



Neuromuscular Electrical Stimulation (NMES) After Total Knee Arthroplasty (TKA)

Learn more at [uchealth.org](https://www.uchealth.org).

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This guide has instructions for using NMES to help with your recovery from total knee arthroplasty (TKA) surgery. You can also watch videos in your patient education account (My Health Connection or MedBridge).

If you have questions, ask your physical therapist or contact us:
TKAprogram@cuanschultz.edu or 720.310.0569.

We hope using NMES will help you during your recovery!

Why we use NMES after surgery.

After surgery, it is hard for your front thigh muscles (called the quadriceps muscles) to work the way they should, and they can get weaker. Leg muscle weakness can be the biggest challenge during your recovery. This is why getting stronger is the most important thing to work on in physical therapy. Getting strong as quickly as you can lets you get back to the activities you do most often. Your knee mobility is important too, but good muscle strength will have the most positive, long-lasting effect on your health in the future.

NMES is a treatment that uses electrodes to help muscles get stronger. The electrodes retrain your thigh muscles to contract, which improves strength. Using NMES after surgery helps you get stronger so you can go back to doing your activities faster. NMES has also been shown to lower pain after surgery.

What to know about using NMES safely.

Do not use NMES if you have:

- An implanted cardioverter defibrillator (ICD).
- Cancer.
- Deep vein thrombosis (DVT) in the leg you had surgery on.

NMES schedule:

You will use NMES for 15 minutes, 2 times per day, for 6 weeks.

Use the NMES log on the last page of this packet to keep a record of your NMES sessions. You will give your NMES device and log to your physical therapist when you are done using NMES.

Equipment:

Sticky pads (electrodes)



Wires



NMES device



Visual aids, if needed



How to use the NMES device.

To watch a video of these steps, go to your patient portal (My Health Connection) or to where your patient education materials are located.

1. Set up.

Get all the equipment together.

Sit in a chair with your knees bent and something sturdy in front of your feet:

- Something sturdy can be a wall or heavy piece of furniture.
- A room with bright lights or reading glasses may be helpful to see the NMES screen.



2. Place electrodes.

Put the sticky pads (electrodes) on your thigh:

- Place 1 high and close to hip.
- Place 1 low and close to knee.

It is best to have the electrodes as far apart as possible. Slant them slightly (see picture).

Do not put the pads on top of a post-op dressing, incision, cut, abrasion, clothing or tape.

Peel the pads off the plastic. Keep the plastic backing and bag for storage. The pads may feel cold on the skin. If edges of the pads are not sticking well, you can use tape to hold them down.



3. Connect wires from the pads.

Connect the wires from the sticky pads to the gray wire.

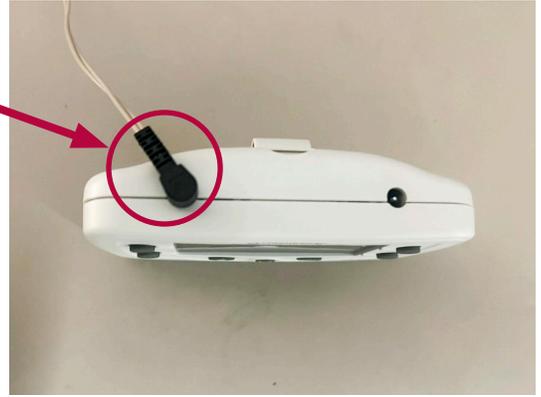
It does not matter which pad is connected to the red connector and which is connected to the black connector.



4. Connect wires to the device.

Put the electrode plug into the top of the device.

Press down firmly until it cannot go in any deeper. You will probably hear a click when it is fully inserted.



5. Turn on device.

Press the **ON/OFF** button on the device.

You will see "Empi Recovery Services" or "Chattanooga" on the screen as it turns on, depending on what model your device is.

Please note: Do **not** take the electrodes off when stimulation is being delivered.

If you need to stop before the session is over **and also** at the end of the session, turn the power **off** first and unplug the electrodes from the device.



6. Using the device.

Press the **+UP** button on **CH1** (on the side where plugged in) to begin the stimulation.

Keep pressing the **UP** button to increase intensity, 1 push at a time. You can also press and hold this button to get to higher intensities faster.

As you increase the intensity, you will feel your quadriceps start to tingle or feel "buzzy," then twitch, and then squeeze and become hard.

This feeling is your muscle contracting. The harder and more defined the muscle becomes, the better it is for you.

Your device should be pre-programmed. If you do not see the screen below in step 6, see page 7 for set-up instructions.



Stimulation is being delivered when you see a dot next to CH1.

7. Using the device.

Press the **+UP** button to the *maximum* stimulation intensity you can tolerate.

The stimulation happens for 10 seconds at a time, followed by 10 seconds of relaxing.

A strong, hard, smooth muscle contraction is what we want.

If the muscle is jumpy or twitchy, the level needs to be turned up as soon as you can.

Re-evaluate after every few contractions to see if you can increase the intensity.



Tip: It can be helpful to watch the timer to wait for contractions (10-second contraction, 10 seconds of relaxing).

8. Using the device.

If a "lock" appears on the screen, you will need to press the **-/DOWN** button to unlock it.

Then, you will be able to increase (or decrease) the stimulation intensity again.

Note: Increase the intensity as much as you can each session. Don't worry if the intensity numbers are different from day to day.



9. Turn off the device.

When the stimulation is finished (after 15 minutes), press and hold the **ON/OFF** button to turn the unit off.

Unplug the electrodes from the back of the device.



10. Store the electrodes.

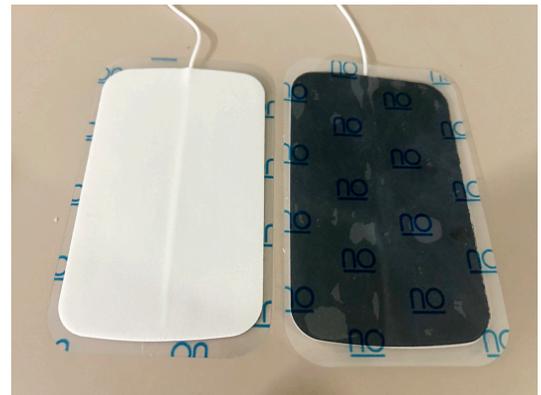
Remove the electrodes from your thigh, put them back on the plastic backing, and place them in plastic bag.

They are more comfortable to remove than a Band-Aid.

Place them on the shiny side of the plastic backing.

How to take care of the electrodes:

- Electrodes should be kept moist.
- You can put water on them before or after using, but this is most often not needed.
- Replace electrodes every 1 to 2 weeks, or when they have gotten worn looking.
- You can ask your therapist for more electrodes if needed.



11. Log session and check batteries.

Mark this session as done on your NMES log.

Reminder of the schedule:

15 minutes, 2 times a day, for 6 weeks.

If the NMES unit batteries are low (shown by having 1 bar in top left corner of screen), replace them before your next NMES session.



If you see a different screen, and need to get back to the correct NMES settings, follow these steps. You should not need to do this often because your unit will be set up and ready for you to use.

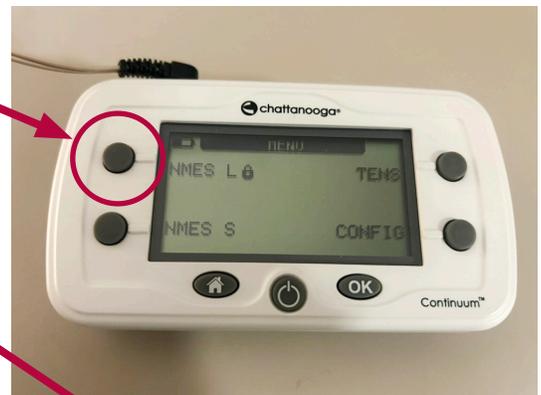
1. Press the HOME button.

The home button has an icon of a house.



2. Press NMES L.

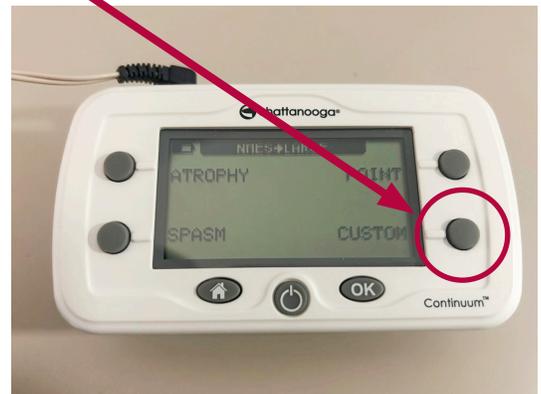
L = Large muscle (quadriceps)



3. Press CUSTOM.

Your physical therapist has already set the time and parameters you need under the CUSTOM setting.

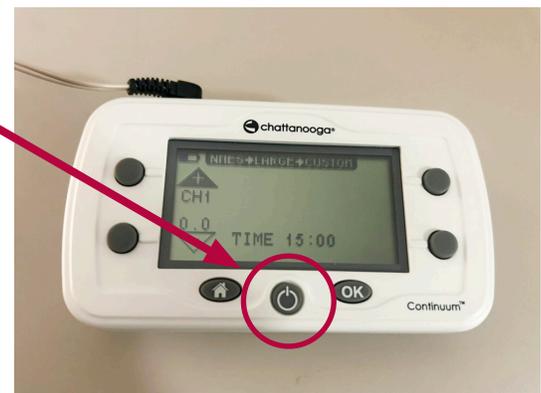
Each session is 15 minutes.



4. Press OK.

Before moving to the next step, please remember: Do not take electrodes off when stimulation is being delivered.

If you need to stop before the session is over **and also** at the end of the session, turn the power **off** first, and then unplug the electrodes from the device.



Press and hold to turn off.

What to expect after using NMES.

Normal and expected reactions include:

- Muscle soreness or fatigue
- Minor skin redness
- Minor discomfort

Please remember: Muscle pain or soreness is a strong (but tolerable) feeling that is deep inside the muscle. It is a good sign if it feels like you just did a hard workout. Mild pain is normal and expected at first. You will get used to the feeling the more you use NMES.

You should not have:

- Burns on your skin.
- Sharp pain, or pain in 1 place.
- Feelings of being too tired.

These symptoms are rare but can happen if the electrodes are not placed properly or are left on too long. They are signs to stop and adjust the electrodes, talk to your physical therapist, or contact our team for help (contact information on the first page).



Frequently asked questions:

Question:	Answer:
<p>My leg is bruised and swollen. Is this normal?</p>	<ul style="list-style-type: none">• Please do not worry, this is normal while your body is recovering from surgery.• You may not see any bruising or swelling right after surgery. Don't be worried if you see new bruising in the week after surgery.• NMES will not cause bruising or swelling or make it worse. You can keep using NMES.• Here are some photos of normal recoveries after surgery:  <p>The image consists of four separate photographs showing a person's leg from different angles after surgery. The first photo shows the front of the leg with a large, dark purple bruise on the upper thigh and a surgical scar on the knee. The second photo shows the back of the leg with a large, dark purple bruise on the calf. The third photo shows the side of the leg with a dark purple bruise on the lower calf. The fourth photo shows the ankle and foot area with a dark purple bruise on the outer side of the ankle. The person is wearing sandals in the first three photos and is sitting on a black exercise table in the fourth photo.</p>
<p>How can I start feeling more confident about using NMES on my own?</p>	<ul style="list-style-type: none">• Your first few NMES sessions may feel awkward without your PT's help. But, if you follow the directions in this packet, you will start to feel more confident after doing more sessions. Remember, if the intensity gets too high, you are in control and can turn it down.• Practice using NMES with help from your PT. You will slowly become better at doing it by yourself. This helps you be an active part of your recovery plan.• Remember that NMES is safe and effective when you use it as instructed. It works by stimulating your muscles to contract. This helps prevent muscle loss and improve strength. This is most important during the early stages of recovery when you may not be able to move as well by yourself.• It may feel uncomfortable at first, but this is a sign that things are working. Accepting some mild muscle pain can help you have a better recovery.• Talk to your PT or contact us with any other questions or concerns (contact information is on the first page).

Question:	Answer:
<p>How do I start to feel more comfortable with stronger NMES contractions?</p>	<ul style="list-style-type: none"> • If you do not feel comfortable increasing the intensity at first, try increasing the intensity very slowly. Each time you turn it up, your body will get used to the new level. This will help you slowly get used to the higher muscle contraction level. • For NMES to build strength and help you recover, the intensity needs to be strong enough to have an impact. You need a strong muscle contraction with NMES to increase your muscle strength. • The deeper and stronger you feel a contraction, the more of the muscle you are training. • Try to distract yourself during the contractions by: <ul style="list-style-type: none"> - Holding your hands together. Keep them linked, but apply tension as if you were pulling them apart. - Lightly kick your leg along with the stimulation.
<p>My skin is irritated. What can I do?</p>	<p>Skin irritation can happen, but can often be helped by trying these tips:</p> <ul style="list-style-type: none"> • Make sure your skin is clean and dry before applying the electrodes. Once your NMES treatment is complete, you can moisturize your skin with a mild lotion or cream at night. Dry skin can become irritated more easily, especially in the winter. • Check to see if the electrodes are in good condition. Old or worn pads may cause more irritation. They should be moistened with water or replaced. Remember to replace your electrodes every 1 to 2 weeks. • Rotate (turn) where you place the electrode a little bit each session so you do not overuse the same skin area. <p>Contact your PT or our team if you are still having skin irritation after making these adjustments. Contact information is on the first page.</p> 
<p>My unit turned off in the middle of a session. What do I do?</p>	<ul style="list-style-type: none"> • Unplug the cord to the device. • Take out the old batteries and put new batteries in. • Start NMES again and: <ul style="list-style-type: none"> - Set a timer (or watch the time) and finish using NMES for approximately the time you had left in your session before the device turned off. - When that time is done, turn off the device.

How to use your NMES log.

Use the calendar below to keep a record of your progress. Check off each session after you finish.

Write the **day of the week** the day **after** your surgery. This is when NMES will begin.

Fill in the rest of the top row of gray boxes with the other days of the week.

Write the **date** the day **after** your surgery in the top right corner of the box under the day of the week.

Fill in the rest of the dates in the boxes until week 6 after surgery.

Example of a calendar:

Surgery Monday 10/28	Week	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday
	1	10/29	10/30	10/31	11/1	11/2	11/3	11/4
		<input type="checkbox"/> 15 min						
		<input type="checkbox"/> 15 min						

Date of Surgery:	Week							
	1	<input type="checkbox"/> 15 min <input type="checkbox"/> 15 min						
	2	<input type="checkbox"/> 15 min <input type="checkbox"/> 15 min						
	3	<input type="checkbox"/> 15 min <input type="checkbox"/> 15 min						
	4	<input type="checkbox"/> 15 min <input type="checkbox"/> 15 min						
	5	<input type="checkbox"/> 15 min <input type="checkbox"/> 15 min						
	6	<input type="checkbox"/> 15 min <input type="checkbox"/> 15 min						

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The logo for UChicago Health, featuring the word "uchealth" in a white, lowercase, sans-serif font. A white horizontal line is positioned below the text, starting under the 'u' and ending under the 'h', with a slight upward curve at the ends.