

O'Connell DG, Richeson SM, Moeller MB, Stephens JW, Key DJ. THE EFFECT OF FOREARM POSITIONING ON MAXIMAL PEAK ELBOW FLEXION FORCE AMONG NURSING, OCCUPATIONAL THERAPY, AND PHYSICAL THERAPY STUDENTS. Hardin-Simmons University Department of Physical Therapy, Abilene, TX.

**PURPOSE:** (1) To determine optimal forearm position (pronation, neutral, supination) during maximal isometric lifting; and (2) to identify differences in peak elbow flexion force (PEFF) in nursing, occupational therapy (OT), and physical therapy (PT) students.

**SUBJECTS:** Professional entry-level nursing, OT, and PT students were invited to participate in the research.

**METHODS:** All subjects: (1) read and signed informed consent and exclusion criteria; (2) obtained demographics and biometrics; (3) completed three trials of grip strength with a Dynex grip dynamometer in a neutral forearm position of dominant hand; (4) completed a 4-min upper extremity warm-up via video link; and (5) performed three repetitions of standing isometric lifts (elbows adducted and flexed 90°) in three randomized forearm positions (supination, pronation, and neutral). A JTECH Commander Force Gauge/Lift Platform was used to assess elbow flexion force. Mean scores from three successive trials for each position were used for analysis. A one-way repeated measures ANOVA (SPSS 24.0) determined which forearm position demonstrated the greatest PEFF. A one-way ANOVA, controlling for lean body mass, assessed differences in PEFF between professions. The alpha level was set at  $p \leq 0.05$  for all analyses.

**RESULTS:** Eighty-five volunteer subjects, including 30 nursing, 25 OT, and 30 PT students, participated in the research. The mean age was 23.27 +/- 3.29, with 70 females and 15 males. The one-way repeated measures ANOVA revealed a statistically significant difference in PEFF between positions ( $F(1.65,138.57) = 146.27, p < 0.0001$ ). A pairwise comparison revealed force production by position was significantly different ( $p < 0.0001$ ), with neutral producing greatest PEFF (56.298 +/- 25.3 lbs) and pronation the weakest PEFF (34.538 +/- 14.8 lbs). A significant difference was found between position by profession (supination:  $F(2,82) = 11.747, p < 0.0001$ ; pronation:  $F(2,82) = 8.654, p < 0.0001$ ; neutral:  $F(2,82) = 16.485, p < 0.0001$ ). PTs were significantly stronger than OTs and nurses in all forearm positions ( $p < 0.05$ ).

**CONCLUSION:** Neutral was the optimal forearm position for maximal isometric lifting with PT students demonstrating greater PEFF than OT and nursing students. These findings suggest healthcare professionals should be instructed in proper body mechanics and efficient lifting techniques in their respective educational programs.

**CLINICAL RELEVANCE:** To reduce the risk of musculoskeletal injury, healthcare professionals should be trained to lift and transfer patients utilizing a neutral forearm position.