

What are ENoGs?

Electroneuronography testing is performed by stimulating the stylomastoid foramen with electrical stimuli. This procedure will cause a reaction at the nasio-labial fold, which can be recorded with the use of electrodes. The process is used to evaluate and measure the integrity of the facial nerve. By comparing the responses from each side of the face, it is possible to determine the amount of degeneration and the best course of action for treatment. Patients with facial nerve disorders will experience difficulty performing simple actions such as eating, blinking or smiling; some patients will need to take additional steps for eye protection while the problem persists.

An ENoG recording will contain a small peak corresponding to the Masseter muscle, followed by negative peak N1, then positive peak P1 and negative peak N2; which occur at around 4.5, 7.5 and 12.5 milliseconds respectively.

Why use ENoGs?

ENoG testing for normal facial nerve integrity, when combined with the right battery of tests, can provide valuable diagnostic information about the following conditions:

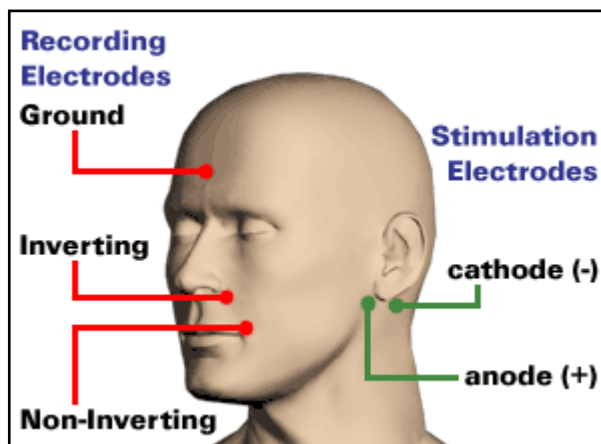
- Bell's Palsy,
- Otitis Media,
- Multiple Sclerosis,
- Facial nerve neuromas,
- Central nervous system disorders,
- Surgically induced injuries,
- Trauma to the temporal bone
- Mastoiditis.

All of these conditions may cause facial nerve palsy, and will cause the ENoG response to reduce significantly in amplitude or to appear unidentifiable in the recording.

Patient Preparation

The patient must be placed in a comfortable environment, where the patient sits upright on a comfortable chair. It is recommended to advise the customer about the stimulation being presented in a sensitive manner. Electrodes and stimulators may be placed in the following configuration:

- Cathode (-): Behind earlobe
- Anode (+): Ahead of earlobe
- Inverting (-) and Non-Inverting: naso-labial fold ipsilaterally
- Ground: Forehead



If the response is 'triphasic' or the mandible starts moving along with the stimulus, then the electrodes will need to be repositioned to minimize Masseter response. Recording electrodes may also be placed across the top of the ipsilateral eyebrow; also used for intra-operative monitoring.



WARNING: When using the somatosensory equipment, The Subject **MUST BE DISCONNECTED FROM THE STIMULATOR BEFORE POWERING UP.** Electrical shock may occur. Maintain the Dial on the stimulator to the lowest position when the equipment is not in use.

Setting up SmartEP

Complete the following steps to set up SmartEP for ENoG acquisition:

- On the SmartEP main menu, select **Stimulus > Modality > Somatosensory > Standard**.
- Click on the **EEG and Amplifier** button in the Control Panel and set the filters, notch filter, artifact rejection, and desired amplification for each channel. Turn OFF channels that will not be used.
- Click on **Stimulus > Select** Stimulus to edit the stimulus settings.
- Choose your intensity, rate, and number of sweeps.
- Click Acquire to start testing.

Carefully select your filter settings in the EEG and Amplifier dialog box. Lack of filtering may result in excessive artifact, excessive filtering may result in waveforms that are too smooth to assess correctly. EEG and Amplifier settings may need to be adjusted more than once.

Recommended Settings

It is recommended to run this test two to four times, using the following settings:

Stimulus	Monophasic or biphasic pulse of 200 microseconds in duration.
Rate	1.1 per second
Phase	Positive
Transducers	Somatosensory stimulator probe with pair of electrodes.
Intensity	15 to 25 mA (or enough to produce supramaximal response, additional stimulation will not produce better results)
Gain	5K
Filters	1 - 5000 Hz
Notch Filter:	OFF.
Amplification	5k or less (An amplifier designed for this kind of testing is required)
Analysis Time Window	20 milliseconds. Extra milliseconds of pre stimulus baseline can be added to the view using the PP menu.
Sweeps	1 - 20

Electrode Montage

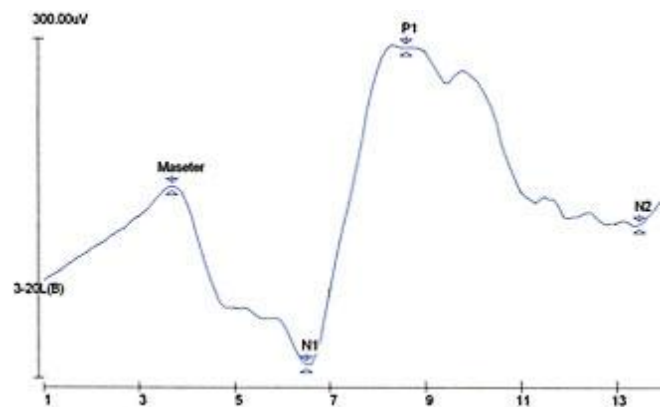
Along the nasolabial fold or near the forehead above the eyebrows, ground to the forehead for the recording electrodes. Stimulation electrodes at the stylomastoid foramen region with the cathode behind the earlobe.

Marking Peaks

For an accurate diagnosis, you may need to place the applicable labels on the recently acquired recording. P1 and N1 may be marked when recognizable follow these steps for each of the labels:

- Right click at the point of the recording where the label is to be placed.
- Select "Mark Other Peak..."
- Select the peak to be marked.
- Drag the marker into position as needed.

The graph shows suggested label placing for an acquired eNOG.



Analysis

Select Print Pages or Print Page from the SmartEP main Menu to print a report of the currently displayed signals. See the SmartEP manual for other report generation options.

Since label placement is subjective, all results must be evaluated by an audiologist or medical professional trained in eNOG techniques.