

University of Texas of the Permian Basin
Biomechanics Laboratory
Department of Kinesiology

Areas of Research

1. Lower extremity injury, treatment and rehabilitation
2. Mechanical and neuromuscular plasticity associated with advancing age
3. Kinematic and kinetic adaptations to advancing weight in obesity and pregnancy

Equipment & Software

6-Camera Vicon MX-13 Motion Capture System
12-lead BTS pre-amplified EMG system with foot switches
6-Camera Vicon*Peak* Motus Motion Capture System
JVC digital high speed camera
2 AMTI OR-6 Force Plates
Treadmill (Full Vision, Inc.)
Cycle Ergometer (SciFit, Inc.)
Biodex Isokinetic Dynamometer
BTS Myolab & Myolab Clinic Software
Microsoft Visual Basic 6.0
Visual 3D (C-Motion, Inc.)
Visual3D Graphic Interface (MotionSoft Systems, Inc.)

Current Members

Douglas Powell
Matthew Bice
Elizabeth Chalambaga
Doug Renshaw
Crystal Ruano

Collaborators

James Eldridge (UTPB)
Camille Cassidy (UTPB)
Benjamin Long (Winston Salem State University)
Carolyn Albright (Towson University, Dept. of Kinesiology)
Blaise Williams (East Carolina University, Motion Analysis Lab)
Tibor Hortobagyi (East Carolina University, Biomechanics Lab)
Paul DeVita (East Carolina University, Biomechanics Lab)
Songning Zhang (University of Tennessee, Biomechanics Lab)
Clare Milner (University of Tennessee, Biomechanics Lab)
Ken Utzinger (Sagebrush Physical Therapy)
Nicolas Stergiou (University of Nebraska, Biomechanics Lab)

Publications

1. Zhang, S., K.G. Clowers, and Powell, D. *Ground reaction force and 3D biomechanical characteristics of walking in short-leg walkers*. Gait Posture, 2006.
2. Keefer, M., King, J., Powell, D., Krusenklous, J., Zhang, S. *Effects of Modified Short-Leg Walkers on Ground Reaction Force Characteristics*. Clinical Biomechanics, 2008.
3. Powell, D., DeVita, P., Hortobagyi, T. *Inertial Loading during Gait Evokes Neuromuscular Plasticity in Old Adults*. Perceptual & Motor Skills, 2009.
4. Chalambaga, E., **Powell, D.**, Bice, M., Albright, C., Eldridge, J., Cassidy, C., Long, B. *Lower extremity coordination and variability in high- and low-arched athletes during a running task*. International Journal of Exercise Science, 2009.
5. Ruano, C., Powell, D., Renshaw, D., Chalambaga, E., Albright, C., Cassidy, C., Eldridge, J. *The effects of two insoles on shock attenuation in running*. International Journal of Exercise Science, 2009.
6. Powell, D., Chalambaga, E., Long, B., Renshaw, D., Eldridge, J., Cassidy, C. and Albright, C. *Lower extremity joint moments in high- and low-arched female athletes during a landing task*. International Journal of Exercise Science, 2009.
7. Powell, D., Zhang, S., Milner, C., Long, B. *The effects of vertical loading on arch characteristics*. Journal of Applied Biomechanics, submitted.
8. Powell, D., Zhang, S., Milner, C., Long, B. *Multi-segment foot kinematics in high- and low-arched females during dynamic loading tasks*. Clinical Biomechanics, submitted.

Publications In Preparation

1. Renshaw, D., Powell, D., Chalambaga, E., Eldridge, J., Cassidy, C. and Albright, C. *Computer-based methods in determining onset and duration of muscle activity and implications on integrated EMG values*. International Journal of Exercise Science.
2. Powell, D., Zhang, S., Milner, C. *A comparison of two methods of implementing the Leardini multi-segment foot model*. Technical Note: Journal of Biomechanics.
3. Powell, D., Clowers, K., Zhang, S., Keefer, M. *Increased intensity and duration of muscle activity associated with short-leg walking boots*. Journal of Electromyography & Kinesiology
4. Powell, D., Zhang, S., Milner, C., King, J., Keefer, M. *Effects of short-leg walking boots on contralateral kinematics and kinetics*. Gait & Posture.

Abstracts

1. Ruano, C., Powell, D., Renshaw, D. *Effect of Memory Foam Insoles on Loading Rate in Running*. Texas Chapter of the American College of Sports Medicine. Tyler, Texas, Feb. 27-28, 2009.
2. Chalambaga, E., Powell, D., Zhang, S., Long, B. *Lower Extremity Kinetics in High- and Low-Arched Athletes during Landing*. Texas Chapter of the American College of Sports Medicine. Tyler, Texas, Feb. 27-28, 2009.

3. Powell D., Zhang S., Milner C., Bice M., and Long B. Coordination in Running within High- and Low-Arched Feet. 1st Meeting of the International Foot and Ankle Biomechanics Congress. Bologna, Italy, Sept. 4-6, 2008.
4. Powell D., Zhang S., Milner C., Long B. and Bice M. Differences in Lower Extremity Coordination in High- Compared Low-Arched Female Athletes during Running. 32nd Meeting of the American Society of Biomechanics. Ann Arbor, MI, Aug. 5-9th, 2008.
5. Zhang S., Powell D. and Keefer M. Effects of Heel Height Modifications of Basketball Shoes on Joint Kinetics in Jumping. 53rd Meeting of the American College of Sports Medicine. Indianapolis, IN, May 28-31st, 2008.
6. Powell D., Long B., Keefer M., Milner C., Zhang S. A Comparison of Measurement Techniques Used to Determine Foot Type & Arch Characteristics. 1st Annual Meeting of the South Central Region of the American Society of Biomechanics, Odessa, TX, Feb. 29-Mar 1, 2008.
7. Zant A., Powell D. The Effect of Advancing Age on Arch Characteristics. 1st Annual Meeting of the South Central Region of the American Society of Biomechanics, Odessa, TX, Feb. 29-Mar 1, 2008.
8. Chalambaga E., Powell D. Old Compared to Young Adults Exhibit Altered Coactivity Patterns when Walking with an Inertial Loading Perturbation. 1st Annual Meeting of the South Central Region of the American Society of Biomechanics, Odessa, TX, Feb. 29-Mar 1, 2008.
9. Berdoza I., Long B., Powell D. The Effect of Vertical Loading on Arch Dynamics. 1st Annual Meeting of the South Central Region of the American Society of Biomechanics, Odessa, TX, Feb. 29-Mar 1, 2008.
10. Bice M., Zant A., Long B., Powell D. Inter-segmental Coordination and Variability within High- and Low-Arched Feet during Running. 1st Annual Meeting of the South Central Region of the American Society of Biomechanics, Odessa, TX, Feb. 29-Mar 1, 2008.
11. Powell D., Zhang, S., Milner, C., Long, B. Multi-Segment Foot Kinematics in High- and Low-Arched Female Recreational Athletes during Walking and Running. 31st Annual Meeting of the American Society of Biomechanics, Stanford, CA, Aug 22-25, 2007.
12. Zhang S., Clowers K., Powell D. Loading Characteristics of Cutting, Jumping and Landing Movements in Basketball. XXI Congress of the International Society of Biomechanics, Taipei, Taiwan, July 1-5, 2007.