



World Stroke  
Organization

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**A translational roadmap for the use of precision non-invasive brain stimulation in stroke rehabilitation**

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Guidelines



## A translational roadmap for transcranial magnetic and direct current stimulation in stroke rehabilitation: Consensus-based core recommendations from the third stroke recovery and rehabilitation roundtable

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- **Key outputs:** 5 Core Recommendations and development of a new SRRR3 Unified NIBS Research Checklist

## Recommendation 1

Preclinical and clinical studies/trials should:

- (a) systematically compare stimulation parameters within and across modalities and quantify the effects of these parameters on the brain and behavior, and;
- (b) use an evidence-based biological framework for target selection and confirm the intervention effect at the level of the target.

***Knowledge Gap 1:  
NIBS Mechanisms***

## ***Knowledge Gap 2: Methodological Rigor***

### Recommendation 2

Preclinical and clinical studies/trials should:

- (a) include pre-registration and use of appropriate patient eligibility criteria, blinding and sham stimulation protocols, and appropriate paired therapies;
- (b) conduct and report prospective power analysis to determine samples sizes appropriate to test primary hypotheses, and;
- (c) use the SRRR3 Unified Checklist for NIBS Research and adhere to current recommended design and reporting guidelines.

## ***Knowledge Gap 3: Outcome Standardization***

### Recommendation 3

- (a) Preclinical studies should:
  - (i) conduct complete outcome assessments across cellular-molecular, physiological and behavioral domains, and;
  - (ii) include standardized behavioral outcomes common to human studies
- (b) Clinical studies/trials should:
  - (i) use standardized assessments with established psychometric properties, and;
  - (ii) report the minimal clinically important difference for outcomes that align with ICF categories and/or study hypotheses.

## ***Knowledge Gap 4: Clinically Relevant Preclinical Animal Models***

### Recommendation 4

Preclinical studies should use stroke animal models that:

- (a) include head-equipment size relationship, aged animals, comorbidities, behavioral assessments, and the clinical trajectory of recovery in humans.

## ***Knowledge Gap 5: Optimized and Individualized NIBS Protocols***

### Recommendation 5

Preclinical and clinical studies/trials should:

- (a) test multi-domain NIBS response;
- (b) have sufficient sample sizes to identify response phenotypes; and
- (c) use appropriate statistical methodology to identify predictive biomarkers.