Eli's Rehab Report

Clinical Rehab Roundup

In this recurring feature, Physical Medicine & Rehab Coding Alert provides you with summaries of a cross section of recent clinical studies. Here's what's new
this month.

How Diabetes Ties Into Differing Segmental Foot Mobilities

"Segmental foot mobility in individuals with and without diabetes and neuropathy." Rao S, Saltzman C, Yack HJ. Clin Biomech (Bristol, Avon). 2007 May; 22(4): 464-71.

Researchers have identified impairment in intrinsic foot mobility as an important potential contributor to altered foot function in individuals with diabetes mellitus and neuropathy. But the role of limited foot mobility in gait remains poorly understood, so the purpose of this study was to examine segmental foot mobility during gait in subjects with and without diabetes and neuropathy.

Researchers examined segmental foot mobility during gait using a multi-segment kinematic foot model in subjects with diabetes and non-diabetic control subjects.

Findings: Subjects with diabetes showed reduced frontal as well as sagittal plane excursion of the calcaneus relative to the tibia. Researchers noted decreased excursion of the first metatarsal relative to the calcaneus in the frontal as well as transverse plane in subjects with diabetes.

Researchers concluded that their findings agree with traditional understanding of foot mechanics and shed new light on patterns and magnitude of motion during gait.

Calcaneal pronation, noted in early stance in both groups, was reduced in subjects with diabetes and may have important consequences on joints proximal as well as distal to it. Subjects with diabetes showed reduced foot "splay" in early stance, indicated by first metatarsal and forefoot eversion.

At terminal stance, researchers noted decreases in calcaneal plantarflexion, first metatarsal and forefoot supination in subjects with diabetes, suggesting that less supination is required in subjects with diabetes to create a rigid lever. In subjects with diabetes, a greater proportion of midfoot stability may come from modified/stiffer soft tissue, such as the plantar fascia.

Find Optimum Pedaling Rate on Bicycle Ergometer

"Optimal pedaling rate in bicycle ergometer exercise determined by probe reaction time." Huo M, Maruyama H, Liu H. Percept Mot Skills. 2006 Dec; 103(3):703-8.

The purpose of this study was to obtain the optimal pedaling rate in bicycle ergometer exercise by measuring probe reaction time, which is a good indicator of attention demand, by changing workloads and pedaling rates. The study also sought to discuss the relevant rhythm of lower limb movement.

Subjects were 19 healthy men whose median age was 22.8 years. Researchers instructed subjects to pedal a bicycle ergometer and measured subjects' reaction time at different workloads and pedaling rates to estimate an optimal

pedaling rate. Researchers measured probe reaction time under the conditions as follows: pedaling rate of 20, 40, 60, 80 and 100 rpm at each workload of 40, 60, 80, 100 and 120 watts.

Findings: The estimated values obtained by regression analysis for pedaling rate to give the minimum probe reaction time were 63.5 rpm for 40 watts, 58.8 rpm for 60 watts, 61.3 rpm for 80 watts, 63.4 rpm for 100 watts, and 64.8 rpm for 120 watts.

These results indicated that the optimal pedaling rate was approximately 60 rpm regardless of the workload, researchers said.