PAL-HAND

A portable device for finger tele-rehabilitation

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What Is It?

PAL-HAND is a lighweight, untethered device designed for active post-stroke finger rehabilitation. It integrates 5 pneumatic soft sensing chambers (SPSCs) to provide localized kinesthetic and vibrotactile feedback on each fingertip, enabling tele-rehabilitation in home or XR environments

How It Works

- **Deformable Pneumatic Chambers** respond to finger pressure to simulate grasp and resistance.
- **Adjustable Stiffness** mimics object interaction through internal directional valves.
- **Vibration Motors & Audio Feedback** increase sensory engagement.
- **Motion Tracking** via IMUs and pressure sensors captures f nger and hand dynamics
- **Wireless Communication** connects to a remote interface for data logging and clinician interaction.

Key Specs

- **Size:** 300 X 80 X 80 mm
- **Weight:** 600 g
- **Pressure Range:** 20–50 kPa
- **Material:** PLA case, TPU membranes
- Motion Range per Finger: ~10 mm

Applications

Tele-rehabilitation: Remote f nger exercises guided by vibro-acoustic cues

XR Integration: Virtual grasping and peg-in-hole exercises with force feedback

Data Collection: Tracks compliance, force prof les, recovery metrics

Why It Matters

Unlike limited clinic hours and bulky home devices, it enables **continuous at-home training** and **data-driven**, real-time **recovery tracking** for individuals suffering from upper limb motor impairments due to neurological strokes.

Let's Collaborate

We are actively seeking partners for:

- **Pilot studies in clinical or home settings** to validate the device's therapeutic functionality and usability in real-world settings
- **Reimbursement and CE/MDR validation pathways**

http://www.palhand.polito.it/

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