

# Post-Operative Shoulder Electrical Stimulation Protocol

University of Cincinnati – NovaCare Rehabilitation

This protocol incorporates electrical stimulation for pain and neuromuscular re-education during post-operative shoulder rehabilitation.

Therapeutic goals are: 1) acute pain management, 2) initiation of the neuromuscular re-education process by minimally invasive exercises with the use of electrical stimulation.

**Note:** The progression of exercises described below can be incorporated into a patient's rehabilitation protocol, but should first be approved by the referring surgeon. Clinicians may choose to use selected exercises depending upon the therapeutic goals and the status of a particular patient. The time lines provided serve only as guidelines and will vary according to specific procedures, indications and patient progress. This protocol can be implemented at any point in the rehabilitation process but only after consulting with the referring physician.

## The Empi 300 PV's Continuum of Care

1. Multi-function device combines High Volt, TENS and NMES to address patient needs at each step of the rehabilitation protocol.
2. Simple controls make the device user friendly.
3. Lock out feature allows the clinician to set up to three treatment programs.
4. Compliance monitor allows clinicians to view and document patient compliance with home exercise program.



## Programming the 300 PV

1. Depress On/Off button.
2. Depress Set-up button.
3. Use center direction arrows to program the device. Backward (<) and forward (>) move the user from screen to screen. Up (Λ) and down (∇) arrows change the values on the screen.  
NOTE: When using PPRs, the user will be prompted to program the waveform, OFF time and treatment time.
4. Once the device has been programmed, the screen will indicate "Ready."

## **Phase I: Pain Management**

Begins immediately post-op (within 2 days) and continues as long as needed for pain management. No muscle contraction is required as this program is for pain suppression only. The stimulation can also be performed if the patient is only allowed passive motion.

**Goal:** Acute pain management

**Program:** PPR 7 (TENS-acute pain)

**Treatment:** As needed throughout the day

**Electrode Placement:** Adjacent to surgical incision  
(do not place directly on wounds)



## Phase II: Neuromuscular Re-education (Days 2-49)

All exercises are done in the safe zone so that repaired tissue is not stressed.

*NOTE: To program the 300 PV for this phase, follow the sequence described below:*

Depress On/Off button	On time: 10 seconds	Ramp time: 2 seconds
Depress Set-up button (use > to move to next screen)	Off time: 20 seconds	Pulse width: 300
Set Therapy: NMES	Rate: 35 pps	Treatment time: 20 minutes
Select: Custom	Waveform: Symmetrical	Lock program: No
	Cycling: Synchronous	

*Once the device has been programmed, the screen will indicate "NMES Custom Ready."  
Increase intensity to start program.*

### Exercise One: "Cuff Shrug" (Can begin Post-Op Day 2)

**Goals:** Co-activation of rotator cuff and prevention of disuse atrophy

**Program:** NMES Custom User - CH 1 only

**Waveform:** Symmetrical

**Duty Cycle:** 10 seconds On/ 20 seconds Off

**Treatment:** 20 minutes sessions as instructed by clinician

**Electrode placement:** Anterolateral deltoid and supraspinatus

**Exercise:** There should be no active elevation of upper extremity with this exercise. It is designed to prevent neuromuscular inhibition, which is common following surgical procedures. The patient performs a "cuff shrug" isometric co-activation exercise during the stimulation on cycle. The patient is instructed to contract with the stimulation to approximate the glenohumeral joint. This exercise should not be confused with a traditional shoulder shrug (elevation). Isolated rotator cuff contraction is avoided.

**Position:** The upper extremity position may vary according to surgical indication and can be performed with the arm in a sling, with the arm at the side, or with the arm at 70 degrees of shoulder flexion in the scapular plane.



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### Exercise Two: Forward Flexion (Can begin Post-Op Day 14 or when cleared for active range of motion by MD).



**Goal:** Stimulation assisted forward flexion

**Program:** NMES Custom User 1 - CH 1 only

**Waveform:** Symmetrical

**Duty Cycle:** 10 seconds On/ 20 seconds Off

**Treatment:** 20 minutes sessions as instructed by clinician

**Electrode placement:** Anterior deltoid and supraspinatus

**Exercise:** During "On" phase, the patient actively performs a "cuff shrug" (exercise #1). Forward flexion is added by lifting the arm 6-12 inches off of the table. The scapula is preset in a retracted position to avoid compensation.

**Position:** Seated, shoulder flexed to 90 degrees and supported in the scapular plane.

**Exercise Three:** Sidelying External Rotation (Can begin when cleared by MD)

**Goal:** Stimulation assisted external rotation

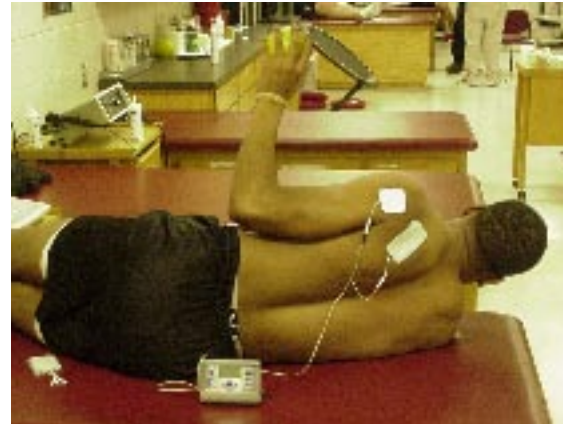
**Program:** NMES Custom User 1 - CH 1 Only

**Waveform:** Symmetrical

**Duty Cycle:** 10 seconds On/ 20 seconds Off

**Treatment:** 20 minutes sessions as instructed by clinician

**Electrode placement:** Posterolateral deltoid and teres minor/infraspinatus



**Exercise:** The patient actively externally rotates the shoulder during the “On” cycle. This exercise can be progressed and performed in multiple positions as indicated. The clinician may choose to prescribe active or isometric contractions in an appropriately indicated shortened range such as 45 degrees of external rotation. **NOTE:** *This exercise may place tension on some repairs and should be initiated only after MD/PT evaluation of healing tissue.*

**Position:** Sidelying

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**Exercise Four:** Closed Chain Co-activation/Re-education (Can begin when ROM is available, active range of motion is indicated and noncompensated scapular/shoulder motion is achieved. Can continue throughout duration of rehabilitation.) The emphasis at this time is training for co-activation for greater cuff control.

**Goal:** Stimulation assisted closed chain co-activation

**Program:** NMES Custom User 1 - CH 1 only

**Waveform:** Symmetrical

**Duty Cycle:** 10 seconds On/ 20 seconds Off

**Treatment:** 20 minute sessions as instructed by clinician

**Electrode Placement:** Anterior and posterior deltoid and rotator cuff (*One or two channel application depending upon clinical goal*)

**Position:** Standing or kneeling

**Exercise:** The specific activity is dependent upon the surgical procedure, tissue quality and available range of motion. The patient performs closed chain exercises to promote co-activation during activities at and above shoulder level.



### Exercise Five: Scapular Stabilization

These exercises may continue several months into rehabilitation to achieve proper scapular mechanics. The clinician must reinforce proper mechanics and eliminate any substitution patterns. When indicated, this exercise can be progressed by adding weight, rhythmic stabilization and functional activities. Can begin when range of motion is available, active range of motion is indicated and non compensated scapular/shoulder motion is achieved.

**Goal:** Proper scapular rotation during shoulder activities

**Program:** NMES Custom User 1 - CH 1 only

**Waveform:** Symmetrical

**Duty Cycle:** 10 seconds On/ 20 seconds Off

**Treatment:** 20 minute sessions or as needed during overhead open chain activities.

**Electrode Placement:** Middle/lower trapezius & rhomboids

