

A Completely Portable and Concealable, Lightweight Assistive Exosuit for Upper Limbs

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Exosuits are a relatively new trend in wearable robotics to answer the flaws of their exoskeleton counterparts, but they remain impractical as the lack of rigidity in their frames makes the integration of crucial components into a single unit a challenge. While some simple solutions exist, almost all current research focuses on the output performance of exosuits rather than the needs of potential beneficiaries of this technology. To address this, a novel mechanism of complete portability for exosuits was developed and tested to improve exosuit practicality and adoption. Designed for elbow flexion, the device produced 12.21-13.66Nm of assistive torque and could be mostly concealed by the wearer's clothing without impacting performance. The proof-of-concept design proved successful and demonstrated many advantages over current portability methods, particularly in size and convenience. This device provides the sense of normalcy crucial for a technology to seamlessly integrate into the daily lives of its end users. It is extendable and upgradeable with access to advanced materials and manufacturing methods.