Instructions From an Active Robotic Hand Increase Body Ownership and Task Clarity

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Motivation

- **Problem**: Stroke survivors need effective, affordable home rehabilitation, but current options have limitations.
- **Goal**: To enhance motivation and personalization in remote hand rehabilitation using a novel robotic hand system.

Methods

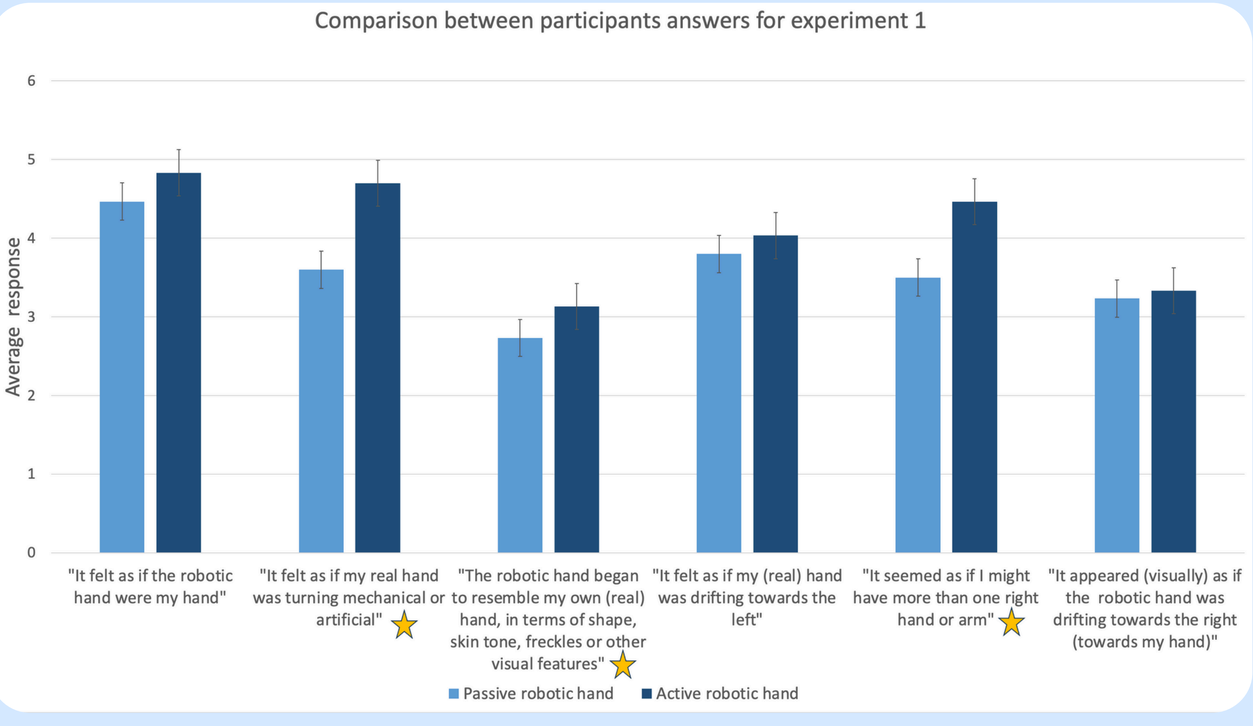
- **Approach**: Developed a low-cost, 3D-printed robotic hand mimicking patient movements, controlled via computer vision.
- **Evaluation**: Two within-subject crossover studies inspired by the RHI compared embodiment and memory retention against video instructions with 30 healthy participants.



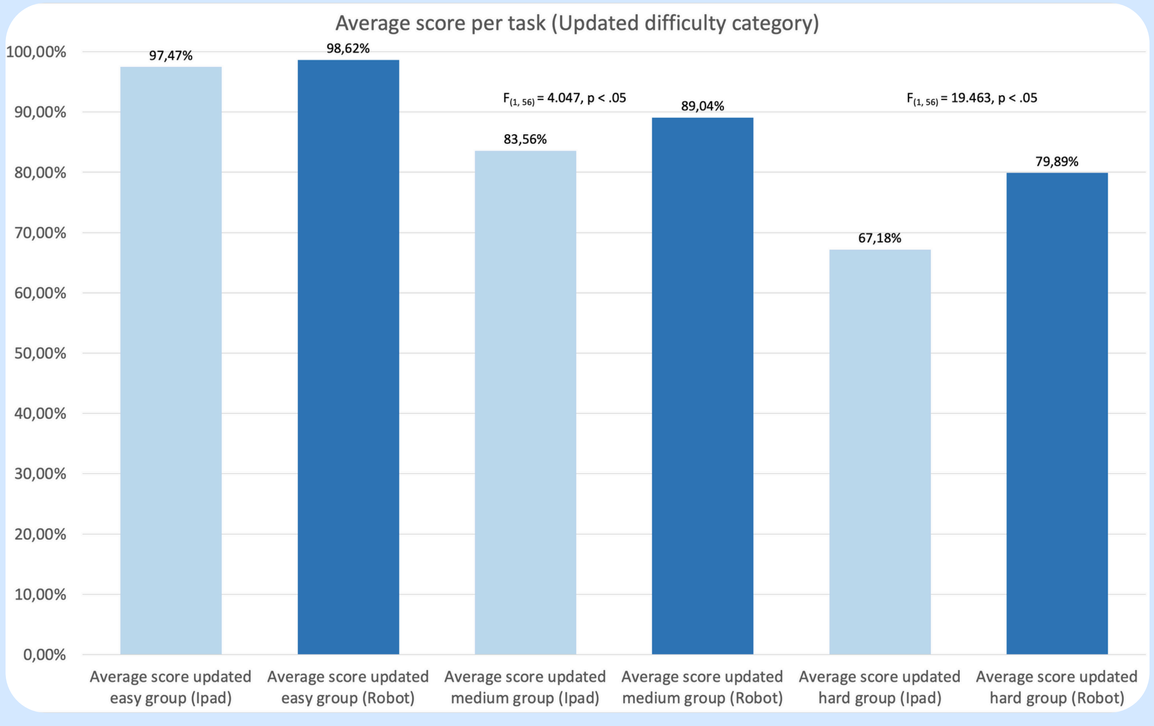
Findings

- 20/30 Participants felt a significant **stronger sense of body ownership** when actively controlling the robotic hand.
- Significant **6-13%** improved short-term memory of finger exercises with the robotic hand compared to video instructions.

Embodiment Questionnaire



Short-Term Memory Retention



Future Work & Applications

- Clinical Translation & Collaboration with Medical Experts
- Long-Term Impact Studies
- Patient Feedback and Usability
- Home Based Stroke Rehabilitation
- Osteoarthritis & Rheumatoid Arthritis
- Hand Injuries



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