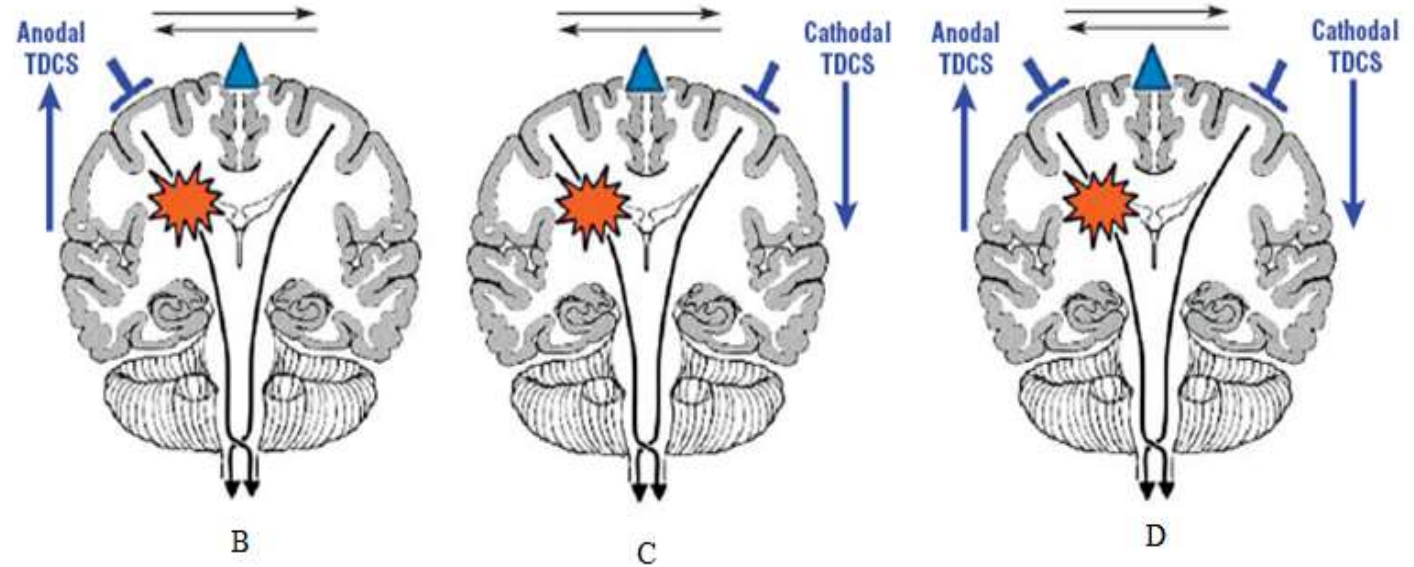
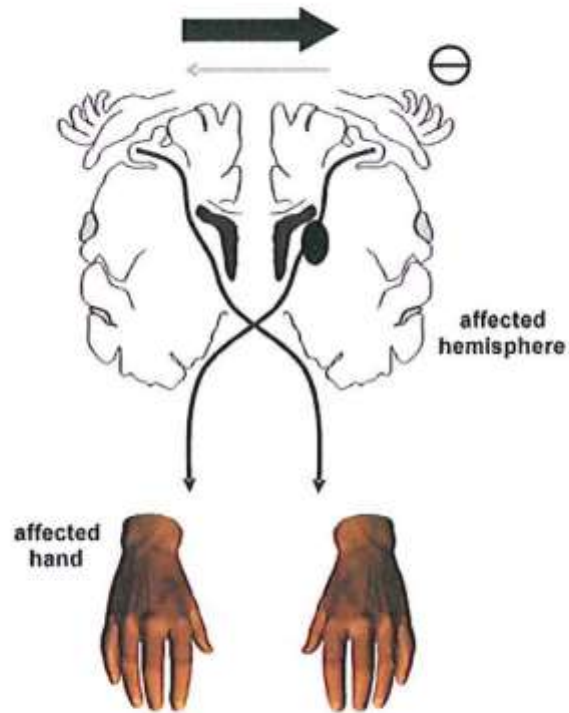




tDCS Demo

Modality of Brain Stimulation

Figure 1
Interhemispheric Competition After Stroke



Following a subcortical stroke in the left hemisphere resulting in a sensorimotor deficit of the right hand, the primary motor cortex of the unaffected (contralateral) hemisphere is disinhibited and exerts enhanced transcallosal inhibition of the primary motor cortex of the affected (ipsilesional) hemisphere. Enhanced transcallosal inhibition of the primary motor cortex of the affected hemisphere hampers motor recovery of the affected hand.



Dosage Parameters in TRANSPORT2

Described Stimulation Parameters

- Current (mA) [2mA, 4mA or sham]
- Pad Size (cm²) [5*7]
- Duration (min) [30 mins]
- Number of Sessions [10]



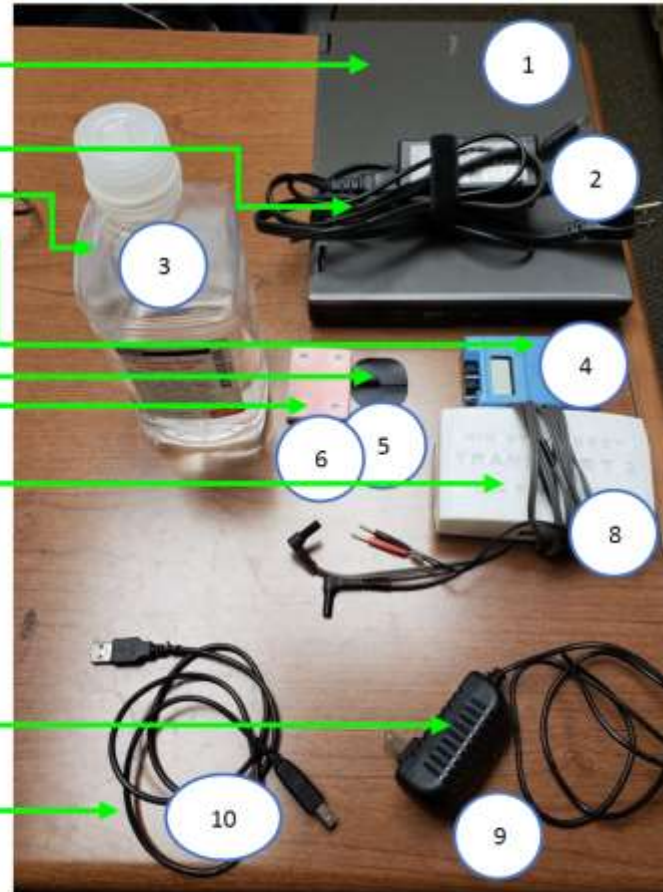
Derived Stimulation Parameters

- Current (mA)
- Current Density (A/m²) =
Current ÷ pad Size
- **Charge (C) = Current × Duration**
- Charge Density (C/m²) =
Current Density × Duration
- **Total Charge (C) = Charge × Sessions**
- Total Charge Density (C/m²) =
Charge Density × Sessions

Overview of the system components

Overview of the system components:

1. Computer
2. Power cable for computer
3. Normal saline (to soak tDCS pads)
4. tDCS device
5. tDCS electrodes (×2)
6. tDCS pads (×2)
7. tDCS pad mounting cap (not shown)
8. Randomizer (with tDCS device cables)
9. Power cable for randomizer (not needed)
10. USB connector cable

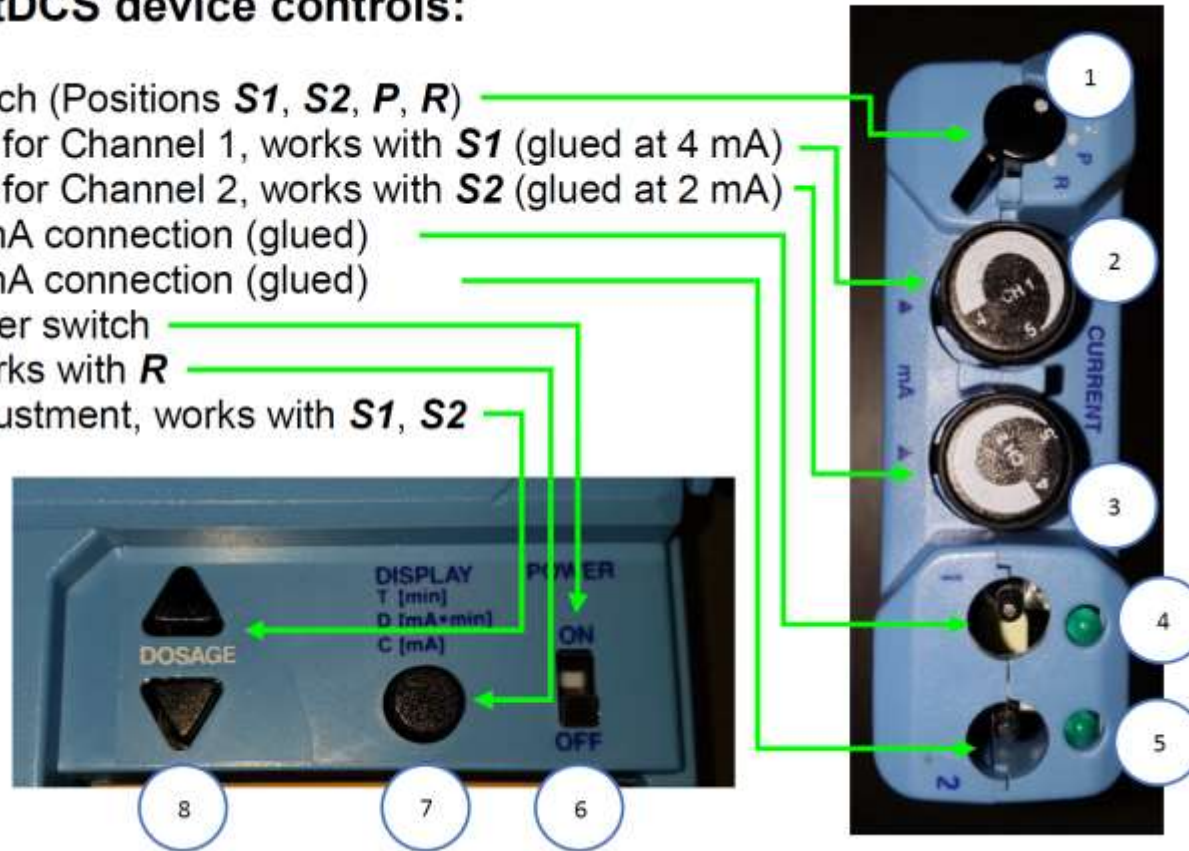


Each Site will be provided with two tDCS systems within 2 weeks after the meeting

Overview of the system components

Overview of the tDCS device controls:

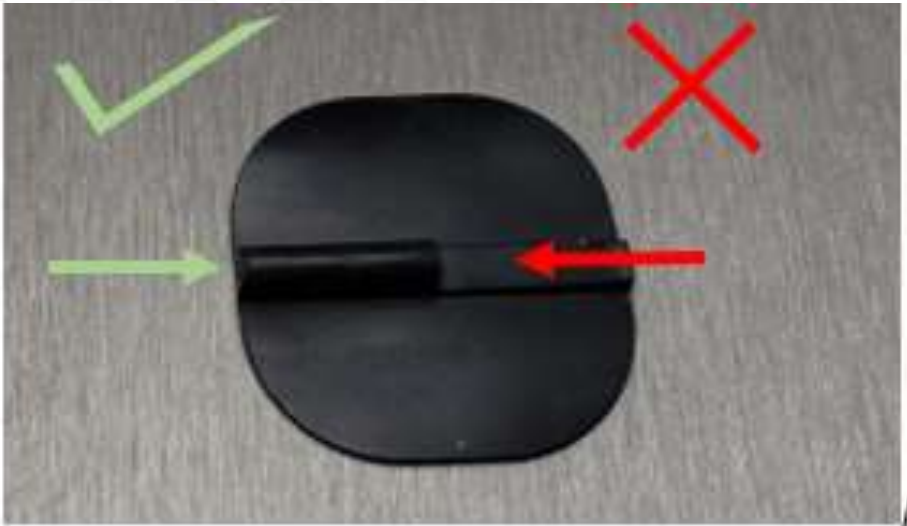
1. tDCS control switch (Positions **S1**, **S2**, **P**, **R**)
2. Current regulator for Channel 1, works with **S1** (glued at 4 mA)
3. Current regulator for Channel 2, works with **S2** (glued at 2 mA)
4. Channel 1 for 4 mA connection (glued)
5. Channel 2 for 2 mA connection (glued)
6. tDCS device power switch
7. tDCS display, works with **R**
8. tDCS dosage adjustment, works with **S1**, **S2**



Each Site will be provided with two tDCS systems and accessories within 2 weeks after the meeting

Preparation

- Insert leads into the biocarbon electrodes
 - Ensure they are entered into the correct direction



Preparation

- Soak tDCS pads with saline using syringe
 - Usually takes 4-6cc on each side. Make note of the amount for next visit
 - Make sure all parts of pad are hydrated uniformly (pay attention to center and edges)
 - Should NOT be dripping with a light squeeze – goal to not have it drip once it is secured to the scalp.



Preparation

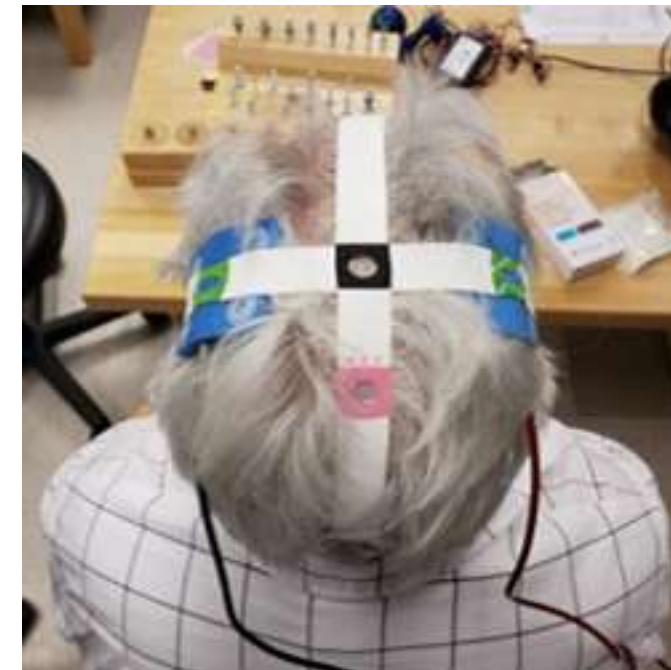
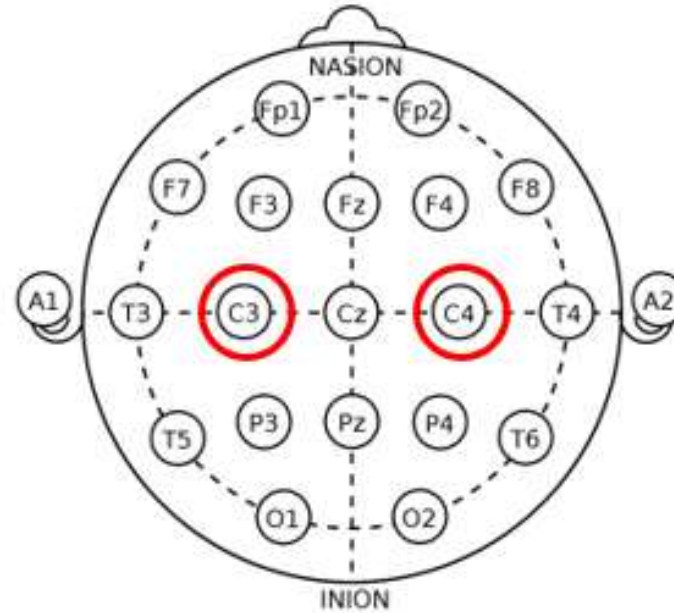
- Insert electrodes into pads
 - Flat/smooth side of electrode faces the smooth button side of pad
 - This side will face the scalp



Side facing the scalp

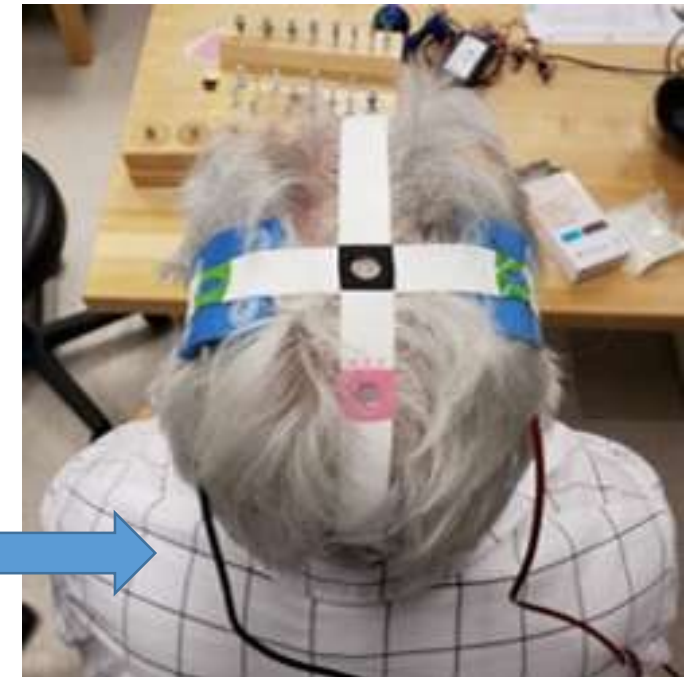
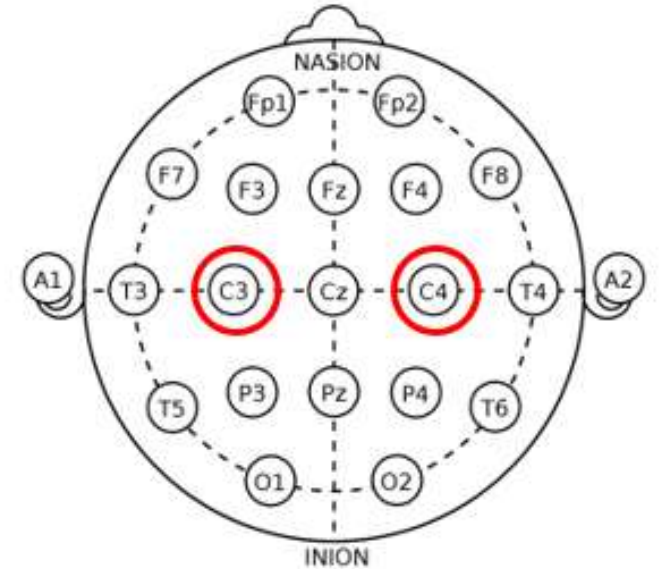
Preparation

- Place EEG cap on subjects head
 - Be sure to separate any hair to expose scalp at C3 and C4 locations
 - IMPORTANT – Please advise subject to wash hair with shampoo and not apply any styling products. Subject will need to undo braids or ponytails



Placement

- Confirm lesioned side of brain.
 - **RED ANODE (positive)** lead will be placed on the lesioned side of brain at either C3 or C4
 - **BLACK CATHODE (negative)** placed on non-lesional side
- Secure pads with smooth side facing scalp, under tDCS strap at appropriate location
 - Cords should come from behind patient as shown here



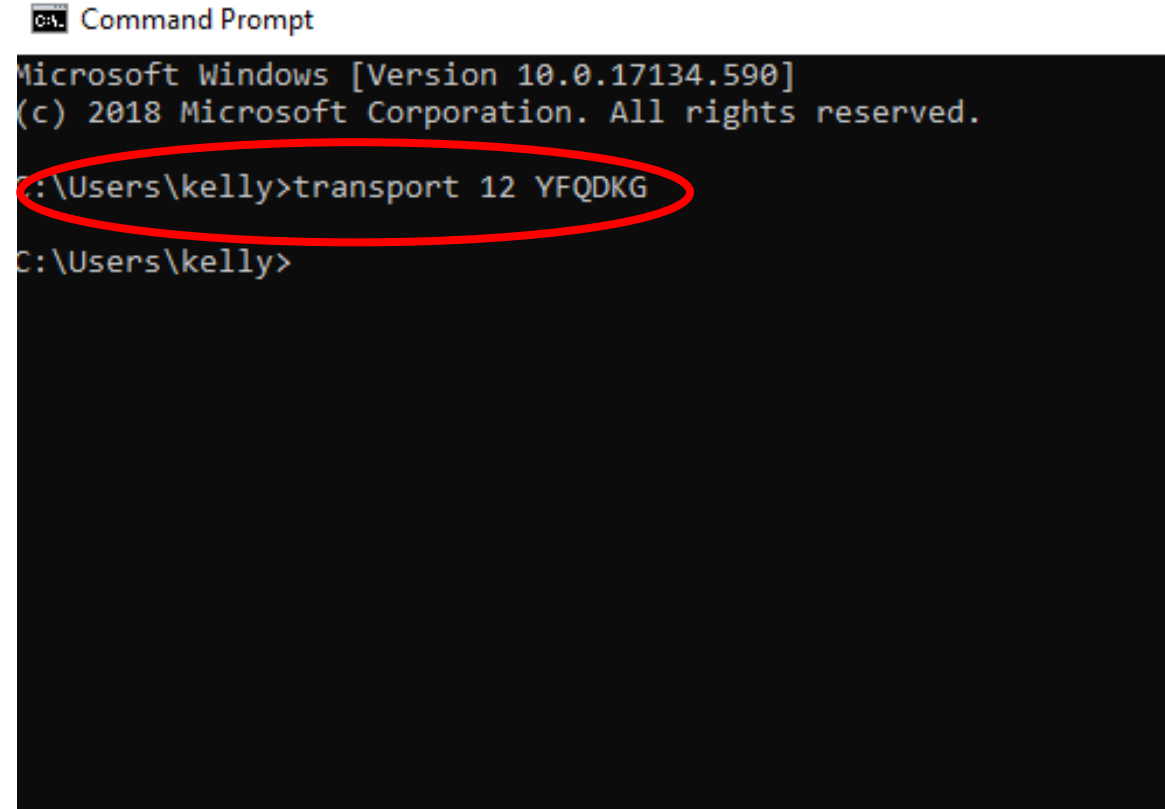
Secure

- Secure pads with foam pre-wrap
 - Ensure good contact between pad and scalp
 - Corners of pads should be flush to scalp
 - Do in advance to ensure scalp is sufficiently soaked with saline and makes good contact, at least 3-4 minutes prior to stimulation



Randomization

- Plug randomizer into computer
- Retrieve randomization code from WebDCU
- To retrieve randomization software on computer:
 - Open command prompt by typing in “cmd” in the search box
 - Type “transport” <spacebar> “Subject ID #” <spacebar> “randomization code”



The screenshot shows a Windows Command Prompt window titled "C:\ Command Prompt". The text inside the window reads: "Microsoft Windows [Version 10.0.17134.590] (c) 2018 Microsoft Corporation. All rights reserved." followed by a new line. The next line shows the command prompt "C:\Users\kelly>" followed by the command "transport 12 YFQDKG", which is circled in red. The final line shows the prompt "C:\Users\kelly>" again.

Example shown:

Study ID # 12

Randomization code: YFQDKG

Connect

- Ensure cables are securely attached to channels 1 and 2.
 - These will be glued to the correct channel when device is received.
- Turn on tDCS device
 - Make sure 9V battery is inserted
 - If battery icon is blinking on status screen, change battery before continuing



Set Up

- Use tDCS switch to set to **S1**



Set up

- Using the up and down arrows, set dose to **120 mA min** for **CH 1**.



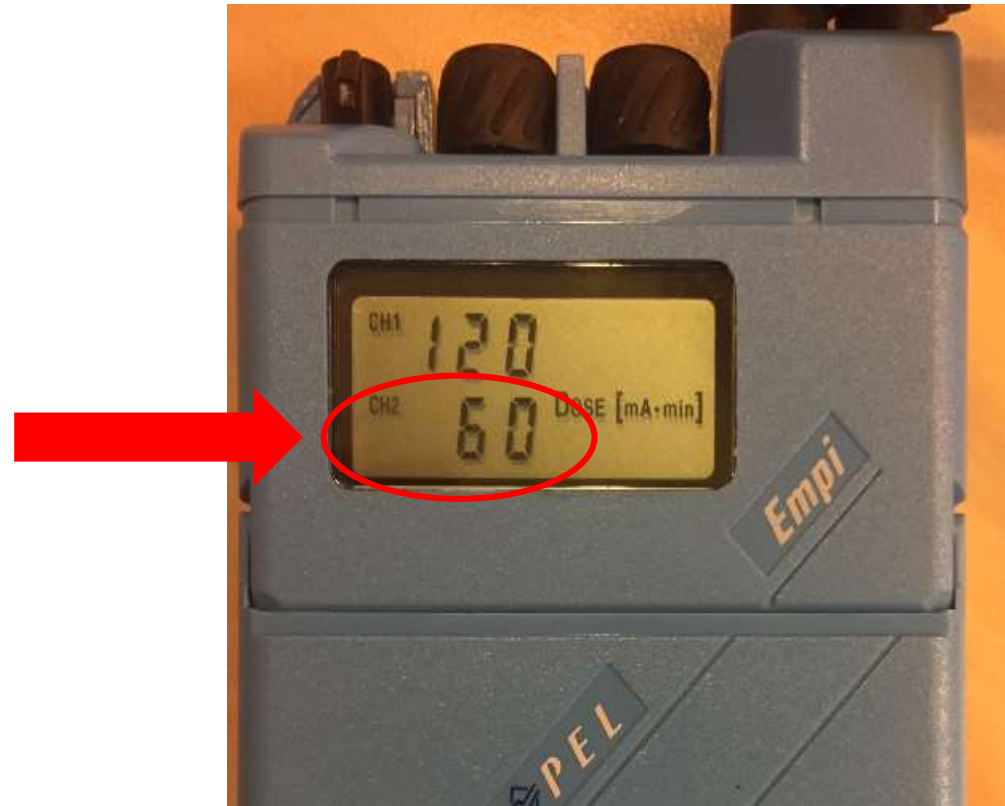
Set Up

- Use tDCS switch to set to **S2**



Set Up

- Using the up and down arrows, set dose to **60 mA min** for **CH 2**.



Set up

- Use tDCS switch to set to **P**



Set Up

- Using the first CH1 dial, set amperage to 4mA



Set Up

- Using the second CH2 dial, set amperage to 2mA

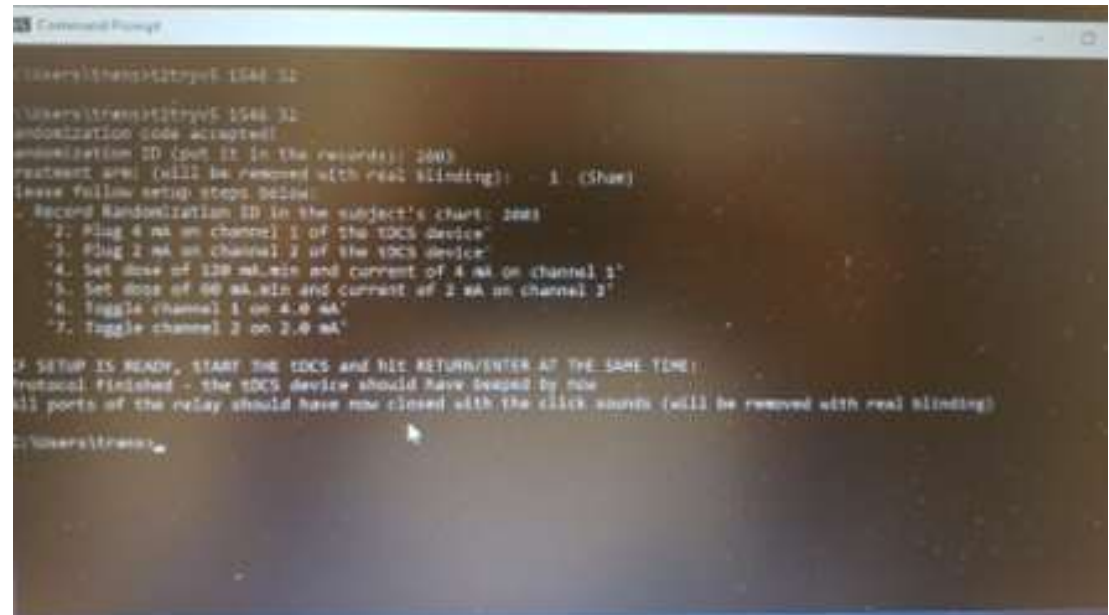


Final Steps

- Confirm all settings are correct
- During therapy, make sure not to bump or dislodge any of the cables or knobs
- Administer pre-tDCS survey to subject (including taking vital signs)
- Apply the mitten on non-affected hand

Ready to Start?

- **Simultaneously (*most critical*)** start the tDCS (toggle switch position on **R**) and hit enter/return on the computer. An couple-second offset between tDCS start and hitting enter/return on the computer is acceptable.
- You should hear 2 clicks from the randomizer
 - If you do NOT hear these clicks, please contact Pratik immediately
 - The subject is now ready to begin therapy
 - After 30 seconds, the randomizer should click twice



Finish

- Once stimulation has been completed, remove wrapping and tDCS cap and pads off of scalp
- Inspect scalp for redness or skin irritation
- Administer post tDCS survey
- Continue mCIMT

Post Administration check list

- Turn off the tDCS device and remove battery.
- *We recommend replacing the battery every week.*
- Close the command window on the computer and shut down the computer.
- Unplug the USB from the computer and the randomizer.
- Unplug the power cable from the randomizer and wall outlet
- Remove tDCS electrodes from the tDCS pads
- Inspect the tDCS pads for any damage or signs of wear
 - *If there is any wear (e.g., tearing of the pad), replace the tDCS pads for the next session*
 - *We recommend on replacing the tDCS pads at every week or for the next patient*
- Gently squeeze out any excess saline from the tDCS pads, let pads and EEG cap dry out before the next session
 - *please do not share pads across subjects*
- Place all the devices and cables in the dedicated storage location



Tips to minimize skin irritation:

- Inform subject some tingling and itching sensation are expected when the stimulation is turned on. The sensation is likely stronger in the first several minutes before it attenuates.
- If patient has thick hair, you may suggest the participant trim his/her hair within one week before the enrollment day
- Ask the subject wash their hair in the morning, but do not use hair products (gel and/or spray)
- Remind subjects to undo any braids, ponytails or other updo hair styles
- Please make sure to evenly compress the tDCS pads on the scalp
- After you place the tDCS pads on the scalp, we recommend waiting at least 2-3 minutes before turning on the device. In this way, the scalp gets a little wet and forms a close contact between the scalp and pads

Common Troubleshooting

- **Intermittent beeping sound with a hand logo pointing at one/two channels on the display of tDCS device**
 - *Bad connection likely*
 - Check wiring and plug connection
 - Ensure sufficiently wet tDCS pads and good contact with scalp
 - Turn the toggle on tDCS on P and then toggle it back to R to resume tDCS delivery
 - **If fixing bad connection has led to delays resulting in tDCS randomizer showing status of completion of the tDCS protocol on the screen without beeping of tDCS device, please ignore the status message on the computer and wait for tDCS device beeping to ensure that the dose of 120 mA.min / 60 mA.min is delivered for the session. Computer and tDCS randomizer need to be on throughout the tDCS delivery.**
 - Record the details of what happened and how it was overcome in the comments section, and also follow-up with Pratik

Common Troubleshooting

- **No clicking sound from the randomizer**
 - No power (no green light through the opening for the cables, underneath the cables, on the tDCS randomizer box)
 - Ensure that the randomizer is connected with the USB cable to the laptop
 - If still no power, Replace the device and contact Pratik Chhatbar in the same day

Once fixed, start the randomization code again by pressing Ctrl+C to abort the ongoing execution and re-typing the same randomization ID.