The Effects of Ankle Mobilizations on Static Balance Performance
Adams, R., Langdon, J., Durland, A., Sales, K., Lin, C.
Department of Physical Therapy Outpatient Clinic, East Carolina University

INTRODUCTION
• Decreased ankle dorsiflexion is associated with increased risk for falls (Landrum et al., 2008; Cosby et al., 2011)
• Joint mobilizations impact neural feedback, stimulate joint receptors, increase local strength, control pain, increase range of motion (ROM), and improve postural control (Moss et al., 2007; Hoch et al., 2010)
• It is controversial how ankle joint mobilizations affect balance performance
• The purpose of this study is to investigate whether the effects of grade III-IV ankle joint mobilizations improve static balance performance

METHODS
Subjects
• 31 subjects were recruited through the ECU Physical Therapy Outpatient Clinic
• 5 males and 26 females
• Age: 33 ± 14 years (range: 21-64 years)
• Height: 168 ± 8 cm
Instrumentation
• Neurocom (Natus, San Carlos, CA) assessments included Sensory Organization Test (SOT), Unilateral Stance (US), and Limits of Stability (LOS)

Variables of Interest
• Ankle dorsiflexion ROM
• SOT composite score
• LOS end-point excursion

Study Protocol
Measurement of pre-mobilization ankle dorsiflexion ROM
Pre-mobilization Neurocom assessments (Figures 1A-1B)
Grade III-IV ankle joint mobilizations (Figures 2A-2D)
Measurement of post-mobilization ankle dorsiflexion ROM
Post-mobilization Neurocom assessments

RESULTS
• Following grade III-IV ankle joint mobilizations, ankle dorsiflexion ROM improved significantly by an average of 4.5 degrees on the right ankle and 5.6 degrees on the left ankle (p < 0.01) (Figure 3A)
• Post-test SOT composite scores significantly improved by an average of 2.7 points (p < 0.01)
• Paired t-test showed a significant difference in ankle dorsiflexion ROM and SOT composite score from pre- to post- ankle joint mobilizations (p < 0.01) (Figure 3B)
• Pearson correlation coefficient showed no significant correlation between right (r = -0.14, p = 0.46) or left (r = -0.19, p = 0.31) ankle dorsiflexion ROM and SOT composite scores
• Post-test LOS results showed a significant difference in end-point excursion for forward (p < 0.01), forward right (p = 0.03), backward (p < 0.01), and forward left (p = 0.01) conditions (Figure 3C)

DISCUSSION AND CONCLUSIONS
• In our study, we found improvements with ankle dorsiflexion ROM, SOT composite score, and LOS end-point excursion after grade III-IV ankle joint mobilizations
• It is probable that the SOT composite score and LOS end-point excursion changes observed from pre- to post- grade III-IV ankle joint mobilizations were due to learning effect (greater than three points is not considered learning effect) (Grindstaff, et al., 2006)
• Current research shows that correlations exist between ankle dorsiflexion ROM and balance in elderly women (Mecagni, et al., 2000; Nitz & Low Choy, 2004); however, we did not find these correlations between ankle dorsiflexion ROM and balance performance
• Limitations of our study include a narrow age demographic, consistency of the amount of verbal feedback given to subjects during Neurocom testing, and subjects’ limited experience with Neurocom tasks
• Based on the results of our study, we found that grade III-IV ankle joint mobilizations may not be related to immediate improvements in balance performance
• Future research should explore where treatment directed at increasing ankle dorsiflexion ROM can improve balance performance and whether these results apply to subjects of different age groups

REFERENCES