

JENNIFER A. ZELLERS, PT, DPT, PhD

Postdoctoral Research Scholar
Washington University in St. Louis
Program in Physical Therapy
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EDUCATION

- 2014-2018 University of Delaware, Newark, DE
Doctor of Philosophy (May 26, 2018)
Dissertation – Early to late outcomes following Achilles tendon
rupture: contributors to clinical success
Program in Biomechanics and Movement Science
- 2007-2010 Columbia University, New York, NY
Doctor of Physical Therapy (May 18, 2010)
- 2003-2007 Arcadia University, Glenside, PA
Bachelor of Arts, Biology (May 8, 2007)

PROFESSIONAL EXPERIENCE

- 2018-present Postdoctoral Research Associate, Washington University in St. Louis, St.
Louis, MO
- 2018 Limited Term Researcher/Postdoctoral Researcher, University of
Delaware, Newark, DE
- 2010-2014 Thomas Jefferson University Hospital, Philadelphia, PA
Advanced Clinician I
- Rotations in outpatient, acute rehabilitation, and acute care settings
 - Assisted with opening of therapy services at Jefferson Comprehensive
Concussion Center
 - Conducted staff competencies for left ventricular assist device use
 - Mentored student physical therapists via lecture and supervision of
affiliating students
 - Educated the larger Jefferson Hospital community via community
outreach presentations
 - Co-chair of the Employee Satisfaction Committee

LICENSURE

- Physical Therapist; Delaware, Pennsylvania and New Jersey

PROFESSIONAL MEMBERSHIPS

2007-present American Physical Therapy Association, Orthopedic/Research
Sections member
2013-2015 International Association for Dance Science and Medicine member

AWARDS AND HONORS:

- Biomechanics Special Interest Group Travel Award, American Physical Therapy Association 2018
- Women of Promise Award, University of Delaware 2017
- Professional Development Award, University of Delaware Office of Graduate and Professional Education 2016
- Award for Outstanding Achievement in Orthopedics, Columbia University 2010
- Rudin Foundation Scholarship, Columbia University 2009
- Merit Scholarship, Columbia University 2007-2009
- Student Address, Honors Convocation, Arcadia University 2007
- Paul R. Cutright Award for Achievement in Biology, Arcadia University 2007
- Dean's Distinguished Honor List, Arcadia University 2004-2007

PUBLICATIONS, PEER REVIEWED

Zellers JA, Cortes DH, Pohlig RT, Silbernagel KG. Tendon morphology and mechanical properties assessed by ultrasound show change early in recovery and potential prognostic ability for 6 month outcomes. *Knee Surgery, Sports Traumatology, Arthroscopy*, 2018, doi: 10.1007/s00167-018-5277-8.

Zellers JA, Corrigan P, Pontiggia L, Cortes DH, Silbernagel KG. Side-to-side differences in Achilles tendon geometry and mechanical properties following Achilles tendon rupture. *Muscles, Ligaments, and Tendons J*, 2018, 7(3):541-547.

Zellers JA, Carmont MR, Silbernagel KG. Achilles tendon resting angle relates to tendon length and function. *Foot & Ankle International*, 2017.

Carmont MR, **Zellers JA**, Brorsson A, Olsson N, Nilsson-Helander K, Karlsson J, Silbernagel KG. The functional outcomes of Achilles tendon minimally invasive repair using 4 and 6 strand non-absorbable suture: A cohort comparison study. *Orthop J Sports Med*, 2017, 5(8).

Zellers JA, van Ostrand K, Silbernagel KG. Calf endurance and Achilles tendon structure in classical ballet dancers. *J Dance Med and Sci*, 2017, 21(2):64-69.

Zellers JA, Cortes DH, Silbernagel KG. From acute Achilles tendon rupture to return to play – a case report evaluating recovery of tendon structure, mechanical properties, clinical and functional outcomes. *Int J Sports Phys Ther*, 2016, 11(7):1150-59.

Zellers JA, Carmont MR, Silbernagel KG. Return to play post-Achilles tendon rupture: A systematic review and meta-analysis of rate and measures of return to play. *Br J Sports Med*, 2016, 50:1325-32.

Pearce CJ, Tourne Y, **Zellers J**, Terrier R, Toschi P, Silbernagel KG. Rehabilitation after anatomical ankle ligament repair or reconstruction. *Knee Surgery, Sports Traumatology, Arthroscopy*, 2016, 24(4):1130-9.

Chiarello C, **Zellers J**, Sage-King F. Predictors of Inter-recti Distance in Cadavers. *Journal of Women's Health Physical Therapy*, Sep/Dec 2012, 36(3): 125-30.

PUBLICATIONS, NON-PEER REVIEWED

Connolly D, Martin L, Brake T, Baxter-Jones K, Quinn B, Priest N, **Zellers J**. Development and Analysis of Mouse Models of Human Epithelial Ovarian Cancer. *Fox Chase Cancer Center Scientific Report* 2006, 2006: 163-166.

BOOK CHAPTERS

Zellers JA and Grävare Silbernagel K. Foot and Ankle Injury. In *Idrottsskador från prevention till säker återgång i idrott*. Anette Heijneoch, Eva Rasmusen Barr, eds. Studentlitteratur, In press. [Printed in Swedish]

LECTURES

Silbernagel, KG, **Zellers JA**, Carmont MR. Return to play following Achilles tendon rupture. ESSKA Congress, Glasgow, Scotland, May 2018.

Silbernagel KG, **Zellers JA**, Chimenti R, Lundberg M. Achilles tendinopathy: Beyond eccentrics. American Physical Therapy Association, Combined Sections Meeting, San Antonio, TX, February 2017. Education session.

Morina A, **Zellers JA**. Vestibular rehabilitation. ENT ORL, Philadelphia, PA, January 2013. Invited speaker.

CONFERENCE PRESENTATIONS, PEER-REVIEWED

Zellers JA, Marmon AR, Silbernagel KG. Lateral gastrocnemius and soleus compensation, and medial gastrocnemius atrophy after Achilles tendon rupture. American Physical Therapy Association Combined Sections Meeting 2018. Platform Presentation.

Zellers JA, Ebrahimi A, Silbernagel KG. Contributions from lower extremity joints to absolute work in individuals after Achilles tendon rupture: Applying the CLEW approach. American Physical Therapy Association Combined Sections Meeting 2018. Platform Presentation.

Tucker LA, **Zellers JA**, Silbernagel KG. Effect of wedge height on triceps surae activity with walking in an orthopaedic boot. Biomedical Engineering Society Annual Meeting 2018. Poster Presentation.

Silbernagel KG, **Zellers JA**, Bley BC, Pohlig RT. Frequency of pathology on diagnostic ultrasound in individuals with insertional Achilles tendinopathy. 5th International Scientific Tendinopathy Symposium 2018. Poster Pitch and Poster Presentation.

Zellers JA, Ebrahimi A, Silbernagel KG. Hopping performance in individuals with Achilles tendon rupture. American Society of Biomechanics Annual Conference 2018. Poster Presentation, Ebrahimi presenting author.

Parker S, **Zellers JA**, Silbernagel KG. Electromyography normalization strategies in individuals with Achilles tendon rupture. World Congress of Biomechanics 2018. Poster Presentation. Winner of The American Society of Mechanical Engineers Bioengineering Division BS-Level Student Paper Competition award.

Zellers JA, Silbernagel KG. Achilles tendon cross sectional area and heel rise performance in individuals following surgical repair. Orthopaedic Research Society, Annual Meeting 2018. Poster Presentation.

Zellers JA, Alghamdi N, Silbernagel KG. Frequency of insertional pathology on ultrasound imaging and functional deficits in individuals with insertional Achilles tendinopathy. American Physical Therapy Association Combined Sections Meeting 2018. Platform Presentation.

Zellers JA, Thoma L, Silbernagel KG. Physical Activity, Gait, and Self-Reported Function Twelve Weeks Following Achilles Tendon Rupture. American Physical Therapy Association Combined Sections Meeting 2018. Platform Presentation.

Corrigan P, **Zellers JA**, Silbernagel KG. Triceps surae activation during walking and running post Achilles tendon rupture. American Physical Therapy Association Combined Sections Meeting 2018. Poster Presentation.

Lopez R, **Zellers JA**, Parker S, Silbernagel KG. Relationship of muscle activation amplitude with elongation and mechanical properties of the Achilles tendon. Biomedical Engineering Society, Annual Meeting 2017. Poster presentation.

Hall ML, Greenspan B, **Zellers J**. 3D printed CAM boot: New media for expressive orthoses. Fashion and Media Symposium 2017.

Zellers JA, Gotha H, Silbernagel KG. Use of ankle resting angle as a surrogate for tendon elongation in individuals following Achilles tendon rupture. American Orthopaedic Foot & Ankle Society, Annual Meeting 2017. ePoster presentation.

Zellers JA, Balascio P, Corrigan P, Cortes DH, Silbernagel KG. Relationship between Young's modulus, shear modulus, and viscosity in healthy Achilles tendon. American Society of Biomechanics, Annual Meeting 2017. Poster presentation.

Corrigan P, Cortes DH, **Zellers JA**, Sprague A, Silbernagel KG. Effects of photobiomodulation therapy on Achilles tendon structure. American Society of Biomechanics, Annual Meeting 2017. Poster presentation.

Balascio P, **Zellers JA**, Cortes DH, Silbernagel KG. Healthy Achilles tendon properties in vivo: Shear modulus, viscosity, and Young's modulus. BMES Mid-Atlantic Research Day 2017. Platform presentation. Honorable mention recipient.

Zellers JA, Pontiggia LP, Cortes DH, Silbernagel KG. Achilles tendon viscoelastic properties relate to clinical outcomes following rupture. Orthopaedic Research Society, Annual Meeting 2017. Poster presentation.

Zellers JA, Pontiggia L, Cortes DH, Silbernagel KG. Clinical measures relate to tendon mechanical properties following Achilles tendon rupture. American Physical Therapy Association Combined Sections Meeting 2017. Poster presentation.

Dreger M, **Zellers JA**, Giordano A, Silbernagel KG. The use of a modified tendon loading program in a patient with complex unilateral Achilles tendon repair. American Physical Therapy Association Combined Sections Meeting 2017. Poster presentation.

Tice T, Dargis S, **Zellers JA**, Silbernagel KG. Changes in gait pattern and triceps surae activity in immobilization boots. Eastern Athletic Trainers Association Meeting and Clinical Symposium 2017. Poster presentation.

Zellers, JA, Van Ostrand KM, Silbernagel KG. Lower limb performance on a standardized functional test battery in classical ballet dancers. Blue Hen Tribute to Dr. John P. Scholz 2016. Poster presentation.

Cox C, **Zellers JA**, Cortes DH, and Silbernagel KG. Viscoelastic properties of human patellar tendons measured using continuous shear wave elastography. Summer Biomechanics, Bioengineering and Biotransport Conference 2016. Poster presentation. Finalist for BS-level student poster competition.

Corrigan P, Sprague A, **Zellers JA**, Cortes DH, Silbernagel KG. Mechanical properties and clinical outcomes in Achilles tendinopathy. American Society of Biomechanics, Annual Meeting 2016. Poster presentation.

Zellers JA, Cortes DH, and Silbernagel KG. Changes in Achilles tendon viscoelastic properties in individuals with insertional tendinopathy. European Society of Sports Traumatology, Knee Surgery & Arthroscopy 2016. ePoster presentation.

Zellers JA, Carmont MR, and Silbernagel KG. Return to play metrics in Achilles tendon rupture: A systematic review. European Society of Sports Traumatology, Knee Surgery & Arthroscopy 2016. ePoster presentation.

Sprague AL, Corrigan DP, **Zellers JA**, Cortes DH, Silbernagel KG. Two-month changes in mechanical properties and clinical outcomes of Achilles tendinopathy. University of Delaware Center for Biomechanical Engineering Research Symposium 2016. Poster presentation.

Zellers JA, Fish J, Cortes DH, and Silbernagel KG. Recovery of Viscoelastic Properties of Achilles Tendon Following Rupture. International Symposium on Ligaments & Tendons XV 2016. Poster presentation.

Zellers JA, Corrigan P, Cortes DH, and Silbernagel KG. Changes in viscoelastic properties along the length of the Achilles tendon. Orthopaedic Research Society, Annual Meeting 2016. Poster presentation.

Zellers JA, Cortes DH, and Silbernagel KG. Relationship between calf endurance and Achilles tendon viscoelastic properties in the heel rise test. American Physical Therapy Association Combined Sections Meeting 2016. Poster presentation.

Cortes DH, Suydam SM, **Zellers JA**, Silbernagel KG, Buchanan TS, and Elliott DM. Continuous Shear Wave Elastography: A Method to Measure in-vivo Viscoelastic Properties of Tendons. International Mechanical Engineering Congress and Exposition 2015. Platform presentation.

Zellers JA, Van Ostrand KM, and Silbernagel KG. Achilles tendon structure and function in classical ballet dancers. International Association of Dance Medicine & Science, Annual Meeting 2015. Platform presentation.

Zellers JA, Cortes DH, and Silbernagel KG. Biomechanical, clinical, and functional changes with Achilles tendon pathology. American Society of Biomechanics, Annual Meeting 2015. Platform presentation.

Zellers JA, Cortes DH, and Silbernagel KG. Viscoelastic properties of healing Achilles tendon: A case series. CBER Research Symposium 2015. Poster presentation.

Cortes DH, Suydam SM, **Zellers JA**, Silbernagel KG, Buchanan TS, and Elliott DM. Evaluation of tendon injuries using shear wave elastography: Preliminary results in human Achilles and semitendinosus tendons. Summer Biomechanics, Bioengineering, and Biotransport Conference 2015. Platform presentation.

Hewston L, Wolfram B, **Zellers J**, Bradley B, Callan A. A Partnership Model for Student Clinical Visits During an Entry-level DPT Cardiovascular and Pulmonary

Class. APTA Education Leadership Conference 2012, Greenwich, CT, October 2012.
Platform presentation.

Chiarello C, Sage-King F, **Zellers J**. Predictors of Inter-recti Distance in Cadavers.
APTA Combined Sections Meeting 2011, New Orleans, LA, February 2011. Platform
presentation.

TEACHING EXPERIENCE

University of Delaware, Newark, DE

- Teaching Assistant:
 - PHYT608 Musculoskeletal Evaluation & Treatment, Course Instructors: Lynn Snyder-Mackler, Karin Grävare Silbernagel
 - PHYT624 Basic Evaluation Techniques, Course Instructor: Karin Grävare Silbernagel
 - PHYT634 Electrotherapy, Course Instructors: Stuart Binder-Macleod, Samuel Lee, Scott Stackhouse
- Mentor to undergraduate research scholars: Courtney Cox, Samantha Dargis, Tyler Tice, Phoebe Balascio, Rene Lopez, Sheridan Parker, Luke Tucker
- Laboratory Proctor: PHYT808 Spine Management, Course Instructor: J. Megan Sions

Drexel University, Philadelphia, PA

- Laboratory Assistant: Functional Mobility

Columbia University, New York, NY

- Teaching Assistant: Gross Anatomy and Kinesiology/Biomechanics

FUNDING

Foundation for Physical Therapy, Foundation Research Grant

- Silbernagel (PI), 01/01/2016-12/31/2017
- Evaluation of recovery following an Achilles tendon rupture. The purpose of this study is to evaluate if the degree of physical activity during the initial 8 weeks after an Achilles tendon rupture is related to the short-term and long-term outcome after an Achilles tendon rupture.
- Role: PhD Student

NIH NIAMS R21 AR067390-01

- Silbernagel and Cortes (PI), 02/13/2015-01/31/17
- Continuous shear wave elastography as a diagnostic marker for tendinopathy.
- The goals of the study are to quantify the effect of mid-portion tendinopathy on the viscoelastic properties of the Achilles tendon at the moment of diagnosis and during treatment, and to explore possible relationships between viscoelastic properties and clinical or functional outcomes.
- Role: PhD Student

University of Delaware Research Foundation (UDRF)

- Silbernagel (PI), 06/01/2015-05/31/2017

- Evaluation of change in viscoelastic tendon properties following and Achilles tendon rupture. The goal of this project is to quantify the changes in tendon viscoelastic properties during the early stages of healing after a complete Achilles tendon rupture and evaluate how these properties relates to the recovery of function.
- Role: PhD Student

Orthopaedic Section, APTA, Performing Arts Special Interest Group

- Silbernagel (PI), unfunded
- Achilles tendon structure and calf function in ballet dancers. The goal of this mechanistic study is to measure calf muscle performance and Achilles tendon structure in healthy classical ballet dancers compared to non-dancers, in order to inform future dance-specific orthopaedic rehabilitation guidelines.
- Role: Co-Investigator

SERVICE

- Reviewer: British Journal of Sports Medicine; Arthritis Care & Research; Journal of Orthopaedic and Sports Physical Therapy; Knee Surgery, Sports Traumatology, Arthroscopy; Muscle, Ligaments, and Tendons Journal; Journal of Dance Medicine & Science
- Career Mentor, Arcadia University (2013-2015)