

Trial Reliability of Postural Stability Measures using the MatScan[®] System: A Platform Based Pressure/Force Measurement Tool

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Objective: Postural stability measures may reflect neuromuscular or biomechanical imbalances. The MatScan[®] System (Tekscan) is a pressure/force sensing floor mat capable of measuring the translation of the center of force over time. Two calculated variables, area (cm²) and distance (cm) have previously been used to discriminate between subject populations with different biomechanical presentations of pelvic neutral and anterior pelvic inclination. Area represents the translation of the center of force (COF) using x and y excursions and the formula for an ellipse. Area is thought to reflect postural sway. Distance represents the total excursion of the center of force across a selected duration of time (calculated using the Pythagorean Theorem) and represents an overall reflection of postural adjustments. The purpose of this study was to determine the trial reliability of the postural stability measures of area and distance using the MatScan[®] System (Tekscan). **Design and Settings:** A repeated measures design was used in this study with subjects in static stance for a total of 30 seconds. Testing occurred in a controlled laboratory setting in a single session. **Subjects:** Twenty-one healthy subjects (11 males and 9 females; mean age = 22.75 ± 3.18 years, mean height = 170.35 ± 6.28 cm., mean weight = 70.66 ± 12.52 kg.) participated in this study. **Measurements:** Subjects stood in static stance for three, 30 seconds trials, under two counter balanced conditions of eyes opened and eyes closed. The force data was collected at 40 Hz. using the MatScan[®] System (Tekscan). COF displacement was quantified and the two variables of area and distance were calculated. ICC's (2,1) were calculated according to Shrout and Fleiss (1979). **Results:** The Intra-class correlations (ICC) were calculated for each variable. The ICCs (2,1) for area were 0.66 for eyes open and 0.45 for eyes closed. Distance reliability scores (ICC(2,1)) were 0.87 for eyes open and 0.84 for eyes closed. **Conclusions:** For static stance, the variable distance demonstrated good reliability for both conditions of eyes opened and eyes closed. The variable area demonstrated poor reliability. However, the area values appear to be fairly homogeneous, for example, with trial standard deviations (eyes closed) of 0.95, 1.49 and 2.25 cm² as compared to the trial standard deviations of distance (eyes closed) of 15.56, 14.11 and 17.75 cm. Thus the reduced reliability for area may be due to the homogeneity of the sample population scores obtained.