



## Hand eMbot

TECHNOLOGY DESCRIPTION: 2025-220



### OVERVIEW

A low-cost, wearable robotic device that restores hand function in stroke survivors by synchronizing movement between their less-impaired and impaired hands—without external motors or complex electronics.

- **Core Features:** Self-powered mechanical transmission, lightweight, and adaptable for home or clinical rehabilitation; avoids external power source and encourages active muscle engagement.
- **Market Opportunity:** Makes advanced hand rehabilitation accessible to millions with stroke or injury, enabling use at home and reducing reliance on expensive clinical infrastructure.

### BACKGROUND

Hand impairment is a major barrier for individuals recovering from strokes and musculoskeletal injuries, often preventing independence and effective neurorehabilitation. Current robotic therapy solutions typically require motors, air compressors, or electrical power, making devices expensive, bulky, and hard to use outside specialized clinics. Critically, powered devices can unintentionally discourage muscle use—reducing the therapeutic effect by promoting “motor slacking” and impeding neuroplasticity, which is essential for recovery.

The rehabilitation robotics market is growing rapidly due to an aging population, increased stroke incidence, and shifting healthcare models toward home-based recovery. However, unmet needs remain: affordable, effective rehabilitation tools that can be used outside the clinic, encourage active participation, and are easy to adopt. Industry trends point to a doubling of rehabilitation robotics revenue in the next decade, but underserved groups (older adults, rural patients with limited access) are still waiting for accessible therapeutic devices.

### Technology ID

2025-220

### Category

Medical Devices  
Life Sciences

### Inventor

Chandramouli Krishnan

### Further information

Katherine Pollard  
[kpollar@umich.edu](mailto:kpollar@umich.edu)

### [View online](#)



## **INNOVATION**

Hand eMbot uses a novel mechanical approach: it harnesses the motion generated by the user's less-affected hand, or a caregiver/therapist's limb, and transmits it in real time to the impaired hand using simple cable and linkage systems. This direct, synchronous movement ensures both hands move together—facilitating muscle engagement and natural motion, which are essential for brain-driven recovery. Because it does not rely on motors or electronics, Hand eMbot is significantly lighter, less expensive, safer, and easier to maintain compared to traditional robotic systems. It avoids common pitfalls of powered devices such as user passivity and high complexity while enabling fine and gross grip movements essential for daily living. Early testing demonstrates not only physical assistance but also increased brain activity linked to motor recovery, addressing both cost and clinical efficacy gaps in the current market.

## **ADDITIONAL INFORMATION**

### **REFERENCES:**

- ["Self-powered robots to reduce motor slacking during upper-extremity rehabilitation: a proof of concept study."](#)

**INTELLECTUAL PROPERTY:** Patent application pending.