Measurement of Postural Control Associated With Fall Risk

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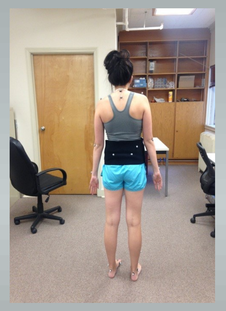
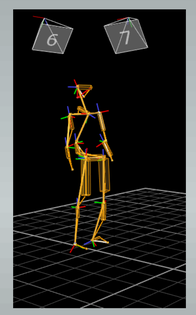
Background and Significance

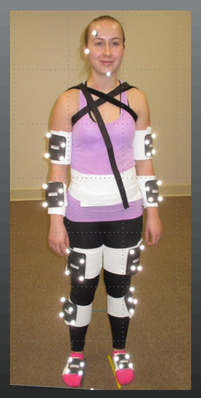
- Over a third of adults 65 and older fall each year.
- Simple movements that challenge postural control and can be performed in the lab may predict fall risk.
- Our motion capture system uses reflective markers that can be time-consuming to attach and calibrate.
- The OUR grant allowed us to purchase reflective cluster sets that shorten setup time for data collection.
- The faster setup allows us to incorporate biofeedback and Electromyography (EMG) into our data collection process.

Individual Markers

This method requires careful placement of markers on bony landmarks and generation of a full-body model in Vicon. Setup takes 30 minutes

Cluster Sets


The cluster sets can be quickly attached and have permanent templates in Vicon. Setup takes 10 minutes.

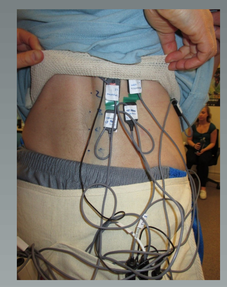
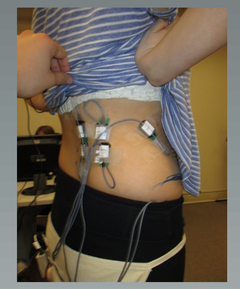
Tasks

Participants perform rapid foot lifts, slow foot lifts, and side bends under different instructions.

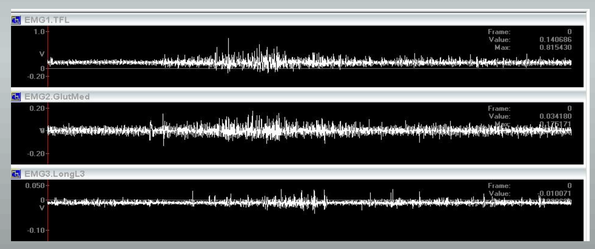

Biofeedback

Participants must stand with their weight evenly distributed before beginning. A "go" cue sounds when the center of mass has remained within 1 cm of the middle of the base of support for 1 second.

Electromyography (EMG)

We attach EMG electrodes to trunk and legs to measure muscle activation before and during movement. This measurement provides insight into how different muscles are coordinated to generate movement.



Shown: raw EMG traces from a single rapid leg lift. TFL = tensor fascia latae. GlutMed = gluteus medius. LongL3 = longissimus at the level of the 3rd lumbar vertebrae.

Next Steps

We plan to test 20 healthy older subjects this summer. The measures developed here will be used to test the effects of different postural instructions.

Acknowledgements

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