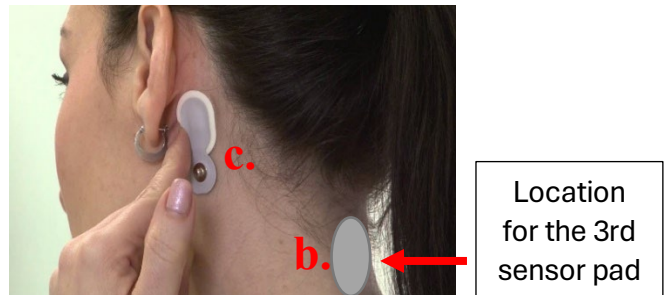
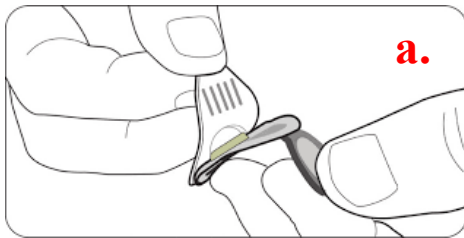


ZMACHINE (HOME SLEEP TEST) INSTRUCTIONS

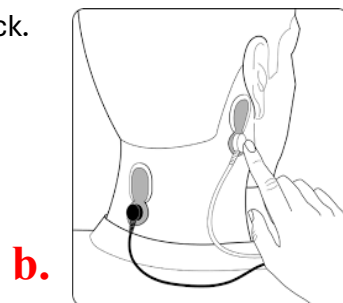
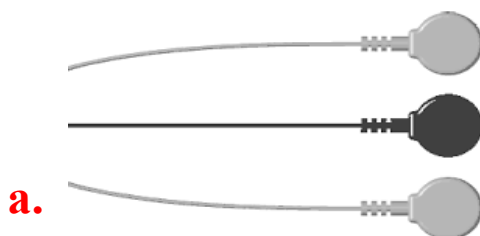
The ZMachine is a device used for home sleep testing. SLEAP participants from the Wake Forest clinical sites will complete 2 home sleep tests at each sleep assessment timepoint. The home sleep tests should be completed on the first 2 typical nights that overlap with the 7 days that you are wearing the Actiwatch. It is important to note that the sleep tests should be completed on back-to-back nights and that those 2 nights should be ones that reflect a ‘normal’ night. In other words, do not do a home sleep test on a night that you have an activity that will keep you up unusually late into the night or require you to get up unusually early in the morning. You will use the same ZMachine for both nights of sleep testing; however, we will provide you with new disposable materials for each night. Below, we provide detailed instructions for using the ZMachine. The instructions are the same for each night. Before starting, we **strongly** encourage you to review the manufacturer’s instructional video and booklet. Both of those can be accessed on the SLEAP webpage, or via the links at the end of this document.

1. Applying the Sensors (~35 min before bed)

- a. Use an alcohol swab (provided) to clean the skin behind your ears and on the back of your neck, right below your hairline.
- b. Let the areas dry completely. This usually takes ~1 minute.
- c. Remove the 3 sensor pads from the package provided in your ZMachine case:
 - i. Pull off the clear plastic tab to expose the adhesive (sticky) side (**a.** in the figure below).
 - ii. Place a sensor pad on the back of your neck, just below the hairline (**b.** in the figure below).
 - iii. Place a sensor pad on the bony area behind each ear (**c.** in the figure below).
 - iv. Press on the edges of the sensor pads (not the middle) to get a good seal. You may need to keep pressing for a few minutes as the adhesive sets.
 - v. Let the sensors sit for ~20 minutes before moving on to the next steps.

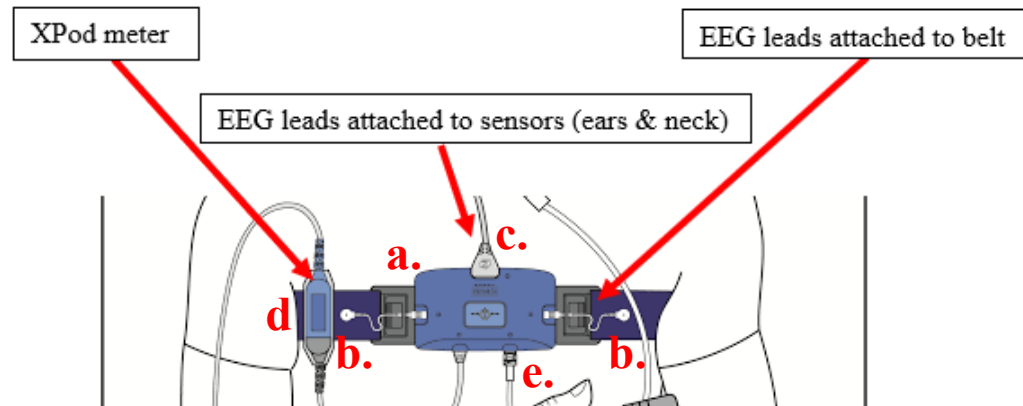


- d. After 20 minutes have passed, take the EEG cord, which has three wires with separate “button heads” (**a.** in the figure below) out of the ZMachine case.
- e. Firmly press the “button heads” of each EEG lead onto the sensor pads that were placed behind your ears and on the back of your neck (**b.** in the figure below).
 - i. The white leads connect to the sensors behind the ears.
 - ii. The black lead connects to the sensor on the back of the neck.



2. Applying the Effort Belt and Attaching the Leads (~10 min before bed)

- a. Clip one end of the elastic 'effort' belt onto one side of the main console (**a.** in the figure below). The console should be at the front of your chest, as pictured below.
- b. Pull the other end of the belt behind your back and clip the free side of the belt to the open end of the main console of the ZMachine.
- c. The sides of the belt should sit just under your armpits, and the console should be in the middle of your chest (above the pecs/breasts).
- d. Adjust the length of the belt to fit snugly around the chest and not fall down. To tighten or loosen the belt, use the plastic adjuster to achieve the desired length and then push closed the attached clip.



- e. Once the belt is securely in place around your chest, firmly press the white EEG "button heads" (that are hanging from the main console) onto the silver buttons located on the belt (**b.** in the figure above).
- f. Next, plug the free end of the EEG cord into the top of the console (**c.** in the figure above).
- g. Next, place the **pulse oximeter** (finger sensor) on one of your index (pointer) fingers, making sure the cord runs along the top of your hand. This is pictured below, on the right.
 - i. Make sure to remove any nail polish or acrylic nails from the finger on which you will put the pulse oximeter. The sleep test will NOT work if there is anything on the nail.
 - ii. Use the included medical tape to secure the cord to your hand. This will help to ensure that the cord doesn't move while you sleep.
 - iii. Clip the **XPod meter** of the pulse oximeter onto the belt in a location that is comfortable for you (**d.** in the figure above).

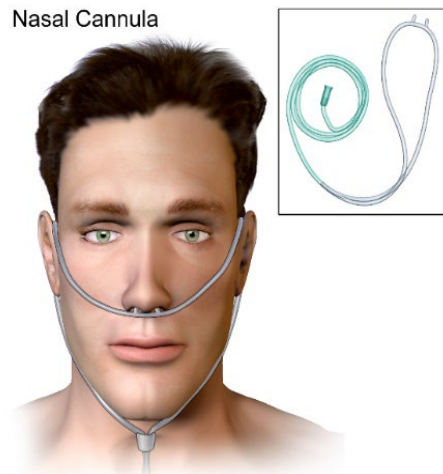


3. Connecting the Nasal Cannula (or CPAP adapter)

a. If you do **NOT** use a CPAP machine to sleep:

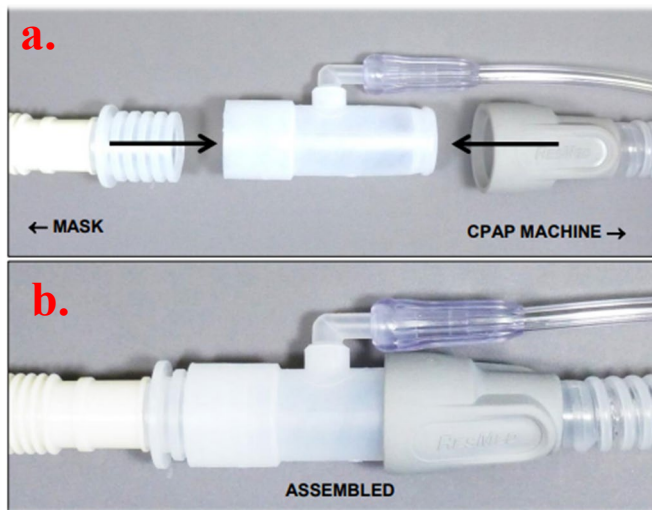
- i. Remove the nasal cannula from its package and put it on as shown to the right. The tubes should be looped behind the ears and over the head, so that the two mini air tubes go into your nostrils.
- ii. Tighten the cannula by running the plastic clip up the tubing under your neck so that it is secure but still comfortable.
- iii. Screw the end of the tubing into the open port on the bottom of the main console (**e.** in the figure above). Be careful not to screw it in too tightly. Twist until you feel resistance, then stop.

Nasal Cannula



b. If you **do** use a CPAP machine to sleep:

- i. Do not use the nasal cannula.
- ii. Instead, insert the ZMachine CPAP Interface between the mask and CPAP machine air hoses (**a.** in figure below).
- iii. Push both hose ends tightly into the ZMachine pressure adapter (**b.** in figure below).



Ensure that all connections are tight and secure.

- iv. Twist the free end of the CPAP Interface clockwise onto the ZMachine fitting as shown.



Twist until you feel some resistance, but do NOT overtighten. This can cause damage.

- v. When the test is complete, disconnect the ZMachine CPAP interface and discard it. Make sure to reconnect your mask to your CPAP machine.

4. Turning the Machine On (once in bed) and Off (when you wake up for the day)

- a. When you get into bed and are ready to go to sleep, turn on the ZMachine.
 - i. This is done by pressing the Power button in the middle of the machine for 1-2 seconds.
 - ii. The Power button should light up **GREEN**.
 - iii. All 5 of the lead indicator lights (surrounding the Power button) should also turn **GREEN**.
 - iv. If any indicator lights are **YELLOW**, this means a signal is not yet being received from that channel. Give the device a moment – sometimes it takes time to pick up a signal.
 - v. If the indicator light remains **YELLOW**, try re-connecting the corresponding channel reader.
 - vi. You will know that all signals are being received when all of the indicator lights are **GREEN**.
- b. When you wake up for the final time in the morning (up for the day), turn off the ZMachine.
 - i. Turn off the machine by holding the Power button down for 3-4 seconds until it beeps and goes dark.
 - ii. Unbutton the sensor pads from the EEG leads and discard the used pads.
 - iii. Do NOT throw away the wired leads – just the pads that you have unbuttoned.

5. Night 2: Second Night of Home Sleep Testing

- a. Repeat all of the steps described above (for Night 1).
- b. Make sure to replace your used EEG sensor pads with new ones (provided in the ZMachine case).
- c. After completing the second night of home sleep testing, unbutton the sensor pads from the EEG leads and throw the used pads away.
 - i. Do NOT throw away the wired leads.
- d. The nasal cannula can be unscrewed from the console and thrown away. The same is true for the CPAP interface – that can be discarded after Night 2.
- e. Return all other components of the ZMachine to its carrying case.
- f. Once you have completed the 2 nights of home sleep testing and returned all of the parts to the original bag, place the case somewhere safe where you will not lose it or forget about it.

6. Returning the Device to Wake Forest

- a. Following completion of the remaining days wearing the Actiwatch, place the ZMachine case and all of its contents into the same padded mailer as the Actiwatch, which will be provided.
- b. Make sure the mailer is tightly sealed (we recommend using tape to reinforce it) and tape on the pre-filled shipping label (also provided).
- c. Drop the mailer at your nearest post office or FedEx location.

7. Links to ZMachine Manufacturer's Instructions

<https://www.youtube.com/watch?v=DklrQB9D2Dc>

<https://www.generalsleep.com/Documents-Synergy/Patient%20Guide.pdf>

Contact us

If you have any questions or concerns during the measurement period, please contact **our SLEAP team**.

Email: SLEAP@wakehealth.edu;

Website: <https://www.leapstudy.net/sleep>