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Evaluation of Active Sitting Using Hip Accelerations

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Active sitting claims to increase core muscle activation because sitting on an unstable surface such as an exercise ball requires more effort in order to maintain balanced sitting posture than while sitting on a stable surface such as a stool or chair. Accelerations obtained through ActiGraph provide an objective measurement of subtle body movements. **PURPOSE**: To compare hip accelerations while sitting on a chair with a backrest, a chair without backrest (stool) and an exercise ball. **METHODS**: Eight apparently healthy students, 6 males and 2 females, were recruited from Penn State Berks (Age 22.9 ± 2.5 years, BMI 25.5 ± 4.5 kg/m^2). Each participant sat for 10 minutes on a chair, stool and ball in random order. Participants wore an ActiGraph GT9X accelerometer on their right hip. During each of the three 10-minute sitting segments, participants completed one task (typing, reading comprehension or spatial awareness). **RESULTS**: Standard deviations of the magnitude of the hip accelerations were used to compare differences in hip motion between sitting on a chair with a backrest (2.74 ± 0.682 cm/s^2), stool (3.46 ± 1.65 cm/s^2) and exercise ball (4.69 ± 2.22 cm/s^2). Figure 1 shows the standard deviations for each participant. Statistically significant differences were noted between the chair and the ball (p=0.02). **CONCLUSION**: Our preliminary study showed that deviations in the hip accelerations were lowest when participants sat on a chair with a backrest, and highest when participants sat on an exercise ball. In conclusion, participants moved more while sitting on an exercise ball than while sitting on a chair with a backrest or stool, which suggests that active sitting might increase core muscle activation during a normally passive and sedentary behavior.
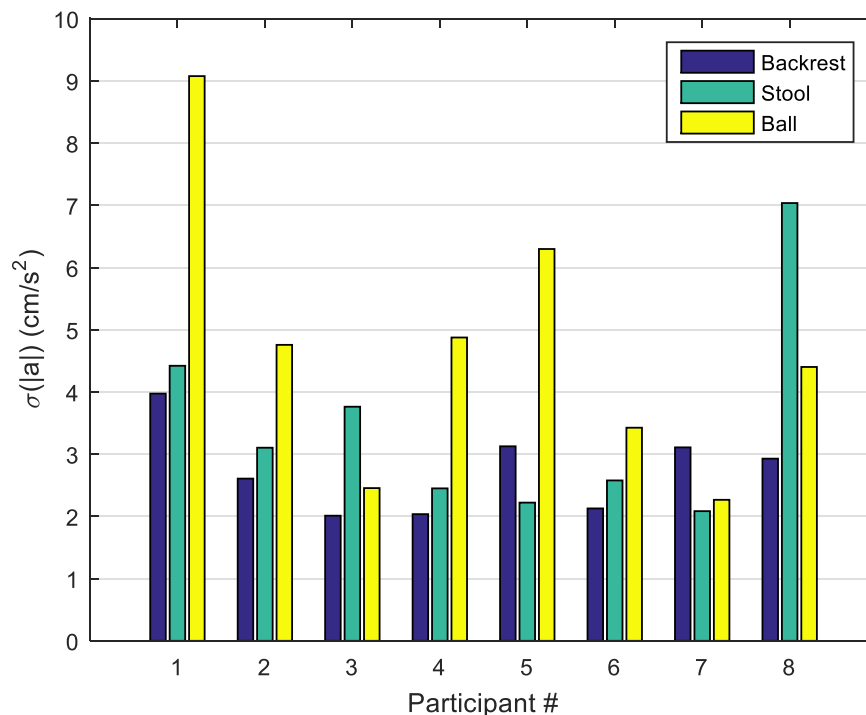

Figure 1. Standard Deviations of Acceleration for Sitting Condtions