Sports Medicine

RESEARCH AND TRAINING DETAILS

Faculty .................................................. 7
Joint Appointment Faculty ....................... 1
Support Personnel .................................. 7
Direct Annual Grant Support .................... $291,407
Direct Annual Industry Support ............... $164,967
Peer Reviewed Publications ..................... 36

CLINICAL ACTIVITIES AND TRAINING

Clinical Fellows ...................................... 2
Outpatient Encounters ............................. 4,013

Research Highlights

Sports Medicine Human Performance Laboratory

The Human Performance Laboratory at Cincinnati Children’s Sports Medicine Biodynamics Center was established in 2002 to provide a technology-driven laboratory to continually advance and validate cutting-edge injury prevention and
athletic development programs. Over the past 13 years, the researchers from Sports Medicine have produced some of the most progressive and clinically translatable data related to injury prevention in youth athletes.

In FY15, with funding from the Cincinnati Children’s Research Foundation, the Division of Sports Medicine and the Human Performance Laboratory ushered in a new era of technological advances with the creation and construction of a new state-of-the-art facility called the SPORT Center. This area boasts an upgraded motion capture system which allows for high fidelity measurement of inverse dynamics during sport maneuvers. Our experts in Sports Medicine, in collaboration with the Center for Cognition, Action and Perception and the Center for Simulations and Virtual Environments Research at the University of Cincinnati, will be exploring the world of virtual reality to both identify risk factors for injury prevention and develop targeted biomechanical injury prevention techniques.

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**Significant Publications**


This study of 659 adolescent athletes was focused on evaluating a limited echocardiogram as an adjunct to history, physical exam, and electrocardiogram for identifying cardiac conditions that would increase the risk for sudden cardiac death. The authors found that physical examination alone was ineffective in identification of subjects at elevated risk for sudden cardiac death, but also that echocardiogram identified many conditions not associated with elevated risk for sudden cardiac death.


There is an emerging trend in young athletes specializing early in a single sport instead of participating across multiple sports over the year. This research highlights the negative consequences of adolescent athletes specializing in a single sport and shows that this early specialization results in an increased risk of knee injuries.


This pilot feasibility study enrolled obese youth in order to test a new exercise protocol using high-intensity interval exercise. The four-week intervention had an attendance of 95%, with 100% of participants reporting they would recommend it to a friend, and 86% reporting a desire to “continue with the same type of exercise program”. Fitness improved in both intervention and control groups. This study was the first to demonstrate that a practical and enjoyable high-intensity interval exercise protocol can be successfully performed by obese children in a weight management program.


The study represents an important collaboration between the divisions of Orthopaedics and Sports Medicine to develop and test a novel web based assessment of identified radiographic features of Osteochondritis Dissecans (OCD) femoral condyle lesions. The current investigation identified radiographic characteristics of the OCD that were reliable and that have potential for use in predictive model of time to healing and ultimate healing rates. Given the fact that time of healing and when they can return to sports are of the most common questions that parents and patients ask a sports medicine physician during their first clinic visit, this study lays the groundwork to better answer questions. In
addition, through use of novel web portal developed for this study, we are uniquely positioned to test and validate a radiographic prognostic model to predict and improve OCD lesion healing rates.

**Division Publications**


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**Faculty, Staff, and Trainees**

**Faculty Members**

- **Kelsey Logan, MD, MPH**, Associate Professor
  - Leadership Division Director
  - Research Interests Dr. Logan's research interests include concussion; female athlete issues; overuse injuries in sport.

- **Kate Berz, DO**, Assistant Professor
  - Research Interests Dr. Berz's research interests are in injuries of the female athlete, nutrition, and osteopathic manipulative therapy.

- **Nicholas Edwards, MD,MPH**, Assistant Professor
  - Research Interests Nicholas M. Edwards, MD, MPH is focused on the areas of physical activity promotion and cardiovascular disease prevention.

- **Paul Gubanich, MD, MPH**, Associate Professor
  - Leadership Fellowship Director
  - Research Interests Dr. Gubanich's research interests are sports concussion; medical problems in athletes; injury prevention; performance enhancement; musculoskeletal ultrasound.
Adam Kiefer, PhD, Assistant Professor
  **Research Interests** Dr. Kiefer's research interests include augmented/virtual reality; behavioral dynamics; biofeedback; dynamical disease; exercise science; individual/team coordination; nonlinear dynamics; quantitative methods; sports medicine.

Greg Myer, PhD, Associate Professor
  **Leadership** Director of Research
  **Research Interests** Dr. Myer’s primary research interests are related to injury biomechanics, pediatric exercise science and exercise prevention strategies.

Catherine Quatman-Yates, PT, DPT, PhD, Assistant Professor
  **Research Interests** Dr. Quatman-Yates is interested in optimizing post-concussion evaluation and rehabilitation processes for children and adolescents.

Gregory Walker, MD, Assistant Professor
  **Research Interests** Dr. Walker's research focus is physical inactivity in youth and concussion prevention and treatment.

Timothy Hewett, PhD, Adjunct
  **Research Interests** Dr. Hewett's research interests lie in neuromuscular; biomechanical and molecular adaptation of the muscular; boney and nervous systems to stresses such as growth, development and neuromuscular training.

Laura Schmitt, PhD, Adjunct
  **Research Interests** Dr. Schmitt is interested in outcomes after ACL reconstruction; injury biomechanics

**Joint Appointment Faculty Members**

Mark Paterno, PhD,PT, MS, MBA, SCS, ATC, Associate Professor (Occupational Therapy and Physical Therapy)
  **Research Interests** Clinical outcomes after lower extremity injury; rehabilitation intervention outcomes; outcome after ACL reconstruction

**Trainees**
- James Hahn, MD, PGY IV
- Gregg Kottyan, MD, PGY IV

**Grants, Contracts, and Industry Agreements**

<table>
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<th>Grant and Contract Awards</th>
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<tr>
<td>Kiefer, A</td>
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<td>Driving Performance of Teenage Patients with Concussion</td>
<td>9/17/2014-6/30/2015</td>
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<td>Ohio Department of Public Safety</td>
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<p>| Myer, G                   |              |
| Multi-Faceted Approach Modeling ACL Injury Mechanisms |                 |
| National Institutes of Health (The Ohio State University Research Foundation) |</p>
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<th>Grant Number</th>
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<td>R01 AR056259</td>
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<td>National Institutes of Health</td>
<td>Identification of Patellofemoral Pain Risk Factors Developed During Maturation</td>
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<td>R21 AR065068</td>
<td>2/13/2015 - 1/31/2017</td>
<td>National Institutes of Health (The Ohio State University Research Foundation)</td>
<td>Prospective Study of Bio-mechanics and Early Degeneration after ACL Reconstruction</td>
<td>Paterno, M</td>
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<td>$132,000</td>
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<tr>
<th>Grant Number</th>
<th>Start Date - End Date</th>
<th>Funding Source</th>
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- **Current Year Direct**: $291,407
- **Industry Contracts**
  - Myer, G
    - ElMindA Ltd: $70,704
    - Q30 Labs, LLC: $94,263
  - **Current Year Direct Receipts**: $164,967
- **Total**: $456,374
Football Helmets Do Not Necessarily Protect Against ‘Brain Slosh’

Can woodpeckers and big horn sheep help solve the troubling and often debilitating problem of football concussions? Does a city’s altitude affect the likelihood that its NFL team members will experience concussions? Are better-padded helmets or stricter NFL rules on helmet-to-helmet contact actually solving football’s concussion problems?

Yes, yes, and no, according to a study by Gregory Myer, PhD, FACSM, Director of Sports Medicine Research at Cincinnati Children’s. Myer led a team of scientists who analyzed 300 concussions sustained by 284 professional football players during the 2012 and 2013 NFL seasons. Their findings, published in the *Journal of Orthopaedic & Sports Physical Therapy*, include:

- “Brain slosh,” the rapid acceleration and deceleration of the brain inside the skull, is the suspected common cause of concussions - not direct impact to the head.
- Big horn sheep and woodpeckers, which routinely experience tremendous blows to the head at 10 and 20 times that, respectively, of a head-to-head tackle, appear to be protected from brain injury via modulations of their intracranial blood volume that help make a tighter fit inside their skulls prior to impact. This finding could influence concussion prevention strategies that will better protect human athletes’ brains.
- Players in cities at the highest altitudes — Phoenix, Atlanta, Buffalo, Charlotte, Denver, Indianapolis, Kansas City, Minneapolis and Pittsburgh — have a combined 30 percent lower odds of sustaining a concussion relative to players in the NFL’s other 23 cities at 644 feet at sea level or lower. At higher altitudes, cerebral blood flow increases, which the research team hypothesized, might influence the brain to fit tighter inside the skull — like a bubble wrapping the brain.

“If we’re going to solve this problem, we have to figure out how to protect the brain from the inside out,” Myer says. “That’s why we think we might be on the leading edge of something that could influence a paradigm shift in concussion-prevention strategies.”
“If we’re going to solve this problem, we have to figure out how to protect the brain from the inside out.”

A team of scientists led by Cincinnati Children’s analyzed 300 concussions sustained by 284 professional football players during the 2012 and 2013 NFL seasons. Among their findings: Games played in cities with higher altitudes had lower concussion rates, suggesting that topographical mechanisms that increase cerebral blood flow and volume may be useful for protecting the brain from injury during impact sports.