



## A COMPACT MODULAR ACTIVE HAND REHABILITATION DEVICE

### IITM Technology Available for Licensing

#### Problem Statement

- Current hand rehabilitation devices are not universally adjustable for different hand sizes and shapes, necessitating individualized devices for each patient.
- Existing devices are often bulky and heavy due to multiple actuators and tethered transmissions.
- Further, the high cost and complex control systems of current rehabilitation devices make them expensive and challenging to maintain, reducing their accessibility for widespread use.

#### Technology Category/ Market

**Category-** Rehabilitation Robotics and Assistive Technology

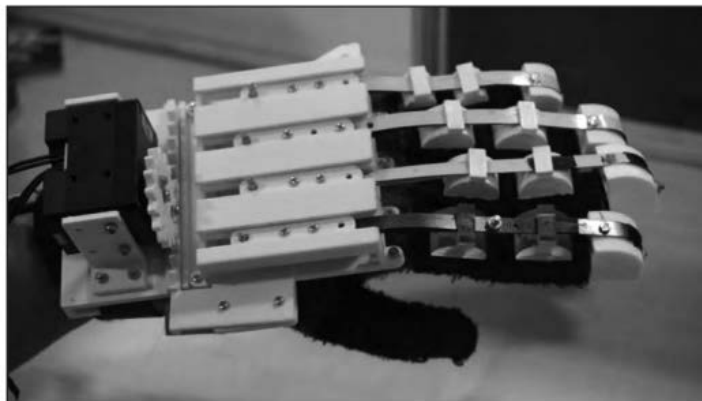
**Applications** - Stroke Rehabilitation, Post-Surgery Recovery, Sports Injury Rehabilitation, Occupational Therapy

**Industry-** Healthcare and Medical Devices

**Market** - Global rehabilitation equipment market in terms of revenue was estimated to reach \$19.8 Bn by 2027, growing at a **CAGR of 5.9%**.

#### Intellectual Property

- IITM IDF Ref. 1724
- **IN 494829 - Patent Granted**



**FIG. 1. shows the prototype of hand rehabilitation device in extended position.**

#### TRL (Technology Readiness Level)

**TRL - 4: Technology validated in lab scale.**

#### Research Lab

**Prof. Asokan T,**  
Dept. of Engineering Design

#### Technology

The present invention relates to **rehabilitation device that enables the extension and flexion of the fingers to perform grasp and release activities.**

1

#### Compact and Lightweight Design :

- The device uses a single actuator, significantly reducing its size and weight compared to traditional multi-actuator systems.

2

#### Adjustable Flexibility

- Features a modular guide assembly with flexible metal bands that can be adjusted to accommodate various hand sizes and degrees of movement.

3

#### Efficient Motion Translation:

- Incorporates a cam plate and guide assembly to convert the actuator's linear motion into precise sliding motion for each metal band, ensuring effective hand rehabilitation.

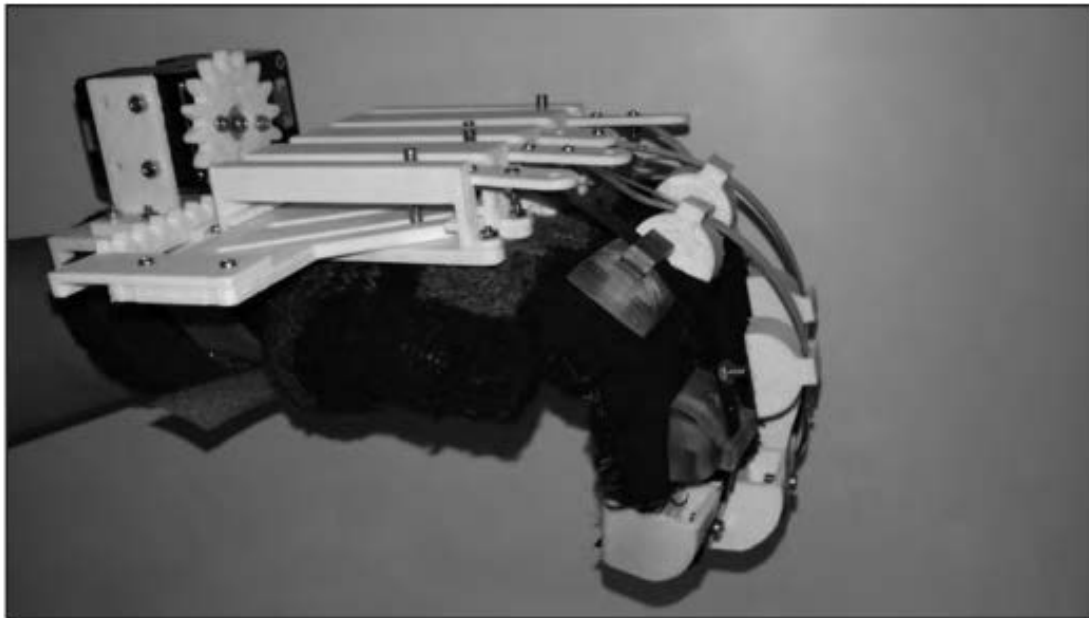
#### CONTACT US

**Dr. Dara Ajay, Head TTO**  
Technology Transfer Office,  
IPM Cell- IC&SR, IIT Madras

**IITM TTO Website:**  
<https://ipm.icsr.in/ipm/>

**Email:** [smipm-icsr@icsrpis.iitm.ac.in](mailto:smipm-icsr@icsrpis.iitm.ac.in)  
[sm-marketing@imail.iitm.ac.in](mailto:sm-marketing@imail.iitm.ac.in)

**Phone:** +91-44-2257 9756/ 9719



**FIG. 2.** Shows the prototype of hand rehabilitation device in flexed position.

### Key Features / Value Proposition



#### 1. Compact Design:

Single actuator minimizes device size and weight, enhancing portability and user comfort.



#### 2. Customizable Fit

Adjustable guide assembly and flexible metal bands cater to varying hand sizes and movement needs, ensuring personalized rehabilitation.



#### 3. Efficient Motion Translation

Cam plate and guide assembly convert linear motion into precise sliding motion, improving rehabilitation effectiveness.



#### 4. Simplified Mechanism

Reduced number of actuators lowers maintenance requirements and operational costs.



#### 5. Enhanced Durability

Robust metal bands and modular components ensure long-term reliability and consistent performance.



#### 6. User-Friendly Operation

Microcontroller integration allows for intuitive control and easy adjustments, facilitating user independence.

### CONTACT US

Dr. Dara Ajay, Head TTO  
Technology Transfer Office,  
IPM Cell- IC&SR, IIT Madras

**IITM TTO Website:**  
<https://ipm.icsr.in/ipm/>

Email: [smipm-icsr@icsrpis.iitm.ac.in](mailto:smipm-icsr@icsrpis.iitm.ac.in)

[sm-marketing@iimail.iitm.ac.in](mailto:sm-marketing@iimail.iitm.ac.in)

Phone: +91-44-2257 9756/ 9719