Background and Impact

- Over 8 million high school and college athletes in U.S.
  - 7.6 million high school athletes (NFHS 2022)
  - 480,000 college athletes (NCAA 2020)
Health Benefits of Sport

• Vigorous exercise benefits physical, cognitive, and psychological domains of health (Garber 2011; Oja 2015; Smith 2014)

• Elite athletes live longer than non-athletes (Runacres 2021; Clarke 2015; Lemez 2015)

• Greater strength → better function (Luc-Harkey 2018; Oiestad 2022)

• High aerobic capacity → could help preserve independence (Shephard 2009)
Risk Factors

• Athletes have high rates of injury, especially traumatic knee injuries (Kay 2017; Hootman 2007; Kerr 2015; Matheson 2015; Agel 2016; Zbrojkieicz 2018)

• Former athletes have an increased risk of osteoarthritis and joint replacement (Migliorini 2022; Palmer 2022)

• Former college athletes may have poorer function and cardiometabolic health (Simon & Docherty 2017)
  • Did not control for prior injury, which was higher in former athletes

• Athletes may be more sedentary outside practice/competition (Weiler 2015)
  • Physical activity is greatly reduced following injury – and persists many months! (Bell 2017)
Most prior research on athletes’ long-term health focuses on neurocognitive health in football players or studies very elite (Olympic / International level) athletes.
Mission: Optimize long-term health in athletes
Learn more at www.lastlab.org
How can we optimally position (former) athletes for long-term health and wellness?

1. Investigate physical activity patterns and musculoskeletal, cardiometabolic, and general health in (former) athletes

2. Develop and evaluate interventions to improve healthspans in athletes
My Background

• NCAA Varsity Basketball
  • Campbell University, 2007-2009
  • Christopher Newport University, 2009-2012
    • BS in Psychology, Summa Cum Laude

• DPT/PhD Training at the University of Delaware, 2012-2019
  • PhD research: athletes after traumatic knee injury
  • NICHD T32-HD00749 & NICHD F30-HD096830

• Postdoctoral Fellowship at the University of Colorado School of Medicine and VA Advanced Geriatrics Fellowship, 2019-2021
  • NIA F32-AG066274, VA Advanced Geriatrics Fellowship

• Licensed physical therapist

• USA Triathlon Level-I Certified Coach
NIH Director’s Early Independence Award (Award #: DP5-OD031833)

Jacob J. Capin, P.T., D.P.T., Ph.D., M.S.

Marquette University

Project Title: Life After Sport: Prior Injury and Sedentary Behavior as Mechanisms of Later Poor Health
Grant ID: DP5-OD031833

A clinician-scientist driven to advance rehabilitation and health outcomes through exercise, behavior change, and other non-surgical, non-pharmacologic interventions, Jacob Capin is an Assistant Professor of Physical Therapy at Marquette University and Director of the emerging Life After Sport Trajectories (LAST) laboratory. Inspired by playing NCAA basketball and rehabilitating athletes after traumatic knee injury, Jacob has the long-term research goal of improving musculoskeletal, cardiometabolic, and general health across the lifespan of former athletes, emphasizing early behavioral interventions to prevent their developing chronic diseases by mid-life. His DP5 work will investigate two potential determinants of poor long-term health in former athletes (prior injury and sedentary behavior), deriving critical evidence to inform future studies to prevent disease, promote health, and facilitate an aging population less reliant on costly end-stage medical

https://commonfund.nih.gov/earlyindependence/AwardRecipients21
Athletic and Human
Performance Research Center

Phenomenal Space for Research, Funding, and Recruitment!!
Methods: Data Collection

- Clinical / functional assessments
  - Strength
  - Function
- Body composition
  - DXA / DEXA
- Cardiometabolic indicators
  - AHA Cardiovascular Disease Risk Indicator
- Physical activity monitoring
- Dietary logs
- Questionnaires

Funding: DP5-OD031833
<table>
<thead>
<tr>
<th>Young Adult Cohort (age 18-25 years) N=225</th>
<th>Midlife Cohort (age 40-64 years) N=225</th>
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</thead>
<tbody>
<tr>
<td>Current collegiate athletes with and without a history of injury (n=150)</td>
<td>Former athletes with history of knee injury (n=75)</td>
</tr>
<tr>
<td></td>
<td>Former athletes without a history of lower extremity injury (n=75)</td>
</tr>
<tr>
<td>Matched non-athlete controls (n=75)</td>
<td>Matched non-athlete controls (n=75)</td>
</tr>
</tbody>
</table>

Follow-up Assessments

Funding: DP5-OD031833
Jena Heck Street, PT, DPT, ATC/L, CSCS  
*Research Physical Therapist*

Taylor Wolf, BS  
*DPT Student Research Technician*

Lindsey Mirkes, MS  
*Study Coordinator*

Kaycee Glattke, PhD, MS  
*Postdoctoral Fellow*

Grace Tostrud  
*Student Research Technician*

Roman de Guia  
*Student Research Technician*

Abby Larson  
*Student Research Technician*
Former Athlete Interviews

• Qualitative study of midlife and recent former athletes to describe their lived experiences into life after sport
• 6 themes:
  1. Athlete Identity
  2. Experience of the College Athlete
  3. Transferable Life Skills
  4. Transition
  5. Post-College Health
  6. Facilitators and Barriers to Post-College Health

Capin et al., 2023, ACSM
Scoping Review Findings

• 20 articles published since 2000 that evaluated at least one functional outcome, body composition, and/or cardiometabolic measure in midlife former athletes compared to controls
  • Mostly males who competed at international and/or professional levels
• Former endurance athletes have leaner body compositions, higher aerobic capacity, and better cardiometabolic indicators than controls
• Former athletes who maintain higher physical activity are healthier than those who do not
• Former team sport athletes, who have higher injury prevalence, may have poorer physical function than recreationally active controls
• Future research should include both sexes, control for prior sports-related injury, quantify physical activity, use standardized outcome measures, and incorporate longitudinal designs
Who can participate?

- Current and former college athletes ages 18-25 years and 40-64 years
  - Some exclusions apply
- Age- and sex-matched healthy controls

Visit [https://www.lastlab.org/research-participants](https://www.lastlab.org/research-participants)
Open Positions in LAST Lab!

• Full-Time Research Technician
• PhD Student

Contact Dr. Jacob Capin
Visit: https://www.lastlab.org/open-positions
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LAST Lab Website: www.lastlab.org
Twitter: @LASTLabMU
Instagram: @lastlabmarquette
Facebook: Life After Sport Trajectories Lab
Panelist Introductions

- **Kareeda Chones-Aguam**, Comm ’98, senior vice president of Partner Strategy and Management, Milwaukee Bucks, former Marquette Women’s Basketball player
- **James Wright**, special education teacher and head coach for girls basketball, Shorewood High School, former college basketball player
- **Lindsey Mirkes**, H Sci ’21, Grad ’22, MS, research technician, Life After Sport Trajectories Lab, Marquette University, former Marquette University track and field student-athlete who holds the school record for the high jump
- **Taylor Wolf**, BS, SPT, Doctor of Physical Therapy Student, Department of Physical Therapy; student research technician, Life After Sport Trajectories Lab, Marquette University, former Marquette University volleyball student-athlete and 2021 Big East Co-Player of the Year
- **Carolyn Smith**, MD, associate clinical professor, College of Health Sciences and team physician, Intercollegiate Athletics, Marquette University
Jacob J. Capin, PT, DPT, PhD, MS
Assistant Professor
Director, Life After Sport Trajectories Lab

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