

Elevating TMS With Objective Brain Measurement

CASE 1: DEPRESSION AND ANXIETY

DOCUMENTING NEUROPHYSIOLOGIC CHANGE WITH THE FIREFLY PLATFORM

Transcranial Magnetic Stimulation (TMS)

is delivered using defined stimulation parameters and precise cortical targeting.

Yet treatment response is often assessed primarily through symptom scales and patient report. While standardized questionnaires remain essential, they do not directly measure brain function.

The Firefly platform brings cognitive electrophysiology into TMS practice through quantitative EEG brain mapping.

By providing objective biomarkers of brain function before and after treatment, it enables providers to evaluate physiologic change alongside clinical improvement.

Through structured pre and post assessment, TMS providers can:

- Establish baseline power abnormalities
 - Define regional deviations across slow and fast frequencies
 - Measure normalization following treatment
 - Align electrophysiologic findings with standardized symptom outcomes

The following cases illustrate how integrating objective brain based measurement into TMS workflows strengthens clinical evaluation and documents measurable treatment response.

Patient Profile:

A 46 year old patient presented with depression and reported attention and focus symptoms.

Treatment Protocol:

- ✓ Brainsway H1 TMS
- ✓ Standard MDD Protocol
- ✓ Anxiety + Memory Enhancement
- ✓ 20 Sessions over 4 weeks

Baseline Brain Findings

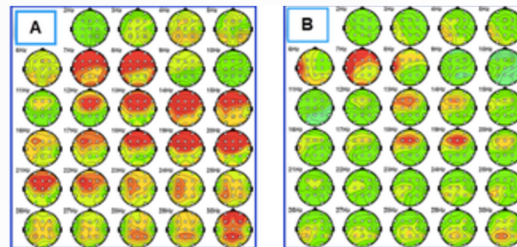
1

Quantitative EEG brain mapping demonstrated a notable global high power feature across slow and fast frequencies.

2

These deviations were most significant in the **frontal and parietal regions**.

Post Treatment Brain Findings



Baseline brain activity before treatment

Shows widespread elevated slow-wave activity (red areas), indicating abnormal power patterns.

Brain activity after 20 TMS sessions

Demonstrates normalization of power across multiple regions (green), particularly in the frontal and parietal cortex.

■ Elevated deviation from normative database
■ Within normal range

Follow-up quantitative EEG mapping demonstrated substantial normalization of brain activity.

As seen in the brain maps on the left:

- The baseline map (A) shows widespread elevated slow-wave activity (red regions).
- After 20 TMS sessions (map B), these abnormalities largely resolve, with activity returning to the normative range (green).

The most notable normalization occurred in the frontal and parietal regions, areas associated with mood regulation and executive function.

What This Demonstrates

This case illustrates how cognitive electrophysiology can be integrated into TMS workflows to measure treatment response over time.

Using the Firefly platform, clinicians were able to:

- Establish a baseline electrophysiologic profile before treatment
- Monitor changes after therapy using the same objective measures
- Document physiologic improvement alongside symptom improvement

This approach transforms treatment evaluation from subjective reporting to measurable brain-based change.

Elevating TMS With Objective Brain Measurement

CASE 2: DEPRESSION WITH ATTENTION AND FOCUS SYMPTOMS

Patient Profile:

A 46 year old patient presented with depression and reported attention and focus symptoms.

Treatment Protocol:

- ✓ Magstim TMS
- ✓ Accelerated Theta Burst Stimulation
- ✓ Left Dorsolateral Prefrontal Cortex
- ✓ 20 Sessions of accelerated iTBS

Baseline Brain Findings

Baseline brain mapping demonstrated a power deficit in the **4-5 Hz range in the left temporal and parietal regions.**

This pattern is often associated with **impaired attentional processing and network inefficiency**, which aligns with the patient's reported focus and attention symptoms.

Post Treatment Brain Findings

Follow up mapping demonstrated significant improvement in 4 to 5 Hz power, moving toward a more normal pattern.

Significant increases in beta power were observed, particularly in the left prefrontal and left parietal regions.

What This Demonstrates

Objective Treatment Monitoring

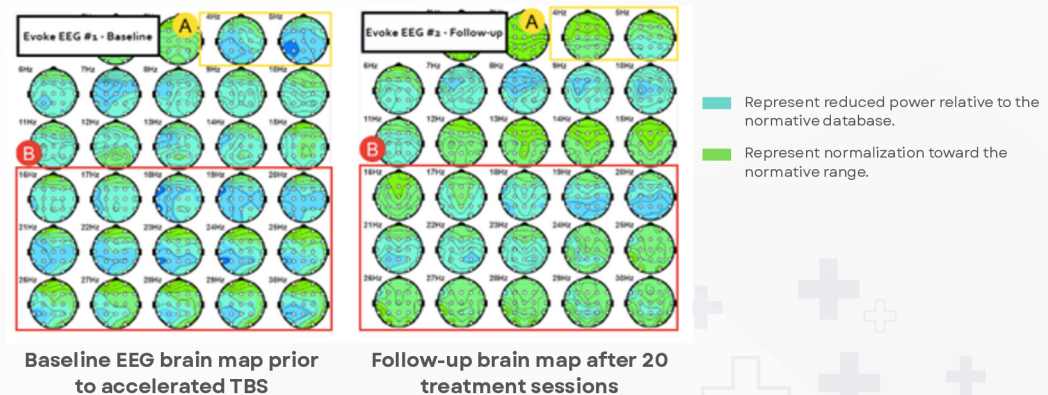
Baseline and follow-up brain mapping documented measurable physiologic change following TMS therapy.

Treatment Validation

Electrophysiologic normalization occurred in the same regions targeted during stimulation.

Clearer Clinical Communication

Objective brain maps provide visual evidence of treatment response that can be shared with patients and referring providers.



Elevating TMS With Objective Brain Measurement

WHY THIS MATTERS FOR TMS PRACTICES



Clinical Evidence of Change

Objective electrophysiologic biomarkers provide measurable evidence of brain function before and after treatment.

This allows clinicians to document physiologic treatment response alongside symptom improvement.



Structured Treatment Monitoring

Baseline and follow-up quantitative EEG assessments establish a defined physiologic reference point and a measurable comparison over time.

This enables clinicians to track how brain function changes throughout treatment.



Clearer Patient Conversations

Brain mapping provides visual, objective data that can support discussions about treatment progress and response.

This may help patients better understand how their brain function is changing during therapy.