REHABVEDA

As seen on SHARK TANK INDIA SEASON 5

REHABVEDA R1

is an AI-powered Motor Imagery Brain–Computer Interface (MI-BCI) designed to restore upper-limb motor function by strengthening cortico-muscular pathways through neuroplasticity.

Revolutionizing Neuro-Rehabilitation Through Neurotechnology

RehabVeda R1 is a Revolutionary AI-Driven Neurotech Solution for Muscular Rehabilitation

RehabVeda R1 is more affordable and easier to use than Neuro_utions and Sy_ebo, making advanced neuro-rehabilitation accessible to more patients and clinics.

Accessible | Engaging | Clinically Effective

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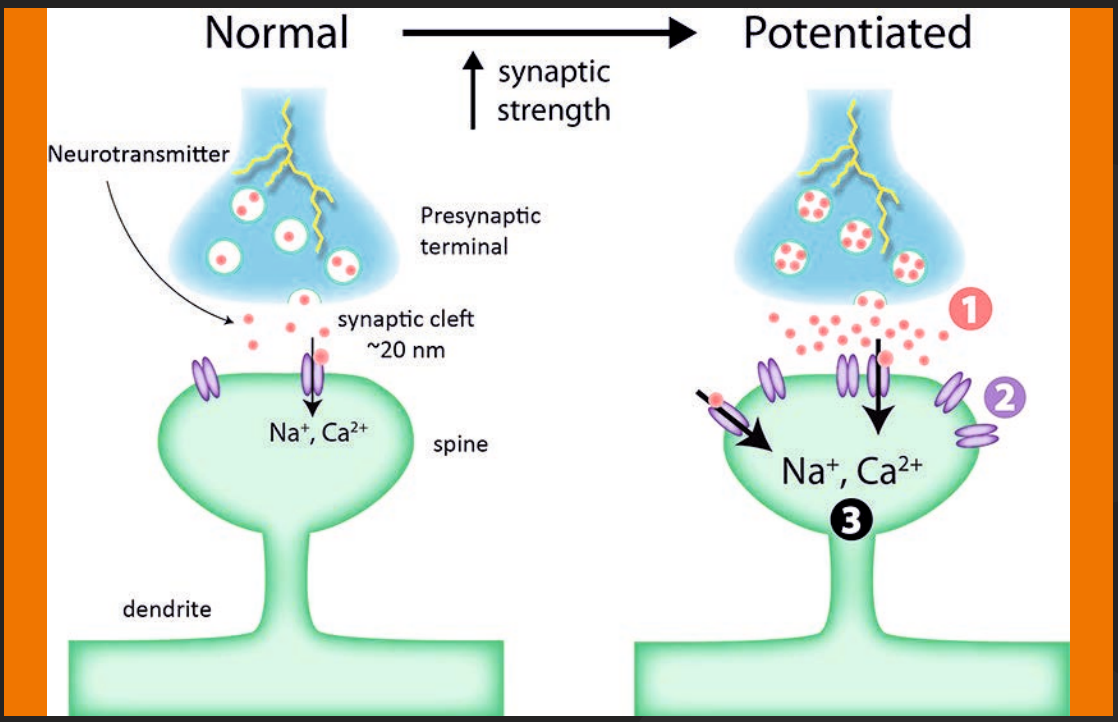
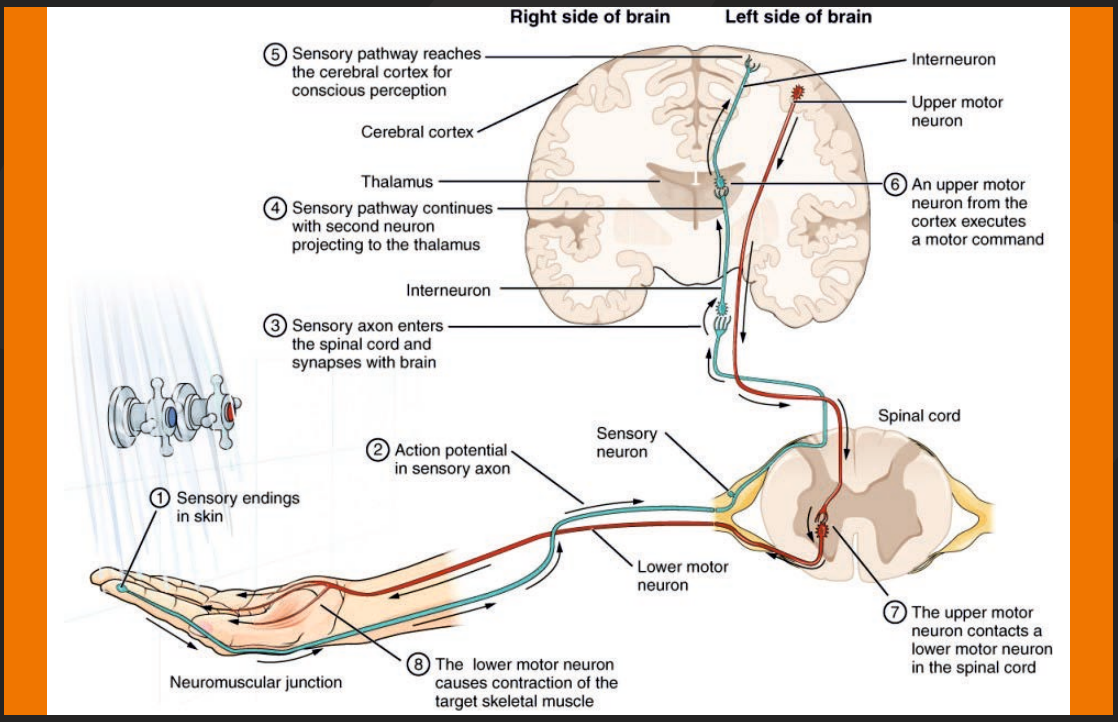
SCIENTIFIC RATIONALE:

NEUROPLASTICITY-DRIVEN MOTOR RECOVERY



MECHANISTIC MODEL OF

R1-INDUCED RECOVERY



RehabVeda

SCIENTIFIC RATIONALE

CM1: Spatial encoding
PMC: Planning of the movement
Pre-SMA: Timing of the movement
SMA: Modulatory influence on M1

Superior parietallobule:
Generation of mentalimage
Internal model of the action

Basal ganglia + cerebellum:
Motor preparation
Cerebellum: Inhibition of the motor command

Scientific Rationale: Neuroplasticity-Driven Motor Recovery

Motor Imagery Activates Motor Cortex

Motor imagery activates the premotor cortex, primary motor cortex (M1), and supplementary motor area (SMA).
This allows rehabilitation even when physical movement is impossible.

MI-BCI Enhances Cortico-Muscular Coupling

RehabVeda R1 translates EEG-detected motor imagery into glove-assisted motion, strengthening the Hebbian learning loop:
Thought - Motor Intention - Sensory Feedback - Cortical Rewiring - Movement Recovery

Evidence-Based Approach

A referenced MI-BCI clinical study (Frontiers in Human Neuroscience, 2023) demonstrated significant improvements in upper-limb recovery through motor-imagery-based neurorehabilitation.

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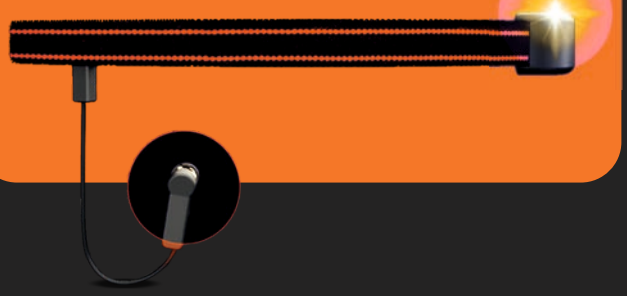
REHABVEDA R1:
SYSTEM ARCHITECTURE

Neural Interface

- Behaveneu B1 EEG Headband
- High-precision MI-optimized sensors
- Real-time cortical signal extraction



AI Processing Unit

- Onboard edge-AI microcomputer
- Autonomous artifact filtration
- Adaptive ML for personalized neural activation thresholds

Smart Pneumatic Glove

- Multi-chamber pneumatic actuation
- Active + passive finger motion
- Real-time synchronization with EEG intention

Therapist Interface

- Touchscreen monitoring
- Progress-based task selection
- Data visualization dashboards

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CLINICAL EVIDENCE & OUTCOMES

Clinical Evidence & Physiological Outcomes

Fugl-Meyer Assessment (FMA)

MI-BCI participants showed significantly higher motor gains compared to controls.

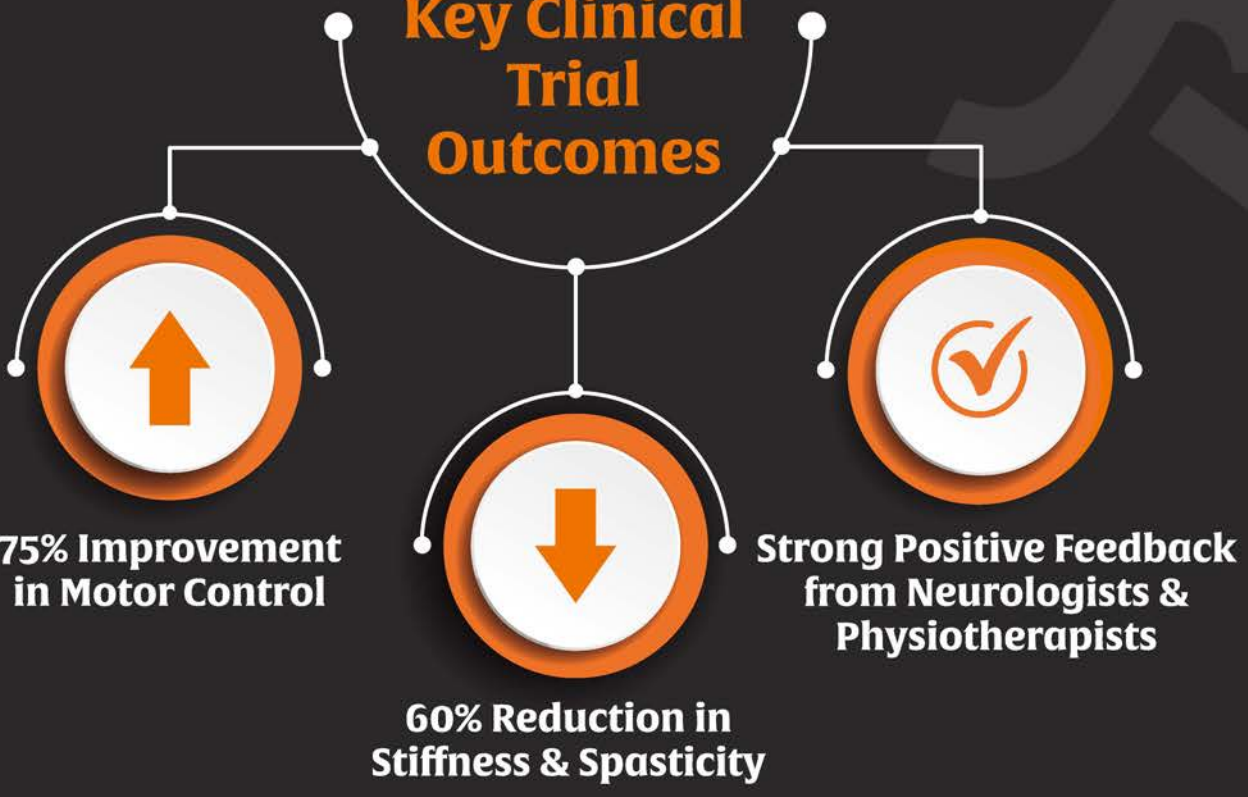
Motor Assessment Scale (MAS)

MAS scores improved substantially, indicating reduced spasticity and better functional control.

Neuroimaging Biomarkers

Reduction in high-density MCA (NCCT) signs suggests improved perfusion and neural tissue recovery.

CLINICAL TRIAL & EFFICACY DATA



Reference DOI: 10.3389/fnhum.2023.1117670

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CLINICAL INDICATIONS

- **Stroke Survivors**
  Hemiparesis, upper-limb dysfunction
- **Incomplete Spinal Cord Injury**
  Activation of spared corticospinal pathways
- **Neuromuscular Disorders**
  Facilitates functional retraining and motor unit activation
- **Geriatric Population**
  Cognitive-motor maintenance and functional hand use
- **Rehabilitation Hospitals & Neuro-Centers**
  Integrate advanced neurotech for improved outcomes

KEY ADVANTAGES FOR CLINICIANS

- **Non-Invasive & Drug-Free**
  - Pure EEG-driven neural activation
  - No pharmacologic burden
- **Data-Driven Rehabilitation**
  Mobile + desktop dashboards track:
  - Cortical activation frequency
  - Motor imagery accuracy
  - Repetition-quality score
  - Therapy adherence metrics
- **High Patient Engagement**
  Gamified neurofeedback improves participation and motivation
- **Scalable for Clinics**
  - Quick setup
  - Technician-friendly workflow
  - Portable and clinic-friendly system

MECHANISTIC MODEL OF R1-INDUCED RECOVERY

Stepwise Neural Recovery Flow

EEG-Detected Motor Imagery
Activates M1, SMA, premotor cortex.

Glove-Assisted Movement
Converts intention into guided motor output.

Adaptive Neural Rewiring
Hebbian plasticity creates stronger cortico-muscular pathways.

AI Pattern Recognition
Extracts neural intention biomarkers.

Sensory + Visual Feedback
Strengthens the sensorimotor loop.

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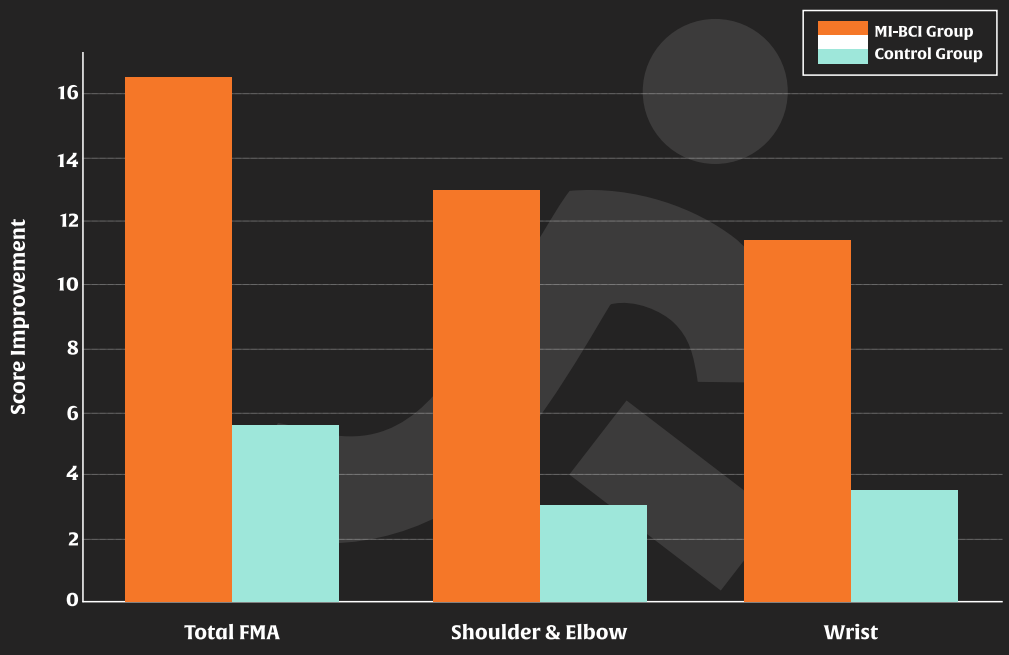
SCIENTIFIC STUDIES (FMA CHART)

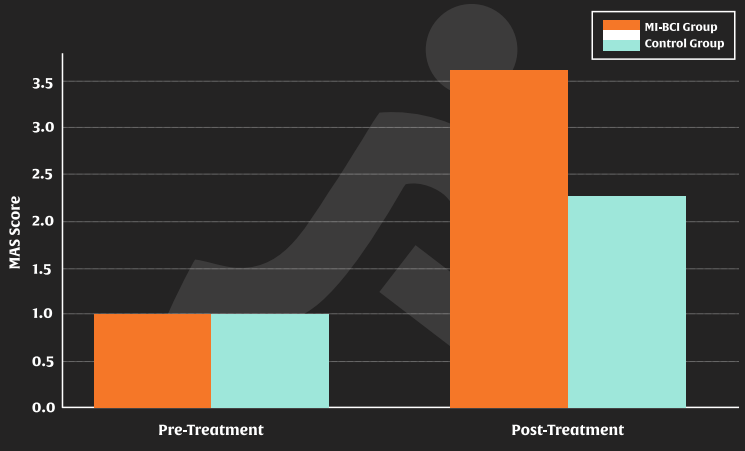
Fugl-Meyer Assessment (FMA) Results



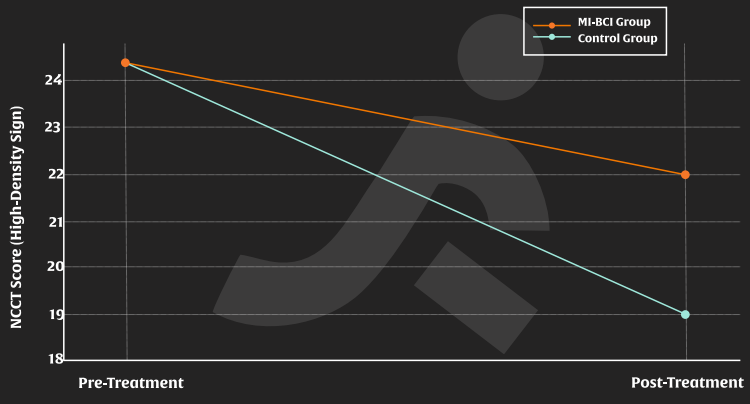
MI-BCI group shows consistently superior functional gains vs. controls.
This demonstrates improved voluntary control and neuroplastic recovery.

SCIENTIFIC STUDIES (MAS + NCCT)

Motor Assessment Scale (MAS) Improvement



NCCT Biomarker Improvement



☑ Post-Therapy MAS Improvements Show:

- Reduced spasticity
- Better functional hand use

☑ Reduction in MCA High-Density Signs Indicates:

- Improved perfusion
- Reduced tissue stress
- Improved neural recovery environment

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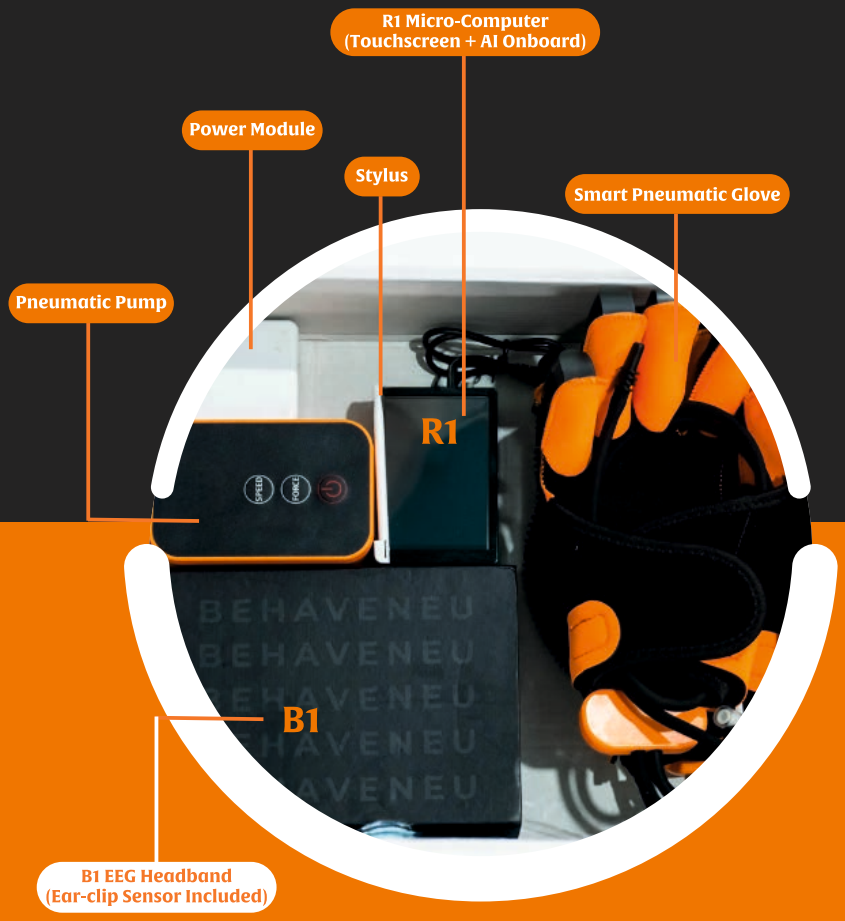
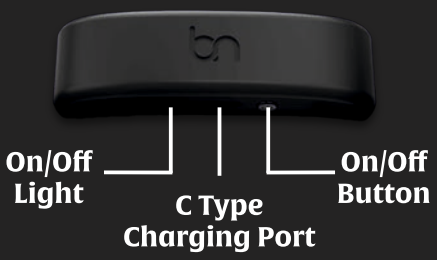
SYSTEM HARDWARE OVERVIEW





CLINICAL INTEGRATION

RehabVeda offers:

• Rental model for patients • Technical + clinical support

CUSTOMER CARE:

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Disclaimer- "Clinical outcomes may vary based on patient condition, severity, and therapy protocol."

Design by: SHADDOCCK