

## About the presenter

Christopher M. Powers



Christopher M. Powers is an Associate Professor in the Division of Biokinesiology & Physical Therapy, and Co-Director of the MBRL at USC. He also has joint appointments in the Departments of Radiology and Orthopaedic Surgery within the Keck School of Medicine. His primary teaching responsibilities include the areas of biomechanics and the mechanics of human gait. He received a Bachelors degree in Physical Education from the University of California, Santa Barbara in 1984, his Masters degree in Physical Therapy from Columbia University in 1987, and a Ph.D. in Biokinesiology in 1996 from USC. Dr. Powers did his post-doctoral training at the Orthopaedic Biomechanics Laboratory, University of California, Irvine.

Dr. Powers studies the biomechanical aspects of human movement. More specifically, his research and publications are concerned with the kinematic, kinetic and muscular actions associated with human movement, the pathomechanics of orthopedic disabilities and issues related to rehabilitation of the musculoskeletal system. He has published over 90 peer-reviewed articles and has received several research awards from the American Physical Therapy Association, including the Rose Excellence in Research Award from the Orthopaedic Section, the Eugene Michels New Investigator Award, the Dorothy Briggs Scientific Inquiry Award and the Helen J Hislop Award for contributions to the professional literature.

Dr. Powers is a Fellow of the American College of Sports Medicine and a member of the American Physical Therapy Association (Orthopaedic and Research sections), American Society for Biomechanics, American Society for Testing and Measures, and the North American Society for Gait and Clinical Movement Analysis. In addition, Dr. Powers is on several editorial boards including the *Journal of Applied Biomechanics*, *Journal of Orthopaedic and Sports Physical Therapy*, and the *Journal of Athletic Training*. He is an active member of the American Physical Therapy Association, serving as President of the Section on Research.

### Education

- Postdoctoral Fellow, Orthopaedic Biomechanics (1996-1997), University of California, Irvine, CA
- Ph.D. Biokinesiology (1996). University of Southern California, Los Angeles, CA
- M.S. Physical Therapy (1987). Columbia University, New York, NY
- B.A. Physical Education (1984). University of California, Santa Barbara, Santa Barbara, CA

## Selected Publications

- Stefanik JJ, Zhu Y, Zumwalt AC, Gross KD, Clancy M, Lynch JA, Frey LA, Lewis CE, Roemer FW, **Powers CM**, Guermazi A, Felson DT. The association between patella alta and the prevalence and worsening of structural features of patellofemoral joint osteoarthritis: The Multicenter Osteoarthritis Study. *Arthritis Care & Res* (In press).
- Farrokhi S, Colletti PM, **Powers CM**. Differences in patella cartilage thickness, T2 relaxation time and cartilage deformational behavior: A comparison of young females with and without patellofemoral pain. *Am J Sports Med* (In press).
- Chen YJ, Scher I, **Powers CM**. Quantification of patellofemoral joint reaction forces during functional tasks: A subject specific, three dimensional model. *J Appl Biomech* (In press).
- Kulig K, Harper-Hanigan K, Souza RB, **Powers CM**. Measurement of femoral torsion by ultrasound and magnetic resonance imaging: Concurrent validity. *Phys Ther* (In pre).
- Souza RB, Draper CE, Fredericson M, **Powers CM**. Femur rotation and patellofemoral joint kinematics: A weight-bearing MRI analysis. *J Orthop Sports Phys Ther.* 40:277-285, 2010.
- **Powers CM**, Chen YJ, Scher I, Lee TQ. Multi-plane loading of the extensor mechanism alters the patellar ligament force/quadriceps force ratio. *J Biomed Eng.* 132:024503, 2010.
- Fithian DC, **Powers CM**, Khan N. Rehabilitation of the knee following medial patellofemoral ligament reconstruction. *Clin Sports Med.* 29:283-290, 2010.
- **Powers CM**, Blanchette MG, Brault JR, Flynn J, Siegmund GP. Validation of walkway tribometers: Establishing a reference standard. Submitted to: *J Forensic Sci.* 55:366-370, 2010.
- **Powers CM**. The influence of abnormal hip mechanics on knee injury: A biomechanical perspective. *J Orthop Sports Phys Ther.* 40:42-51, 2010.
- Wagner T, Behnia N, Ancheta WL, Shen R, Farrokhi S, **Powers CM**. Strengthening and neuromuscular re-education of the gluteus maximus in a triathlete with exercise-association cramping of the hamstrings: A case report. *J Orthop Sports Phys Ther.* 40:112-119, 2010.
- Tonley JC, Dye JA, Kochevar RJ, Yun SM, Farrokhi S, **Powers CM**. Treatment of an individual with piriformis syndrome focusing on hip muscle strengthening and movement re-education: A case report. *J Orthop Sports Phys Ther.* 40:103-111, 2010.
- Pollard CD, Sigward SM, **Powers CM**. Limited hip and knee flexion during landing is associated with increased frontal plane knee motion and moments. *Clin Biomech.* 25:142-146, 2010.
- Tsai LC, Sigward SM, Pollard CD, Fletcher MJ, **Powers CM**. The effects of fatigue and recovery on knee kinetics and kinematics during side-step cutting. *Med Sci Sport Exerc.* 41:1952-1957, 2009.
- Kulig K, Beneck GJ, Selkowitz DM, Popovich JM Jr., Ge TT, Flanagan SP, Poppert EM, Yamada K, **Powers CM**, Azen S, Winstein CJ, Gordon J, Samudrala S, Chen TC, Shamie N, Khoo L, Spoonamore MJ, Wang JC and Physical Therapy Clinical

Research Network (PTClinResNet), The effect of an intensive, progressive exercise program on functional performance in patients post single-level lumbar microdiscectomy. *Physical Therapy*. 89:1145-1157, 2009.

- Tsai YJ, Powers CM. The influence of footwear sole hardness on utilized coefficient of friction during walking. *Gait & Posture*. 30:303-306, 2009.
- Souza RB, Powers CM. Concurrent criterion-related validity and reliability of a clinical test to measure femoral anteversion. *J Orthop Sports Phys Ther*. 39:586-592, 2009.
- Souza RB, Powers CM. Predictors of hip rotation during running: An evaluation of hip strength and femoral structure in women with and without patellofemoral pain. *Am J Sports Med*. 37:579-587, 2009.
- Souza RB, Powers CM. Differences in hip kinematics, muscle strength and muscle activation between subjects with and without patellofemoral pain. *J Orthop Sports Phys Ther*. 39:12-19, 2009.
- Sigward SM, Ota S, Powers CM. Predictors of frontal plane knee excursion during a drop landing in young female athletes. *J Orthop Sports Phys Ther*. 38:661-667, 2008.
- Brennglass A, Souza RB, Meyer J, Powers CM. Identification of abnormal hip motion associated with acetabular labral pathology: A resident's case report. *J Orthop Sports Phys Ther*. 38:558-565, 2008.
- Farrokhi S, Pollard CD, Souza R, Chen YJ, Reischl S, Powers CM. Trunk position influences lower extremity demands during the forward lunge exercise. *J Orthop Sports Phys Ther*. 38:403-409, 2008.
- Tsai YJ, Powers CM. The influence of footwear sole hardness on slip initiation in young adults. *J Forensic Sci*. 53:884-888, 2008.
- Powers CM, Doubleday KL, Escudero C. The influence of patellofemoral bracing on pain, knee extensor torque and gait function in females with patellofemoral pain. *Physiother Theory Pract*. 24:1-9, 2008.
- Powers CM, Beneck GJ, Kulig K, Landel RF, Fredericson M. The effects of a single session of posterior to anterior spinal mobilization and press-ups on pain response and lumbar spine extension in persons with nonspecific low back pain. *Phys Ther*. 88:485-492, 2008.
- Burke WS, Vangsness CT, Powers CM. Quantification of glenohumeral rhythm in persons with and without impingement. *Am J Orthop*. 37:24-30, 2008.
- Landel RF, Kulig KK, Powers CM. Intertester reliability and validity of motion assessments during lumbar spine accessory motion testing. *Phys Ther*. 88:43-49, 2008.
- Burnfield JM, Powers CM. The role of center of mass kinematics in predicting utilized coefficient of friction during walking. *J Forensic Sci* 52:1328-1333, 2007
- Ward SR, Terk MR, Powers CM. Patella alta: Association with patellofemoral alignment and changes in contact area during weight bearing. *J Bone & Joint Surg Am*. 89:1749-1755, 2007.
- Sigward S, Powers CM. Loading characteristics of female athletes who demonstrate excessive valgus moments at the knee during side-step cutting. *Clin Biomech*. 22:827-833, 2007.
- Feller JA, Amis AA, Andrish JT, Arendt EA, Erasmus PJ, Powers CM. Surgical biomechanics of the patellofemoral joint. *Arthroscopy*. 23:542-553, 2007.

- Pollard CD, Sigward S, **Powers CM**. Gender differences in hip joint kinematics and kinetics during a side-step cutting maneuver. *Clin J Sports Med.* 17:38-42, 2007.
- **Powers CM**, Stefanou MA, Tsai YJ, Brault JR, Siegmund GP. Assessment of walkway tribometer readings in evaluating slip resistance: A gait based approach. *J Forensic Sci.* 52:400-405, 2007.
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- Sigward SM, **Powers CM**. The influence of experience on knee joint kinematics, kinetics and muscle activation patterns during side-step cutting in young females. *Clin Biomech.* 21:740-747, 2006.
- Ganley KJ, **Powers CM**. Intersegmental dynamics during the swing phase of gait: A comparison of knee kinetics between 7 year old children and adults. *Gait Posture.* 23:499-504, 2006.
- Sigward S, **Powers CM**. The influence of gender on knee joint kinematics, kinetics and muscle activation patterns during side-step cutting. *Clin Biomech.* 21:41-48, 2006