THE CHANGES IN ARM SWING DURING PREGNANT GAIT

Chair: Robert Catena

Arm swing improves dynamic stability, forms reliable coordination patterns with other body segments during walking, and decreases energy consumption. Examining arm swing may shed light on energy expenditure, fall risk, and potential compensation strategies during pregnancy. The purpose of this study is to examine the arm swing changes that occur during pregnancy, including asymmetry and impacts on balance and momentum. Twenty-three pregnant women were tested in four-week intervals at 18-, 22-, 26-, 30- and 34-weeks’ gestation. Anthropometry and kinematic data were measured as they walked at self-selected speed. Kinematics, balance, coordination, torso center of mass (COM), whole-body momentum, and asymmetry were calculated for each visit. Linear mixed model analyses were used to examine change over time and the interaction between body side and time. Regression analyses were used to determine correlations between kinematics, coordination, torso COM, balance, momentum, and asymmetry. Arm range of motion (ROM) significantly increased over gestation (p=0.006) and was asymmetric (p<0.001), with the left arm having greater ROM throughout pregnancy. The right arm increased at a greater rate than the left, decreasing the amount of asymmetry over time. Torso COM position formed a contralateral relationship with the asymmetrically dominant arm. Torso COM position only increased in the AP (p=0.029) and CL (p=0.033) direction. Torso COM deviation changes were not seen, but ML COM deviation was negatively correlated with arm asymmetry (r²= 0.051,
Torso COM momentum increased over time ($p=0.053$) and trended towards being asymmetric ($p=0.077$). All balance ($p<0.060$) and momentum ($p<0.014$) variables significantly changed. Right stance time, left torso SI COM momentum, and changes in arm-leg couplings explain 71% and 67% of the change in left and right arm ROM ($p<0.001$). Sagittal arm couplings shifted to more arm dominant over time ($p<0.042$) and these coupling were asymmetric towards the left side ($p<0.036$). These arm couplings explain 27% of the change in momentum during pregnancy ($r=0.521$). However, only the changes in thorax-arm and pelvis-leg couplings explain some of the balance changes ($r<0.326$, $p<0.035$). Arm swing changes during pregnancy (ROM, asymmetry, and coordination patterns) are not explained by changes in thorax rotations, torso COM position or deviation, or anthropometric measures. However, increased arm swing does contribute to the balance and momentum changes observed during pregnancy. Therefore, the arms may have important implications for maintaining momentum during pregnancy. If arm motion or asymmetry is interrupted by constrained arm swing during a push, pull, or carry task, there may be greater energy required of the lower extremities, causing fatigue and increasing fall risk.