

Brain-Computer Interface (BCI) for neurorehabilitation

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Target : Hemiplegia after stroke / spinal cord injury

Paralysis results in prolonged hospitalization and disrupted lives.

TOP 4 + 40%

One of the world's
four major diseases

Number of patients increased
by 40% in the past 10 years

1/4 100 million

One in four will have a
stroke in their lifetime

Economic and livelihood
losses



Feigin et al. *Lancet* (2013); The World Health Organization (WHO). *World Health Report* (2002).

Problem : No effective treatment for severe hand paralysis

Mild-Moderate

Conventional



Moderate-Severe

Our target

Unmet Needs!



Severe patients: **30% of 100M**



Economic burden: **\$900B/yr**

Approach : Targeting the Brain

Our solution directly rewires the brain to enable recovery beyond conventional rehabilitation.

Our BCI



LIFESCAPES Inc.

Conventional



Langhorne et al. *Lancet Neurol* (2009)

Targeting the paralyzed hand,
without ability to modulate the brain.

Solution : Brain-Computer Interface (BCI) for treatment

BCI reorganizes brain circuits, enabling hand movement even after the device is removed.

**Reorganizing
brain circuits**

Wearable, non-invasive EEG sensor
Brain signals are read out.

Robot

Supports finger movement and stimulates muscles via electrical stimulation

Software

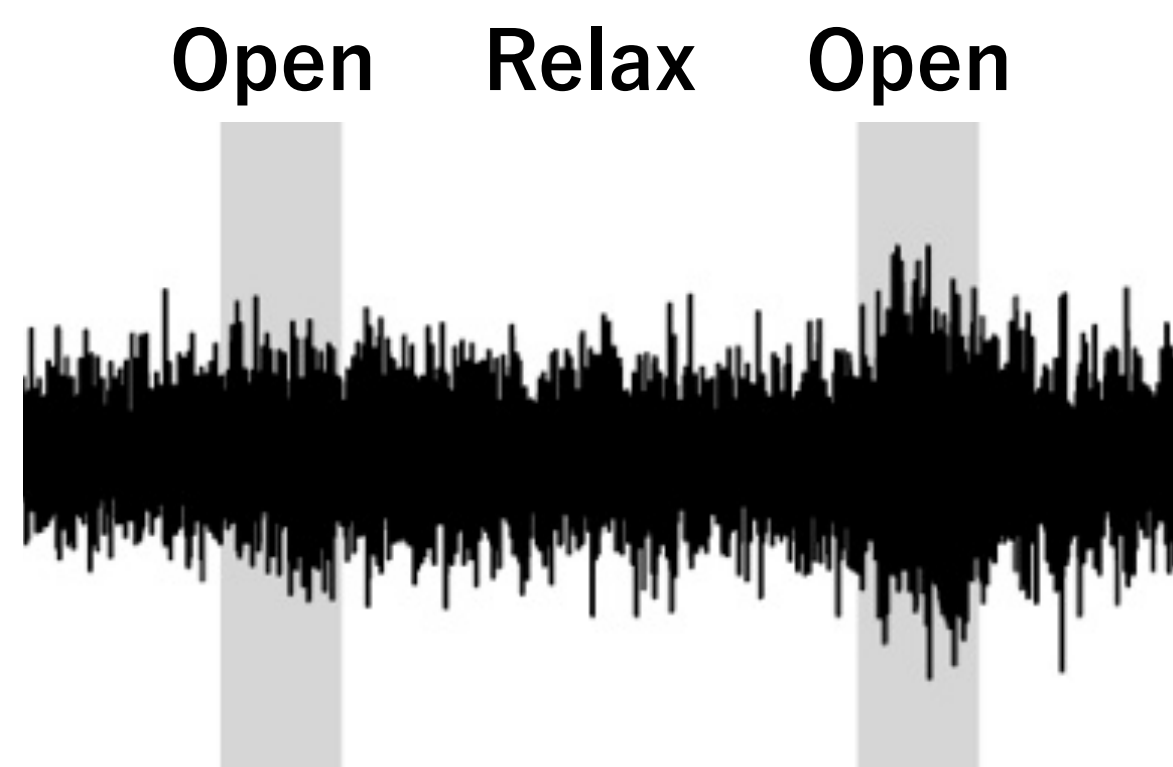
Signals are analyzed, and the robot is driven when brain activity is detected.

Impact : Restoring the 'untreatable.'

74% recovery in just 10 days (40 min/day): even in chronic severe paralysis.

BEFORE (Severe)

Muscle
response

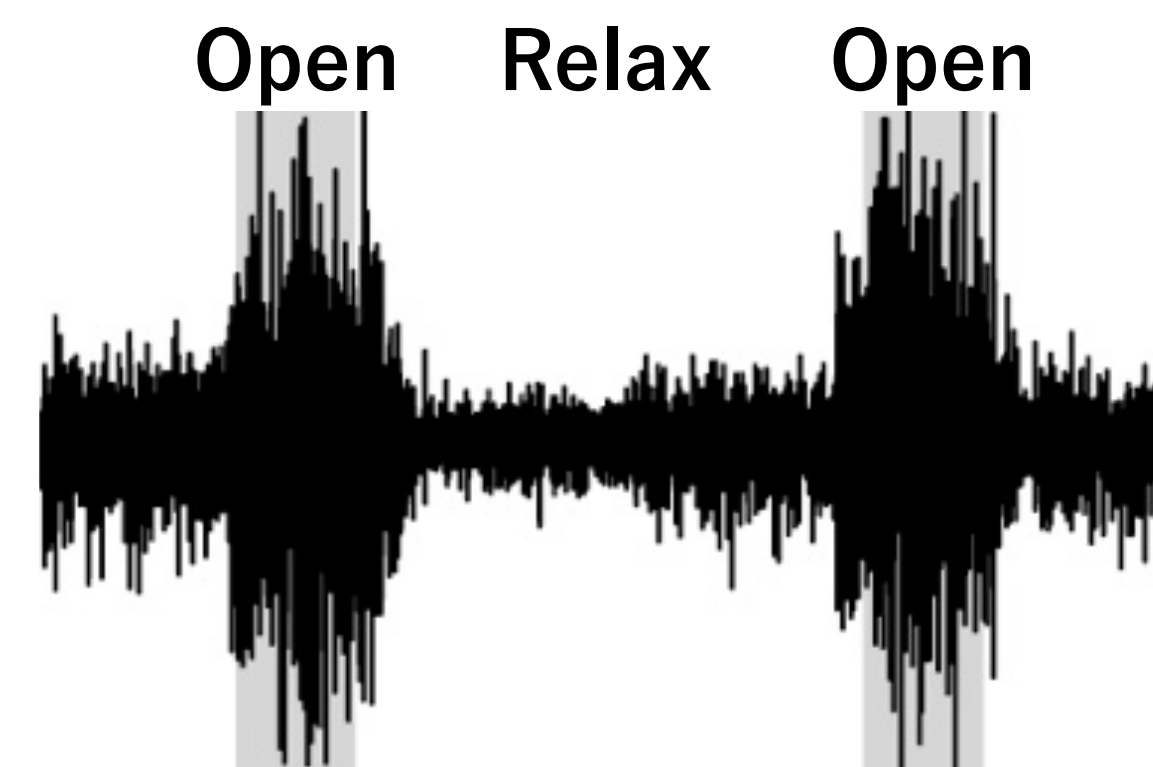


Finger
movement



Fingers clenched, impairing grasp

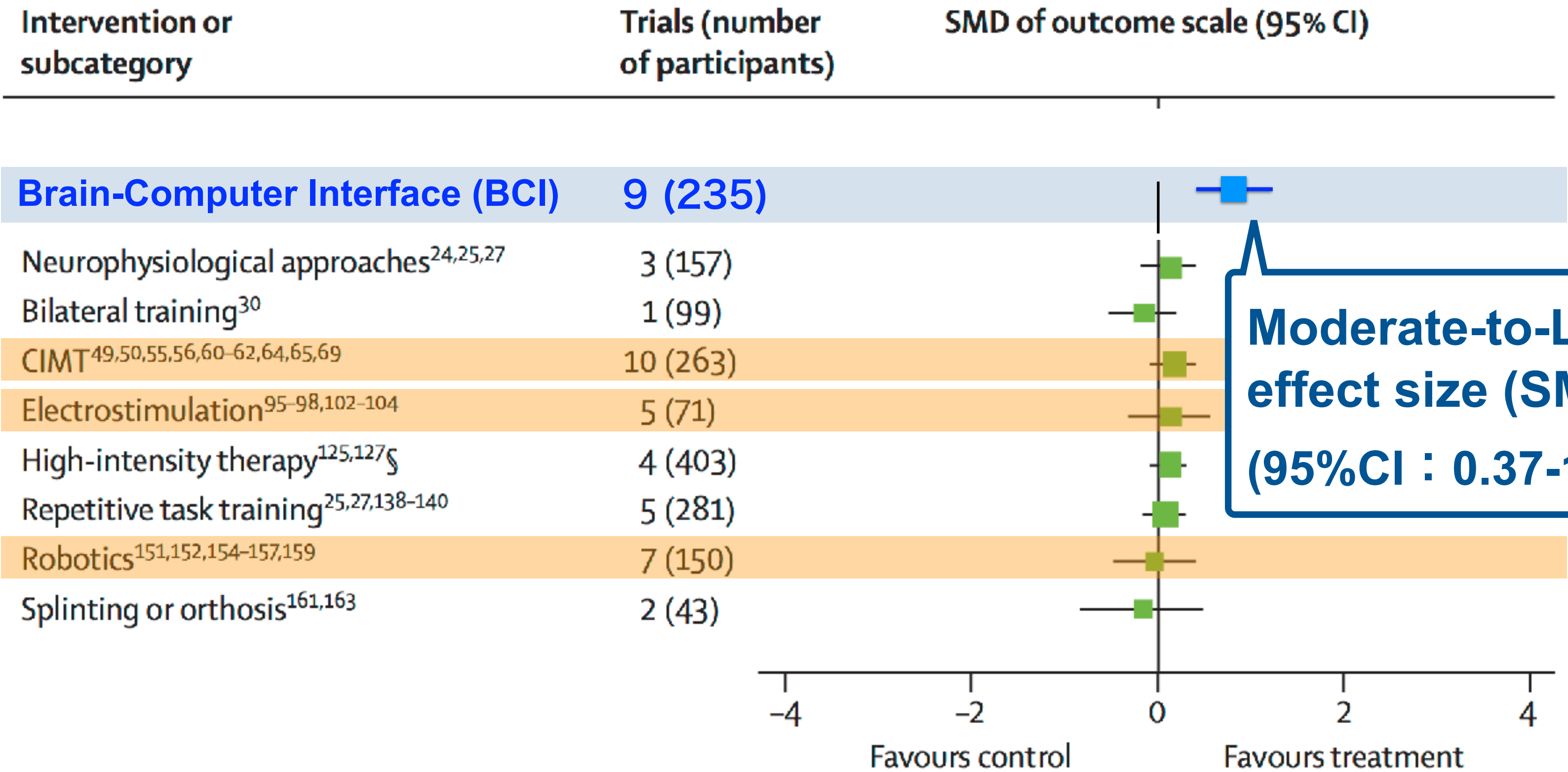
2w (Moderate)



enable grasp/release

Advantage : Meta-analysis confirms treatment effectiveness

A meta-analysis integrating the results of 9 randomized controlled trials conducted around the world, totaling 235 cases, revealed that BCI induced greater recovery of hand motor function over conventional methods.



(*) Cervera et al. *Ann Clin Transl Neurol* (2018)
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Original table comes from *Langhorne et al. Lancet Neurol* (2009)

Vision : “Disused hand” can be turned into “Functional hand”

