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Kinematic characteristic of postural stability during one leg standing in athletes

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This presentation is to introduce evidence based kinematic changes in the lumbar spine in subjects with and without low back pain (LBP) while standing on one leg with and without visual feedback. The lumbar stability index includes relative holding time (RHT) and relative standstill time (RST). Even though a number of studies have evaluated postural adjustments based on kinematic changes in subjects with LBP, lumbar spine stability has not been examined for abnormal patterns of postural responses with visual feedback. The stability index of the core spine significantly decreased in both RHT and RST, especially when visual feedback was blocked for subjects with LBP. The interaction between visual feedback and trunk rotation indicated that core spine stability is critical in coordinating balance control. A trunk muscle imbalance may contribute to unbalanced postural activity, which could prompt a decreased, uncoordinated bracing effect in subjects with LBP. As a result, kinematic rehabilitation training could be used in the prevention of postural instability. The effect of visual feedback on kinematic changes, such as RHT and RST, has not been carefully considered in subjects with LBP. Statistically significant and clinically relevant differences in postural stability and visual feedback were observed between subjects with and without LBP during the one leg standing test. Subjects with LBP have decreased RHT and RST when visual feedback is blocked. As a result, the early detection of kinematic imbalance might be required to understand compensatory mechanisms and postural adjustments in subjects with LBP.

Biography

Paul Sung is Associate Professor in Department of Physical Therapy at the University of Scranton, Scranton PA. He received his PhD degree in Physical Therapy from Nova Southeastern University in Fort Lauderdale, Florida in 2004. He also received his DHSc degree from the University of St. Augustine in St. Augustine, Florida in 1999. He conducted his research fellowship at the Iowa Spine Research Center, Biomedical Engineering Department at the University of Iowa in Iowa City, Iowa from 2001 to 2003. He is a member of the International Society for the Study of the Lumbar Spine as well as the American Physical Therapy Association. His research interests include the mechanisms of chronic low back pain, sports injury mechanism, spine biomechanics, and non-operative spine care and its clinical application to neuromuscular control.

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