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Clinical Training Binder

Clinical Training Lab PowerPoints

Rehab Medical

Quick Start Guide

Accessing User Protocols

>File Folder

>User Protocols

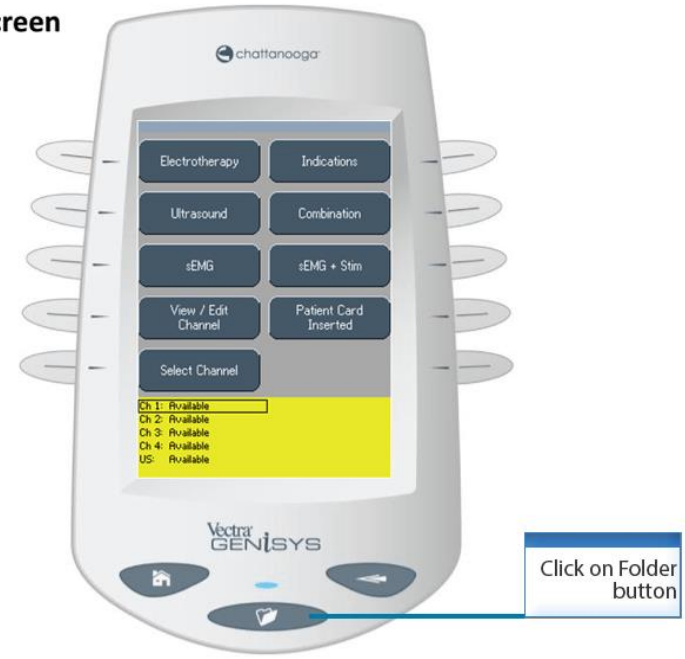
>Select Protocol

>Set up electrodes appropriately for the waveform chosen

>Increase amplitude using turn knob

>Press Start

The Home Screen



Electrode Placement (See electrode placement guide for samples)

Pain Management: Place the electrodes surrounding area of pain

IFC : channel 1 and 2 cross, "X" marks the spot

Premod : single channel, electrodes "bracket" the area of complaint

Muscle Strengthening: Place one electrode on muscle belly and one at the tendinous muscle junction

Strength: target muscle or muscle group

Functional Re-ed (FR): channel 1 over target muscle/muscle group, channel 2 over antagonist muscle/muscle group

High Volt Waveform (Edema management, Increase Circulation, Spasms, Trigger Points): Red lead goes distal, black lead goes proximal (smoke over fire), only exception is trigger point application (see below)

Inc. Circulation/Wounds: bracket wound with electrodes as close to wound margin as possible

Spasms: place electrodes over target muscle

Trigger Points: electrode with red lead over active trigger point, electrode with black lead approx. 4 inches away towards referral area

Edema: electrode with red lead over or distal edematous area, place electrode with black lead proximal with the lymphatic system and venous return in mind.

** Electrode size should reflect the area of the body being treated

Rehab Medical

Contraindications and Precautions

Ultrasound & Electrical Stimulation

DO NOT use **ULTRASOUND** over:

1. Implanted Electrical Devices
2. Malignancies
3. Unknown Etiologies
4. Infection (swelling warm to touch/fever)
5. Epiphyseal Growth Plates (Active)
6. Unprotected spinal cord (laminectomy)
6. Heart and Eyes
7. Carotid Sinus
8. Reproductive Organs
9. Known or suspected blood clots
10. Artificial joints over plastic or cement
11. Hemorrhage/prone to hemorrhage

Additional Precautions:

1. Know your depth of penetration and what is in the treatment field i.e. back of shoulder into pacemaker
2. Be cautious about treatment over area of altered sensation skin as the patient may not be able to report excessive heat - try contra-lateral side for tolerance.
3. Do not use ultrasound over abdomen/low back of a patient that is or may be pregnant.

DO NOT use **ELECTRICAL STIMULATION** on patients with:

1. Implanted Electronic Devices (Can be safe depending on device, get an MD order for application)**
2. Pregnancy (has not been effectively researched)

DO NOT use **ELECTRICAL STIMULATION** over:

1. Malignancies
2. Unknown Etiologies
3. Infection (swelling warm to touch/fever)
4. Where AROM is contraindicated (motor levels)
5. Transdermal Patches
6. Carotid Sinus
7. Transthoracic/Transcranial
8. Reproductive Organs
9. Circulatory Insufficiencies

Additional Precautions for Electrical Stimulation over:

1. Skin with absent or diminished sensation
2. Patients with dementia or other cognitive deficits
3. Closely monitor patients with known cardiac conditions or seizure disorders

Contraindications and Precautions

Shortwave Diathermy (SWD)

DO NOT use **SHORTWAVE DIATHERMY (SWD)** on patients with:

1. **Implanted Electronic Devices**
2. **Metal IN the Treatment Field (Thermal)**
3. **Pregnancy**

- Anyone that has an implanted electronic device should remain outside 10 foot radius of the SWD unit
-Treating therapists should avoid "hanging out" within 1-2 feet of treatment area
- Double check treatment area for metal (necklaces, snaps, zippers, wheelchairs/bedrails, bra straps, coins, etc.)

Additional Precautions:

1. SWD penetrates 5 cm – be aware of what is in the treatment field. Place a pillow between the patient and any metal surface if questionable.
2. Loose dry clothing or a dry towel should be used as a barrier, avoid tightly fitting wraps or clothing as it can constrict air flow and increase heat.
3. Be aware of other electronic devices, SWD may interfere with RF (radio frequencies) of other devices. I.e. External pumps (Insulin, Baclofen, etc), IV's, NMES, US during SWD treatment.

DO NOT use **SHORTWAVE DIATHERMY (SWD)** over:

1. **Malignancies**
2. **Unknown Etiologies**
3. **Infection (swelling warm to touch/fever)**
4. **Epiphyseal Growth Plates (Active)**
5. **Carotid Sinus/Cervical Ganglia**
6. **Transdermal Patches**
7. **Eyes/Cranial Area**
8. **Reproductive Organs**
9. **Circulatory Insufficiencies**
10. **Hemorrhage/prone to hemorrhage**
11. **Unprotected Spinal Cord (laminectomy)**

Additional Precaution for SWD over:

1. Skin with absent or diminished sensation if utilizing thermal dosing.

Documentation Guidelines for Therapeutic Modalities

**These are general guidelines for documentation; please check with your company for their specific rules and requirements if applicable.*

General Guidelines:

- Documentation of treatment must clearly support the plan of care. Functional performance should be described in reference to short and long term goals.
- Treatment performed must be described clearly. To evaluate whether your description is adequate, ask yourself the following question: "If my colleague were to read this note, would they be able to replicate the treatment?", or, "If a reviewer were to read this note, would they immediately be able to appreciate the skill involved in this treatment?"
- Patient's response to the treatment must be documented as objectively and functionally as possible, especially as it relates to the rationale of the treatment intervention. For example, if the treatment's objective is to reduce pain, did it work? How did the pain score improve?

Specific Guidelines to the use of Modalities

When documenting the Assessment and Plan of Care:

- Include specific reference to the modalities that may be used. Also include the rationale and how it relates to function. For example, "Shortwave Diathermy to decrease inflammatory signs and symptoms and facilitate gait training."
- Specify frequency and duration. For example, 3 x per week for 3 weeks.
- Make sure the Physician signs off on plan of care that includes the modality use.

When documenting the treatment in the Daily Note, always include:

- Duration of modality use
- Anatomical location of application
- Patient position (supine, seated, etc.)
- Patient participation/activity involved
- Condition prior as related to goals (i.e. pain, ROM, ability to perform functional task)
- Condition after (i.e. pain score, ROM, ambulation distance, ability to reach, etc.)

ELECTRICAL STIMULATION (ES)

- Physiological goal of treatment
- Protocol used (IFC Acute, VMS Strength, etc.)
- Cycle time (work to rest ratio)
- Changes made throughout treatment (if any) Including (frequency, intensity, phase duration)
- Intensity in terms of patient response (i.e. Sensory, submaximal motor, maximal motor)

<u>Note</u>: Documenting avg. or max intensity in mA is not useful as it is not a reliable reflection of current.

"IFC Acute applied to left shoulder to reduce the perception of pain with graded therapeutic exercises for goal of increased function of LUE. Skin assessed pre and post, intact with no changes"

ULTRASOUND (US)

- Physiological goal of treatment
- Size of the ultrasound head (cm2)
- Frequency (MHz)
- Duty cycle (%)
- Treatment time
- Dose (W/cm2)
- Ultrasound medium used (regular gel medicated gel, water, etc.)

"Ultrasound applied to left medial knee at 3.3MHz, 1.0 W/cm², at 20% duty cycle for 10 minutes to reduce acute pain and edema for goal of reduction of antalgic gait pattern. Skin assessed pre and post, intact with no changes"

SHORTWAVE DIATHERMY (SWD)

- Physiological goal of treatment
- Type and size of the applicator (inductive drum or capacitive plates)
- Dose (non thermal or thermal)
- Duty cycle (%)
- Pulse width/duration (usec)
- Pulse frequency (Hz or pps)

"Shortwave diathermy applied to right ankle at dose 4 for 20 minutes to achieve 4°C change in the soft tissue to maximize extensibility followed by stretching and ROM activity for goal of increased dorsal flexion. Skin assessed pre and post, redness present following treatment, dissipates after 10 minutes. Intact with no changes."

Always review condition of skin in treatment area before and after treatment and document

High Volt Edema

Application:

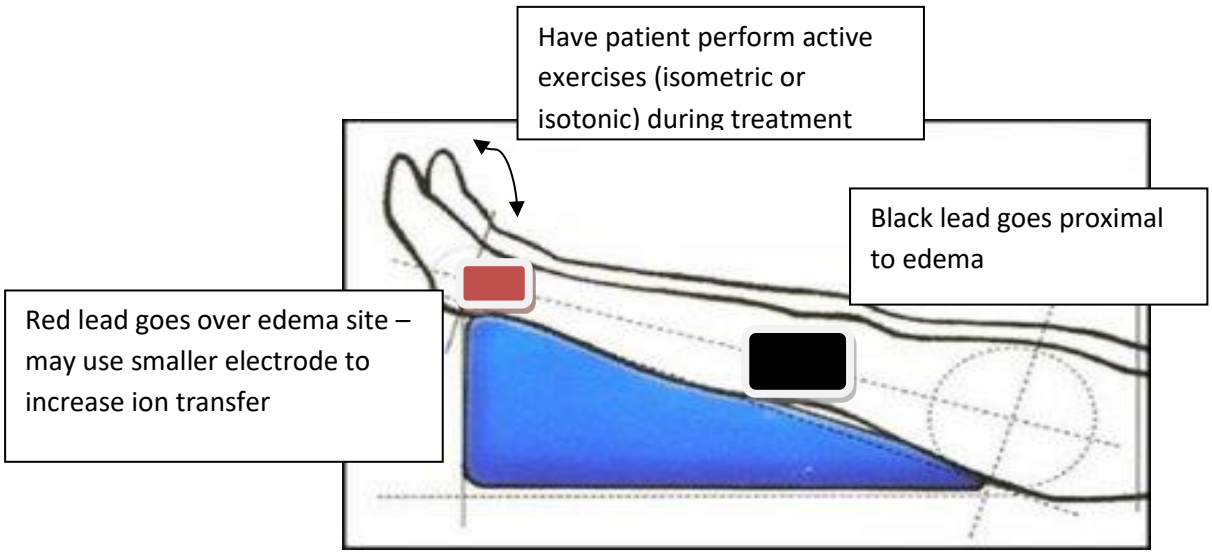
- Place red electrode over edema site and black electrode proximal on edematous area.
- May use a small electrode on the red lead and a larger electrode on the black lead to increase ion transfer.
- Increase intensity to comfort below motor response
- Patient is encouraged to perform active exercises (isometric or isotonic) during this treatment
- Patient may also be positioned with edematous extremity elevated.
- Treatment time is typically 30 minutes, up to 60 minutes.
- Frequency is once daily 5-7x/week
- Incorporate other activities to effectively manage billable time. i.e. 60 minutes of electrical stimulation paired with exercises and therapeutic activities e.g. 15 min G0283, 30 min 97110, 15 min 97530

Considerations:

Skin integrity - if skin has blisters, is weeping, or is not intact do not place electrodes in that area. May use combination US/e-stim with US intensity set to 0 with high volt if concern regarding removal of electrodes and skin integrity.

Large area of edema - work proximal to distal to move edema systematically.

CHF – shorten time frame to prevent overloading the heart.



High Volt Spasm

Application:

Muscle Spasm/Hyperactive muscle

- Red lead distal to black lead, both over spastic muscle body
- Increase intensity to borderline uncomfortable
- Patient is encouraged to relax during this treatment
- Treatment time up to 20 minutes
- Frequency 5x/week until resolved

Trigger Point Technique

- Red lead directly over active trigger point (may use smaller electrode)
- Black lead in or toward referred pain area approximately 4-5 inches away
- Increase intensity to borderline uncomfortable
- Patient is encouraged to relax during this treatment
- Treatment time up to 20 minutes
- Frequency is 5x/week until resolved

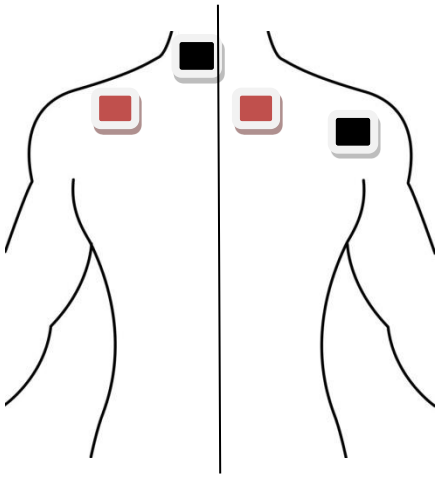
Following treatment for muscle spasm or trigger point technique, follow up with stretching, manual techniques and joint mobility to elongate the affected muscle body.

Considerations:

Skin integrity – is the skin is blistered or broken do not place electrodes over that area. May use combination therapy to apply electrical stimulation to desired target tissue with US intensity set to 0.

Redness is common with modalities, especially high volt due to the increase of blood flow to the area, this should subside in 10-15 minutes.

In the case of a **muscle spasm** of the upper trap, the red lead is distal/inferior to the black lead covering the affected muscle body at least 2-3 inches apart.



In the case of a **trigger point** of the upper trap, the red lead is placed directly over the trigger point and the black lead is in/toward the referred pain area 4-5 inches away. May use a smaller electrode with red lead.

High Volt Wound

Application:

- Red lead is placed distal and black lead is proximal distal to wound (bipolar method)
- Red lead is placed in wound bed and black lead is placed proximal to wound (monopolar method)
- Increase intensity to comfort, below motor level
- Patient is encouraged to off-load wound site treatment area during treatment, may engage in other activity that won't disrupt treatment in area. (i.e. wound on leg, may complete UE activity.)
- Treatment time is 60 minutes
- Frequency : inflammatory stage 5-7x/week, proliferative stage 5-7x/week rotating polarity every 3 treatments, maturation stage decrease frequency to 60pps 3x/week rotating polarity every 3 treatments

Considerations:

To bill electrical stimulation for wound care (G0281) the wound must be stage III or IV and not responding to traditional treatments and documented as such for 30 days.

If using the monopolar technique use proper electrodes for the application

In the case of a lower leg wound, place red lead distal and the black lead proximal

Polarity: Can be changed on the "Edit" screen, or you can rotate the electrodes around the wound. "Polarity" describes the charge of the red lead.

IFC Acute

Gate Control Theory - Sensory

IFC Acute works on the Gate Control theory of pain management; it is indicated to produce an immediate analgesic effect. The temporary analgesia may allow for functional exercises that would otherwise have been difficult to perform because of pain. Analgesia only occurs as long as stimulation is delivered. Works well with acute pain pathology in a large treatment area.

Application:

- Place electrodes of channel 1 and channel 2 so they cross over the patient's area of complaint at least 4-6 inches apart ("X" marks the spot)
- Increase intensity to "over power pain", may need to be adjusted throughout treatment due to accommodation
- Patient may perform exercises along with electrical stimulation or relax
- Treatment time 25-30 minutes. Will likely need to adjust intensity throughout treatment due to accommodation. Check in with the patient every 5 minutes.

Considerations:

Vector Scan:

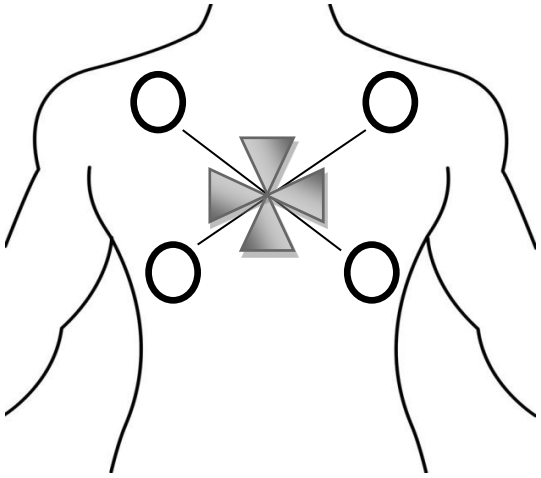
"Off" will create a very focal area of stimulation.

40% will move stimulus around 40% of the treatment area (area in the middle of the electrodes).

100% will move stimulus throughout the entire treatment area for larger areas of diffuse pain.

Manual will allow user to adjust the excursion of the stimulus to individualize the treatment.

In the case of upper back pain, place electrodes so channels 1 and 2 cross at the center of the area of complaint. The area under the shadowed area denotes the area of stimulus with a 40% vector scan.



IFC Chronic

Opiate Protocol - Motor

This approach produces a lasting analgesic effect to facilitate functional movement with ADL's and mobility. This motor level of simulation can facilitate the endorphine release in the brain which can block transmission of pain to the brain; the analgesic effect may last for several hours after application.

Application:

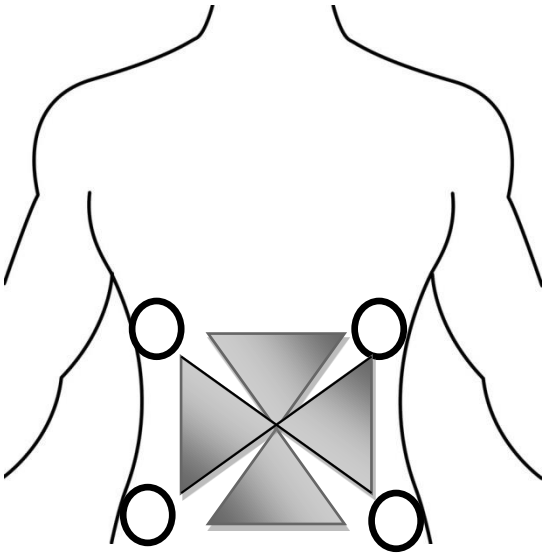
- Place electrodes of channel 1 and channel 2 so they cross over the patient's area of complaint (this is most effective over muscles as opposed to bony tendinous areas).
- Place electrodes at least 4-6 inches apart
- Increase intensity to a motor level, borderline uncomfortable for the patient.
- Patient may perform activity during treatment time or relax
- Treatment time 20-25 minutes to facilitate endorphin release. Patient may accommodate to the current, therapist may need to adjust intensity throughout treatment.

Considerations:

This application is for chronic pain, eliciting motor response may exacerbate acute symptoms.

Vector scan applications from IFC Acute apply for IFC Chronic

In the case of lower back pain, place electrodes so channels 1 and 2 cross at the center of the area of complaint. The area under the shadowed area denotes the area of stimulus with a 100% vector scan.



Premod Acute

Gate Control Theory - Sensory

Premod Acute works on the Gate Control theory of pain management and it is indicated to produce an immediate analgesic effect. The temporary analgesia may allow for functional exercises that would otherwise have been difficult to perform because of pain. Analgesia only occurs as long as stimulation is delivered and works well with acute pain pathology in a large treatment area.

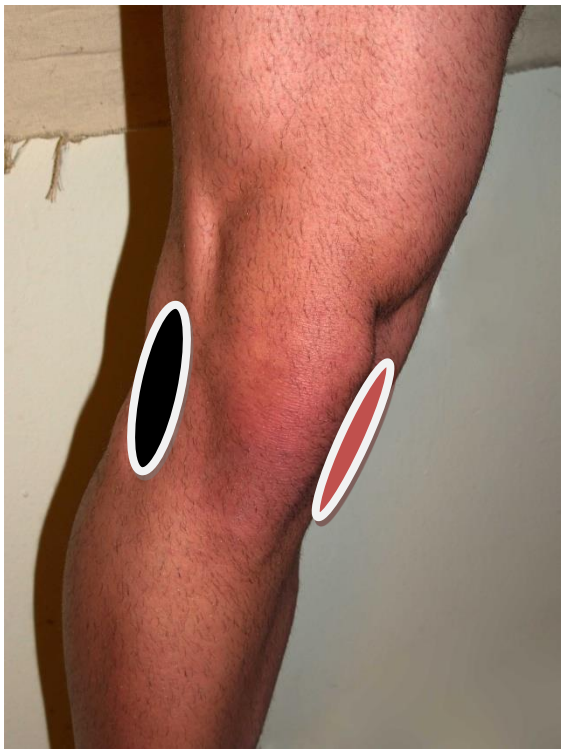
Application:

- Place electrodes on either side of that patient's area of complaint
- Increase intensity to "over power pain", may need to be adjusted throughout treatment due to accommodation
- Patient may perform exercises along with electrical stimulation or relax
- Treatment time 25-30 minutes. Will likely need to adjust intensity throughout treatment due to accommodation. Check in with the patient every 5 minutes.

Considerations:

Premod is a single channel waveform best used over joints and smaller treatment areas.

In the case of acute knee pain, place electrode on either side of the knee surrounding the pain and increase intensity to a comfortable level.



Premod Chronic

Opiate Protocol - Motor

This approach produces a lasting analgesic effect to facilitate functional movement with ADL's and mobility. This motor level of simulation can facilitate the endorphine release in the brain which can block transmission of pain to the brain and the analgesic effect may last for several hours after application.

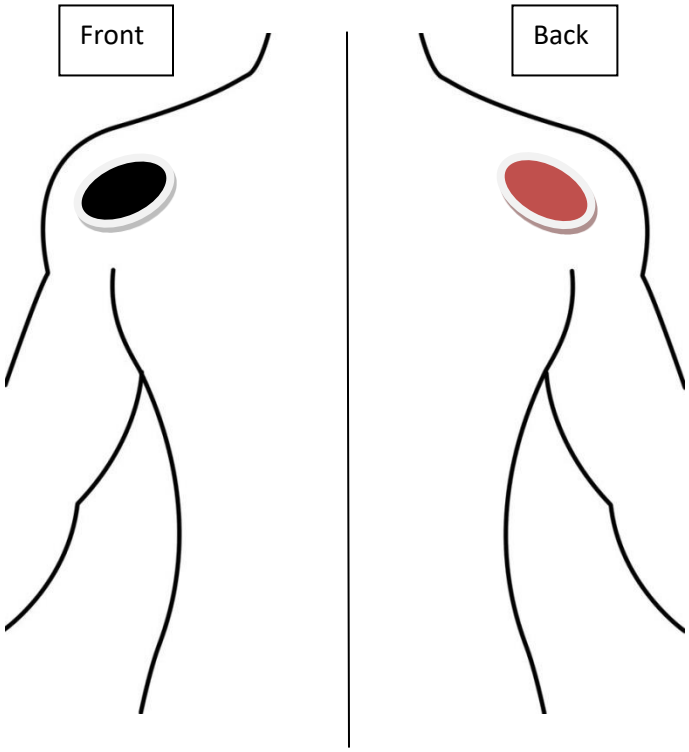
Application:

- Place electrodes so they bracket over the patient's area of complaint (this is most effective over muscles as opposed to bony, tendinous areas).
- Increase intensity to a motor level, borderline uncomfortable for the patient.
- Patient may perform activity during treatment time or relax
- Treatment time 20-25 minutes to facilitate endorphin release. Patient may accommodate to the current, therapist may need to adjust intensity throughout treatment.

Considerations:

This application is for chronic pain, eliciting motor response may exacerbate acute symptoms.

In the case of a chronically painful shoulder, place electrodes to surround the pain. The motor application will work best over muscle to elicit desired effect.



VMS Strength

Development of a strong foundation of strength; may be used with exercises and functional movement patterns. Always incorporate activity for maximum benefit of the modality.

Application:

- Place electrodes to cover target muscle or muscle group, may need to move electrodes to find optimal placement an engage motor unit. If electrodes are too close (approx < 2 inches) they may elicit a resistance error. If electrodes are too far apart they may penetrate too deep inadvertently facilitating an antagonist muscle or muscle group.
- Increase to a motor level (beyond a twitch to a muscle contraction)
- Have patient work with the current to increase comfort with increasing intensity
- May decrease frequency to increase comfort (30-35pps ideal)

Considerations:

Channel Mode:

Single - single muscle/muscle group

- Cycle time will reflect On/Off time eg. 10 seconds on, 50 seconds rest

Reciprocal - channel 1 will engage, and then channel 2 will engage

- Set intensity of channel 1 and 2 separate in “Edit” screen
- Cycle time work independent on each channel eg. With 10/10 channel 1 will fire and rest for 10 seconds, channel 2 will fire once channel 1 turns off and then rest for 10 seconds. There will be no complete rest period.

Co-Contract – channels 1 and 2 will engage simultaneously

- Set intensity of both channels, may adjust channel 1 and 2 separately
- Cycle time will engage both channels for On period and complete rest during Off period.

Cycle Time : should reflect the complexity of the motion, exertion and arc of motion.
Manual Stim : connect therapist pendant at front of unit, press “M” to initiate manual stim mode. Press and HOLD “M” to deliver stim to personalize the stimulation for patients that fatigue quickly or require a lot of cueing for maximum benefit.

VMS Endurance

Increase muscular endurance to improve ADL performance, posture, tone, and stability. Incorporate exercise or functional activities with this protocol. Continuous reciprocal activities work well with this protocol i.e. cycling or bike.

Application:

- Place electrodes to cover target muscle or muscle group, may need to move electrodes to find optimal placement an engage motor unit. If electrodes are too close (approx < 2 inches) they may elicit a resistance error. If electrodes are too far apart they may penetrate too deep inadvertently facilitating an antagonist muscle or muscle group.
- Increase to a motor level (beyond a twitch to a muscle contraction)
- Have patient work with the current to increase comfort with increasing intensity
- May decrease frequency to increase comfort (35-45pps ideal)

Considerations:

Channel Mode:

Single - single muscle/muscle group

- Cycle time will reflect On/Off time eg. 10 seconds on, 50 seconds rest

Reciprocal - channel 1 will engage, and then channel 2 will engage

- Set intensity of channel 1 and 2 separate in “Edit” screen
- Cycle time work independent on each channel eg. With 10/10 channel 1 will fire and rest for 10 seconds, channel 2 will fire once channel 1 turns off and then rest for 10 seconds. There will be no complete rest period.

Co-Contract – channels 1 and 2 will engage simultaneously

- Set intensity of both channels, may adjust channel 1 and 2 separately
- Cycle time will engage both channels for On period and complete rest during Off period.

Cycle Time : should reflect the complexity of the motion, exertion and arc of motion.
Manual Stim : connect therapist pendant at front of unit, press “M” to initiate manual stim mode. Press and HOLD “M” to deliver stim to personalize the stimulation for patients that fatigue quickly or require a lot of cueing for maximum benefit.

VMS FR

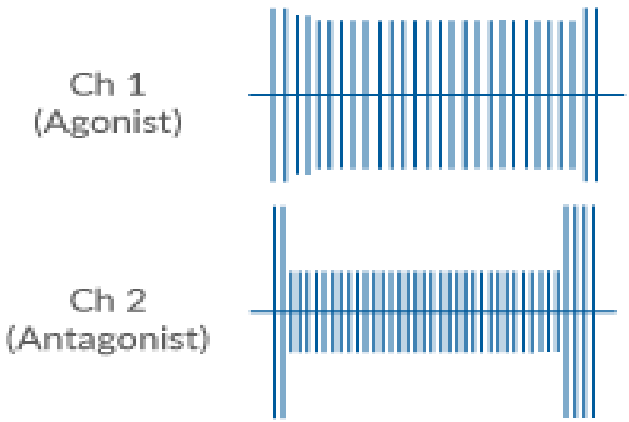
Waveform delivered concurrently through 2 channels, placed on agonistic and antagonistic muscle groups. Stimulation mimics natural recruitment patterns

Application:

- Place electrodes of channel 1 over target muscle or muscle group, may need to move electrodes to find optimal placement an engage motor unit. If electrodes are too close (approx < 2 inches) they may elicit a resistance error.
- Place electrodes of channel 2 over antagonist muscle or muscle group.
- Increase to a motor level (beyond a twitch to a muscle contraction)
- Have patient work throughout treatment to increase comfort and maximize therapeutic benefit

Considerations:

- Treatment time: 30-60 minutes, 3-5 times a week
- Strengthening: Frequency 25-35 Hz, Phase Duration 160-200, Burst Duration 500 ms = 0.5 seconds (adjust to activity)
    - Moderate to strong muscle contraction
    - Incorporate activity – functional activity, bike, weight bearing, etc. Start with open chain exercises, progress to closed chain and functional activities.
- Spasticity: Frequency 25-35 Hz, Phase Duration 200, Burst Duration 2000 ms
    - Mild to moderate muscle contraction
    - Incorporate activity – weight bearing, stretching, functional reach, etc.



The agonist initiates movement while the antagonist contracts to control the movement, facilitating a more controlled and fluid movement pattern. Paired with weight bearing, this can also facilitate proprioceptive input to surrounding joints.

Electrical Stimulation - User Protocols

Rehab Medical

What is the physiological goal of your treatment?

Physiological Goal	Protocol	Target Tissue	Accompanying Activities
Decrease Pain			
reduce nociception with activity	IFC ACUTE (large area), PREMOD ACUTE (small area)	area of complaint	ROM, strengthening of supporting structures
reduce muscle spasms	IFC CHRONIC (large area), PREMOD CHRONIC (small area)	area of complaint	ROM, stretching, corrective exercises
nerve block	IFC NERVE BLOCK (large area), PREMOD NERVE BLOCK (small area)	area of complaint	ROM, stretching, manual techniques
Increase Circulation			
	HIGH VOLT EDEMA	red lead distal to edema, black lead proximal	muscle pumping activity, elevate extremity, manual techniques
	VMS STRENGTH – co-contract	Agonist and antagonist to facilitate muscle pumping effect	muscle pumping activity, elevate extremity, therapeutic activities
Motor Activation			
build strength	VMS STRENGTH	muscle, muscle group impacting function	graded therapeutic exercise, activities to improve functional performance
build endurance	VMS ENDURANCE	muscle, muscle group impacting function	continuous, reciprocal activities i.e. bike, sci-fit, etc
motor control	VMSFR STRENGTH	muscle, muscle group impacting function, adjust phase duration to 300 if over large muscle/muscle group, and 400 if over flaccid muscle/muscle group	weight bearing, volitional activation of target muscle
spasticity reduction	VMSFR SPASTICITY	muscle, muscle group impacting function, adjust phase duration to 300 if over large muscle/muscle group, and 400 if over flaccid muscle/muscle group	weight bearing, volitional activation of target muscle, stretching of spastic muscle impairing function
Tissue Healing			
wound care	HIGH VOLT WOUND	outside wound margins	functional activities to address baseline causes of wound development if applicable

Ultrasound User Protocols

Frequency

1 MHz deep penetration (3.0-5.0cm)

3.3MHz superficial penetration (0.8-2.5cm)

ERA – Effective radiating area

Application	Thermal Effect	Frequency/Intensity/Time	Duty Cycle	Freq. of Treatment	Effect
Inflammation					
Acute	Non-Thermal (approx. 0.5°C)	1 MHz, 1.0 W/cm², 10 minutes 3.3 MHz, 0.5 W/cm², 7 minutes	Pulsed – 20%	3x ERA 3-5x per week	Alters tissue permeability, increases blood flow/cellular activity, pain reduction (thermal)
Subacute	Mild Thermal (approx. 1.0°C)	1 MHz, 1.0 W/cm², 10 minutes 3.3 MHz, 0.5 W/cm², 7 minutes	Pulsed – 50%	3x ERA 3-5x per week	
Chronic	Moderate Thermal (approx. 2.0°C)	1 MHz, 1.0 W/cm², 10 minutes 3.3 MHz, 0.5 W/cm², 7 minutes	Continuous	3x ERA 3-5x per week	
Pain					
Acute	Non-Thermal (approx. 0.5°C)	1 MHz, 1.0 W/cm², 10 minutes 3.3 MHz, 0.5 W/cm², 7 minutes	Pulsed – 20%	3x ERA 3-5x per week	Increases blood flow/cellular activity, removes inflammatory chemicals, pain reduction
Subacute	Mild Thermal (approx. 1.0°C)	1 MHz, 1.0 W/cm², 10 minutes 3.3 MHz, 0.5 W/cm², 7 minutes	Pulsed – 50%	3x ERA 3-5x per week	
Chronic	Moderate Thermal (approx. 2.0°C)	1 MHz, 1.0 W/cm², 10 minutes 3.3 MHz, 0.5 W/cm², 7 minutes	Continuous	3x ERA 3-5x per week	
Tissue Healing					
Wound Care	Non-thermal	3.3 MHz, 0.5 W/cm², 1-2 minutes increasing to 3 minutes per ERA	Pulsed – 20%	1-2x ERA 5x/week	Tissue healing, increases blood flow and cellular metabolism, alters tissue permeability
Acute Soft Tissue Healing	Non-Thermal (approx. 0.5°C)	1 MHz, 1.0 W/cm², 10 minutes 3.3 MHz, 0.5 W/cm², 7 minutes	Pulsed – 20%	2-3x ERA 3-5 x per week	
Subacute Soft Tissue Healing	Mild Thermal (approx. 1.0°C)	1 MHz, 1.0 W/cm², 10 minutes 3.3 MHz, 0.5 W/cm², 7 minutes	Pulsed – 50%	3x ERA 3-5x per week	
Chronic Soft Tissue Healing	Moderate Thermal (approx. 2.0°C)	1 MHz, 1.0 W/cm², 10 minutes 3.3 MHz, 0.5 W/cm², 7 minutes	Continuous	3x ERA 3-5x per week	
Soft Tissue Extensibility					
Contractures	Vigorous Heating (approx. 4.0°C)	1 MHz, 1.5 W/cm², 13 minutes 3.3 MHZ, 1.0 W/cm², 7 minutes	Continuous	3x ERA 3-5x per week	Increases in non-elastic tissues Increases mobility
Contractures GTO activation	Non-Thermal	3.3 MHz, 0.5 w/cm², 2 minutes at each musculotendinous junction of affected muscle	Pulsed – 20%	1-2x ERA 5x/week	

Shortwave Diathermy User Protocols

Dosage :

Based on acuity and desired thermal effect.

Application	Thermal vs. Non-thermal	Dosage	Treatment Time	Effect
Soft Tissue Trauma/Edema Reduction/Arthritis				
Acute Sub acute Chronic	Non-thermal Mild Thermal Mild/Moderate Thermal	Dose 1 Dose 2 Dose 3	20 minutes	Pain relief Decrease edema
Wound and Ligament Healing				
Acute Sub acute Chronic	Non-thermal Mild Thermal Mild/Moderate Thermal	Dose 1 Dose 2 Dose 3	20 minutes	Assists in the healing of pressure sores Increased organization of collagen
Musculoskeletal pain associated with muscle spasms				
	Thermal	Dose 4 Cont.	20 minutes	Increases blood flow/circulation Removes inflammatory chemicals
Contracture Management				
	Thermal	Dose 4 Cont.	20 minutes	Increases extensibility of collagen

- When using continuous diathermy, start at 60 Watts of output, increase by increments of 5 each treatment until desired thermal benefit is achieved

LLLT - Low Level Laser Therapy User Protocols

Wavelength (nm) – preset on device; determines depth of penetration

Power (mW) – specific to probe that is connected to device; determines time to deliver energy

Duty Cycle – continuous or pulsed; influences time to deliver energy

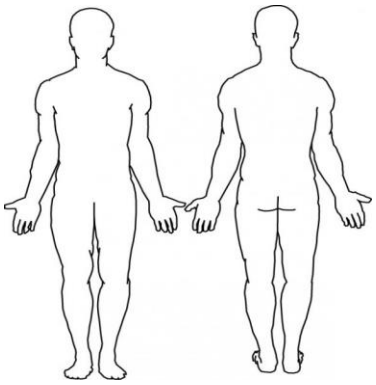
Spot Size – Size of laser beam(s) penetrating the skin; influences the time to deliver energy

Energy density (J/cm²) – measure of dosimetry, i.e. total power delivered per treatment session per cm²; influenced be all parameters above.

Indication	Dosage	Frequency	Application	Result
Neuralgia	10-12 J/cm²	Continuous	Along course of nerve	Decreased pain ratings
Pain	5-30 J/cm²	Continuous	Over pain area or TP	Decreased pain ratings
Acute soft tissue	4-8 J/cm²	<100 Hz	Over lesion	Decreased pain Accelerated inflammatory response
Chronic soft tissue	Up to 30 J/cm²	Continuous	Over lesion	Decreased pain Accelerated inflammatory response
Tendonitis/Bursitis	2-10 J/cm²	5000Hz	Over inflamed tissue	Decreased inflammation, pain and swelling Improved ROM
Trigger Points	5-20 J/cm²	Continuous	Over TP	Decreased pain Elevated beta-endorphin levels Decreased TP activity
Acute wounds	8 J/cm²	700Hz	In and around wound bed	Increased blood flow Accelerated healing
Chronic Wounds	1-6 J/cm²	Continuous	In and around wound bed	Increased blood flow Accelerated healing
Chronic Joint Disorders	Finger: 0.5 J/cm² Knee: 6 J/cm² C-Spine: 12 J/cm² L-Spine: 48 J/cm²	Continuous Continuous Continuous Continuous	Over joint surface Over joint surface Over joint surface Over joint surface	Decreased pain Improved ROM Improved function

Modality Evaluation Form

Date:_____ **Patient**:_____**Diagnosis**:_____



Precautions:_____

Target Tissue_____**User Protocol**:_____

Treatment Time:_____**Activity During Tx**:_____

Tolerance:_____

Skin Assessment:_____**Additional Equipment**:_____

Cues needed:_____

	Diathermy 97024	**Ultrasound 90735**	**E-Stim G0283/97032**	**Biofeedback 90901**	**Infrared/LLLT 97026**
INDICATIONS FOR USE					
↓Pain					
↑Circulation/↓Edema					
↑ROM					
↓Contracture/↓Scar Tissue					
↓Muscle Tone/↓Spasm					
↑Neuro Re-Ed					
↑Muscle Re-Ed/↓Disuse Atrophy					
↑Functional Re-Ed					
APPLICATION SETTINGS					
Thermal:	◯Continuous ◯Dose 4 ◯Dose 3 ◯Dose 2	◯100% ◯50%	**Acute Pain:** ◯IFC Acute(Sensory) ◯Premod Acute(Sensory) **Chronic Pain:** ◯IFC Chronic (Motor) ◯Premod Chronic (Motor) **Muscle Spasm:** ◯High Volt Spasm **Trigger Points:** ◯High Volt Spasm **VMS Strength/Power:** ◯Single ◯Reciprocal ◯Co-contract **VMS Endurance:** ◯Single ◯Reciprocal ◯Co-contract **Motor Control:** ◯VMS-FR Slow ◯VMS-FR Fast **Edema/Circulation:** ◯High Volt Wound ◯High Volt Edema	◯sEMG ◯sEMG + Stim	◯Neuralgia ◯Pain ◯Acute Soft Tissue ◯Chronic Soft Tissue ◯Tendonitis/ Bursitis ◯Trigger Points ◯Acute Wounds ◯Chronic Wounds ◯Chronic Joint Disorders
Sub-Thermal:	◯Dose 1	◯20% ◯10%* (*fracture healing)			

Rehab Medical

Electrode Placement Guide

Rehab Medical

Getting Started:

- **Skin Prep**
  - Wipe treatment area with warm water
    - Alcohol will dry the skin, increasing resistance
  - Place electrodes on/ around target tissue
    - Pain: around the area of complaint
    - Muscle facilitation: over muscle belly and musculotendinous junction
- **Electrode Selection**
  - Size of electrode is dependent on target tissue
  - Larger target tissue = larger electrodes
    - i.e. large area of pain, large muscle/muscle group
  - Smaller target tissue = smaller electrodes
    - i.e.

Rehab Medical

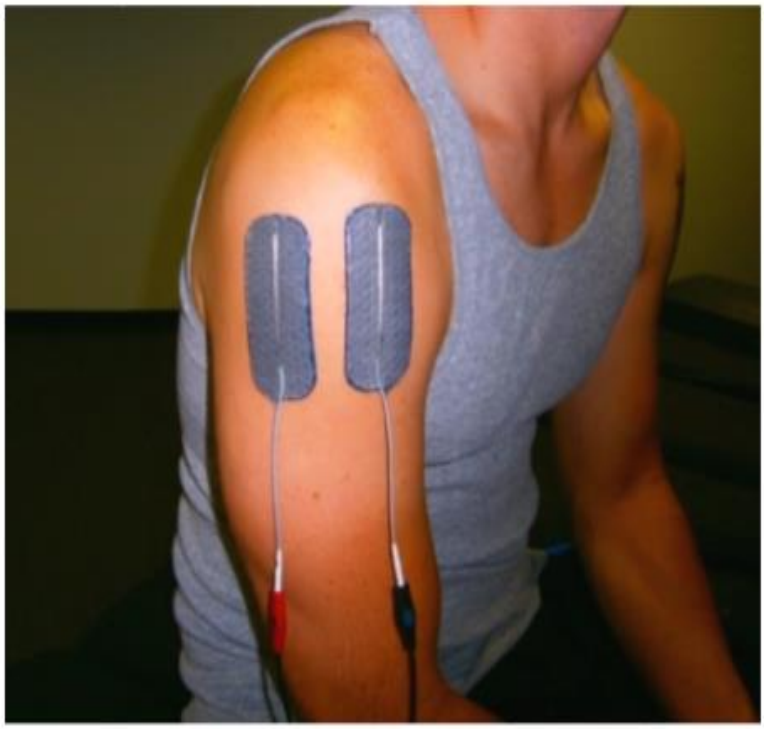
Trouble Shooting:

- **Factors that decrease conduction:**
  - Resistance from dirt, sweat, lotions, etc
  - Excessive adipose tissue
  - Dry skin, skin irritation or breakdown
  - Hair (can be trimmed/cropped, avoid shaving)
  - Resistance from old electrodes (skin, dirt, oils, etc)
  - Electrode spacing (too close together)
- **No motor activation:**
  - Double-check electrode placement
  - Adjust phase-duration and frequency
  - Gradually adjust throughout treatment

Rehab Medical

Shoulder Flexion and Abduction

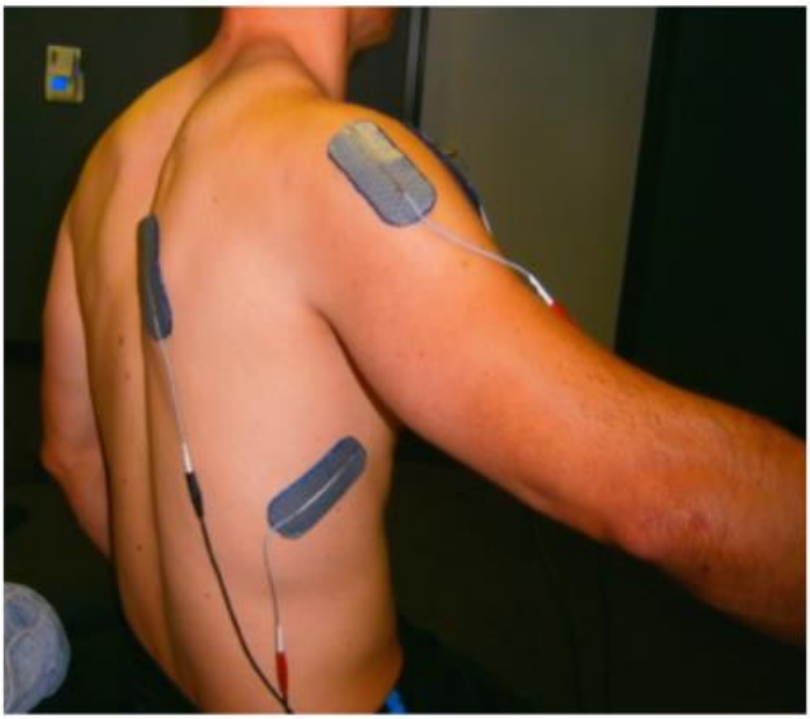
One electrode is placed on the Anterior Deltoid and the other electrode is placed on the Middle Deltoid



Rehab Medical

Shoulder Flexion and Scapular Retraction

One channel on Middle Deltoid and Anterior Deltoid. Second channel on Middle Scapula and Serratus Anterior



Rehab Medical

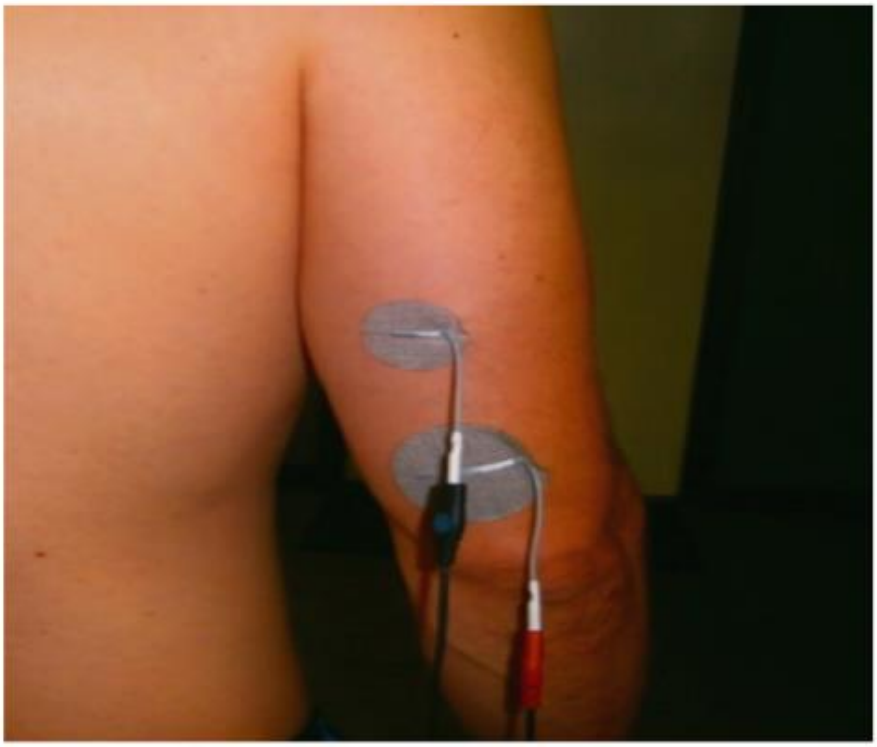
Scapular Retraction

One electrode is placed on the Serratus Anterior and the other electrode is placed on the Middle Scapula

Rehab Medical

Elbow Extension

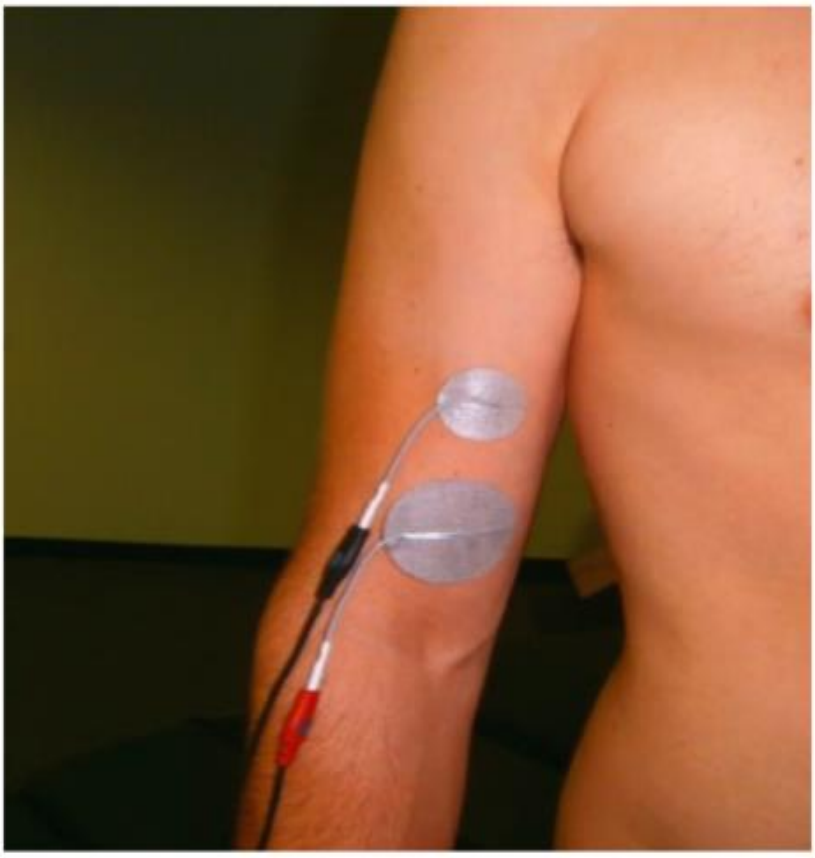
One electrode is placed on the middle Triceps and the other on the distal Triceps



Rehab Medical

Elbow Flexion

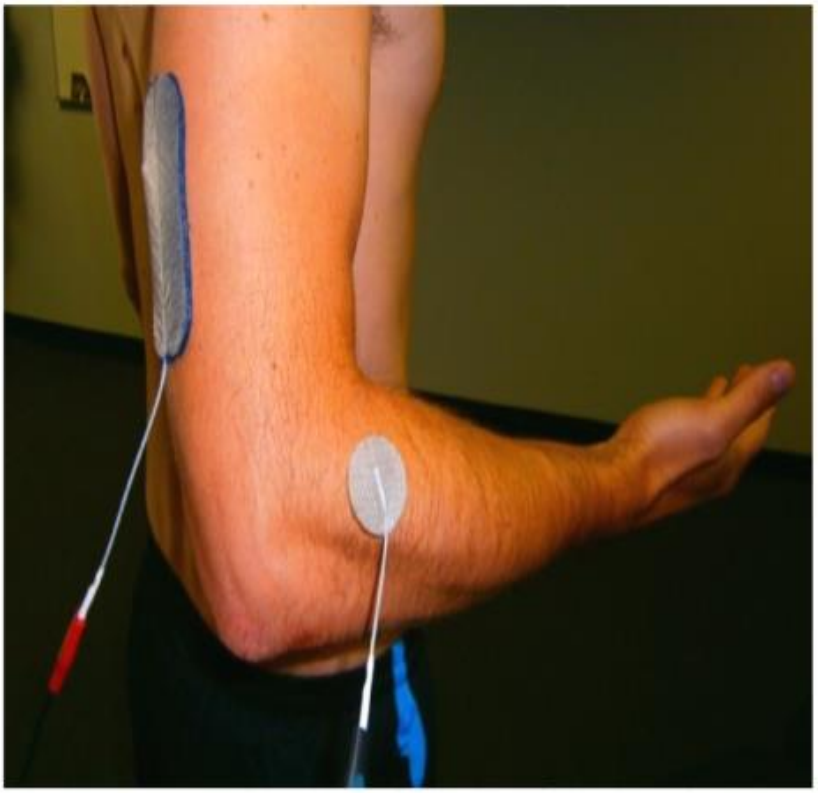
Place one electrode on the Biceps muscle belly and the other electrode is placed near the crease of the elbow



Rehab Medical

Supination

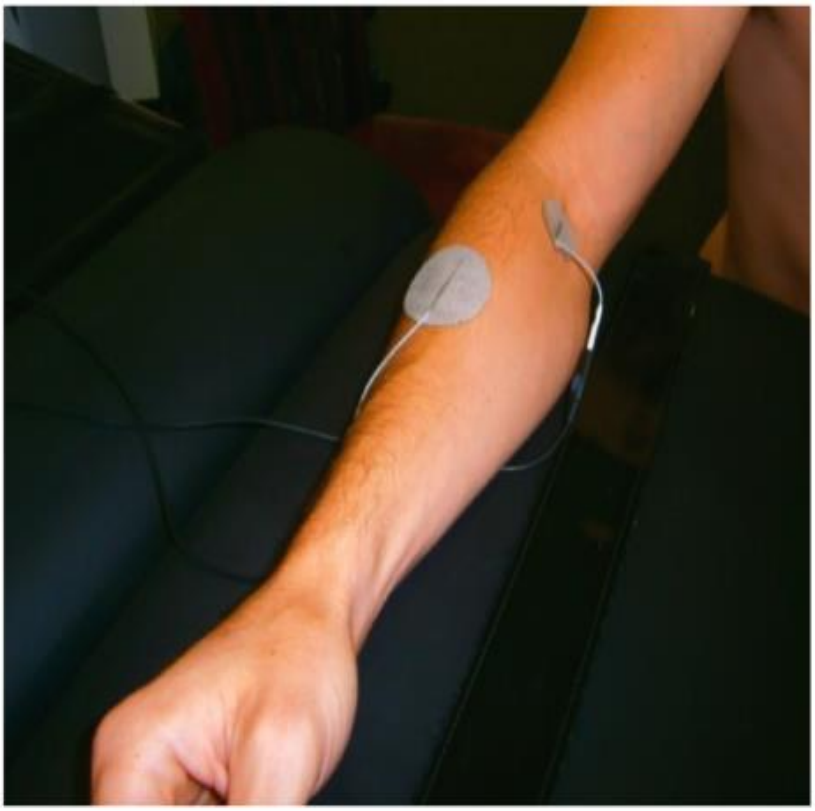
Place one electrode proximal to the Lateral Epicondyle and one electrode placed over the posterior upper arm



Rehab Medical

Pronation

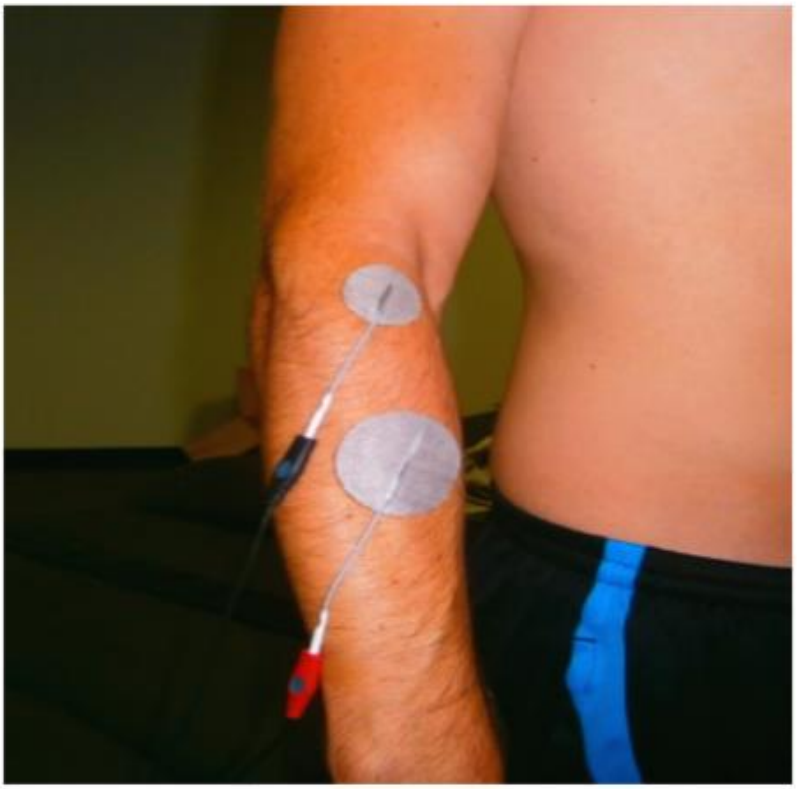
Place one electrode between midline and medial condyle and another electrode proximal on the forearm and radial border



Rehab Medical

Wrist Extension

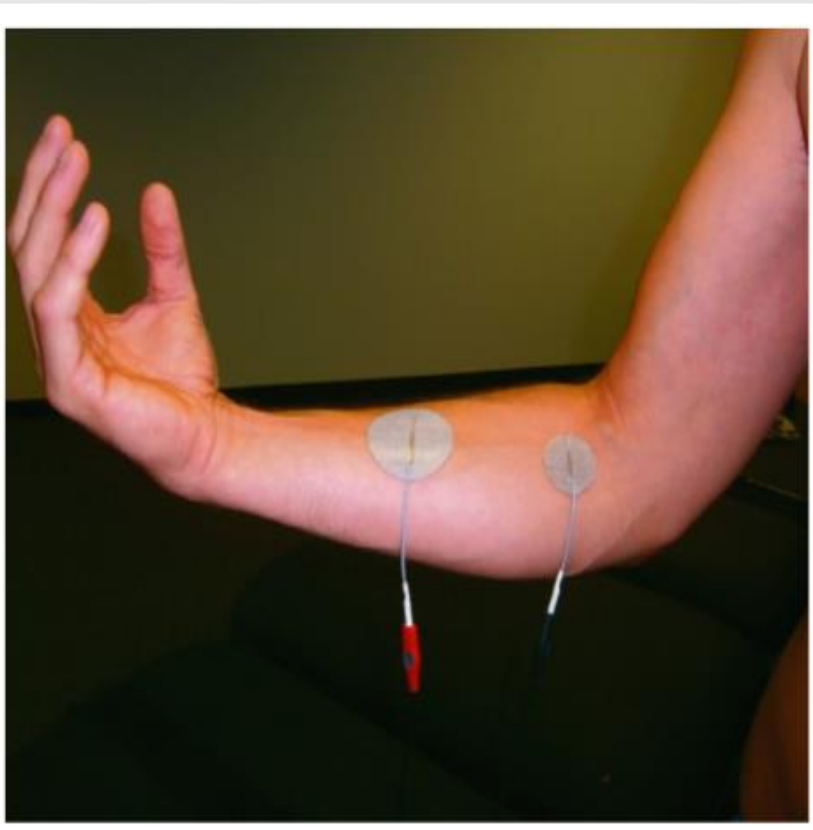
Place one electrode just distal of Lateral Condyle and one electrode at the tendonous area of forearm



Rehab Medical

Wrist Flexion

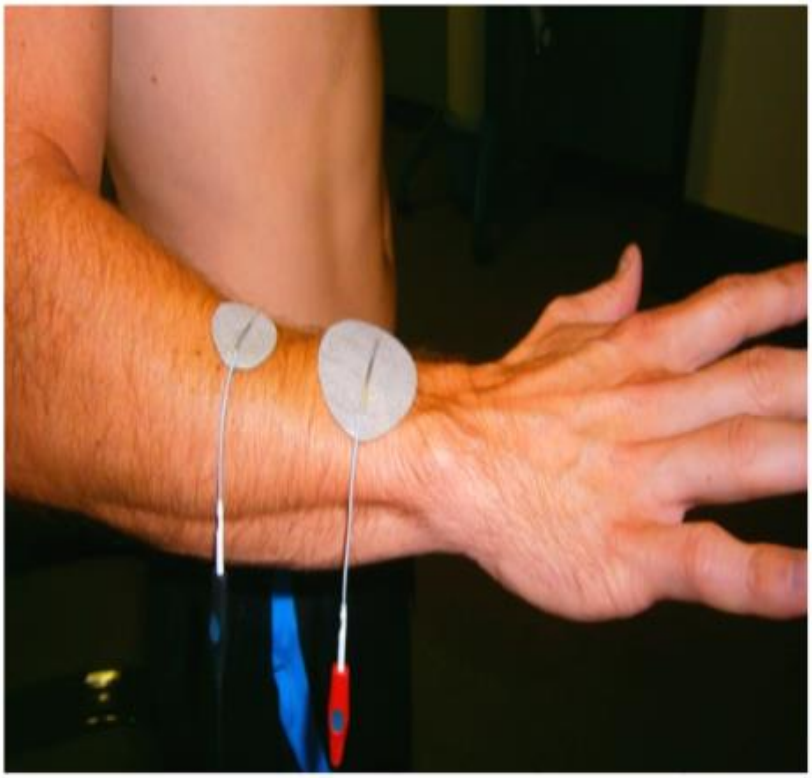
Place one electrode distally from the wrist extensors and one electrode at the tendonous portion of the flexor surface



Rehab Medical

Finger Extension

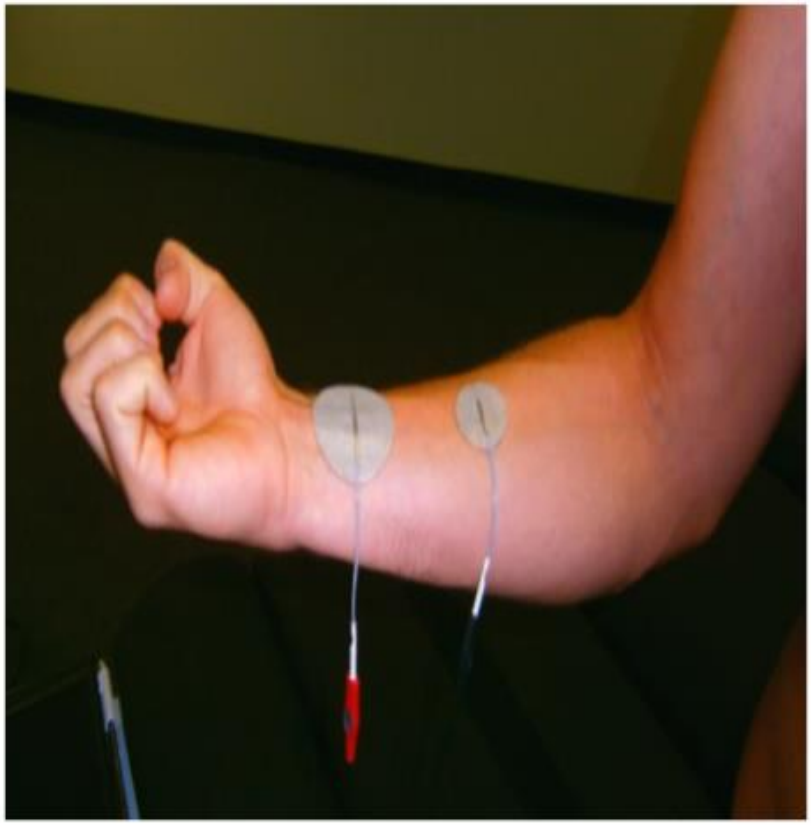
Place one electrode distally from wrist flexors and one electrode at the tendonous portion of the flexor surface



Rehab Medical

Finger Flexion

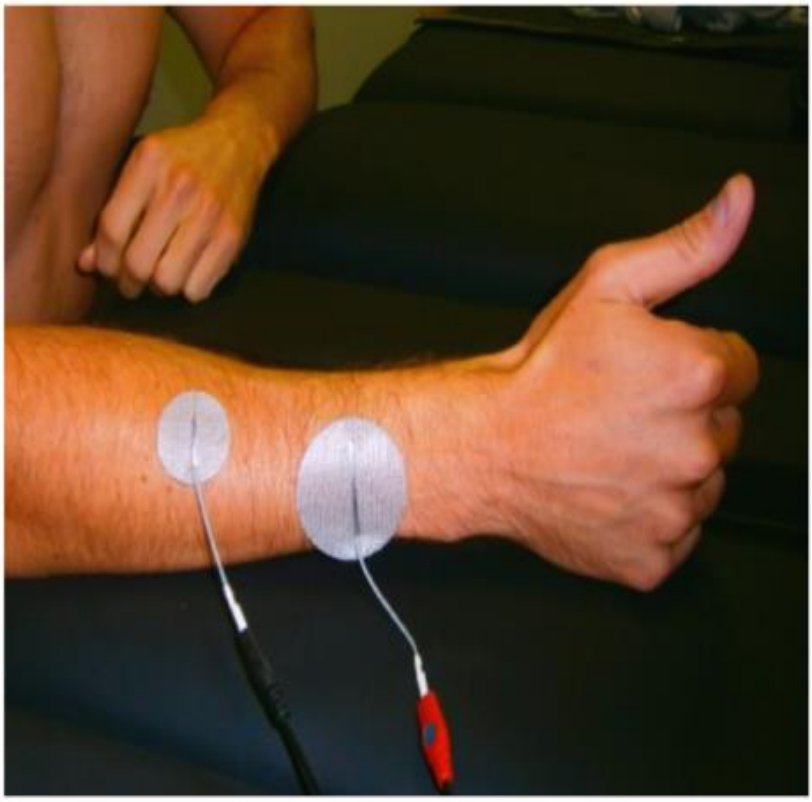
Place one electrode distally from wrist flexors and one electrode at the tendonous portion of the flexor surface



Rehab Medical

Thumb Extension

Place one electrode 2/3 of the way down the forearm over the extensor surface and another electrode over the extensor tendons



Rehab Medical

Thumb Opposition

Place one electrode over the lateral border of the 1st metacarpal and another electrode over the extensor surface

Rehab Medical

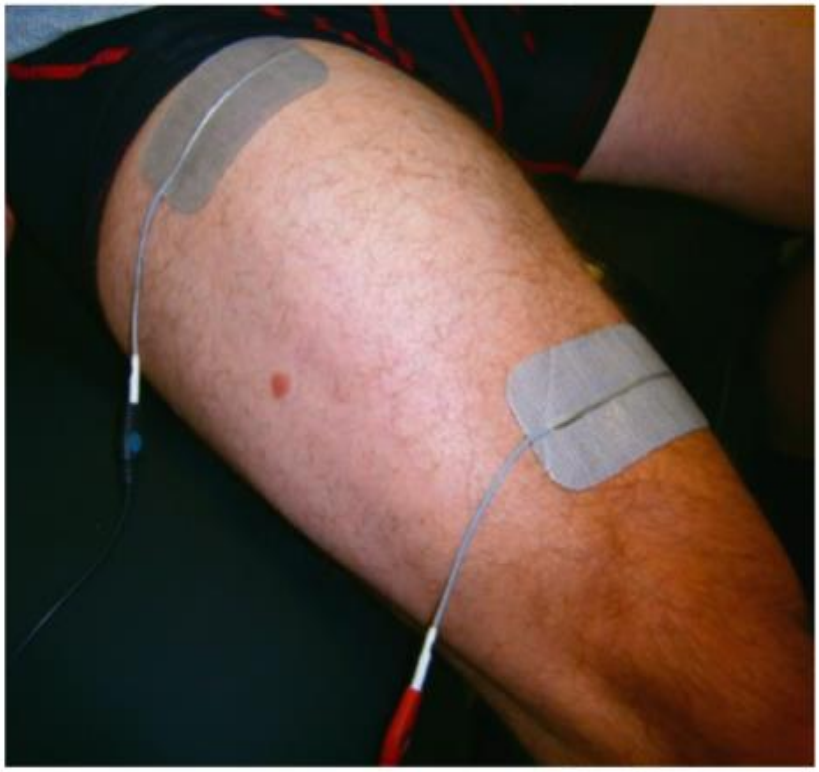
Thumb Abduction

One electrode is placed over the Thenar and the other over the extensors

Rehab Medical

Knee Extension

One electrode is placed more laterally and proximal and the other electrode is placed distal and midline to knee

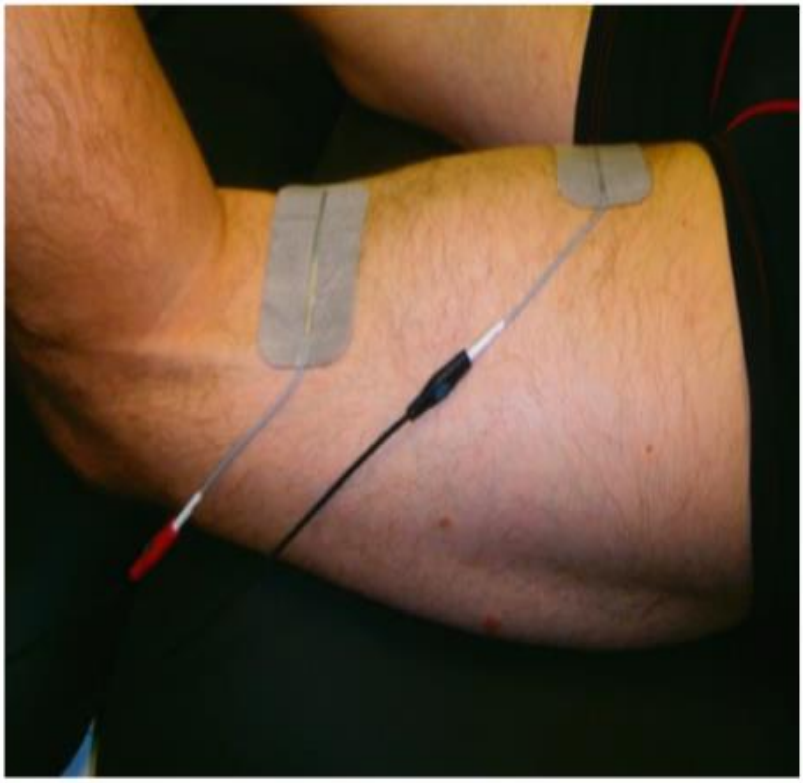


Rehab Medical

Knee Flexion

One electrode is placed proximal and medial over the Hamstring and the second electrode is placed midline and distal.

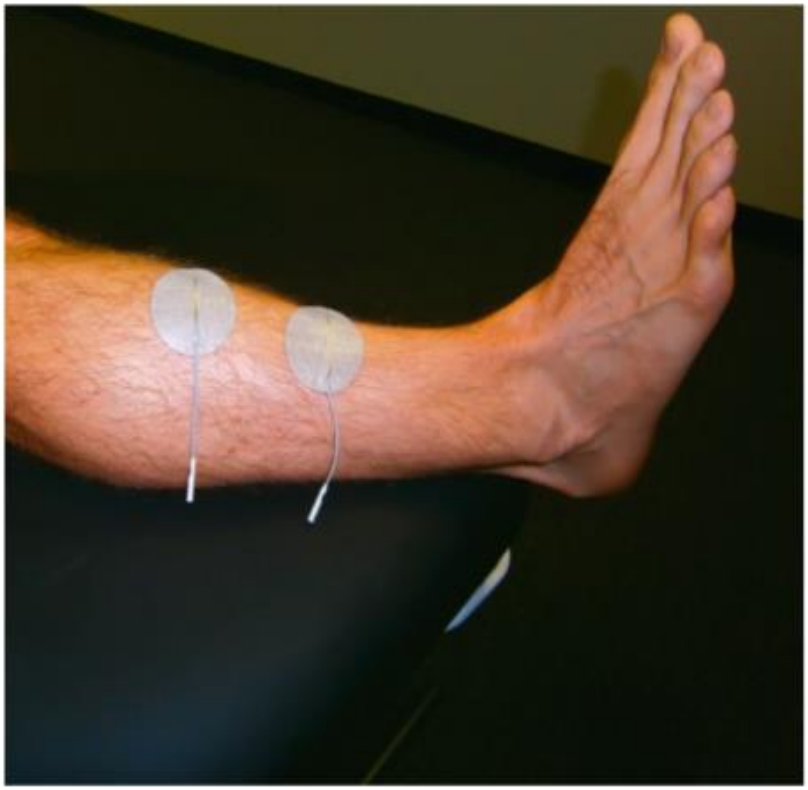
Must add 15 of flexion in order to achieve*



Rehab Medical

Ankle Dorsiflexion

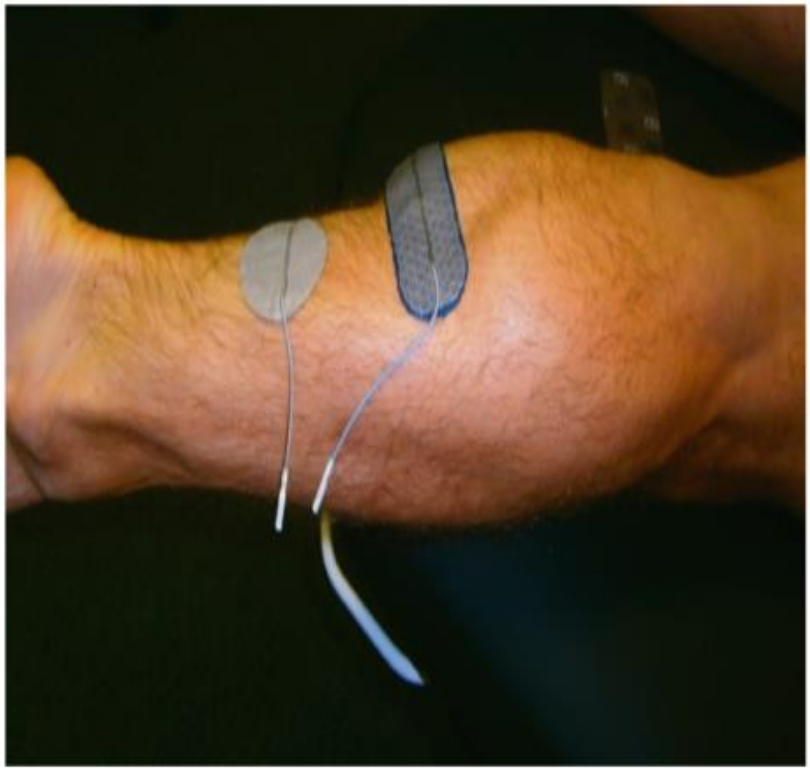
One electrode is placed over the muscle belly of the Anterior Tibia more midline and second electrode distal to that close to Tibia



Rehab Medical

Ankle Plantar Flexion

Place one electrode at the origins of the medial and lateral Gastrocnemius and one electrode over Soleus



Rehab Medical

Rehab Medical

Intro to Modalities in Motion

Vectra Genisys: E-Stim & Ultrasound

Rehab Medical

Indications

- **Nerve Stimulation**
  - Neuromuscular Stimulation (peripheral nerves are intact)
  - Pain Management
- **Tissue Stimulation**
  - Wound healing
  - Hematoma management
- **Muscle Stimulation**
  - Strengthening
  - Muscle coordination

Rehab Medical

Contraindications

- **Do not use electrical stimulation on patients with:**
  - Implanted electrical devices*
    - Advocate to MD and get order for use
  - Pregnancy*
    - Manufacturer contraindication, get MD clearance
- **Do not use electrical stimulation over:**
  - Infection
  - Cancer
  - Carotid sinus
  - Transcerebral/Transthoracic
  - Circulatory insufficiencies
  - Eyes/mucosal membranes
  - Unknown etiologies
  - Genitals

Rehab Medical

Precautions

- **Use clinical reasoning when:**
  - Impaired sensation
  - Impaired cognition
  - Impaired communication
  - Around the neck
  - Transdermal Patches

Rehab Medical

Skin Prep/Skin Assessment

- **Before Treatment:**
  - Visually assess the area
  - Wipe with warm water (NO ALCOHOL)
  - Place electrodes and administer treatment
- **During treatment:**
  - Check on your patient!
  - Check electrodes
- **Following treatment:**
  - Visually assess the area for any changes and document
  - Wipe area with warm water
  - Can apply skin moisturizer if patient wishes

Rehab Medical

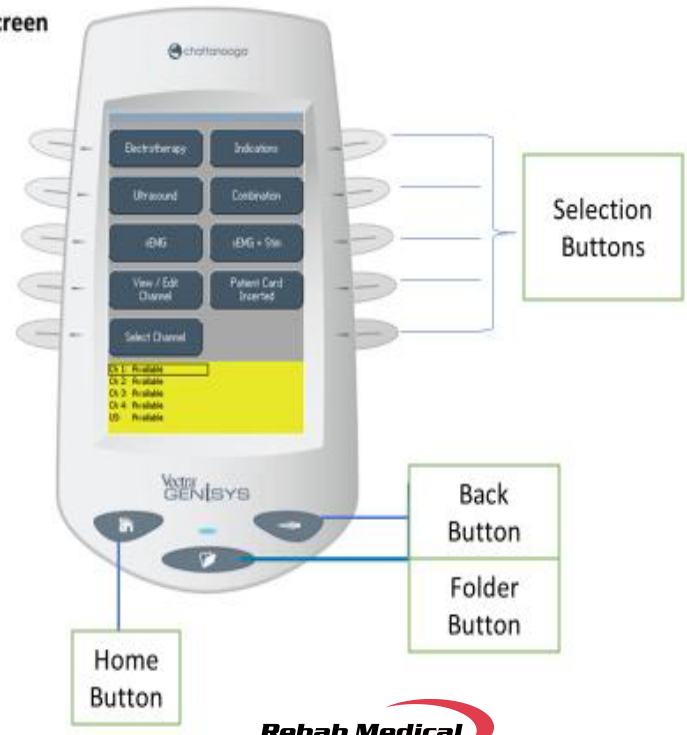
Electrodes

- **Know your target tissues**
  - **Pain :**
    - IFC "X" marks the spot – larger areas
    - Premod on both sides of pain – smaller areas
    - Trigger Points – red (+) on TP, black (-) in referral area
  - **Strengthening/Endurance :**
    - Muscle/Muscle Groups
    - Location
  - **Electrode Life :**
    - Dura-Stick recommended by manufacturer
    - Single patient/multiple use
    - Approx 10 uses (with proper care)

Rehab Medical

Navigation

The Home Screen



Rehab Medical

Electrotherapy

- **Interferential Current (IFC)**
  - 4 electrodes - Pain Management
- **Premodulated Current (Premod)**
  - 2 electrodes – Pain Management
- **Asymmetrical Biphasic**
  - 2 electrodes– strengthening, pain (TENS Waveform)
- **Microcurrent**
  - 2 electrodes – wound healing
- **VMS/VMS Burst/VMS FR**
  - 2 or 4 electrodes – strengthening, neuro – reeducation, motor control
- **Russian**
  - 2 electrodes – strengthening
- **High Volt**
  - 2 electrodes – pain, MM spasm, TP, wounds
- **Symmetrical Biphasic**
  - 2 electrodes– strengthening, pain (NMES Waveform)
- **Direct Current**
  - 2 electrodes – wound healing, pain, iontophoresis

Rehab Medical

Folder/Clinical Protocols

- **Folder** Button
- **Clinical Protocols** Button
  - Choose body part
  - Choose indication/modality
  - Parameters are adjustable
    - **Edit**!
- Saving Protocols
  - **Save** button
  - Name it, up to 22 characters
  - **Save** Button
  - Accessible by **Retrieve Custom Protocols**

Rehab Medical

Adjustability

- **IFC – Acute/Chronic/Nerve Block**
  - Sweep – rhythmic fluctuations of beat frequency
    - Frequency - pulses per second
    - 80/150 Hz **Acute** pain – **Sensory** – Gate Control
    - 1-10 Hz **Chronic** Pain – **Motor** – Opiate Release
    - Fixed pulse – 100 hz – **nerve block**
  - CC/CV – Constant Current/Voltage
    - How the unit modulates output
  - Vector Scan – focal to diffuse
    - ON - sensation moves around treatment area
      - 40% v 100% v manual
    - OFF - focal
  - Carrier Frequency - increases comfort of waveform
    - 4000 default Acute/Gait Control
    - 2500 default Chronic/Opiate Release

Rehab Medical

Adjustability

- **Premod– Acute/Chronic/Nerve Block**
  - Sweep – rhythmic fluctuations of beat frequency
    - Frequency - pulses per second
    - 80/150 Hz **Acute** pain – **Sensory** – Gate Control
    - 1-10 Hz **Chronic** Pain – **Motor** – Opiate Release
    - Fixed 100 Hz – **nerve block**
  - CC/CV – Constant Current/Voltage
  - Cycle Time – ratio of on:off time
    - Continuous for pain applications

Rehab Medical

Patient Switch

•To be given to a patient to control administration of stimulation

•Will pause treatment and requires therapist intervention to resume treatment

Rehab Medical

Adjustability

- **High Volt (edema, spasm, wound)**
  - Cycle Time – ratio of on:off time
    - Continuous for most applications
  - Frequency – Pulses per second
    - 100 pps for most applications
  - Polarity describes the polarity of the red lead
  - Ramp – the time to go from 0-max (if not continuous)
  - Display - visual display of output – Volts
  - Sweep – rhythmical fluctuations
  - Increases by increments of 5
    - Edema and Wound management : keep below motor stimulation
    - Spasm : elicit motor response to fatigue

Rehab Medical

Adjustability

- **VMS Strength (Power) – elicit contraction with activity**
  - Channel Mode – single, reciprocal, co-contract
  - CC/CV – Constant Current/Voltage
  - Cycle Time - Ratio of on : off time
  - Frequency – Pulses per second
    - Can adjust for comfort
  - Ramp – time to go from 0 –max
    - Decrease ramp time as patient progresses
  - Phase Duration –
    - Defaults to 200
    - Increase to 300 for large muscle groups (quads, glutes, abs, etc)
    - 300-400 for flaccid muscles
  - Anti-fatigue – frequency auto adjusts to minimize fatigue

Rehab Medical

Pendant

- Pause – start/pause
  - Therapist use – adjustments
  - Patient use – safety/comfort
- Channel Adjustment
  - Increase/decrease intensity
- "M" Manual administration
  - Handheld administration of stimulation
  - To control timing of stimulation

Rehab Medical

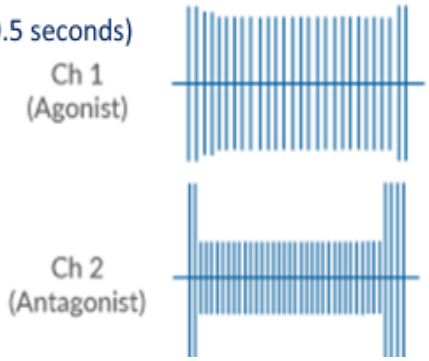
Adjustability

- **VMS Endurance – elicit contraction with activity**
  - Channel Mode – reciprocal
  - CC/CV – Constant Current/Voltage
  - Cycle Time - Ratio of on : off time
  - Frequency – Pulses per second
    - Can decrease for comfort
  - Ramp – time to go from 0 –max
    - Decrease ramp time as patient progresses
  - Phase Duration
    - Defaults to 200
    - Increase to 300 for large muscle groups (quads, glutes, abs, etc)
    - 300-400 for flaccid muscles
  - Anti-fatigue – frequency auto adjusts to minimize fatigue

Rehab Medical

Adjustability

- **VMS-FR(Strength/Spasticity) Motor Control and Neuro Reeducation**
  - "Quad phasic" - facilitates normal relationship between agonist and antagonist
  - Ch 1 : agonist/Ch2 : antagonist
    - Set intensity : both channels or 1st/2nd channel
  - Burst Duration : 200-5000ms
    - Increase burst for longer period between burst (500ms = 0.5 seconds)
  - Phase Duration : 20-400
    - Defaults to 200
    - 300 for large muscles/muscle groups
    - 400 flaccid muscles
  - Activity
    - Always incorporate with activity!



Rehab Medical

Biofeedback

- **sEMG**
  - Surface Electromyography aka Biofeedback
  - **No electrical stimulation is delivered**
  - **Precaution:** skin integrity
  - Channels 1 and/or 2 only
  - sEMG lead wire
    - Red and Black
      - Over target muscle/group
    - Green
      - Reference lead
      - On patient out of treatment area

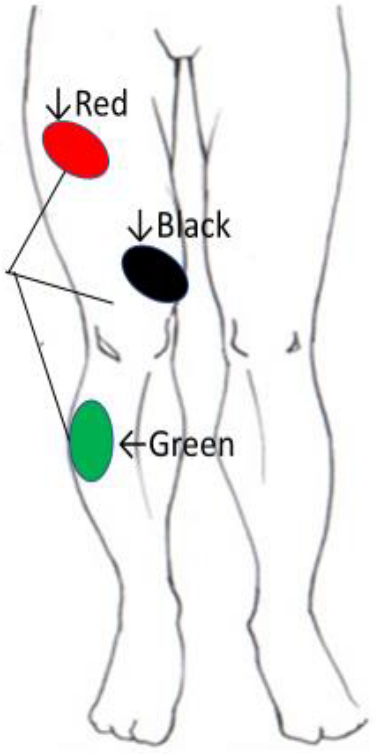
Rehab Medical

sEMG (Biofeedback) Set Up

When setting up sEMG (biofeedback)

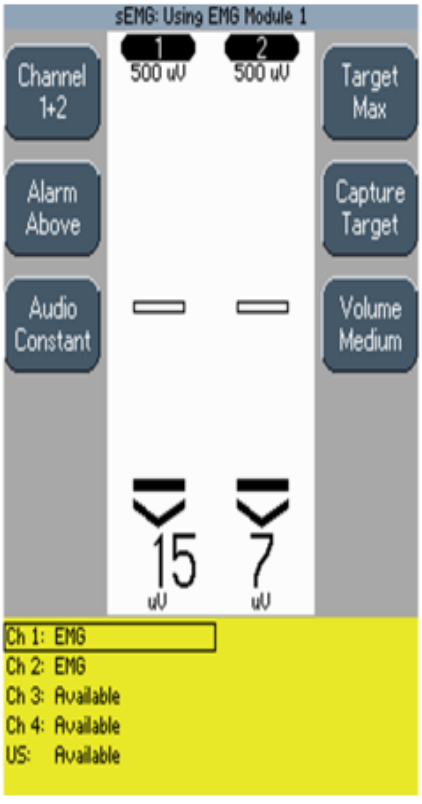
- Identify target muscle/muscle group and action
- Place electrodes attached to **red and black leads over target muscle**
- Place electrode attached to **green lead to the patient, out of the treatment area**

- Example: to facilitate the quadriceps group.



Rehab Medical

sEMG – Vectra Genisys



- **Channel Mode** : channel 1, 2 or 1 & 2
- **Alarm** : Above, Below or at Target
- **Audio** : Adjusts audio output
- **Capture Target** : Begin capture (facilitate contraction x3) set percentage of maximum exertion (varies by patient)
- **Target Manual** : Therapist adjusts target µV
- **Volume** : adjusts volume of audio output
- Instruct patient to contract muscle to hear music or move bar above target on screen
- **Uses**: to improve motor control, eliciting or relaxing target muscle, increasing awareness of target muscle activation, etc

Rehab Medical

Biofeedback + Stim

- **sEMG + Stim**
  - **All e-stim precautions/contraindications must be considered**
  - Single channel only (1 or 2)
  - **Set up** : same as sEMG
  - **Edit Stim** : Set phase duration and frequency desired as with VMS
    - Cycle time : dependent on activity and patient tolerance (on/off time)
  - **Intensity** : to muscle contraction
  - **Start sEMG+Stim**
    - Unit cues patient to "GO", once they hit the target, stim will be triggered. Once completed unit will cue to "Relax"
  - **Uses** : once patient achieves therapist set target, stim will ramp up to help facilitate robust muscle contraction.

Rehab Medical

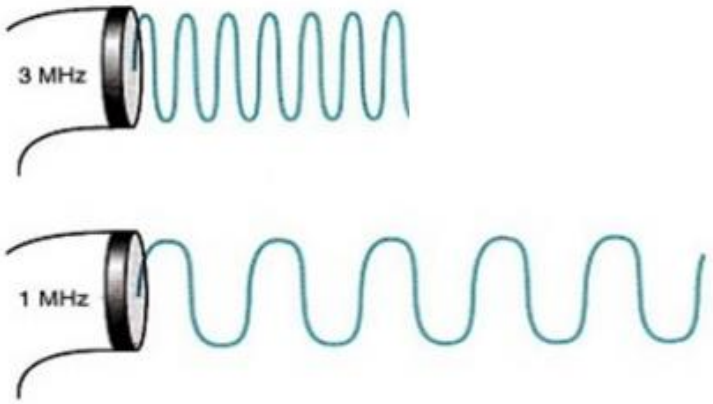
Ultrasound

- **Description:**
  - Acoustic energy produced when electrical current traveling through a cable transducer is converted into mechanical vibration
  - "Micro Massage"
- **Coupling Agent:**
  - Gel – recommended
  - Water – heats muscle approx 50% of the peak temp obtained with gel
  - Hydrocortisone cream – is not an effective coupling agent
  - Theragesics – like biofreeze mixed 1:1 with gel work best however will alter sensation

Rehab Medical

Ultrasound

- **1MHz**
  - Deep penetration
  - 0.8-5 cm of penetration
- **3.3MHz**
  - Superficial penetration
  - 0.8cm – 2.5cm
- **Heat retention**:
  - 3.5 minutes muscle
  - 5 minutes for tendon



- **Rate of absorption**: US loves protein rich tissue!
  - Highest to Lowest : Bone, peripheral nerves, cartilage, skeletal muscles, blood vessels, fat and water

Rehab Medical

Indications

- Musculoskeletal pain associated with muscle spasm
- Acute, sub-acute and chronic inflammation
- Soft tissue tightness
- Wound healing
- Increasing blood flow – modulating inflammation
- Bone fractures –studies show that low intensity ultrasound stimulates callus and trabeculae development

Rehab Medical

Contraindications

- **Do not sonate over:**
  - Implanted electrical devices
  - Pregnant uterus
  - Tumors – malignant or benign
  - Thrombophlebitis – diagnosed or suspected
  - Infection
  - Cervical ganglia, stellate ganglia, heart, carotid sinus
  - Vertebral bodies after laminectomy, due to fear of unstable cavitation to the cerebrospinal fluid
  - Eyes, ears, genitals
  - Active skeletal growth plates
  - Active bleeding or susceptible to hemorrhage

Rehab Medical

Precautions

- **Use clinical reasoning when:**
  - Joint replacement with plastic components or methylmethacrylate due to rapidity of heating or those materials. Metallic components are very homogenous and ultrasound energy is less absorbed
    - *Know your depth of penetration!!*
  - Decreased sensation
    - *Know your thermal benefit!!*

Rehab Medical

Ultrasound

- **Access from Home Screen**
  - Edit desired parameters
- **Effective Radiating Area (ERA)**
  - Treatment area ***ONLY*** 2-3 X the size of the sound head
  - Keep US head in contact and moving
  - "Float" the head in the gel
  - Maintain continuous flat contact with patient for maximum comfort and efficacy of treatment
- **Coupling Agent**
  - Appropriate for your treatment area and application
- **Depth of target tissue**
  - 1 MHz or 3.3 MHz
- **Head Warming**
  - ON/OFF – comfort
- **Duty Cycle**
  - Continuous vs Pulsed

- *See OMS US Parameter guide for recommended parameters*

Rehab Medical

US/Electrical Stimulation COMBO

- **Uses:**
  - Trigger points, pain, edema, finding motor point, etc
- **Access from Home Screen**
  - Will always be channel 2!
  - US head become red lead of channel 2
  - Edit US FIRST
    - Set US parameters
  - Customize electrical stimulation
    - Select waveform and parameters
    - Maintain contact with skin
  - Press Start
    - US and ES are working simultaneously

  - *Maintain continuous flat contact with patient for maximum comfort and efficacy of treatment*

Rehab Medical

Thank You!

- Welcome to OMS Rehab!
- Feel free to call, text, email with questions
  - Jessica Ostrye, OTR/L
    - (913) 333-8561
    - jostrye@omsrehab.com
- If you get error messages, take a picture of it for me. That will help determine the problem.

- P.S. Send me bad jokes and pictures of small animals ☺

Rehab Medical

Rehab Medical

Intro to Modalities

Shortwave Diathermy (SWD)

Rehab Medical

Short Wave Diathermy

- **Description** – Inductive SWD (drum)
  - Alternating current passed through a coil producing a magnetic field perpendicular to the coil causing electrical eddy currents in the tissues.
  - Charged particles in the tissues oscillate causing friction which produces a temperature rise in the tissue.
  - Known as heating by magnetic field
  - Larger treatment area than ultrasound

Rehab Medical

Short Wave Diathermy

- **Research**:
  - SWD can produce deep tissue heat
  - When applied in non-thermal dosages, it decreases pain and facilitates tissue healing
  - When thermal dosages are utilized, it increases blood flow and ROM, decreases muscle spasms and provides pain relief
  - Heat Retention > 9 minutes

Rehab Medical

Short Wave Diathermy

- **Non-Thermal Effect:**
  - Increase local microvascular perfusion
  - Increase local tissue oxygenation
  - Increase local nutrient availability
  - Increase phagocytosis
  - Increase fibroblastic activity and capillary growth
  - Alters cell membrane activity and cellular activity

Rehab Medical

Short Wave Diathermy

- **Thermal Effect:**
  - One top of all non-thermal benefits….
  - Vasodilation
  - Increase nerve conduction rate
  - Elevation of pain threshold
  - Acceleration of enzyme activity
  - Increased soft tissue extensibility

Rehab Medical

Short Wave Diathermy

- **Indications:**
  - Musculoskeletal pain
  - Muscle Spasm
  - Inflammation
  - Soft tissue tightness
  - Increase blood flow
  - Acute soft tissue trauma
  - Wound healing

Rehab Medical

Short Wave Diathermy

- **Contraindications**
  - Implanted Electrical Devices - **10 feet**
  - Metal in area – surface or implanted
    - **Manufacturer contraindication** Research suggests non-thermal doses are safe (Dose 1 only)
  - Infection in treatment area
  - Over open lamina (s/p laminectomy, hx of spina bifida, etc)
  - Pregnancy – **10 feet**
- **Do not use over:**
  - Acute hemorrhage/Active bleeding
  - Known or suspected DVT
  - Malignancies
  - Eyes, ears, testes, ovaries
  - Open lamina (s/p laminectomy, spina bifida)
  - Infection
- **Precautions:**
  - Areas with sensory impairment – **use non thermal only**
  - Genitalia – **use caution**

Rehab Medical

Dosage

- Dose 1 – Non Thermal – 0˚C change
  - Acute Pain, stages of healing, edema reduction
- Dose 2 – Mild Thermal – 1˚C change
  - Sub-acute pain, stages of healing, edema reduction
- Dose 3 – Moderate Thermal – 2˚C change
  - Chronic pain, stages of healing, edema reduction
- Dose 4 – Vigorous Heating – 4˚C change
  - Muscle pain, collagen extensibility, skeletal pain, contractures

Rehab Medical

Short Wave Diathermy

- **Application:**
  - Loosen all joints when positioning drum
    - Careful to not over-tighten
  - Position drum as desired
    - Consider target tissues
    - Position of patient for comfort/patient activity
    - Take gravity into consideration
  - Determine dosage/access clinical protocols
  - Press Start
  - Incorporate activity with treatment and immediately following to maximize effects

  - *See OMS SWD parameter guide for recommended parameters*

Rehab Medical

Clinical Protocols

- **Access from Home Screen**
  - Press Clinical Protocols
  - Select body part
  - Select indication

- **Can Save customized protocols**
  - Select Manual SWD and adjust parameters as desired
  - From treatment screen press Save Protocol
  - Save Protocol as new name (up to 25 characters)
  - Press 

Rehab Medical

Rehab Medical

Modalities in Motion

Long Term Care

Rehab Medical

Introduction

- **Preset protocols**
  - based on review of scientific literature
  - Intended to give clinician treatment options based on stage of healing and other condition the patient is presenting.
  - Are a starting point
  - Increase confidence in potential for achieving positive outcomes when applied correctly on the properly evaluated patient.

Rehab Medical

Introduction

- **Modalities**
  - Are an **ADJUNCT** to interdisciplinary care to assist the patient to return to their prior level of functional independence.
  - Create a change in the soft tissue allowing therapists to do more with the patient

- *Modalities do not replace quality therapy care, they ENHANCE it!*

Rehab Medical

Introduction

- **Clinical decision-making** needs to take place before using modalities, especially:
  - In the presence of stated *contraindications/precautions*, or
  - When the patient show no signs of improvement after an adequate number of treatment sessions.
    - 5-7 treatments

- Individual lists of contraindications per modality under each modality's section.

Rehab Medical

Maximum Benefit of Use

- **Screening process**
  - Nursing: decreased function with ambulation, transfers, ADL's, mobilizing slowly or more labored
  - Medication records: increased requests for pain meds or PRN pain meds
  - Dietary: changes in intake, changes in weight
  - Activities: changes in recreational pursuit or affect
  - Look: identification of poorly fitting devices and seating systems
- **Communication!!**
- **Keep indications for use in mind with each patient interaction**

Rehab Medical

Justification of Services

- **Medical Necessity**
  - **Necessary** – this approach promotes recovery, restores function and is ordered and furnished by qualified personnel
  - **Reasonable** – probability that a patient will make an improvement as a consequence of therapy
  - **Predictable** – planned frequency and duration of treatments are reasonable in relation to the diagnosis, severity and prognosis of the patient's function

Rehab Medical

Documentation

- **Must clearly support the plan of care!**
  - Reference to short and long term goals in use of modalities
- **Include:**
  - Settings/parameters of treatment
  - Position of patient/electrodes
  - Activity incorporated with treatment
  - Verbal/tactile cues
  - Patient education completed
  - Patient condition pre/post as pertains to goals in POC
  - Skin condition!
    - *Clearly outline the skilled need for treatment!!*
- See Documentation guidelines in binder for samples

Rehab Medical

Ultrasound

- **Description**:
  - Acoustic energy produced when electrical current traveling through a cable transducer is converted into mechanical vibration
  - Coupling Agent:
    - Gel – **recommended**
    - Water – heats muscle approx 50% of the peak temp obtained with gel
    - Hydrocortisone cream – is not an effective coupling agent
      - Hydrocortisone GEL for phonophoresis
    - Theragesics – like biofreeze mixed 1:1 with gel
      - **will alter sensation!**

Rehab Medical

Ultrasound

- **What the Research tells us:**
  - Low frequency ultrasound (1MHz) is more effective in treating deep tissues (0.8-5.0 cm)
  - Higher frequency ultrasound (3.3MHz) is more effective in treating superficial tissues (0.8-2.5 cm)
    - Heats 3x as fast as lower(1MHz) frequency US
  - Rate of absorption and heat retention dependent on target tissue (Protein rich tissue absorbs faster)
    - Heat retention
      - 3.5 minutes muscle
      - 5 minutes for tendon

Rehab Medical

Indications

- Musculoskeletal pain associated with muscle spasm
- Acute, sub-acute and chronic inflammation
- Soft tissue tightness, contractures
- Wound healing/hematoma management
- Increasing blood flow – modulating inflammation
- Bone fractures – new studies show that low intensity ultrasound stimulates callus and trabeculae development

Rehab Medical

Contraindications and Precautions

- **Do not sonate over:**
  - Implanted electrical devices
  - Pregnant uterus
  - Tumors – malignant or benign
  - Thrombophlebitis – diagnosed or suspected
  - Infection
  - Cervical ganglia, stellate ganglia, heart, carotid sinus
  - Vertebral bodies after laminectomy, due to fear of unstable cavitation to the cerebrospinal fluid
  - Eyes, ears, genitals
  - Active skeletal growth plates
  - Active bleeding or susceptible to hemorrhage

Rehab Medical

Contraindications/Precautions (cont.)

- **Use clinical reasoning when:**
  - Joint replacement with plastic components or methyl methacrylate due to rapidity of heating or those materials. Metallic components are very homogenous and ultrasound energy is less absorbed
    - *Know your depth of penetration!!!*
  - Decreased sensation
    - *Know your thermal benefit!!!*

Rehab Medical

ULTRASOUND

- **Application**
  - Select appropriate conductive medium
  - ERA – effective radiating area
    - Treatment area ONLY 2-3 X the size of the sound head
    - Keep US head in contact and moving, "Float" the head in the gel
    - Maintain continuous flat contact with patient for maximum comfort and efficacy of treatment
  - Determine parameters for target tissue/goals
    - Depth of penetration
    - Thermal goal of treatment
      - Intensity : time
    - *See OMS US Parameter guide for recommended parameters*
  - Administer treatment
  - Follow up with manual/stretching/exercise
  - Document/Educate

Rehab Medical

Short Wave Diathermy

- **Description – Inductive SWD (drum)**
  - Alternating current passed through a coil producing a magnetic field perpendicular to the coil causing electrical eddy currents in the tissues.
  - Charged (H20) particles in the tissues oscillate causing friction which produces a temperature rise in the tissue.
  - Known as heating by magnetic field
  - Tissue is heated from the inside out to reach deeper tissue more effectively (i.e. deep joint pain)
  - Can control pain and edema and promote tissue healing without tissue temperature rise
  - Larger treatment area than ultrasound

Rehab Medical

Short Wave Diathermy

- **Research**:
  - SWD can produce deep tissue heat
  - When applied in non-thermal doses, it decreases pain and facilitates tissue healing
  - When thermal doses are utilized, it increases blood flow and ROM, decreases muscle spasms and provides pain relief
  - Heat Retention > 9 minutes

Rehab Medical

Short Wave Diathermy

- **Thermal Effect:**
  - Vasodilation
  - Increase nerve conduction rate
  - Elevation of pain threshold
  - Acceleration of enzyme activity
  - Increased soft tissue extensibility

Rehab Medical

Short Wave Diathermy

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Rehab Medical

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Rehab Medical

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  - Malignancies
  - Eyes, ears, testes, ovaries
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- **Precautions:**
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Rehab Medical

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- **Application**
  - Loosen all joints when positioning drum
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    - Take gravity into consideration
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  - Press Start
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Rehab Medical

Dosage

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  - Muscle pain, collagen extensibility, skeletal pain, contractures

Rehab Medical

Clinical Protocols

- **Access from Home Screen**
  - Press Clinical Protocols
  - Select body part
  - Select indication
- **Can Save customized protocols**
  - Select Manual SWD and adjust parameters as desired
  - From treatment screen press Save Protocol
  - Save Protocol as new name (up to 25 characters)
  - Press 

Rehab Medical

ELECTRICAL STIMULATION

- **Indications:**
  - *Nerve Stimulation*
    - Neuromuscular Stimulation (peripheral nerves are intact)
    - Pain Management
  - *Tissue Stimulation*
    - Soft tissue healing
    - Edema management
  - *Muscle Stimulation*
    - Strengthening
    - Muscle control

Rehab Medical

Contraindications

- **Do not use electrical stimulation on patients with:**
  - Implanted electrical devices*
    - Advocate to MD and get order for use
  - Pregnancy*
    - Manufacturer contraindication, get MD clearance
- **Do not use electrical stimulation over:**
  - Infection
  - Cancer
  - Carotid sinus
  - Transcerebral/Transthoracic
  - Circulatory insufficiencies
  - Eyes/mucosal membranes
  - Unknown etiologies
  - Genitals

Rehab Medical

Precautions

- **Use clinical reasoning when**:
  - Impaired sensation
  - Impaired cognition
  - Impaired communication
  - Around the neck
  - Previous reactions to PAMS

Rehab Medical

User Protocols

- Check out your user protocols
- From Home Screen
  - Press the Folder button
  - Press User Protocols
  - The following protocols are found there!
- Can add up to 200 protocols
  - Can delete as needed as well

Rehab Medical

Skin Prep

- **Before Treatment:**
  - Visually assess the area
  - Wipe with warm water (NO ALCOHOL)
  - Place electrodes and administer treatment
- **Following treatment:**
  - Visually assess the area for any changes and document
  - Wipe area with warm water
  - Can apply skin moisturizer if patient wishes

Rehab Medical

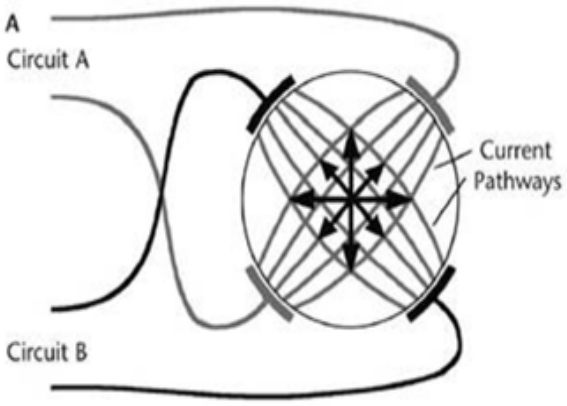
Electrodes

- **Know your target tissues**
  - **Pain :**
    - IFC "X" marks the spot – larger areas
    - Premod on both sides of pain – smaller areas
    - Trigger Points – red (+) on TP, black (-) in referral area
  - **Strengthening/Endurance :**
    - Muscle/Muscle Groups
    - Location
  - **Electrode Life :**
    - Dura-Stick recommended by manufacturer
    - Single patient/multiple use
    - Approx 10 uses (with proper care)

Rehab Medical

Pain Management

- **IFC (Acute/Chronic/Nerve Block)**
  - **Gate Control Theory** "Sensory" – 80-150 hz – Acute pain
    - Up to comfort – works when on
  - **Opiate Release Theory** "Motor"– 1-10hz – Chronic pain
    - Borderline noxious
    - Can elicit endorphin release
  - Vector Scan
    - Off
    - Manual
    - 40%
    - 100%
  - Time – 20-30 minutes



Rehab Medical

Pain Management

- **Premod (Acute/Chronic/Nerve Block)**
  - Gate "Sensory" – 80-120 hz – Acute pain
    - Up to comfort
  - Opiate "Motor" – 1-10hz – Chronic pain
    - Borderline noxious
  - Time – 20-30 minutes

Rehab Medical

High Volt

(High Volt is a Monopolar waveform – electrons travel one direction)

- **Polarity Matters : SMOKE OVER FIRE MATTERS**
- Edema – *keep below motor activation*
  - Pumping activity, transfer of electrons pulls fluid from red lead to black lead. Pull fluid towards center-mass
- Spasms – *Elicit motor activity to fatigue target muscle*
  - Trigger point activity
    - Red lead over TP, black lead in referred pain area
    - **Exception to smoke over fire**
  - Muscle pain related to spasms
- Increasing circulation – *keep below motor activation*
  - Wound healing

Rehab Medical

Strengthening

- **VMS – Strength/Power**
  - Channel Mode
    - Single, Reciprocal, Co-contract
  - Frequency
    - Defaults to 30 : can decrease to increase comfort and improve motor activity
  - Phase Duration
    - 200 Most applications
    - 300 Large muscle groups i.e. Quads
    - 400 over Flaccid muscles
  - Intensity
    - Turn to motor activity (beyond twitch)
  - Cycle time – very adjustable!
    - Cont, 5/5, 4/12, 10/10, 10/20, 10/30, 10/50
    - Manual Stim Mode – Therapist Pendant ->
  - Activity
    - Always incorporate with activity!

Rehab Medical

Pendant

- Pause – start/pause
  - Therapist use – adjustments
  - Patient use – safety/comfort
- Channel Adjustment
  - Increase/decrease intensity
- "M" Manual administration
  - Handheld administration of stimulation
  - To control timing of stimulation

Rehab Medical

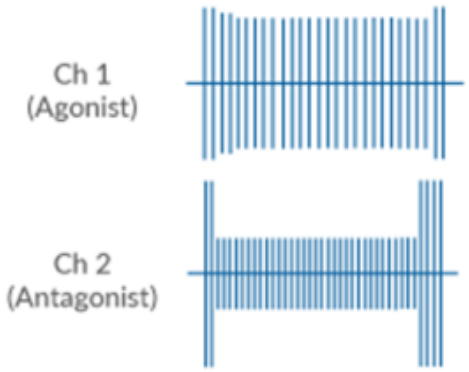
Endurance

- **VMS - Endurance**
  - Channel Mode
    - Reciprocal
  - Frequency
    - Defaults to 40 : can decrease to increase comfort and improve motor activity
  - Intensity
    - Turn to motor activity
  - Cycle time – very adjustable!
    - Work/Rest ratio
  - Phase Duration
    - Defaults to 200
    - Increase to 300 for large muscle groups (quads, glutes, abs, etc)
    - 300-400 for flaccid muscles
  - Activity
    - Always incorporate with activity!

Rehab Medical

Motor Control

- **VMS-FR(Strength/Spasticity) Motor Control and Neuro Reeducation**
  - "Quad phasic" - facilitates normal relationship between agonist and antagonist
  - Ch 1 : agonist/Ch2 : antagonist
    - Set intensity : both channels or 1st/2nd channel
  - Burst Duration : 200-5000ms
    - Increase burst for longer period between burst (500ms = 0.5 seconds)
  - Phase Duration : 20-400
    - Defaults to 200
    - 300 for large muscles/muscle groups
    - 400 flaccid muscles
  - Activity
    - Always incorporate with activity!



Rehab Medical

Biofeedback

- **sEMG**
  - Surface Electromyography aka Biofeedback
  - **No electrical stimulation is delivered**
  - **Precaution:** skin integrity
  - Channels 1 and/or 2 only
  - sEMG lead wire
    - Red and Black
      - Over target muscle/group
    - Green
      - Reference lead
      - On patient out of treatment area

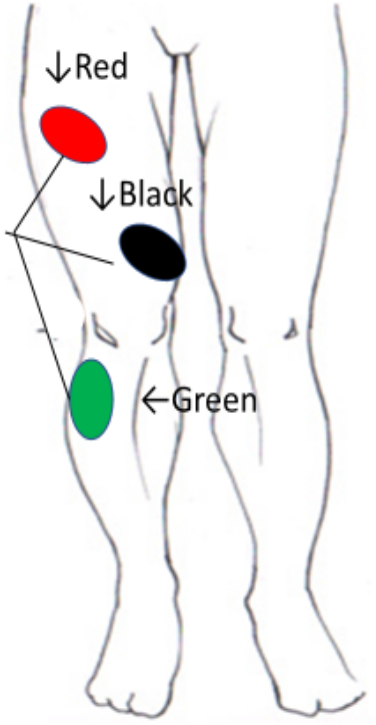
Rehab Medical

sEMG (Biofeedback) Set Up

When setting up sEMG (biofeedback)

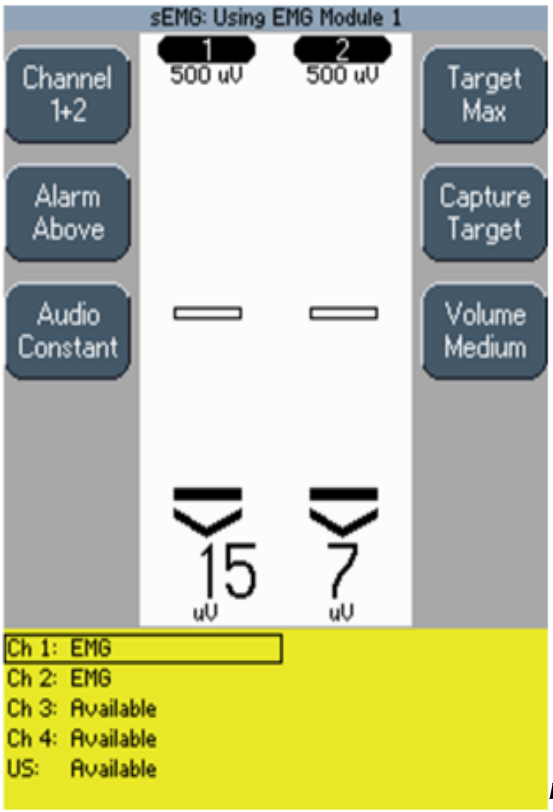
- Identify target muscle/muscle group and action
- Place electrodes attached to **red and black leads over target muscle**
- Place electrode attached to **green lead to the patient, out of the treatment area**

- Example: to facilitate the quadriceps group.



Rehab Medical

sEMG – Vectra Genisys



- **Channel Mode** : channel 1, 2 or 1 & 2
- **Alarm** : Above, Below or at Target
- **Audio** : Adjusts audio output
- **Capture Target** : Begin capture (facilitate contraction x3) set percentage of maximum exertion (varies by patient)
- **Target Manual** : Therapist adjusts target µV
- **Volume** : adjusts volume of audio output
- Instruct patient to contract muscle to hear music or move bar above target on screen

- **Uses**: to improve motor control, eliciting or relaxing target muscle, increasing awareness of target muscle activation, etc

Rehab Medical

Biofeedback + Stim

- **sEMG + Stim**
  - **All e-stim precautions/contraindications must be considered**
  - Single channel only (1 or 2)
  - **Set up** : same as sEMG
  - **Edit Stim** : Set phase duration and frequency desired as with VMS
    - Cycle time : dependent on activity and patient tolerance (on/off time)
  - **Intensity** : to muscle contraction
  - **Start sEMG+Stim**
    - Unit cues patient to "GO", once they hit the target, stim will be triggered. Once completed unit will cue to "Relax"
  - **Uses** : once patient achieves therapist set target, stim will ramp up to help facilitate robust muscle contraction.

Rehab Medical