

LOSS OF TRUNK REPOSITIONING SENSE AND ITS RELATION TO POSTURAL CONTROL FUNCTIONS IN PEOPLE POST STROKE. Ryerson SJ.

Purpose: To determine whether trunk repositioning sense is impaired and related to loss of function in people with post-stroke hemiparesis.

Background/significance: Good trunk control is essential for functional activities. Deficits of trunk anticipatory postural control have been identified in people post-stroke. One conceptual model suggests that postural control requires an internal model for accurate orientation. Proprioceptive feedback provides part of the information for internal modeling. Trunk repositioning sense is one aspect of proprioception. If trunk repositioning sense is impaired post-stroke, it may be one of the underlying contributing elements to altered trunk postural control. Altered trunk postural control would adversely affect trunk-limb linked movement sequences and ultimately interfere with the performance of daily activities. If rehabilitation clinicians have a clearer understanding of trunk postural impairments, they may refocus their intervention techniques to include trunk position sense retraining.

Subjects: 21 subjects with chronic stroke and 21 age/sex matched non-neurologically impaired subjects.

Methods: Trunk repositioning error was assessed in sitting while the subject performed forward flexion movements. Subjects were instructed to move to a pre-specified flexion position during which trunk position was recorded from a tracking marker placed on the skin over the spinous process of T1. An electromagnetic movement analysis system, 'Flock of Birds', was used to track the position of the trunk and document errors.

Analysis: Mean repositioning error in people post-stroke and non-neurologically impaired people was compared using a two-tailed independent t-test ($p \leq 0.05$). Spearman correlation coefficient analyses were used to determine the strength of the relationship between absolute repositioning error and clinical measures of balance (Berg Balance Test), postural control (Postural Assessment Scale for Stroke), and stroke severity (Fugl-Meyer)

Results: There were significant differences in absolute repositioning error between stroke and controls groups in both the sagittal ($p=0.0001$) and transverse ($p=0.012$) planes. Mean sagittal plane values: post stroke $6.9^\circ \pm 3.1^\circ$, control $3.2^\circ \pm 1.8^\circ$; mean transverse plane values: post stroke $2.1^\circ \pm 1.3^\circ$, control $1.0^\circ \pm 0.6^\circ$. There was a significant correlation between sagittal plane absolute repositioning error and the Berg Balance score ($r = -0.487$, $p = 0.029$); transverse plane absolute repositioning error and Berg Balance scores ($r = -0.484$, $p = 0.031$); and transverse plane repositioning error and the PASS score ($r = -0.518$, $p = 0.019$).

Conclusions: This study is an important first step towards a more complete understanding of the role of trunk repositioning sense in subjects with post stroke hemiparesis. Position sense, with an emphasis on sagittal and transverse movements should be integrated into intervention strategies to improve trunk postural control in sitting for patients post-stroke.