

Title: Peripheral Nerve Stimulator – Adult Use

Source: Critical Care Nursing
Station 20 Breakthrough Committee

I. Revision History:

Approval: Anesthesia Department
Critical Care Committee

Date Originated: 3/1999

Date Reviewed: 3/2007

Date Revised: 3/2007

Related Regulations/Laws:

Related Standards:

II. Purpose: Monitor the degree of neuromuscular blockage by stimulating a nerve and gauging the response of the muscle in patients receiving non-depolarizing neuromuscular blocking agents to allow administration of the optimal dose possible to achieve the desired effect

III. Supportive Information: N/A

IV. Definitions:

<u>Train of Four (TOF)</u>	<u>Percentage of Neuromuscular Blockade</u>
All four twitch responses	0-75%
Three out of four twitches	75%
Two out of four twitches	80%
One out of four twitches	90%
Zero out of four twitches	100%

V. Equipment List:

Peripheral Nerve Stimulator (PNS)
2 electrodes (pediatric preferred) - do not cut adult electrodes to fit because cutting could compromise the integrity of the electrode

VI. Procedure:

Responsibility:	Action:
RN	1. Explain procedure to patient and family
	2. Site Selection: <ul style="list-style-type: none">• Choose a site: free from injury, inflammation, and edema.• Sites are not interchangeable.• For consistency of site usage, leave electrodes in place or indicate with black marker on skin if ball method used. Date electrodes. Change electrodes every 72 hours and prn.
	3. Wash and dry skin and remove hair if necessary.

4.	<p>Site selection</p> <ul style="list-style-type: none"> ▪ Ulnar nerve site Place one electrode at the head of the ulna at the wrist crease, the second electrode is placed along the same imaginary line approximately 3-5 cm away from the first electrode (see figure 1). ▪ Facial nerve site (useful with patients with peripheral edema) One electrode is placed approximately 2 cm lateral to the outer canthus of the eye and the second electrode is placed proximal to the tragus of the ear (see figure 2). Check facial diagram. ▪ Posterior tibial nerve Electrodes are placed posterior to the medial malleolus on the groove between the medial malleolus and the Achilles tendon (see figure 3).
5.	<p>Attach lead wires to surface electrodes and output jacks of the PNS. The ball electrodes may also be used – place directly on skin or electrodes along nerve site.</p> <p style="padding-left: 40px;">Black = negative Red = positive</p> <p>The negative electrode is the active stimulating electrode. Therefore, the most effective stimulation is obtained when the black (negative) output jack is attached to the electrode placed distally along the nerve (the location closest to the evoked muscle response).</p>
6.	<p>Determine baseline response to neuromuscular stimulation</p>
7.	<p>Whenever possible, determine the supramaximal stimulation (SMS) level prior to initiating NMBAs. The SMS is the level at which additional stimulating current elicits no further increase in the intensity of the four twitches.</p>
8.	<p>Frequency of testing:</p> <ul style="list-style-type: none"> • Test the TOF 10 to 15 minutes after a bolus dose and/or continuous infusion of NMBA is given/initiated/changed. • If more than one or two twitches occur and neuromuscular blockade is unsatisfactory for clinical goals, increase the infusion rate as prescribed or according to hospital protocol and retest in 10 to 15 minutes. • Retest every 4 to 8 hours after clinically stable and a satisfactory level of blockade is achieved.

Troubleshooting

- Change the electrodes and ensure skin is clean and dry.
- Potential for decreased response with edema. Elevate extremity or switch to another site and document site used.
- Assure battery function.
- If using patches, make sure gel is moist and the alligator clips do not touch each other.
- Assure contacts are facing the correct direction: Black (negative) electrode is placed distally.
- Refer to clinical variables affecting NMBA's (on the back of the medication protocol).

Figure 1. Ulnar

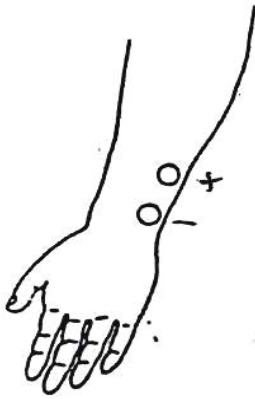
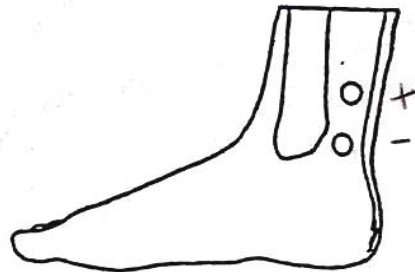


Figure 2. Facial



Figure 3. Posterior Tibial



Documentation: Document current dosage of neuromuscular blocking agent, site utilized, voltage used and patients' response (ie. 0/4, 1/4, etc.) to TOF via NMB in Excellian.

Reference:

Lynn-McHale Wiegand, D and Carlson, K. (2005). AACN Procedure Manual for Critical Care (5th Ed.) Elsevier Inc. Missouri, USA.

Ellender, P.J. (1994). The use of neuromuscular blocking agents in ICU patients. Hospital Pharmacy, 29 (1), 36-44.

Ellis, M.F., Klein, D.G. (1995). Implementing neuromuscular blockage monitoring in a surgical intensive care unit. Clinical Nurse Specialist, 9 (3), 134-139.

Ford, E.V. (1995). Monitoring neuromuscular blockage in the ICU. American Journal of Critical Care, 4 (2), 122-30.

Henneman E.A., Bellamy, P. & Togashi, C. (1995, June). Peripheral nerve stimulators in the critical care setting: A policy for monitoring neuromuscular blockage. Critical Care Nurse, 82-88.

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