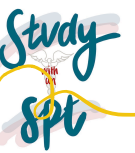


electrical stimulation



GENERAL PRACTICAL STEPS FOR E-STIM

1. Introduce self
2. Check cognition/orientation (name, date, location)
3. Explain why e-stim is used (& ↑ functional activity)
4. Explain how e-stim will exert its effects
5. Obtain consent
6. Position patient & drape
7. Check skin integrity
8. Perform light touch sensation test
9. Select & apply electrodes
10. Tell pt what they expect to feel but NO PAIN
11. Provide & explain call bell
12. Set parameters
13. As you ↑ intensity, tell pt to let you know when they feel something
14. Remind pt about call bell & treatment duration
15. After treatment, turn off device before removing electrodes
16. Reassess skin integrity
17. Tell grader of an additional intervention & why
18. Tell grader of secondary modality that could've been used & relevant pt info
19. SOAP NOTE (make sure to sign & date at end)

PURPOSE	SPECIFIC PRACTICAL STEPS	TYPE	DESCRIPTION
PAIN	3. explain how e-stim is used to ↓ pain & ↑ function 4. explain how e-stim will exert its effects ↳ sends electrical current through skin ↳ triggers nerves, which sends signals to brain ↳ these signals override the pain signals, preventing them from reaching the brain 10. tell pt to expect a tingling sensation (conventional) or uncomfortable tingle & motor twitch (acupuncture)	TENS	<ul style="list-style-type: none"> - portable because handheld device - use for SMALLER areas - biphasic alternating current → continuous - settings: <ul style="list-style-type: none"> ↳ conventional: (A-β fibers) <ul style="list-style-type: none"> - gate control theory - pulse freq: 80-110 pps → high → acute - pulse duration: 50-100 μsec - intensity: comfortable tingle - treatment duration: ≥ 30 min - limited treatment effect ↳ acupuncture: (A-β & A-α fibers) <ul style="list-style-type: none"> - central inhibition theory - pulse freq: < 10 pps → low → subacute/chronic - pulse duration: ≥ 200 μsec - intensity: uncomfortable, strong tingle → motor twitch - treatment duration: ~15-20 min - pain relief can last for HOURS
		IFC	<ul style="list-style-type: none"> - generally a better choice b/c more comfortable & goes deeper - use 4 electrodes → covers LARGER areas - amplitude - modulated AC → continuous ★ same parameters as conventional TENS ★ can use premod IFC (2 electrodes) for smaller areas
	3. explain that e-stim is used for muscle strengthening 4. explain how e-stim does this: ↳ it artificially contracts muscles, ↑ strength similarly to using them voluntarily	NMES	<ul style="list-style-type: none"> - for disuse atrophy - biphasic pulsatile current - settings: <ul style="list-style-type: none"> ↳ symmetrical or asymmetrical ↳ pulse frequency: 30-50 pps ↳ pulse duration: ≥ 250 μsec to start ↳ on/off: 1:3 - 1:5 with on time up to 10 sec ★ can also use NMES for muscle strengthening ↳ 10% MVC

STRENGTH

10. patient should experience
 a sustained muscle contraction
 ↳ when muscle is contracted, patient should perform exercise
 ↳ should be uncomfortable

↳ ramp time: 1-2 seconds for comfort
 ↳ treatment time: 8-10 contractions
 ↳ pulse intensity: submax contraction
 · 50% MVC for disuse

- uncomfortable & intense
 ↳ for only higher-level patients who need to strengthen muscles even more

- settings:
 ↳ burst frequency: 50 bursts/sec
 ↳ burst duration: 10 msec
 ↳ on/off: 1:5
 ↳ duration: 10 contractions
 ↳ ramp: 1-2 seconds for comfort
 ↳ treatment time: 10 contractions
 ↳ burst intensity: as high as needed for contraction
 · >70% for strengthening

Russian

SPASTICITY

3. explain that e-stim is used for ↓ spasticity
 4. explain how e-stim does this:
 ↳ e-stim contracts muscle enough to fatigue them & decrease spasticity (overactivity)
 10. patient should experience
 a sustained muscle contraction
 ↳ should be uncomfortable

- biphasic pulsatile current

- settings:
 ↳ pulse frequency:
 · twitch (reactive pts): <10 pps
 · tetanus (maximizes fatigue): 30-50 pps
 ↳ pulse duration: 200-400 msec
 ↳ on: off ratio:
 · twitch: NONE (continuous)
 · tetanus: 1:1 or 1:3
 ↳ duration: 15-60 min (as tolerated)
 ↳ ramp: 1-2 seconds for comfort (tetanus only)
 ↳ pulse intensity: submax contraction to tolerance

NMES

EDEMA

3. explain that e-stim is used for ↓ edema
 4. explain how e-stim does this:
 ↳ e-stim triggers muscle contractions that help squeeze blood through veins & away from the swollen area (subacute/chronic) OR uses (-) charged current to repel (-) charged albumin in blood (acute)
 4. when positioning patient, always add elevation whenever possible
 10. patient should experience
 a tingling sensation until motor response is elicited & then we will turn down intensity ~10% from that

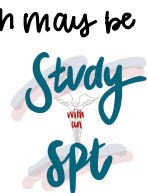
- for ACUTE edema
 - monopolar electrode set up:
 ↳ active lead: on site of swelling
 ↳ dispersive lead: placed proximal to wound, at least one joint away

- settings:
 ↳ make sure leads are hooked up to HV input on dynatron & click HV button on the right
 ↳ negative polarity
 ↳ pulse frequency: 100-125 pps
 ↳ pulse duration: 2-100 msec
 ↳ on: off: continuous
 ↳ ramp: none
 ↳ duration: 10-30 min (to pt tolerance) up to 3-4 hrs
 ↳ intensity: sensory level (10% below motor threshold)
 · increase intensity until 1st twitch & ↓ by ~10%

HVPC

- for SUBACUTE & CHRONIC edema
 - must involve a motor twitch
 - biphasic pulsatile current
 - electrodes placed over desired muscles (distal to proximal)

- settings:



NMES

- ↳ pulse frequency: 20-80 pps (twitch may be better elicited at 1-10 pps)
- ↳ pulse duration: 100-600 μ sec
- ↳ on:off ratio:
 - subacute: continuous
 - chronic: 1:1 to 1:3
- ↳ ramp:
 - subacute: none
 - chronic: 1-2 sec for comfort
- ↳ intensity:
 - subacute: comfortable twitch motor response
 - chronic: submax. contraction

SHOULDER SUBLUX

3. explain that e-stim is used to \downarrow shoulder subluxation
4. explain how e-stim does this:
 - ↳ strengthens muscles that help approximate humerus into glenoid (help keep arm in socket)
10. patient should experience a tingling sensation $\&$ then muscle contractions
 - ↳ when muscle is contracted, patient will do functional exercise (ex. overhead reaching)

FES

- biphasic pulsed current (sym. or asym.)
- electrodes placed on supraspinatus $\&$ post. deltoid
- can also use Russian but very uncomfortable
- settings:
 - ↳ pulse frequency: 30-50 pps
 - ≥ 40 can lead to fatigue
 - ↳ pulse duration: 100-400 μ sec
 - 250-400 μ sec most common
 - ↳ on:off time: 1:3 to 1:1
 - ↳ duration: 15 minutes for first time
 - can increase for up to 6 hours
 - ↳ ramp: 1-2 secs for comfort
 - ↳ intensity: reduction of subluxation w/o any excess motion (ex. abd)
 - ↳ amplitude: strong contraction

GAIT

3. explain that e-stim is used to help with gait (ex. foot drop)
4. explain how e-stim does this:
 - ↳ helps with muscle activation of anterior fibularis
6. remember to put on gait belt $\&$ use AD if needed
 - ↳ pt can be sitting to set up electrodes, then have them stand to walk during treatment
 - ↳ when setting up intensity, make sure foot goes into DF $\&$ eversion
 - adjust electrodes to achieve this
10. patient should experience a tingling sensation $\&$ then muscle contractions
 - ↳ should feel muscle contraction during swing phase

FES

- biphasic pulsed current (sym. or asym.)
- electrodes on anterior fib. muscle belly and on common peroneal nerve (posterior $\&$ inferior to the fibular head)
- put manual on/off switch on channel 2
- settings:
 - ↳ pulse frequency: 30-50 pps
 - ≥ 40 can lead to fatigue
 - ↳ pulse duration: 100-400 μ sec
 - 250-400 μ sec most common
 - ↳ on:off ratio: timed with device
 - set off time to zero when finding appropriate intensity to trigger a good contraction
 - ↳ duration: to fatigue
 - ↳ ramp: 0-1 sec for comfort
 - ↳ pulse intensity: submax contraction to about 3-15 MMT grade