

Poster 137**Relationship Between Vastus Medialis Onset Delay and Patellar Tracking in Patellofemoral Pain Subjects.**

Michael Fredericson, MD (Stanford University, Redwood City, CA); Gary S. Beaupre, PhD; Thor Besier, PhD; Scott Delp, PhD; Christine E. Draper, PhD; Garry Gold, MD; Saikat Pal, PhD.

Disclosures: M. Fredericson, Coolsystems, Inc, Consulting fees or other remuneration.

Objective: To test the hypothesis that measures of patellar maltracking, tilt, and bisect offset, correlate with vastus medialis onset delays in patellofemoral pain (PFP) subjects classified as maltrackers.

Design: Post hoc cohort study.

Setting: Three-dimensional motion analysis laboratory, magnetic resonance (MR) imaging laboratory.

Participants: 55 subjects: 15 healthy controls and 40 subjects with patellofemoral pain (PFP).

Interventions: Not applicable.

Main Outcome Measures: Correlations between electromyography (EMG) activation onset delay of vastus medialis (VM) muscle compared with vastus lateralis and patellar maltracking measures, tilt, and bisect offset. The subjects with PFP were classified into nonmaltrackers and maltrackers based on their tilt and bisect offset measurements. Anticipatory EMG activations during the swing phase of walking were analyzed. Tilt and bisect offset were measured from images acquired in an open-configuration MR scanner with a subject upright and the knee near full extension.

Results: Subjects classified as maltrackers with both abnormal tilt and abnormal bisect offset demonstrated a significant relationship between VM onset delay and patellar tilt ($R^2=0.89$, $P<.001$). Approximately 38% of the PFP subjects (15 of 40) were classified as maltrackers, with 8 subjects having both abnormal tilt and abnormal bisect offset.

Conclusions: The etiology of PFP is unclear. It has been theorized that delay in VM activity onset causes lateral maltracking of the patella, resulting in elevated stress and pain in the PF joint; however, evidence relating muscle onset delay to maltracking of the patella is sparse. The results of this study demonstrate a significant relationship between VM onset delay and patellar maltracking in subjects classified as maltrackers with both abnormal tilt and abnormal bisect offset. This implies that a clinical intervention such as VM retraining may be effective only in a subset of subjects with PFP, those with excessive tilt and excessive bisect offset measures.

Poster 146**The Reliability of the Clinical Diagnosis in Persons Offered Surgery for Lumbar Spinal Stenosis.**

Andrew J. Haig, MD (University of Michigan, Ann Arbor, MI); Peter Henke, MD; Sierra Loar, MPA;

Paul Park, MD; Christy Tomkins, PhD; Juan Valdivia; Karen S. Yamakawa, MS.

Disclosures: A. J. Haig, Rehabilitation Team Assessments, LLC, Ownership or partnership; The International Rehabilitation Forum, nonremunerative positions of influence; The University of Michigan, Employment.

Objective: To determine if expert clinical history and physical examination can differentiate persons offered surgery for spinal stenosis, persons with vascular claudication, and asymptomatic age-matched controls.

Design: IRB approved, NIH funded, prospective, controlled, masked diagnostic trial.

Setting: Academic medical center.

Participants: Patients with no polyneuropathy risk, negative ankle brachial index (ABI), and no previous surgery who were offered surgery for lumbar stenosis; persons diagnosed with vascular claudication, positive ABI, and no back pain; and asymptomatic volunteers. Patients were found by systematic review of vascular and spine clinic records, control subjects by community recruitment.

Interventions: Examination and diagnosis by faculty vascular and neurosurgeons, masked to imaging and vascular tests, who reviewed extensive questionnaires, and who performed a comprehensive and open-ended spine and vascular history, and physical examination.

Main Outcome Measures: Agreement among examiners.

Results: Among 234 persons preliminarily screened, 79 qualified and 48 completed all components, including 15 (60%) of surgical stenosis, 6 (50%) of vascular claudication, and 27 (64%) of asymptomatic recruits. Although there was good agreement ($\kappa = 0.637$) between them, the surgeons disagreed on 20% of diagnoses. The neurosurgeons classified 4 (24%) of 17 persons who had been offered spine surgery as asymptomatic and 1 as vascular.

Conclusions: Spinal stenosis has been defined as a clinical entity associated with a radiological finding. Recent studies have exposed the lack of a concrete radiological criteria. Now this study of clinical diagnosis, in the ideal situation of persons stringently screened and extensively examined by experienced specialists, found disagreement about diagnosis in one-fifth of persons who were offered surgical intervention for the syndrome. This lack of reliable clinical and radiological criterion standards may explain some of the arbitrary and exponential rise in stenosis surgery. A specific clinical criterion for the clinical syndrome of lumbar spinal stenosis may make the diagnosis less ambiguous.

Poster 147**The Retrodiskal Approach for Lumbar Transforaminal Epidural Block.**

Hee E. Choi (Sanggye Paik Hospital, Inje University Medical College, Seoul, Republic of Korea); Chul Kim, MD, PhD; Chang J. Moon.