

## **VERIFY TMS Technique Check – Standard Sites**

This document is designed for experienced TMS users to check the technique of TMS Operators for the VERIFY study.

The key competencies identified in this document should be checked by an experienced TMS user while they observe the VERIFY TMS Operator completing a session with a healthy volunteer. Ideally this will take place in person, though it may be necessary to complete a technique check remotely using a videocall.

Before this TMS Technique Check, all TMS Operators at a site are expected to:

- Have successfully completed all the self-directed online training available at <https://verifytraining.blogs.auckland.ac.nz/>
- Have submitted 3 healthy volunteer datasets that are approved by the TMS team
- Have received the “green light” from the VERIFY team to proceed with the technique check

Successful completion of data collection sessions with healthy volunteers involves completing the VERIFY TMS protocol with these volunteers, uploading the data to REDCap, and having the data approved by the VERIFY TMS team.

Once the TMS Technique Check and this documentation is complete, this document ought to be emailed to [verify.study.tms@gmail.com](mailto:verify.study.tms@gmail.com).

If the person checking the TMS Operator’s technique identifies any shortcomings they ought to rectify them by providing instruction and training. If this can’t be achieved within the time available then the outcome of the technique check is that the operator is not ready to use TMS with VERIFY patients. Additional practice and a second technique check should be arranged.

### **VERIFY TMS Operator**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## TMS Technique Check

Note that the TMS Operator needs to start the TMS assessment from the beginning so that the technique check includes all components of the assessment. If the healthy volunteer already has EMG electrodes on one upper limb from a previous test, the TMS Operator will need to prepare and test their other upper limb, so that they can demonstrate correct EMG preparation and set up.

Competency	Yes/No	Comments
<p><b>Can screen patient for contraindications to TMS</b></p> <ul style="list-style-type: none"><li>▪ Accurately completes the TMS Safety Checklist. <i>For VERIFY this is done in consultation with the patient, their family, and the patient's clinical notes.</i></li><li>▪ Provides the patient and their family with an accurate and concise explanation of the TMS procedure. <i>The operator ought to demonstrate this ability by explaining the TMS procedure to the healthy volunteer.</i></li></ul>		
<p><b>Can record surface EMG</b></p> <ul style="list-style-type: none"><li>▪ Prepares the skin appropriately.</li><li>▪ Accurately positions EMG electrodes over the target muscle(s) and reference site, as well as the ground strap if it is used.</li><li>▪ Correctly connects the EMG electrodes to the EMG recording system.</li><li>▪ Correctly uses EMG system software to display EMG activity.</li></ul>		

<ul style="list-style-type: none"> <li>▪ Can discern between acceptable and unacceptable EMG signals, and between biological and non-biological sources of noise in the signal. <i>If there is no noise in the EMG signal you can check the operator’s understanding by verbally quizzing them.</i></li> <li>▪ Can trouble-shoot to improve the quality of the EMG signal as required. <i>If there is no noise in the EMG signal you can check the operator’s understanding by verbally quizzing them.</i></li> </ul>		
<p><b>Can carry out a TMS testing session</b></p> <ul style="list-style-type: none"> <li>▪ Communicates effectively with the patient before and during the testing procedure. <i>The operate ought to demonstrate this ability by communicating effectively to the healthy volunteer during testing, so they know what to expect at each step.</i></li> <li>▪ Safely turns on and checks that the TMS unit is working.</li> <li>▪ Appropriately positions the TMS coil over the patient’s head over the area of the primary motor cortex.</li> <li>▪ Starts with stimulator intensity of 30%.</li> <li>▪ Appropriately re-positions the TMS coil at each stimulus intensity in order to locate the optimal stimulation site.</li> <li>▪ Increases the stimulus intensity as required in 10% increments and with communication to the patient if no motor evoked potentials (MEPs) have been elicited.</li> </ul>		

<ul style="list-style-type: none"> <li>▪ Accurately evaluates whether MEPs can be elicited in the target muscle(s). <i>If an MEP or MEP-like response is elicited, the operator should deliver 9 more stimuli in the same coil position and at the same stimulus intensity.</i></li>   <li>▪ Can confidently stimulate at 100% intensity while participant performs bilateral facilitation. <i>Get TMSO to deliver approx. 5 stimulations at 100% MSO while volunteer performs bilateral facilitation. Assess TMSO's comfort delivering high intensity stimulation and their instructions to the participant for bilateral facilitation. Check no new electrical noise issues appear during bilateral facilitation.</i></li>   <li>▪ Demonstrates ability to determine MEP status while keeping volunteer blinded. <i>If this can't be done due to the nature of the technique check then ask the operator how they will keep stroke patients blinded to MEP status</i></li>   <li>▪ Correctly identifies whether the stimulus intensity produces MEPs in at least 3 out of 10 traces</li>   <li>▪ Correctly classifies the participant as MEP+ or MEP-.</li>   <li>▪ Monitors the patient throughout the TMS session and responds appropriately.</li>   <li>▪ Correctly completes VERIFY TMS source document.</li>   <li>▪ Removes EMG electrodes and cleans patient's skin.</li> </ul>		
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<ul style="list-style-type: none"> <li>▪ Disconnects, turns off and stores equipment correctly.</li>   <li>▪ Knows how to clinically monitor the patient after the TMS session. <i>Healthy volunteers do not require clinical monitoring so you can verbally quiz the TMS Operator on when the checks should be performed with patients and what they involve.</i></li> </ul>		
<p><b>Post-session debrief:</b></p>		<p><b>Recommendation:</b></p> <p>Ready to use TMS with patients as part of the VERIFY study?</p> <p style="text-align: center;"><b>YES</b>                      <b>NO</b></p> <p>If no, outline further self-directed or supervised learning required:</p>

**VERIFY Technique Checker**

Name: \_\_\_\_\_

Signed: \_\_\_\_\_

Date: \_\_\_\_\_