MODULE 3-P3: Towards minimally-supervised robot-assisted therapy for increased rehabilitation dose – the RehabGym

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1 RehabGym

RehabGym: Technology-aided upper limb rehabilitation

- **Aims**:
  - To provide minimally/unsupervised rehabilitation throughout the health care system – from hospital to home
  - To tailor holistic post-stroke upper limb rehabilitation based on the preferences and needs of the clients, caregivers and therapists
  - To reduce the requirement for rehabilitation manpower while maintaining the quality and quantity of rehabilitation
- The unique set of complementary rehabilitation technologies of the RehabGym are **H-Man** [2], **ReHandyBot** [3] and **MyoPanda** [4] with **RELab tenoexo** [5] supporting in the home setting

2 Extending rehabilitation from hospital to home

- **H-Man:** A commercially available platform developed by ARTICARES
  - Enables training of the proximal joints of the upper limb in two-dimensional plane
  - Has a range of interactive games include training of movement coordination, strength, and memory
- **ReHandyBot**: A compact robotic end-effector platform for minimally-supervised/unsupervised therapy of hand function
  - Facilitates neurocognitive training, including training of proprioception, motor and cognitive impairments
  - Has an intuitive and user-friendly interface to support minimally-supervised usage
- **MyoPanda**: A set of a tablet and a commercial armband with an automated algorithm to detect wrist extension and different functional hand movements
  - Allows participants to repeatedly perform various functional hand/wrist movements with specific objects while interacting with an immersive application or play an exergame that requires hand/wrist movement control
- **RELab tenoexo**: A lightweight, fully wearable robotic hand orthoses intended for grasping assistance for individuals with sensorimotor hand impairments

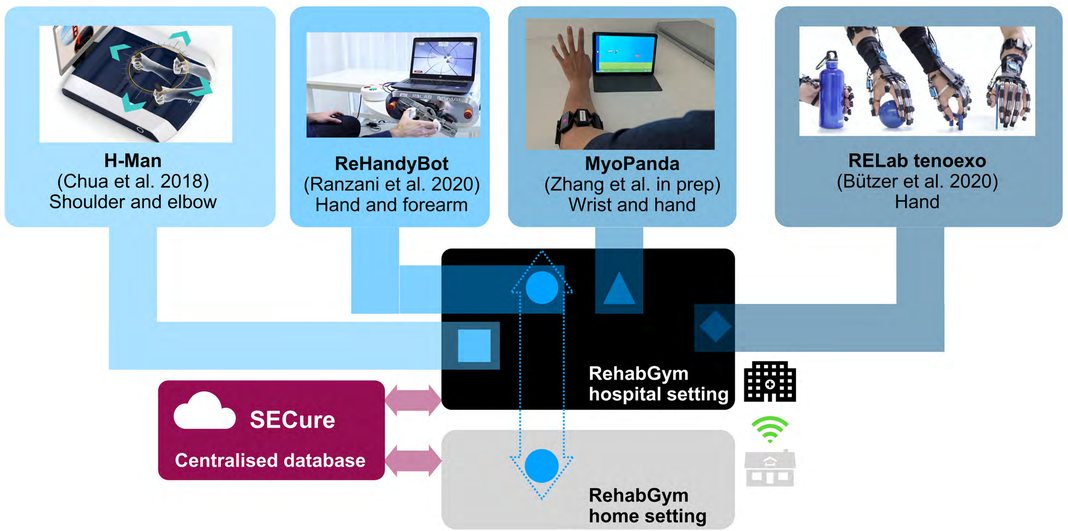

Figure 1: Conceptual overview of a connected RehabGym, with examples of user-friendly and complementary (i.e., targeting all segments of the upper limb) mobile robotic technologies for minimally supervised or unsupervised neurorehabilitation. All technologies are first introduced during inpatient rehabilitation at the hospital, and selected technologies (e.g., the one(s) best adapted to the impairment level and rehabilitation goals of a patient) are taken home upon discharge. Connected devices ensure asynchronous (i.e., not online/real-time), remote communication with healthcare professionals for monitoring purposes.

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