UNIVERSITY of WISCONSIN LA CROSSE

La Crosse Institute For Movement Science (LIMS) Thomas Kernozek, PhD, FACSM, Director

The Institute was created in 2005 at the University of Wisconsin-La Crosse Health Professions Department in the Health Science Center. It brings together scientists and clinicians from various disciplines seeking new knowledge related to human movement, factors related to injury, and in the foundations of therapeutic exercise used in the treatment and rehabilitation of injury.

Each year over 40 students from graduate and undergraduate programs from the UW-L campus are involved in laboratory research including Physical Therapy, Exercise and Sport Science, Physics, and Biology. High technology funding from the State of Wisconsin supports 8 Physics Biomedical student internships in the laboratory.

Due to the many publications from the clinical biomechanics laboratory has developed a national reputation from published and presented work.



LIMS funded by the NIH to study vibratory effects on blood flow and muscle activation

Tom Kernozek, in collaboration with Bertram Ezenwa (UW-Stout) and Qiangwei Fu (Gundersen Lutheran), will study a new medical device that is applied to a limb to increase blood flow by increasing muscle activation. This device can potentially be used for medical conditions where blood pooling is thought to be a medical issue. The device was developed by BEzenwa Biomedical Engineering LLC.



Current Projects

- · Postural control of Older Adults
- Changes in knee mechanics during movement after anterior cruciate ligament reconstruction
- Effects of multifrequency vibration on blood flow and muscle activation.

Research Spotlight-

Runners who rearfoot strike may have less Achilles tendon loading than forefoot/midfoot strike runners each time that they contact the ground (see

Figures Right). These data show that it may be wise to make a slow transition if changing foot strike pattern during distance running. It will likely take time for the tendon to remodel to these new stresses (Almonroeder T, Willson JD, Kernozek TW. Ann Biomed Eng. 2013 Aug;41(8):1758-66)





LIMS Scientists

Chris Durall, DPT, ATC, MSPT (UW-La Crosse Health Center)

John Greany, PT, PhD, Exercise Physiologist, (Health Professions)

Thomas Greiner, PhD, Biological Anthropologist, (Health Professions)

Di-An Hong, PhD, Biomechanist, (Laboratory Manager, Health Professions)

Tom Kernozek, PhD, FACSM, Biomechanist, (Health Professions)

Patrick Grabowski, PT, PhD. OCS, CSCS, /Motor Control/Biomechanics, (Health Professions)

Robert Ragan, PhD, Computational Physicist (Physics)



LIMS

Page 2

Recently Published or In Press Research

Kinetic comparison of the power development between power clean variations. Suchomel TJ, Wright GA, Kernozek TW, Kline DE. J Strength Cond Res. 2013 May 17. [Epub ahead of print]

The effect of foot strike pattern on achilles tendon load during running. Almonroeder T, Willson JD, Kernozek TW. Ann Biomed Eng. 2013 Aug;41(8):1758-66.

Plantar loading asymmetry in american indians with diabetes and peripheral neuropathy, with diabetes only, and without diabetes. Kernozek TW, Greany JF, Heizler C. J Am Podiatr Med Assoc. 2013 Mar-Apr;103(2):106-12.

Effects of a movement training program on hip and knee joint frontal plane running mechanics. Wouters I, Almonroeder T, Dejarlais B, Laack A, Willson JD, Kernozek TW.Int J Sports Phys Ther. 2012 Dec;7 (6):637-46.

Muscle activation of vastus medialis obliquus and vastus lateralis during a dynamic leg press exercise with and without isometric hip adduction. Peng HT, Kernozek TW, Song CY. Phys Ther Sport. 2013 Feb;14(1):44 -9.

Male and female gluteal muscle activity and lower extremity kinematics during running. Willson JD, Petrowitz I, Butler RJ, Kernozek TW. Clin Biomech (Bristol, Avon). 2012 Dec;27(10):1052-7.

Effects of medially wedged foot orthoses on knee and hip joint running mechanics in females with and without patellofemoral pain syndrome. Boldt AR, Willson JD, Barrios JA, Kernozek TW. J Appl Biomech. 2013 Feb;29(1):68-77.

Peak muscle activation, joint kinematics, and kinetics during elliptical and stepping movement pattern on a Precor Adaptive Motion Trainer. Rogatzki MJ, Kernozek TW, Willson JD, Greany JF, Hong DA, Porcari JR. Res Q Exerc Sport. 2012 Jun;83(2):152-9.

Variation of Anatomical and Physiological Parameters that Affect Estimates of ACL Loading During Drop Landing. Kernozek TW, Ragan RJ, Willson JD, Koehler CS, Lopez TR. Open Orthop J. 2012;6:245-9.

A comparison of two isometric tests of trunk flexor endurance. Durall CJ, Greene PF, Kernozek TW. J Strength Cond Res. 2012 Jul;26 (7):1939-44.

Intersession reliability and concurrent validity of isometric endurance tests for the lateral trunk muscles. Greene PF, Durall CJ, Kernozek TW. J Sport Rehabil. 2012 May;21(2):161-6.

Comparison of estimated anterior cruciate ligament tension during a typical and flexed knee and hip drop landing using sagittal plane knee modeling. Southard J, Kernozek TW, Ragan R, Willson J. Int J Sports Med. 2012 May;33(5):381-5. doi: 10.1055/s-0031-1299750.

Predicting lower body power from vertical jump prediction equations for loaded jump squats at different intensities in men and women. Wright GA, Pustina AA, Mikat RP, Kernozek TW. J Strength Cond Res. 2012 Mar;26(3):648-55.

Intersession reliability and concurrent validity of isometric endurance tests for the lateral trunk muscles. Greene PF, Durall CJ, Kernozek TW. J Sport Rehabil. 2012 May;21(2):161-6.

Associations between single-leg postural control and drop-landing mechanics in healthy women. Durall CJ, Kernozek TW, Kersten M, Nitz M, Setz J, Beck S. J Sport Rehabil. 2011 Nov;20(4):406-18.

Patellofemoral joint stress during running in females with and without patellofemoral pain. Wirtz AD, Willson JD, Kernozek TW, Hong DA. Knee. 2012 Oct;19(5):703-8.



Patrick Grabowski joins LIMS

2013-2014

Patrick Grabowski, PT, PhD, OCS, CSCS will join the UW-L Physical Therapy faculty and the LIMS in the Fall of 2013. Dr. Grabowski has practiced in Orthopedic and Sports Rehab for nearly a decade and has research expertise studying the neural control of movement. His research has focused on the visuomotor control of the upper extremity and on rehabilitation of athletes with prolonged symptoms after concussion in sport. In collaboration with clinicians at UW Hospitals and Clinics in Madison, he recently led the development of their Sport Concussion Rehab Program. Dr. Grabowski will continue to pursue neuromotor control studies with LIMS, focusing on neural mechanisms of rehab interventions and injury recovery. Dr. Grabowski is also interested in the evaluation of new technologies, such as the kiio FLEX system, developed to improve clinical avaluation and outcomes (www.kayotechnology.com)

evaluation and outcomes (www.kayotechnology.com).





GA