

Handgrip, Pinch Grip, and Reaction Time of Firefighters and Police Officers

ZARMINA AMIN, GALILEA GUTIERREZ, YANGMI KANG, & LARISSA TRUE

Exercise Physiology Lab; Kinesiology Department; New Mexico State University; Las Cruces, NM

Category: Doctoral

Advisor / Mentor: True, Larissa (ltrue@nmsu.edu)

ABSTRACT

Handgrip strength (HGS) and pinch grip strength are related to proper hand function. Quick and accurate reaction to stimuli is critical to perceptual-motor abilities. Firefighters (FF) and police officers (PO) are routinely involved in high-intensity emergency tasks that require HGS, pinch grip strength, and reaction time (RT). **PURPOSE:** The purpose was to examine differences in bimanual HGS, bimanual pinch grip strength, and dominant hand RT between FF and PO in the Southwest. **METHODS:** Anthropometric measures of the hand were taken. HGS was measured using a hand dynamometer. Tip, key and palmar pinch grip strength were measured using a pinch gauge dynamometer. Participants completed three consecutive maximum effort trials of handgrip and pinches with both hands. Visual RT was assessed using Human Benchmark Software on an iPad. **RESULTS:** There was a statistically significant, low negative correlation between PO's dominant HGS and RT ($r = -.331$), non-dominant HGS and RT ($r = -.374$), dominant key pinch and RT ($r = -.345$), non-dominant key pinch and RT ($r = -.391$), dominant palmar pinch and RT ($r = -.374$), non-dominant palmar pinch and RT ($r = -.348$). No such correlations for FFs were statistically significant. There were statistically significant differences in dominant HGS ($p < .001$), non-dominant HGS ($p < .001$), dominant palmar pinch ($p < .001$), non-dominant palmar pinch ($p < .001$), dominant tip pinch grip ($p < .001$), non-dominant tip pinch grip ($p < .001$), and RT ($p < .001$) between FF and PO, with results indicating FF were stronger and had faster RT than PO. **CONCLUSION:** PO bimanual HGS, dominant and non-dominant key pinch, and dominant and non-dominant palmar pinch strength are related to RT. PO may practice shooting firearms more than FF, contributing to these results. FF had stronger pinch, HGS, and RT than PO, which is likely attributed to occupational differences. For example, FF have access to exercise facilities at their workplace, which may aid in increased physical fitness among FF. FF assess and process significant sensory stimuli (fire conditions, environmental events) and must quickly react to dynamic working environments. In general, PO have a more sedentary job than FF; thus, FF are more fit, stronger, and have better RT than PO.