

CONNECTICUT VALLEY HOSPITAL

Physical Therapy Services

PT Equipment Procedure # 34

Re: NMES (Neuromuscular Electrical Stimulation)

Date: March 20, 2000

Revised: October 19, 2008

Description:

NMES is a portable electrical stimulation unit, which produces skeletal muscle contraction by stimulating the motor neuron to produce muscle contraction, usually stimulating the larger motor units. NMES unit should be used with innervated muscle only.

Indications:

NMES using bi-phasic output is indicated as a therapeutic adjunct for:

1. Prevention or retardation of muscle disuse atrophy
2. Relaxation of muscle spasms
3. Muscle reeducation
4. Maintaining and increasing range of motion
5. Increasing local blood circulation
6. Immediate post-surgical stimulation of calf musculature to prevent venous thrombosis
7. Increasing muscle endurance
8. Decreasing abnormal tone

Contraindications:

NMES is contraindicated for:

1. Patients with demand-type pacemakers
2. Over malignant tumors or areas of possible malignancy
3. Over the carotid sinus, anterior neck, eyes, or mouth
4. Over skin irritations
5. Pregnancy
6. Epilepsy
7. Transthoracic applications (and in the presence of suspected heart problems)

Precautions:

1. After recent surgical procedure or trauma where muscle contraction may disrupt the healing process.
2. After acute trauma or fracture where there is a tendency to hemorrhage.
3. Over the menstruating uterus.
4. Where sensory nerve damage has caused the loss of normal skin sensation.

Adverse Effects:

Improper use/over use may result in skin irritations and burns beneath the electrodes. This can be reduced by using an alternative electrode site or by using an alternate conductive medium.

Procedure:

1. Clean and dry area where electrodes will be placed.
2. Inspect skin where electrodes will be placed, document whether remarkable or not.
3. Apply electrodes to patient. (Electrodes are disposable, one set per patient, for the entire course of treatment.)
4. Attach electrodes to lead wires and lead wires to unit.
5. Slide *Stimulation Mode switch* to **CO** (constant).
6. Turn *On Ramp dial* to the desired on ramp duration. (Duration of ramp up to set Intensity, off ramp is preset at 2 seconds.)
7. Turn *On Time dial* to desired stimulation on time. (Duration of delivery of Stimulation.)
8. Turn *Off Time dial* to desired off time. (Duration of rest time between stimulations.)
9. Turn channel one *Output Intensity dial* up to desired level of muscle contraction.
10. Adjust *Pulse Rate dial* to desired level. (Should be as low as possible to maintain tetany, yet still be comfortable to the patient.)
11. **If using one channel:**
 - Switch *Stimulation Mode switch* to desired mode of stimulation. (Constant: constant stimulation) (Cycle: alternating on and off times) (Reciprocal: not used in one channel application)
12. **If using two channels:**
 - Switch *Stimulation Mode switch* to desired mode of stimulation. (Constant: constant stimulation)(Cycle: both channels on & off at same time) (Reciprocal: alternating channel on & off times)
 - Turn channel two *Output Intensity dial* up to desired level of muscle contraction. (do not adjust output intensity during an off time)
12. *Output Intensity* may need to be adjusted as the treatment progresses and the patient grows accustomed to the level of intensity.
13. When treatment duration has passed, turn *Output Intensity dial(s)* counterclockwise until it is off. Turn all other dials to zero
14. Disconnect lead wires from unit and from electrodes.
15. Remove electrodes and inspect skin beneath electrode area, document whether remarkable or not.
16. Place electrodes on plastic and save for use again **with that patient only**.
17. NMES Machine is cleaned as per Physical Therapy Cleaning Procedures.
18. The NMES Machine receives Biomedical Testing annually in January of each year.

NMES Parameters:

- **Waveform:** Symmetrical biphasic
- **Pulse Rate:** 1 to 80 Hz **adjustable**
- **Pulse width:** 300 micros.
- **Stimulation modes:** Cycled, Constant, Reciprocal **adjustable**
- **On Ramp:** 0 to 8 seconds **adjustable**
- **Off Ramp:** 2 seconds
- **On Time:** 1 to 60 seconds **adjustable**
- **Off Time:** 1 to 60 seconds **adjustable**
- **Output Voltage:** 0 to 49 volts
- **Output Current Intensity:** 0 to 98 mA **adjustable**