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Interference with Processed Electroencephalographic Recording by Facial Nerve Stimulation

To the Editor:—Over the past several years there has been an increase in the application of automated electroencephalogram (EEG) processing in patients undergoing anesthesia and surgery. Most operating rooms contain numerous devices capable of generating electrical interference sufficient to disturb EEG recording. We have observed that stimulating the facial nerve using a nerve stimulator (Model 91-M3, J. H. Emerson Co., Cambridge, Massachusetts 02140) and peripheral nerve stimulation electrodes (NDM Corporation, Dayton, Ohio 45439) interferes with the display of several of the currently available EEG processors, *e.g.*, the Cerebral Function Monitor (CFM, Model 870, Critikon, Inc., Tampa, Florida 33607), the power spectral analyzer (PSA-1, Neurologics, Inc., Nashville, Tennessee 37215), and Compressed Spectral Analysis (CSA, software developed at our institution and implemented on Digital Equipment Corporation MINC 11/23 computer).

During a recent carotid endarterectomy, the facial nerve was stimulated continuously at 1 Hz to assess the degree of neuromuscular blockade. The display on the CFM (average mode) observed at that time appeared normal and was not substantially different from that previously observed in patients not having their facial nerve stimulated. However, when stimulation was discontinued, a marked decrease of power and increase of frequency occurred, and only then was the contribution of peripheral nerve stimulation to the earlier CFM display appreciated. If stimulation had not been discontinued, the decrease of the power display that subsequently was observed when the carotid artery was clamped might have been obscured. Subsequently we observed that stimulation of the facial nerve interferes with the CFM display in either the average or actual mode, whether the stimulation mode is 1 Hz or train-of-four (fig. 1).

Stimulation of the facial nerve (1 Hz or train-of-four) also increases the amplitude of the power display of the PSA-1. At our institution, a permanent record of the visual display of the PSA-1 is obtained by attaching the power and frequency outputs to strip chart recorders. As with the CFM, the pattern of the display on the PSA-1 appears normal during 1 Hz stimulation of the facial

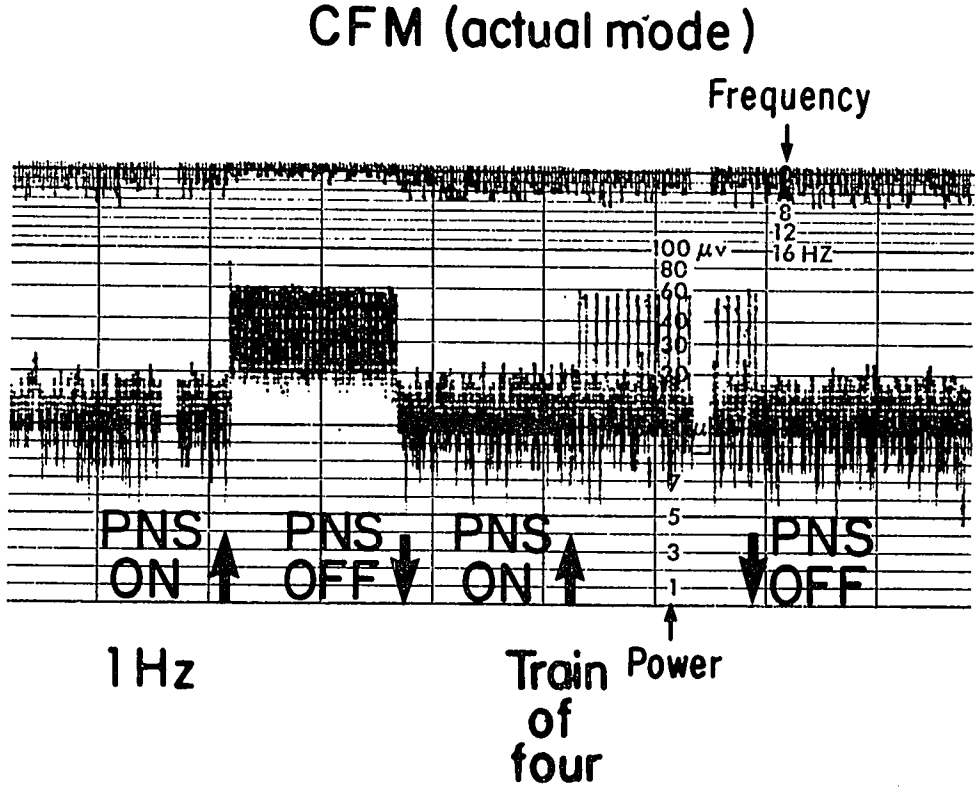

FIG. 1. A portion of a CFM tracing is shown with the CFM set in the actual mode, paper speed at 30 cm/h. Stimulation of the facial nerve at 1 Hz or with repeated "train of four" causes an obvious change in the power and frequency displays.

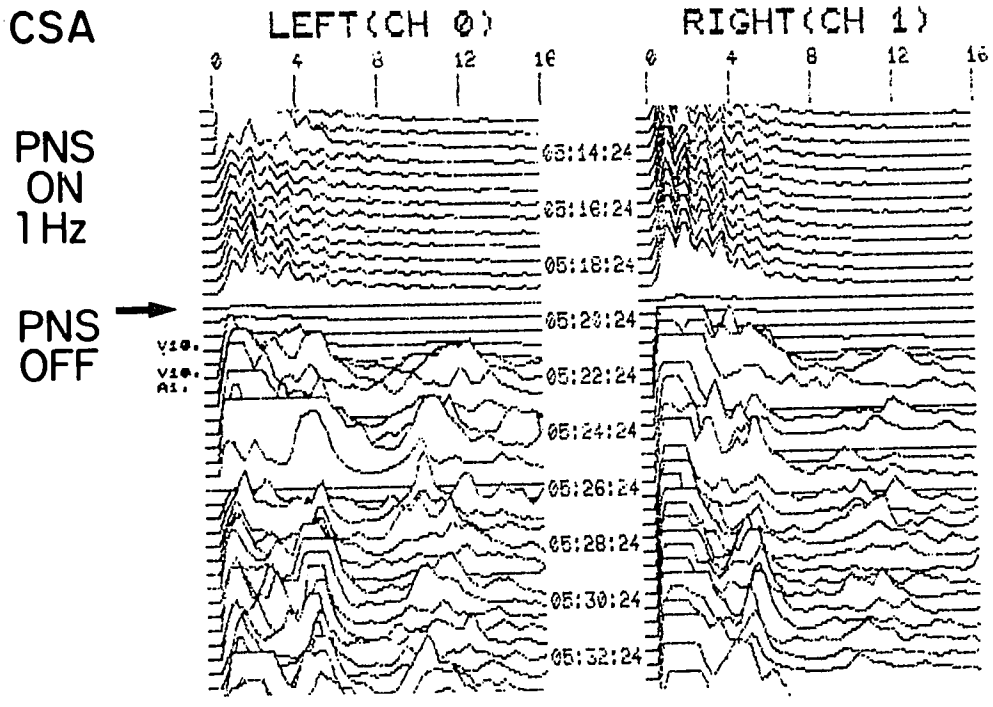

FIG. 2. A portion of a CSA tracing is shown. At the beginning of the tracing (*top*) the PNS is stimulating the facial nerve at 1 Hz and the CSA display is clearly abnormal. When stimulation of the facial nerve is discontinued, a normal CSA tracing is observed.

nerve, so that the increase in the amplitude of the power display caused by nerve stimulation may go unrecognized until stimulation is discontinued.

In contrast to its effect on the CFM or PSA-1, stimulation of the facial nerve produces an artifact in the CSA display that is distinguished easily from a normal display (fig. 2). When stimulation is discontinued and software gain settings reset, a normal CSA display is observed. Stimulation of the ulnar nerve at the wrist causes no interference on either the CFM, PSA-1, or CSA.

The purpose of this communication is to alert users of the CFM, PSA-1, or CSA to the interference caused by stimulation of the facial nerve and to the potential for failure to recognize significant EEG events due to this interference.

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An Atraumatic Method for Topical Application of Local Anesthetics to the Nasal Mucosa

To the Editor:—The topical application of cocaine or other local anesthetics to the nasal mucosa using cotton swabs or the Macintosh atomizer can be distressing to the awake patient. In addition, devices of such large caliber inserted through the nares have the potential for causing epistaxis.

To circumvent these problems, we have adapted the Portex epidural catheter (No. 389300, Portex Inc., Wilmington, Massachusetts), cut to a length of approximately 15 cm and attached to a syringe, for this purpose. The catheter is advanced gradually into the nasal cavity using a to-and-fro motion, while maintaining a slow steady pressure on the syringe plunger. The radially oriented holes in the terminal 2 cm of the catheter provide good coverage