

# Principle of Electrotherapy Application Procedures

## Part 1 patient's preparation procedures

### a-Verify identity of the patients

Good morning sir / madam. I am your therapist who is going to treat you. Don't worry; I will do my best for you.

**N.B some diseases and medical condition are linked to sex and age**

### b-Verify the absence of contraindications and ask about previous treatment of current condition, and check treatment notes.

I will go through reading and understanding medical sheet of the patient and look for

Assessment and diagnosis done by the physician

Laboratory investigation reports

This may be very helpful in finding out the **general contraindications** for my treatment.

By this I will also be able to know about **previous medical or physiotherapy treatment** if any taken by the patient and its effects.

**Checking General Contraindications:** By using rapport with patient and by case sheet reading, I will check the general contraindications (related to the modality to be used).**e.g.**

- Epilepsy
- Severe renal and cardiac problems/ Cardiac pacemakers
- Severe Hypotension and hypertension
- Infections
- Pregnant women
- Metal Implants
- Mentally retarded patients
- Malignancy
- Eyes

### **Checking Local Contraindications:**

- Place patient in a well-supported comfortable position (How)
- Exposed the part to be treated, and removed all jewelry from the area

**Then I will check body area to be treated for local contraindications.**

- Open wounds
- Scars
- Local skin infections
- Dermatitis, Abrasions, and Eczema
- Localized hemorrhagic spots

**Then I will check body area to be treated for local.**

- Check for light touch perception (piece of cotton and/or brush)
- Check for sensation (pin prick sensation)
- Check circulatory conditions (Pulses, capillary refill, pallor)

**Then I will check body area to be treated for functional limitation and disability.**

- Assess function of body part to be treated (e.g. ROM, Pain, muscle strength)

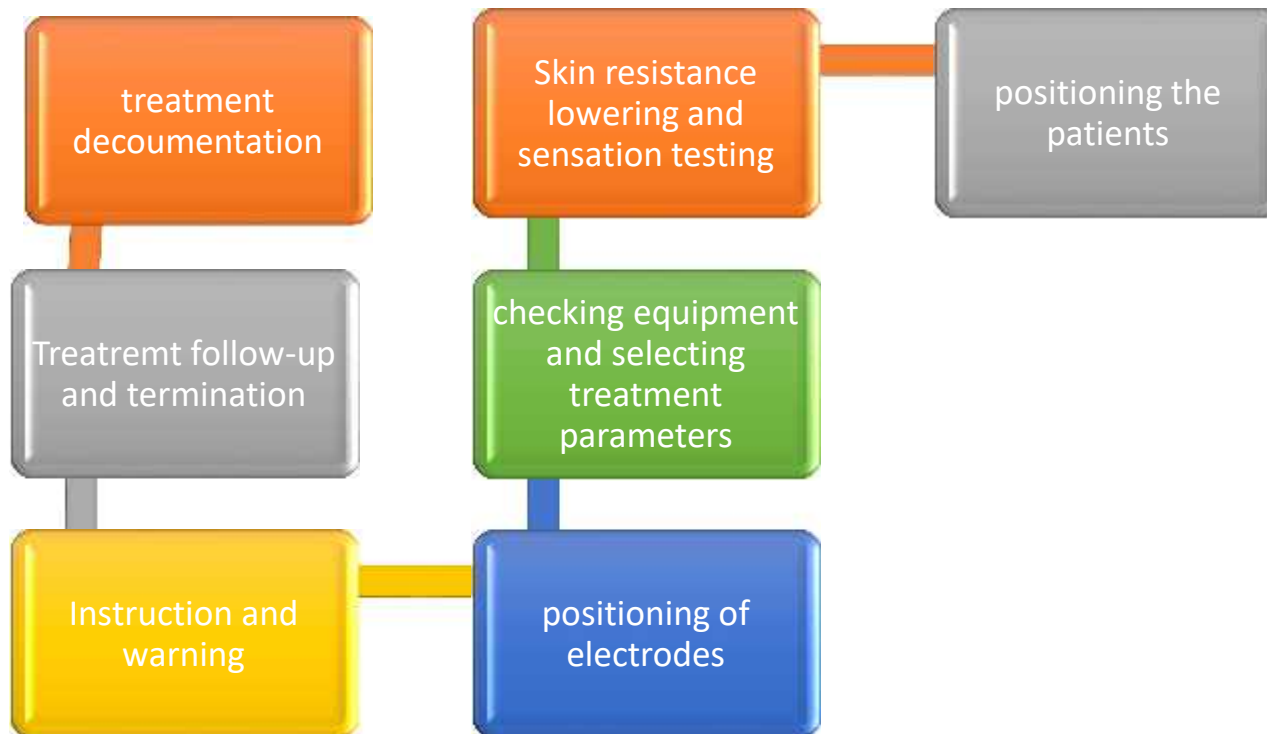
If there is no general contraindication and no local contraindications, I will proceed with treatment.

## ***Part 11: Equipment Preparation Procedures***

### **Preparation of Treatment Tray**

1. Select the proper electrical stimulation unit (e.g. TENS, NMES, HVPC, IFT, Microcurrent, diadynamic) and accessories (electrodes, cables, Adhesive tapes and Straps), conducting material (e.g. sponge pad, ultrasound gel).
2. The apparatus and accessories needed should be assembled and suitably positioned.
3. Visually check the stimulators, electrodes, leads, cables, plugs, power outlets, switches, controls, dials, and indicator lights for cracks and breaks and finally insure the amplitude controls are at zero.
4. Obtain pillows, bed sheet and towel for draping.
5. Skin resistance lowering & sensation testing including (e.g. Cotton, alcohol swap, brush, test tubes (hot & cold), U-pin (sharp& blunt

### Part III Procedures for Application



## Positioning of the patients

The patient must be assumed the most comfortable and relaxed position during treatment position. (**Mention the position for the treatment**)

### NOTE:

- The position of the part to be treated should be completely relaxed.
- Patient should be made comfortable by using maximum number of pillows and sand bags for the support.
- Position of the patient should be such that all the joints of the body are completely relaxed.
- If possible give the position in which patient can see the treatment.

## Skin resistance lowering and sensation testing

### Lowering skin resistance lowering.

- Uncover the part to be treated.
- Make use of cotton irrigated in water and/or alcoholic swap to clean the treated area
- Use of excessive amount of gel and/or sponge pad irrigated in eater
- Use of small electrodes

### Sensation testing: Pain and Light Touch Sensation

Initial evaluation of the sensory system is completed with the patient lying supine, eyes closed. Instruct the patient to say "sharp" or "dull" when they feel the respective object.

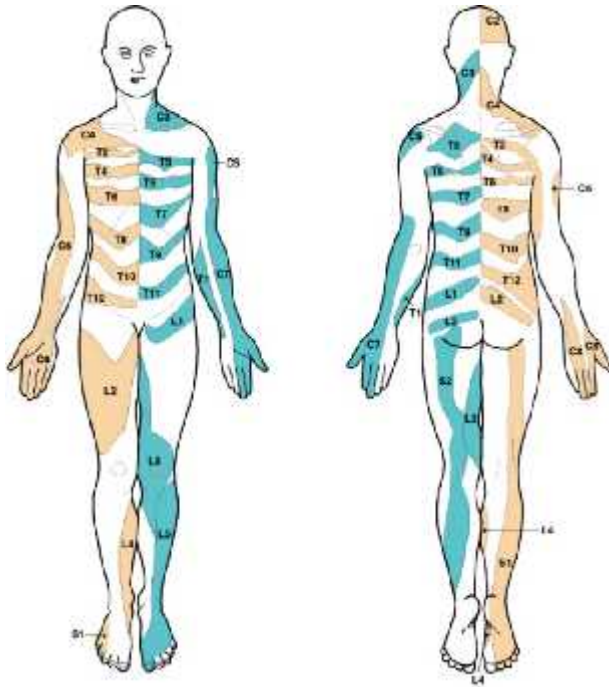
Show the patient each object and allow them to touch the needle and brush prior to beginning to alleviate any fear of being hurt during the examination

With the patient's eyes closed, alternate touching the patient with the needle and the brush at intervals of roughly 5 seconds.

Make certain to instruct the patient to tell the therapist if they notice a difference in the strength of sensation on each side of their body.

Alternating between pinprick and light touch. Touch one body part followed by the corresponding body part on the other side (e.g., the right shoulder then the left shoulder) with the same instrument. This allows the patient to compare the sensations and note asymmetry.

*The corresponding nerve root for each area tested is indicated in parenthesis*



- posterior aspect of the shoulders (C4)
- Lateral aspect of the upper arms (C5)
- Medial aspect of the lower arms (T1)
- Tip of the thumb (C6)
- tip of the middle finger (C7)
- tip of the pinky finger (C8)
- thorax, nipple level (T5)
- thorax, umbilical level (T10)
- upper part of the upper leg (L2)
- lower-medial part of the upper leg (L3)
- medial lower leg (L4)
- lateral lower leg (L5)
- sole of foot (S1)



Pinprick test



Light touch test

## Checking equipment and selecting treatment parameters

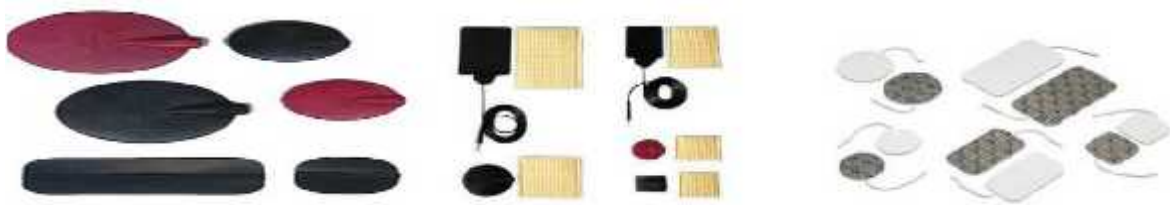
Select the type of application of the treatment wherever possible, then check the apparatus

- Adjust the pulse rate, pulse width, and mode of stimulation to desired setting if possible.
- Set a timer for the appropriate treatment time and give the patient a signaling device. Make sure the patient understands how to use the signaling.

**During this process of application therapist will demonstrate the treatment to the patient, and give an explanation of the treatment to the patient. Explain about the type of sensation, which will be experienced by the patient, and monitor the patient's response, not the stimulator.**

## Positioning of Electrodes:

Select the electrodes properly (rubber electrodes, self-adhesive, metal pin or prop electrode) and suitable size (small, medium large), Active electrode (s) [smaller] is stimulating electrode and placed on the target muscle, greatest current density – treatment effect.

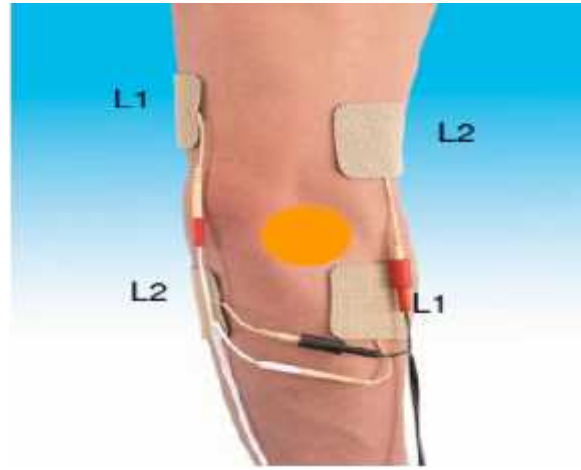
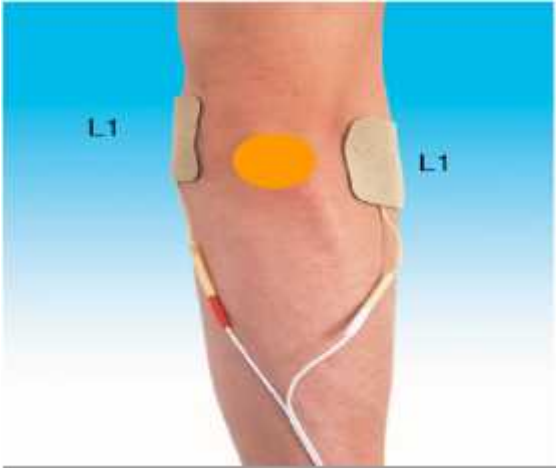


Place electrodes properly in the following area (s)

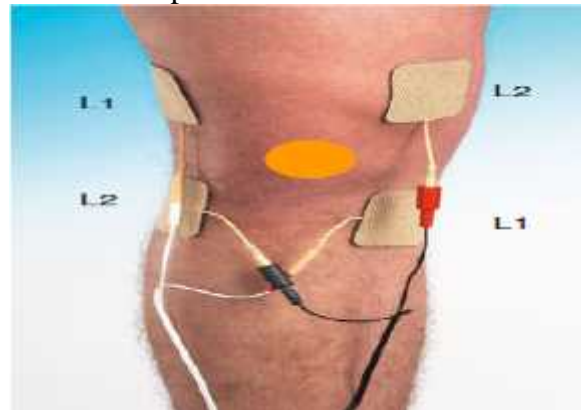
- On and /or around the painful area.
  - Over specific dermatome corresponding to the painful area.
  - Over specific myotomes corresponding to the painful area.
  - Spinal cord segment.
  - Course of peripheral nerve.
  - Motor point.
  - Over trigger point.
  - Acupuncture point
- Use adhesive tapes or straps for placing the electrodes.
  - Apply electrode gel evenly or sponge pad (s) on entire electrode.
  - Maintain good contact between the skin and the electrodes
  - Tie the electrodes with even pressure.
  - Wires or leads should not cross each other and/or over the patient during the treatment.

**Once you finish this step therapist will again check all the connections.**

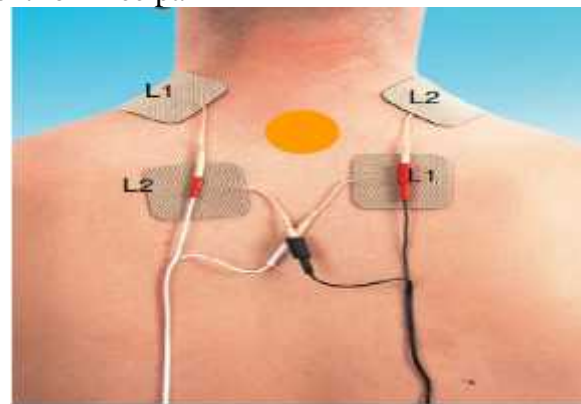
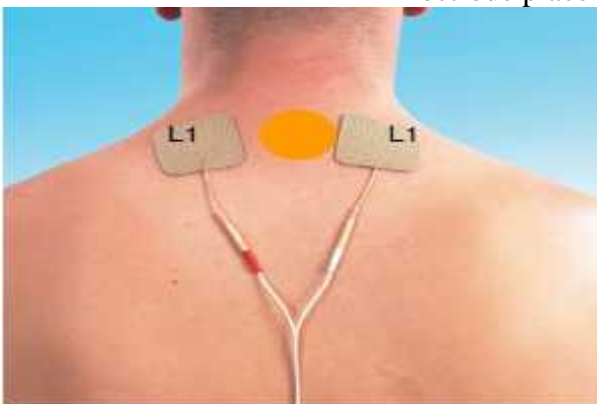
## Diagram for Electrodes placement



Electrode placement for Elbow pain



Electrode placement for knee pain

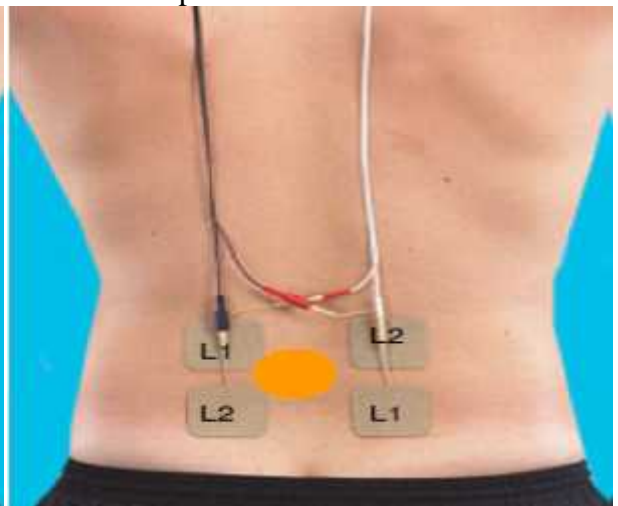
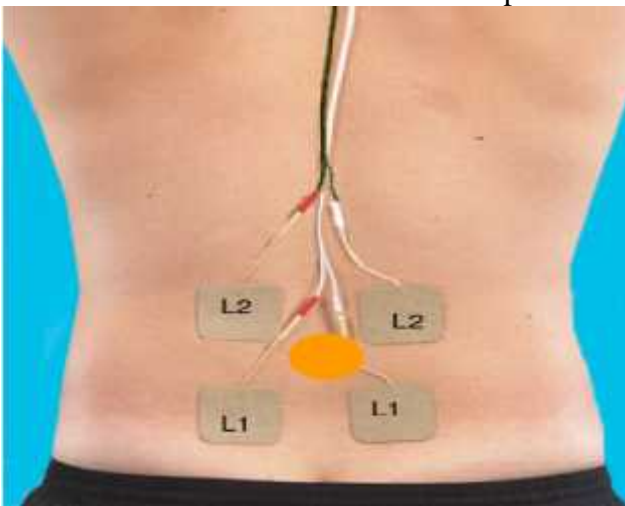


Electrode placement for neck pain

## Diagram for Electrode placement continued



Electrodes placement for shoulder pain



Electrodes placement for lower back pain



## Instruction and warning

**Before starting treatment, therapist must give following *Instruction and warnings to the patient***

### ***Instructions***

- Don't move during the treatment.
- Don't sleep while the treatment is going on.
- Don't touch the cables, apparatus, therapist, and any other metal nearby you.

***Warnings: Remind the patient to inform you when feels something. Do not tell the patient what will feel***

- As there are chances of getting a ***blister*** due to excessive current or overheating, so please inform me if the current is not comfortable or heating is more.
- If there is any burning sensation immediately inform me, as it might lead to ***burn***.
- Inform me if the position is not comfortable.
- The warning given should be noted on the patient's record card.

## Treatment follow-up and termination

### **Treatment:**

- Turn on the stimulator, and increase the amplitude slowly till it is comfortable for the patient.
- Duration of the treatment is decided on the basis of the condition.
- Recheck the patient's response after the first 5 minutes by asking the patient how it feels ,if the sensation has diminished , adjust the amplitude appropriately, and observed throughout to ensure that treatment is progressing satisfactorily and without adverse effects

### **Termination of treatment**

- When the treatment time is over, turn the intensity to zero and move the electrodes away from the patient, remove the electrodes and clean the patient.

### **Assess the treatment efficacy and adverse effects**

- Ask the patient how the treated area feels
- Visually inspect the treated area for any adverse reaction
- Perform functional test as indicated

## *Documentation of treatment*

An accurate record of all parameters of treatment including;

1. Region treated, (knee, shoulder, elbow, back, neck)
2. Conditions stage (acute, subacute, chronic)
3. Parameter of treatment technique, dosage, frequency and duration
4. Assessment parameter (pain, ROM, muscle strength etc.) that reflect the resultant effect.
5. Adverse effect (erythema, burning blisters)

**This is for both assessment purposes and for legal requirements.**

# Electrotherapy Application Procedures

<b>Student name</b>						
<b>ID</b>						
<b>Exam date</b>						
<b>Total score achieved</b>						

## A-Patient preparation procedures (4)

<b>A1-Place patient in a well-supported comfortable position ( How) ;</b> student is able to instruct patients to assume comfortable and relaxed position using necessary equipment and tools related to the case study			
<b>A2-Identity of the patients;</b> Student is able to list characteristics of the patients related to the case study Ask about previous treatment of current condition, and check treatment notes.			
<b>A3-Exposed the part to be treated, and removed all jewelry from the area</b>			
<b>A4-Check contraindications:</b> Check the patient and review the patient's chart for contraindications or precautions regarding the application of electrical stimulation The student is able to <b><u>list 5 contraindication/precautions</u></b> related to the case study.			
<b>A6-Inspect body part to be treated:</b> Student able to exam and clinical evaluated skin where the stimulation is to be applied <ul style="list-style-type: none"> <li>❖ Light touch perception,</li> <li>❖ Pain sensation,</li> <li>❖ Skin conditions (open wound, rashes, eczema, narcotic tissue, and dermatitis) and</li> <li>❖ Skin resistance lowering procedures related to</li> </ul>			
<b>A7- Assess the patient and set treatment goals.</b> <ul style="list-style-type: none"> <li>❖ Increase ROM,</li> <li>❖ Decrease Pain,</li> <li>❖ Increased Muscles strength,</li> <li>❖ Decrease Wound size/edema</li> <li>❖ Increase Activities of daily living and physical function</li> </ul>			
<b>A8- Explain the procedure to the patient, including an explanation of what he/she might expect to experience</b> (e.g. type of sensation, MS contraction) and monitor the patient's response, not the stimulator.			

## B-Equipment preparation procedures (1)

The student is able to apply and practice the following

<p><b>B1-Select the proper electrical stimulation unit to achieve the desired goal in section (A7) (e.g. Muscle contraction, pain modulation, tissue healing).</b></p> <ul style="list-style-type: none"> <li>❖ (e.g. TENS, NMES, HVPC, IFT, Russian current)</li> <li>❖ Accessories (electrodes, cables, Adhesive tapes and Straps),</li> <li>❖ Conducting material (e.g. sponge pad, gel)</li> <li>❖ Obtain sheet or towel for draping</li> <li>❖ Assessment tools (pin prick, light touch discrimination, goniometer, MMT).</li> </ul>			
<p><b>B2-Check stimulator, electrodes, and cable, battery, for continuity or signs of excessive wear, and replace any of those found faulty or of concern.</b></p>			
<p><b>B3-Insure the amplitude controls are at zero</b></p>			

## C-Procedure of ES Application student is able to (7)

<p><b>C1-Understand principle and practice of lowering skin resistance lowering <u>list 3 methods</u> to reduce skin resistance</b></p>			
<p><b>C2-Select the electrodes properly</b></p> <ul style="list-style-type: none"> <li>❖ Types: (rubber electrodes, self-adhesive, metal pin or prop electrode)</li> <li>❖ Size (small, medium large)/ Use conductive gel or straps</li> <li>❖ Placement: on the target muscle and pain area (<b>at least 5 locations/ moto points</b> )</li> <li>❖ Configuration (monopolar, bipolar, quadrpolar)</li> <li>❖ Understand principle of current density greatest</li> </ul>			
<p><b>C3-Set optimal parameters for treatment, including</b></p> <ul style="list-style-type: none"> <li>❖ waveform, polarity, frequency, pulse duration, on: off time,</li> <li>❖ ramp up/ ramp down, and length of treatment time,</li> </ul>			
<p><b>C4-Slowly advance the amplitude until the patient is just able to notice a sensation under the electrodes.</b></p> <ul style="list-style-type: none"> <li>❖ If sensory perception is required gradually increase amplitude to feel sanction of ( tingling, numbness, vibrations, prickling )</li> <li>❖ If a muscle contraction is needed to achieve, continue to increase the amplitude until the indicated strength of contraction is produced,</li> </ul> <p><b><u>N.B:</u></b></p> <ul style="list-style-type: none"> <li>❖ <b><u>Amplitude controlled according to patient tolerance.,</u></b></li> <li>❖ Patient should inform you when feels something.</li> </ul>			

<ul style="list-style-type: none"> <li>❖ Do not tell the patient what will feel; for example, do not say "tell me when you feel a tingle"</li> <li>❖ Monitor the patient's response, not the stimulator.</li> </ul>			
<p><b>C5-Observe the patient's reaction to stimulation over the first few minutes of the treatment.</b></p> <p>If the treatment includes muscle contraction, observe the amplitude, direction, and quality of the contraction. The parameters may need to be adjusted or the electrodes may need to be moved slightly if the expected outcome is not achieved.</p> <p>Student is able to understand and practice principle of adaptation / and or accommodation through Recheck the patient's response after the first 5 minutes by asking the patient how it feels, if the sensation has diminished, adjust the amplitude appropriately.</p>			
<p><b>C6-Give the patient a signaling device and Make sure the patient understands how to use the signaling.</b></p>			

<b>D-Treatment follow-up and termination (3)</b>			
<p><b>D1-When the treatment is completed;</b></p> <ul style="list-style-type: none"> <li>❖ Remove the electrodes</li> <li>❖ Clean the treatment area and the equipment according to normal protocol</li> </ul>			
<p><b>D2-Recheck the patient's response</b></p> <ul style="list-style-type: none"> <li>❖ <b>Inspect</b> the patient's skin for any signs of adverse reaction to the treatment.</li> <li>❖ <b>Ask</b> the patient how the treated area feels,</li> <li>❖ <b>Palpate</b> treatment area for tenderness, pain, and muscle spasm. perform functional test</li> </ul>			
<p><b>D3-Document the treatment, including all treatment parameters and the patient's response to the treatment.</b></p> <ul style="list-style-type: none"> <li>❖ Region treated, such as knee, shoulder, elbow, back, neck),</li> <li>❖ Conditions stage (acute, subacute, chronic)</li> <li>❖ Parameter of treatment technique, dosage, frequency and duration,</li> <li>❖ Patients positioning</li> <li>❖ Electrodes placement /configuration</li> <li>❖ Assessment parameter (pain, ROM, muscle strength etc.,)</li> <li>❖ Response to treatment and Adverse effect (erythema, burning blisters)</li> </ul>			

