Estimation of Intraoperative Stimulation Threshold of the Facial Nerve from Patients With Hemifacial Spasm



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# Introduction

Facial weakness is a debilitating complication of surgical manipulation of the facial nerve. Intraoperative neuromonitoring has reduced incidence of functional impairment but no clear guidelines and approach regarding interpretation of electrophysiological results exists. Most studies describe subjects with facial nerves encumbered by tumors. We sought to assess the neurophysiological parameters in patients undergoing microvascular decompression for hemifacial spasm to characterize the response of facial nerves with less severe pathology than previously reported in the literature.

## Methods

- Baseline STs were obtained in 33 patients with normal facial function undergoing microvascular decompression for hemifacial spasm.
- Currents of 0.2 mA, 0.1 mA, 0.05 mA, and 0.025 mA were applied to the proximal facial nerve (i.e. along its attached segment to the pons).
- Resulting waveforms were characterized according to schematic below.



### Results

- CMAP were generated at all of the tested stimulation currents in the orbicularis oculi and mentalis muscles indicating effective nerve conduction. This included at a current of 0.025 mA.
- Paired comparison shows decreasing CMAP amplitude and increasing onset latency with increasing nerve stimulation.

Table 1: Obicularis O	culi					
Stimulation Current (mA)	Onset Latency (ms)	Termination Latency (ms)	Duration (ms)	Peak Latency (ms)	Peak Amplitude (uV)	Peak to Peak Amplitude (uV)
0.025 (n=15)	6.52 ± 0.280	16.99 ± 0.791	10.46 ± 0.740	11.11 ± 0.779	100.32 ± 31.028	194.03 ± 55.248
0.2 (n=28)	5.78 ± 0.116	17.99 ± 0.620	12.21 ± 0.636	10.84 ± 0.369	368.88 ± 61.487	591.73 ± 89.678
fable 2: Mentalis						
Stimulation Current (mA)	Onset Latency (ms)	Termination Latency (ms)	Duration (ms)	Peak Latency (ms)	Peak Amplitude (uV)	Peak to Peak Amplitude (uV)
0.025 (n=15)	5.77 ± 0.153	18.67 ± 0.851	12.91 ± 0.922	10.84 ± 0.289	469.53 ± 104.471	982.37 ± 219.80

tEMG Patient Data



### Conclusions

- Our results provide reference values that are useful in determining facial nerve functionality during procedures at risk of injurying it.
- Facial nerve responses were recorded at 0.025 mA which is a lower stimulation than previously reported and a ST of <0.05 mA should be considered for an expected functional facial nerve.
- Given the absence of compressive tumor pathology, our results are a closer approximation of the response of a normal facial nerve.

#### **References:**

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- Marin P, Pouliot D, Fradet G. Facial nerve outcome with a peroperative stimulation threshold under 0.05 mA. The Laryngoscope 2011;121:2295-2298.