Stroke remains a leading cause of long-term disability worldwide, often leading to motor impairment and consequent decline in functional independence. Upper extremity (UE) hemiparesis is especially common post-stroke and often leads to decreased independence with self-care activities of daily living (ADLs). The purpose of this study was to determine if wearing a portable, myoelectric elbow-wrist-hand orthosis (MEWHO) immediately reduces motor impairment and increases functional ability in chronic stroke survivors (≥12 months) with moderate UE hemiparesis (n=18). Participants first underwent a battery of measures testing UE motor impairment and functional ability without the MEWHO, then were re-tested on the same battery of measures while wearing the MEWHO. The primary outcome measure was the UE section of the Fugl-Meyer Assessment (FM); secondary measures included a battery of functional tasks and the Box and Block Test (BB).

While wearing the MEWHO, subjects exhibited significantly reduced UE impairment (FM: t=8.56, P<.001) and significantly increased quality of movement during select functional tasks (feeding [grasp]: z=2.251, P=.024; feeding [elbow]: z=2.966, P=.003; drinking [grasp]: z=3.187, P=.001). Additionally, subjects showed significant decreases in time required to grasp a cup (z=1.286, P=.016) and increased gross manual dexterity while wearing a MEWHO (BB test: z=3.42, P<.001). This was the first study, to our knowledge, to compare the effects of a myoelectric UE orthosis versus no orthosis in UE hemiparesis. Results suggest that wearing a MEWHO significantly decreases UE motor impairment, increases gross manual dexterity, and increases functional ability for individuals with UE hemiparesis post-stroke.