Tenwek Orthopaedic Residency Program. As Residency Director, Dr. McCoy coordinated the didactic and call schedules for the orthopaedic surgery trauma service, as well as participated in educational and training programs while

overseeing orthopaedic surgery residents, general surgery residents on orthopaedic surgery rotation, interns, and medical students.

Throughout her education and training, Dr. McCoy was awarded numerous scholarships and awards for her academic work, and she has devoted significant amounts of time to volunteer and community service work.

She enjoys caring for children with general pediatric musculoskeletal conditions, including fractures and infections, and has a special interest in caring for lower limb deformities.



The Division of Pediatric Orthopaedic Surgery at UPMC Children's Hospital of Pittsburgh is pleased to welcome **Jessica L. Hughes, MD**, to the Division. Dr. Hughes began her tenure at UPMC Children's in September. In addition to her clinical

role at UPMC Children's, Dr. Hughes is an assistant professor of orthopaedic surgery in the Department of Orthopaedic Surgery at the University of Pittsburgh School of Medicine.

Dr. Hughes earned a master's degree in Biological Science at the Drexel University College of Medicine prior to earning her medical degree from the University of Texas, San Antonio in 2015. She completed her orthopaedic surgery residency at Baylor Scott & White Health in Temple, Texas. She conducted her orthopaedic surgery fellowship at Rady Children's Hospital in San Diego, completing the program in July. Dr. Hughes is originally from San Diego and earned her undergraduate degree from Davidson College in North Carolina, where also played soccer for the University's Division I women's team, being named captain in 2005 and 2006.

Dr. Hughes's past research projects have involved studies related to idiopathic scoliosis, shoulder instability in adolescents, developmental dysplasia of the hip, clavicular growth, and others.

Her clinical emphasis and special interests include orthopaedic trauma and orthopaedic deformities, as well as hip and neuromuscular conditions.

## Congratulations



Congratulations to **Ozgur Dede, MD**, associate professor of orthopaedic surgery, on receiving the Teacher of the Year Award presented by the orthopaedic surgery residency program at

UPMC Hamot in Erie, Pennsylvania.

## Remembering the Legacy of Dr. Freddie Fu *Continued from Page 1*

Dr. Fu's monumental achievements during his more than 30 years at UPMC and the University of Pittsburgh are difficult to briefly summarize. He developed one of the most ethnically and gender-diverse academic and clinical departments in the country, and he helped revolutionize anterior cruciate ligament (ACL) reconstruction, making UPMC and Pitt the most prolific institutions for influential ACL research and Dr. Fu the most-cited author.

He founded western Pennsylvania's first sports medicine program in 1986 and in 2000 opened the first-of-its-kind UPMC Rooney Sports Complex with the University of Pittsburgh Panthers and the National Football League's Pittsburgh Steelers. Dr. Fu guided a partnership between UPMC and the National Hockey League's Pittsburgh Penguins to build the UPMC Lemieux Sports Complex

north of Pittsburgh, and he established the first-ever high school athletic training program in western Pennsylvania, a program that has grown into one of the largest in the country, and initiated the on-site presence of emergency medical services at high school football games. His partnership with the Pittsburgh Ballet Theatre, made it among the first professional ballet companies in the country to house a medical residency program tailored to dance.

Dr. Fu was one of the most beloved orthopaedic surgeons in the country. He is dearly missed by all those who crossed paths with him during his amazing life.

Read more about Dr. Fu, his achievements, and his enduring legacy in orthopaedic surgery at [UPMC.com](https://www.upmc.com).

Affiliated with the University of Pittsburgh School of Medicine and ranked among the nation's best children's hospitals by *U.S. News & World Report*.



## About UPMC Children's Hospital of Pittsburgh

Regionally, nationally, and globally, UPMC Children's Hospital of Pittsburgh is a leader in the treatment of childhood conditions and diseases, a pioneer in the development of new and improved therapies, and a top educator of the next generation of pediatricians and pediatric subspecialists. With generous community support, UPMC Children's Hospital has fulfilled this mission since its founding in 1890. UPMC Children's is recognized consistently for its clinical, research, educational, and advocacy-related accomplishments, including ranking 15th among children's hospitals and schools of medicine in funding for pediatric research provided by the National Institutes of Health (FY2019) and ranking on *U.S. News & World Report's* Honor Roll of Best Children's Hospitals (2021-22).