The Relationship Between Range of Motion of the Forearm and Hand in Various Anatomical Positions

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ABSTRACT

Activities of daily living (ADL) refers to those elementary tasks that allow one to function independently. The musculoskeletal system of the hand is vital for ADL's, with 25 degrees of freedom that are controlled by approximately 30 muscles located in the forearm and hand. These muscles play a supporting role in upper extremity range of motion associated with ADL's. **PURPOSE**: The purpose of this study was to assess the relationship between various range of motion positions of the forearm and hand. **METHODS**: This was a correlational study. Upon completion of the informed consent subjects completed demographic data and a 5-minute warm up activating the left and right forearm and hand. Proceeding the warmup, the left (L) and right side (R) range of motion (ROM) of wrist flexion (WF), wrist extension (WE), radial deviation (RD), ulnar deviation (UD), supination (S), and pronation (P) was measured. The highest value of three trials was used for analysis and significance was tested at .05. **RESULTS**: The study consisted of 42 individuals (age = 29.81 ± 14). ROM WF L was significantly related to WF R ($r = .70$, $p<.05$), WE L ($r =.51$, $p<.05$), WE R ($r =.64$, $p<.05$) RD L ($r =.31$, $p<.05$), RD R ($r=.34$, $p<.05$) UD L ($r=.34$, $p<.05$), UD R ($r=.37$, $p<.05$), S L ($r=.34$, $p<.05$), S R ($r=.49$, $p<.05$), P L ($r=.39$, $p<.05$), P R ($r=.35$, $p<.05$). ROM WF R was significantly related to WE L ($r=.52$, $p<.05$), WE R ($r=.38$, $p<.05$),:UD L ($r=.37$, $p<.05$), UD R ($r=.46$, $p<.05$), S L ($r=.35$, $p<.05$);:S R ($r=.44$, $p<.05$), P L ($r=.32$, $p<.05$), P R ($r=.61$, $p<.05$). ROM WE L was significantly related to WE R ($r=.66$, $p<.05$), RD L ($r=.33$, $p<.05$), UD R ($r=.38$, $p<.05$), S R ($r=.52$, $p<.05$), P L ($r=.51$, $p<.05$), P R ($r=.48$, $p<.05$). ROM WE R was significantly related to RD L ($r=.36$, $p<.05$), RD R ($r=.40$, $p<.05$), S R ($r=.39$, $p<.05$), P L ($r=.49$, $p<.05$), P R ($r=.32$, $p<.05$). ROM RD L was significantly related to RD R ($r=.74$, $p<.05$), P L ($r=.34$, $p<.05$), P R ($r=.36$, $p<.05$). ROM RD R was significantly related to P R ($r=.32$, $p<.05$). ROM UD L was significantly related to UD R ($r=.80$, $p<.05$), and P R ($r=.33$, $p<.05$). ROM UD R was significantly related to P R ($r=.39$, $p<.05$). ROM S L was significantly related to S R ($r=.35$, $p<.05$), P L ($r=.36$, $p<.05$), and P R ($r=.42$, $p<.05$). ROM S R was significantly related to P L ($r=.48$, $p<.05$), and P R ($r=.33$, $p<.05$). ROM P L was significantly related to P R ($r=.59$, $p<.05$). **CONCLUSION**: The results suggest multiple relationships between various measures of ROM. These may serve as practical measures to assess forearm and hand function that contribute to functional independence in ADL's.