



BETTER EAR AND EYE TRAINING, BETTER OUTCOMES



PneumatoSim™

Installation and User Guide

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PneumatoSim™ for OtoSim 2™

Installation and User Guide

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1. Overview

Thank you for purchasing PneumatoSim™ Upgrade Kit.

This manual is only for PneumatoSim™ Upgrade Kit for OtoSim 2™ . For customers who have bought OtoSim 1™ or PneumatoSim™ for OtoSim 1™ , please contact us for a different manual. Please note that the PneumatoSim™ must be used with the OtoSim 2™ Sensor Box and Base Unit, and does not function as a stand-alone device.

If you experience difficulty in setting up the PneumatoSim™ , feel free to send us an email (info@otosim.com) and set-up an appointment for technical support. We will typically respond within 24 hours, Monday to Friday.

We welcome your feedback on improving PneumatoSim™ and features you would like to see in future versions.

2. Components

The PneumatoSim™ Upgrade Kit for OtoSim 2™ consists of the following four items:

- a) Pneumatic Earform
- b) Pneumatic Otoscope
- c) USB Key with PneumatoSim™ Software and Manual
- d) Extension tube and tube connector
- e) Pelican 1120 Protective Case

a)



b)



c)



d)



e)



Note: The PneumatoSim™ must be used with the OtoSim 2™ Sensor Box and Base Unit, and does not function as a stand-alone device.

3. System Requirements

The minimum requirements for the computer driving the PneumatoSim™ are the same as those for OtoSim 2™ :

- 350 megabytes (MB) of disk space.
- Two available USB 2.0 ports, or one USB 2.0 and a powered external USB hub (sold separately).
- The DisplayLink driver will run on processors ranging from basic single Core CPUs, Dual, Quad Core and Core i3/i5/i7 CPUs. 1.2 GHz or above, with 512 MB RAM or more.
- Any of the following operating systems: Mac OS X 10.7 (Lion), 10.8 (Mountain Lion), 10.9 (Maverick), 10.10 (Yosemite); Windows 8, Windows 7 (32-bit or 64-bit), Windows Vista with Service Pack 1 or 2 (32-bit or 64-bit), Windows XP Home or Professional (including Tablet edition) with Service Pack 2 or 3.

Note: Microsoft is no longer supporting Windows XP. Although the PneumatoSim™ software is compatible with Windows XP, we don't recommend it.

- Minimum WEI score of 3 in “Graphics; Desktop performance for Windows Aero”.

4. Windows: Software Installation

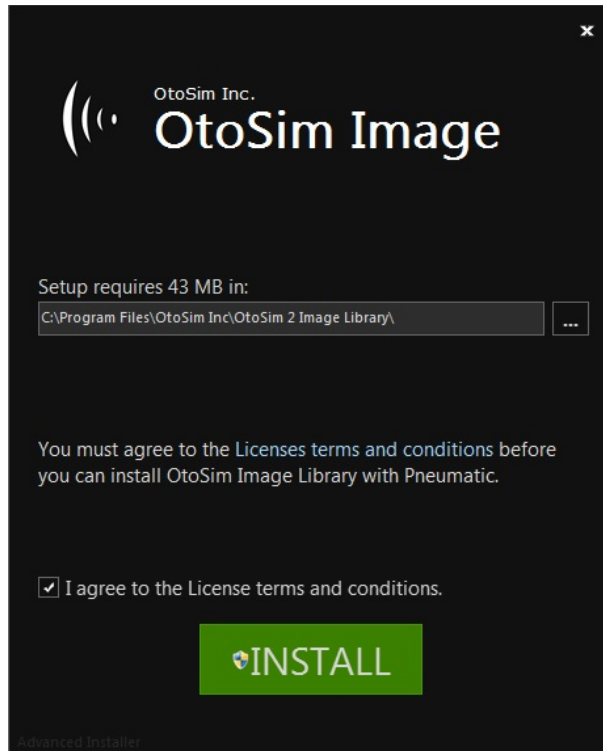
These instructions will guide you through the setup of your PneumatoSim™ software on a Windows PC. The following steps only need to be done once to load the software onto your computer.

- 1) Insert the provided USB Key with the PneumatoSim™ software into your computer. Double-click on the installation file. The following screens will show up. The installer will add PneumatoSim™ images to the OtoSim Image Library.

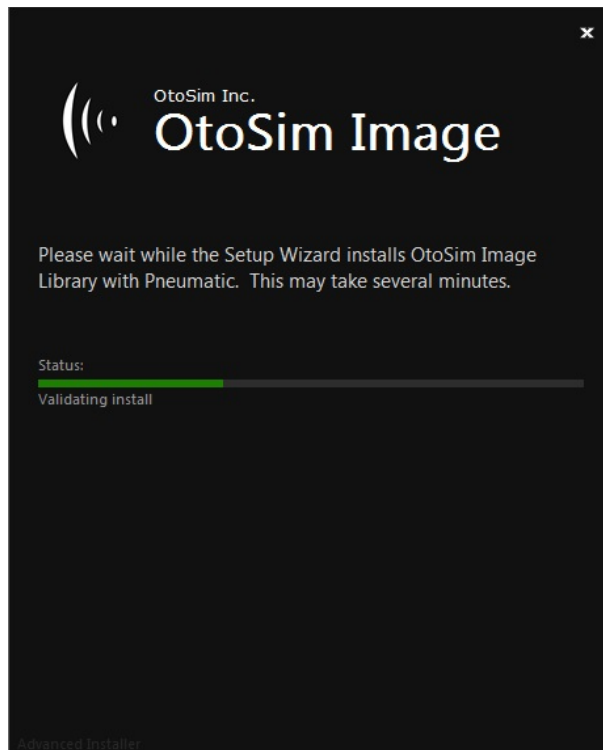


- 2) Select the appropriate install directory or leave the default (recommended) setting. Please read the “Licenses terms and conditions”. If you agree, check “I agree to the License terms and

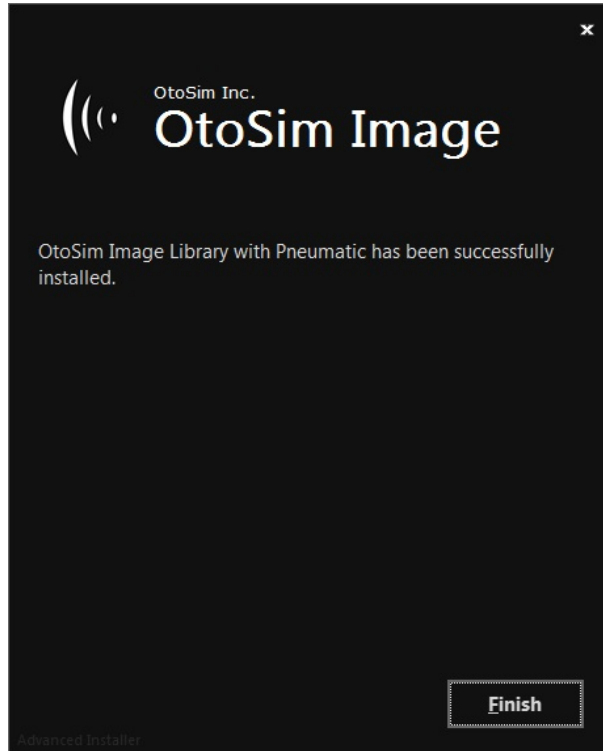
conditions” and click “Install” to continue.



3) Wait for the installation to complete. This may take several minutes.



4) Congratulations, you have successfully installed the PneumatoSim™ software!!



5. Mac OS X: Software Installation

These instructions will guide you through the setup of your PneumatoSim™ software on a Macintosh computer.

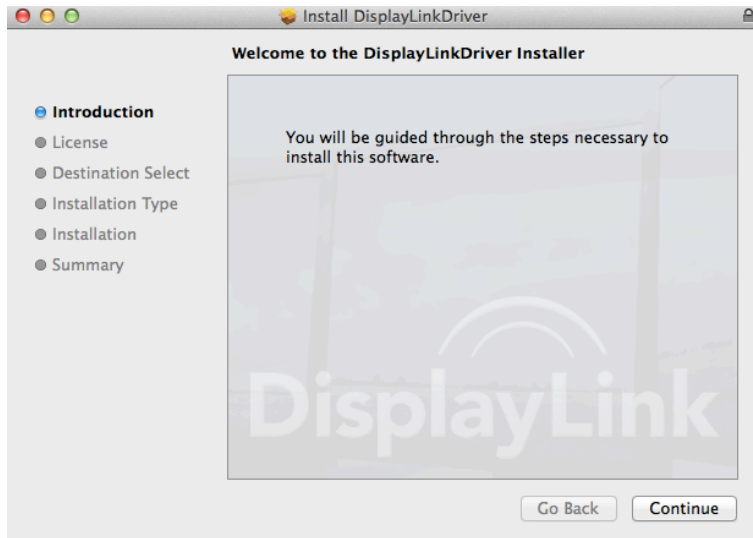
Note: The PneumatoSim™ software for Mac is not an add-on software. In order to use PneumatoSim™, you need to install the OtoSim 2™ Full Version (with PneumatoSim™).

** You do not need to uninstall OtoSim 2™ Basic Version (without PneumatoSim™) if it is already installed.*

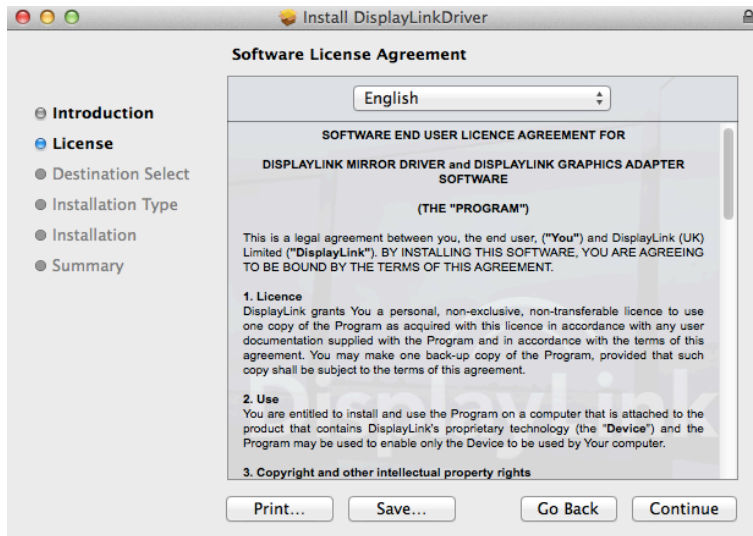
- 1) Insert the provided USB key with the software into your computer. Double click the installation file to install OtoSim 2™ Full Version on your computer.
- 2) Double click the “DisplayLink Software Installer.pkg” file. (The DisplayLink drivers are required for the OtoSim™ Base Unit to function.)

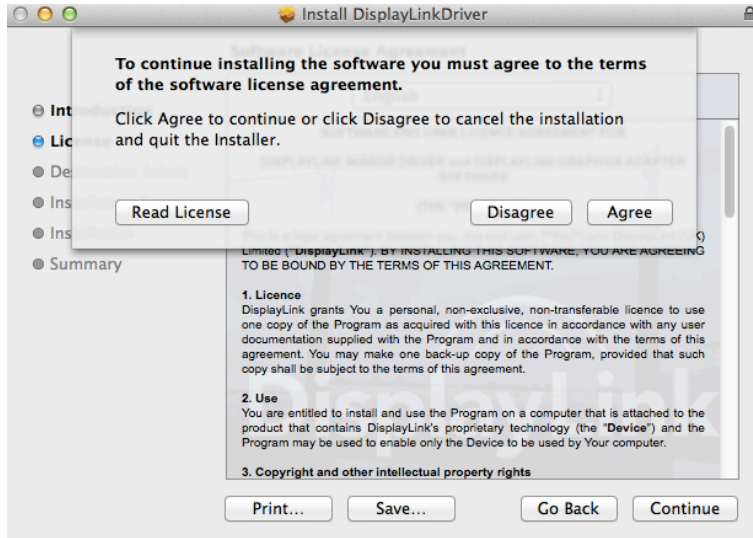


- 3) Press “Continue” to proceed.

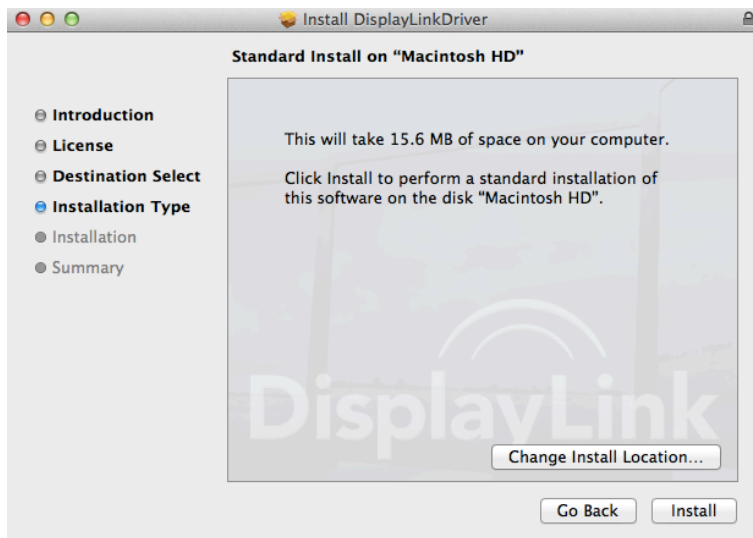


4) You must accept the DisplayLink license agreement to proceed with the installation. If you accept the license agreement, press “Continue” and then “Agree” to proceed with the installation.

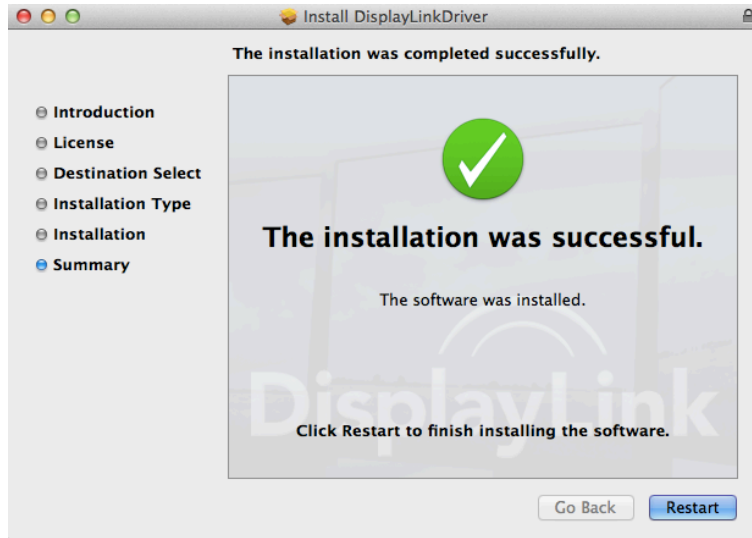




5) Press “Install” to continue with the installation. You will need to enter an administrator’s password to proceed.



6) When the DisplayLink software has been installed, you will be required to restart your computer. Press “Restart” to continue. (Do not change any settings or plug in any OtoSim™ Base Units while the installation progresses.)

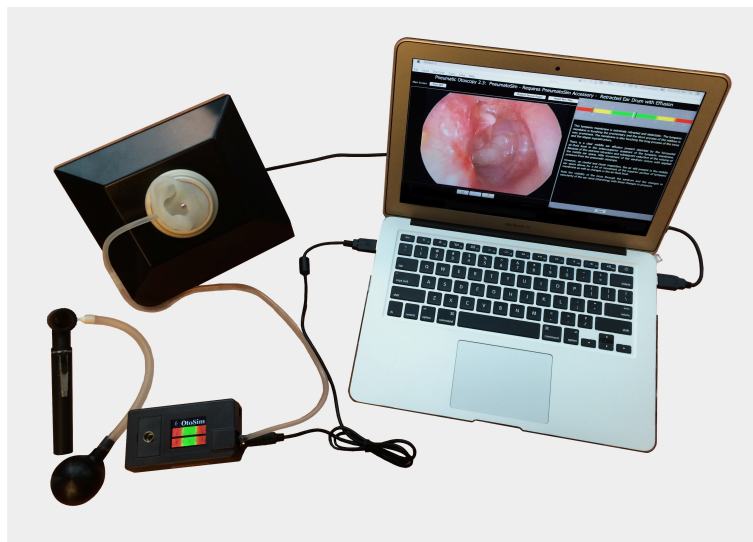


7) Congratulations, you have successfully installed the OtoSim 2™ Full Version with PneumatoSim™ software and DisplayLink drivers!

6. Hardware Configurations

PneumatoSim™ comes with a special Pneumatic Earform. To use PneumatoSim™ :

1. Replace the regular earform on an OtoSim™ Base Unit with the Pneumatic Earform, turning counter clockwise to loosen and clockwise to tighten the aluminium ring that is holding the earform.
2. Ensure that the Pneumatic Earform is seated properly on the Base Unit and that the ring is “snug” so as not to allow the earform to be rotated or removed with gentle force. **Be careful not to over-tighten or cross-thread the ring.**
3. Connect all tubing as shown in the schematic diagram below.
4. Plug in the Base Unit to the USB port on your computer. A dialog box may appear telling you that the “Arduino” network interface has been detected. Select the option to load it automatically as it has already been set up with the installation. Do not select the option to go online.
5. Plug in the Sensor Box to the USB port on your computer. You are now set up to use PneumatoSim™ . Before you start the software, it is extremely important to test your Pneumatic Otoscope to make sure it works properly.

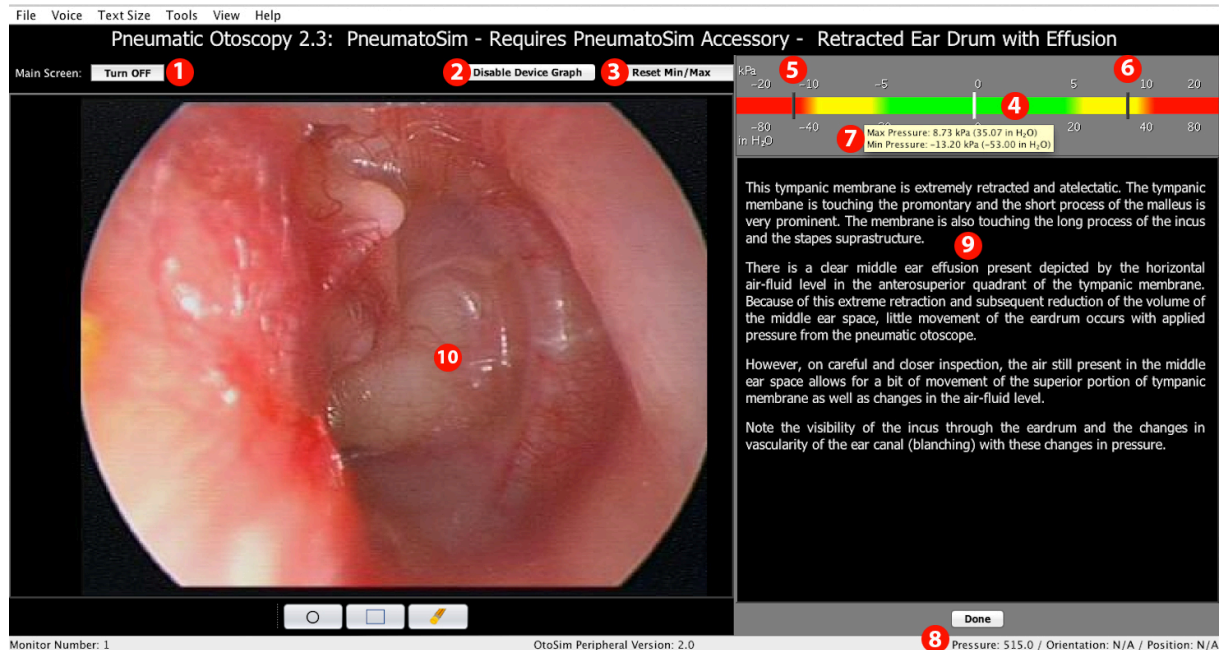


Note: Unlike the OtoSim™ Base Unit, the PneumatoSim™ does not have multiplexing capabilities. Thus, one computer can run only one PneumatoSim™ .

When not in use, the PneumatoSim components should be stored in the case provided. The Sensor Box and the Pneumatic Earform are very fragile and should be handled with care.

7. Features

Below is a summary of features your PneumatoSim™ has:



1. Turn ON/OFF: enable and disable the pathology image to be displayed on the computer
2. Disable/Enable Device Graph: enable and disable the pressure graph to be displayed on the OtoSim™ Base Unit
3. Reset Min/Max: reset pressure
4. Pressure graph
5. Maximum pressure: applied in each insufflation
6. Minimum pressure: applied in each insufflation
7. Maximum and minimum pressure display
8. Current pressure display
9. Description of ear pathology
10. Image of ear pathology

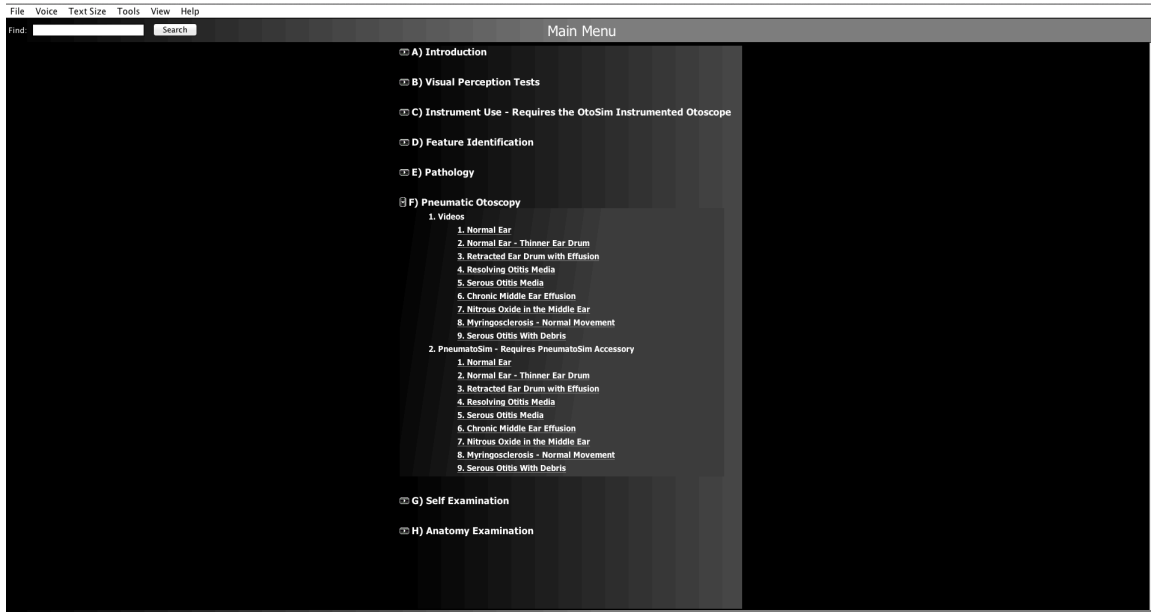
8. Inspecting and Preparing Your Pneumatic Otoscope

To ensure that your Pneumatic Otoscope can create a good seal, follow the checklist below:

1. Ensure that you are using a good-quality Pneumatic Otoscope either with the 5mm speculum provided with the PneumatoSim™ kit, or a special pneumatic speculum that you already own.
2. Minimal to no leak should be present in the otoscopic system that you have chosen to use.
3. You can perform a negative pressure leak test on your otoscope by simply depressing the rubber bulb completely, occluding the speculum tip with your finger and releasing the bulb. Ideally, the bulb should maintain a collapsed form or very slowly resume shape over a period of several seconds. If the leak is excessive, troubleshoot your otoscope to identify the source(s) of air leak and correct them.

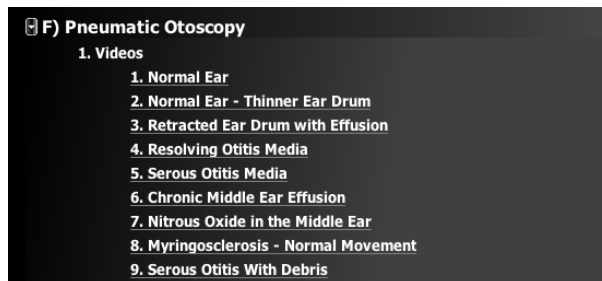
9. Pneumatic Otoscopy in OtoSim 2™

This module specializes in demonstrating Pneumatic Otoscopy. This section is divided into two parts, one of which contains videos and the other allows for students and instructors to directly interact with each simulated pathology.

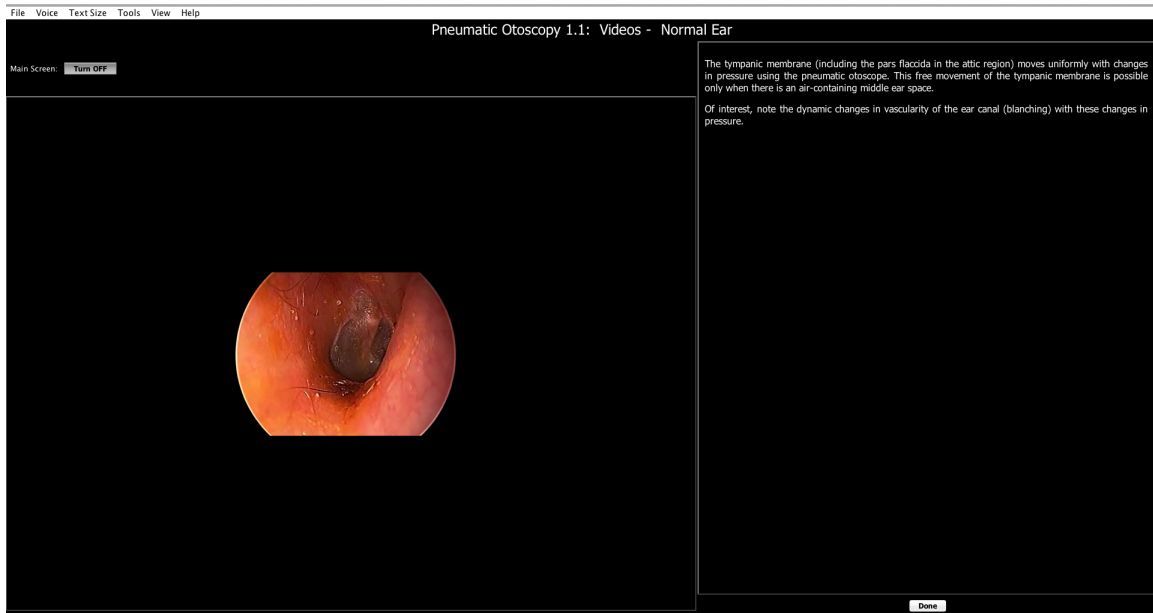


9.1 Videos

This section presents videos of tympanic membranes under the effects of insufflation.

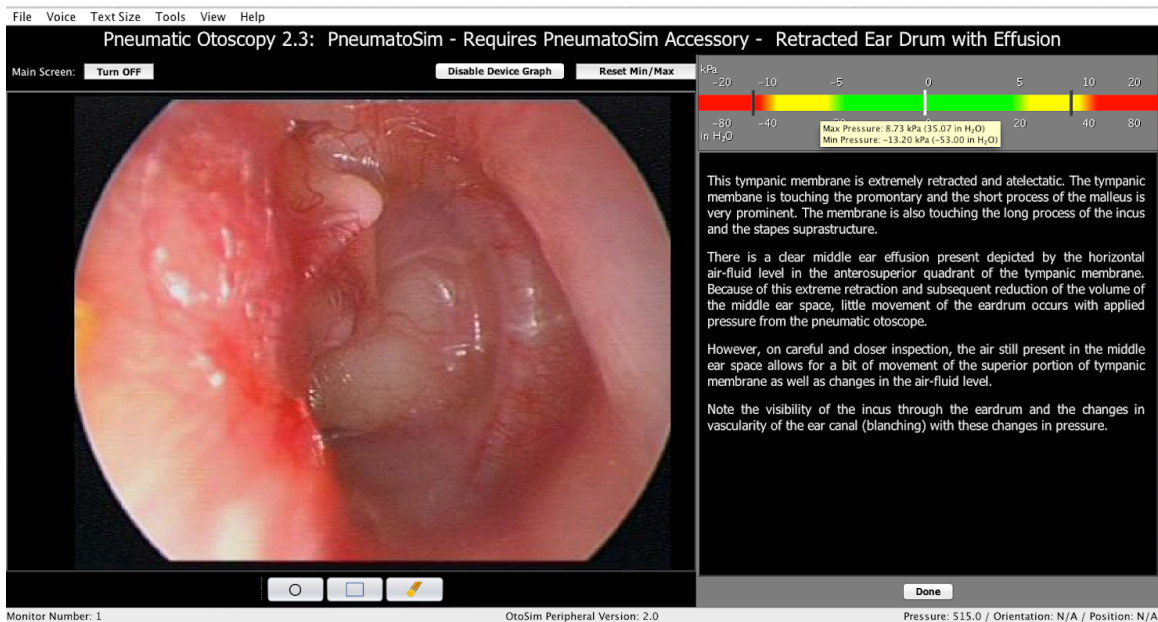


View videos of pneumatic otoscopy by selecting from the list. The videos can be projected onto the OtoSim 2™ Base Unit.



9.2 PneumatoSim

This section requires the PneumatoSim™ Upgrade Kit.



This is a screen shot of the PneumatoSim™ module in the OtoSim 2™ software. Dynamic movement of the tympanic membrane occurs with pressure generated from the Pneumatic Otoscope. Pressure generated is

monitored and displayed to the student for maximum feedback and proper safe translation to clinical usage.

9.2.1 Monitor the Pressure Graph

A real-time pressure graph will also display on the main window, on the Sensor Box, and on the image displayed on the OtoSim™ Base Unit. The maximum and minimum values represent the highest and lowest pressures achieved during the session. The values of the highest and lowest pressures achieved during insufflation will be displayed in kPa (in H₂O).

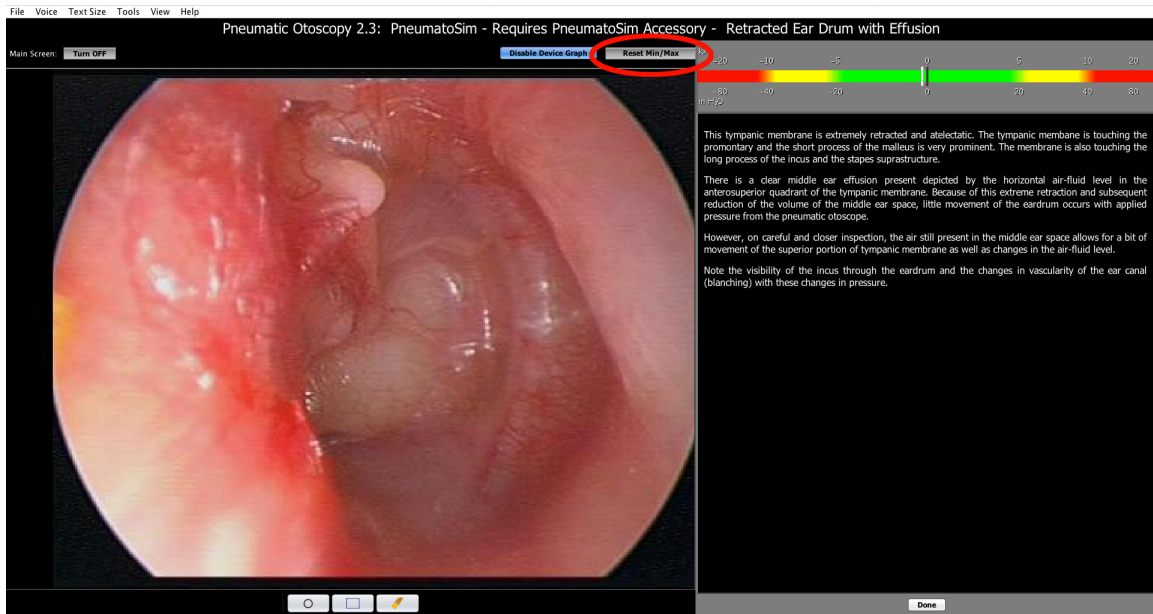


9.2.2 Use your Pneumatic Otoscope

The pressure gauge in the Sensor Box should move with insufflation. The eardrum of the selected image should also move with the pressure applied. If the pressure gauge does not move, please check the connectivity of the tubing and the seal of the Pneumatic Earform.

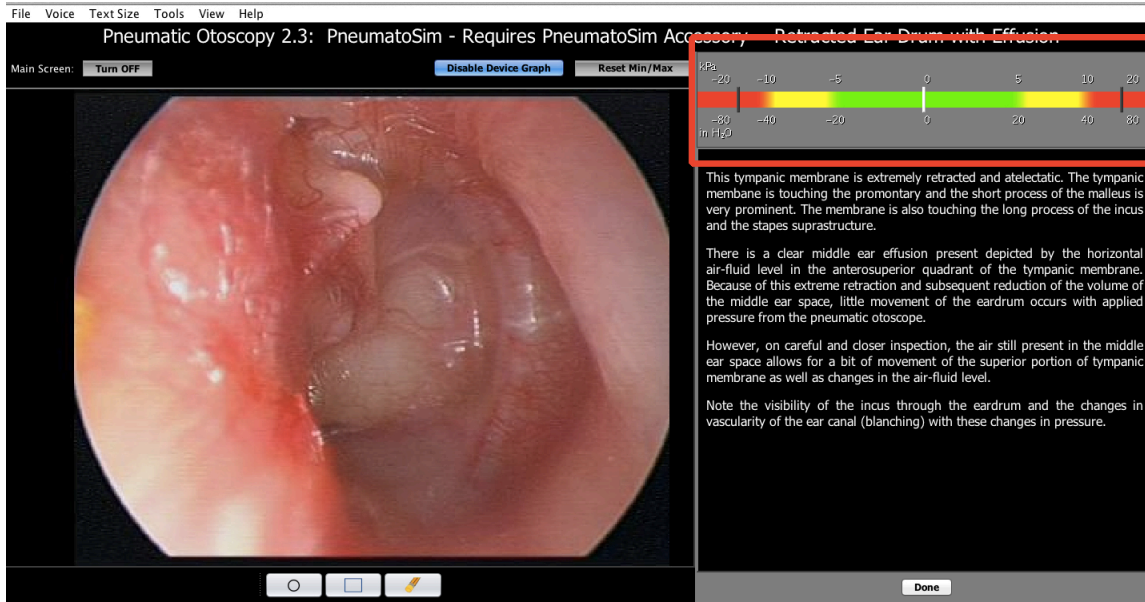
9.2.3 Resetting the Pressure

The value of the highest and lowest pressures can be reset by pressing the “**Reset**” button. The RESET function allows a student to practice Pneumatic Otoscopy technique and an instructor to assess students’ competency.



To understand the use of the Pressure Graph, follow the guidelines listed below:

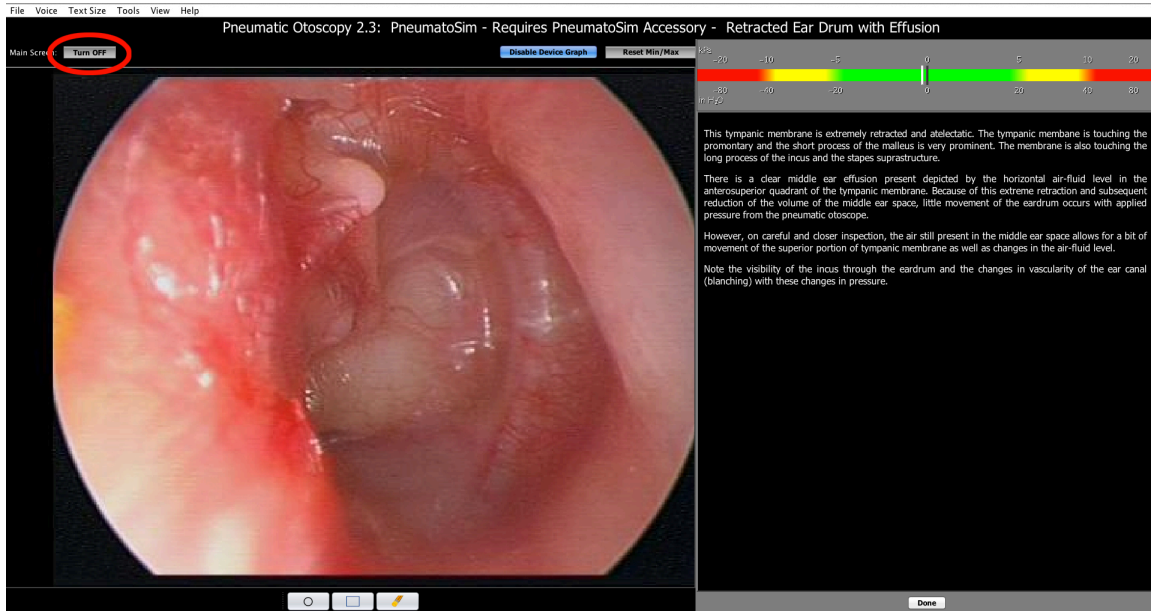
- The pressure graph will change colour from GREEN (optimal pressure applied), to YELLOW, and finally to RED during the session if excessive pressure is applied.



- A similar pressure graph is displayed on the OtoSim™ Base Unit when viewed with the Pneumatic Otoscope. Click on the “Disable Device Graph” or “Device Graph” button on the main window to disable or enable the graph from being displayed on the OtoSim™ Base Unit.



- It is possible to enable and disable the pathology image on the computer. To enable or disable the image on the computer, click the “Turn OFF” button.



10. Troubleshooting

- **The window looks odd/has distorted images/colors.**

Ensure that you are using a supported operating system. The PneumatoSim™ only functions on Windows XP, Vista, 7 and 8, as well as Mac OS X 10.6, 10.7, 10.8, 10.9, and 10.10. If you are using a supported platform, assure all connections are correct and cord plugs are seated properly. Try reinstalling as a last resort.

- **The OtoSim 2™ Sensor Box is not working.**

When you connect the OtoSim 2™ Sensor Box to the computer via a USB port, it will automatically light up and display the pressure gauge (a color spectrum). If this doesn't happen, try disconnecting and re-connecting. The Sensor Box is powered by the computer via a functional USB port. Make sure the computer is fully powered. If the problem still exists, try connecting to a different USB port.

- **When I apply pressure, the ear only moves a tiny bit.**

Not all ears will react the same way to changes in pressure. For example, if there is fluid build-up behind the eardrum, very little motion will be observed. Check for signs of light reflux, fluid motion, or blanching of the ear canal as the pressure increases. Not seeing a dramatic movement may be normal. However, if none of the pathologies show signs of motion, see the next section.

- **When I apply pressure, the pressure graph/readout only moves a little bit.**

This is usually a sign of air leakage or an improper seal. Assure the Pneumatic Earform is free of damage without cracks in the silicone and that the plastic lens at the base of the ear canal is not damaged. Ensure the earform is properly secured to the OtoSim™ Base Unit and that the ring is snug by turning it clockwise. Check to ensure the OtoSim 2™ Sensor Box is connected securely to the Pneumatic Earform via the sialastic tubing. Check the sialastic tubing for any signs of kinking, internal obstruction or damage. As well, check to ensure you are inserting the Pneumatic Otoscope properly into the silicon Pneumatic Earform and making a proper seal. Also check your Pneumatic

Otoscope for leaks by doing a negative pressure test as mentioned in a previous section above. If you have no motion at all, see the next scenario.

- **When I apply pressure, nothing happens.**

Check to ensure that the OtoSim 2™ Sensor Box is properly connected. The LCD screen should be lit, and a pressure readout should be visible on the OtoSim program's main screen. If these are not present, unplug the USB cable from both the computer and the Sensor Box. Re-insert the cable back into the computer and the Sensor Box assuring proper pin and plug alignment. Do not force any connection as this may damage your devices permanently. You can also try an alternate USB port on your computer, if available, if the previous step was unsuccessful. If all else fails, try re-booting your computer with all devices attached to insure both the software and OtoSim™ Base Unit have been detected by your computer.

If all measures fail and the pressure reading still does not respond, or if the pressure reading is not at 0, try reinstalling the PneumatoSim™ software.

- **The OtoSim™ Base Unit is blank but the program window shows an image.**

Check OtoSim™ Base Unit for any signs of damage. The unit is fragile and should be handled with care. Also check the illuminated OtoSim logo on each the side of the unit. If no glow is seen, ensure the unit is plugged in properly. Try disconnecting and then reconnecting the OtoSim™ Base Unit again. Assure proper connections and do not apply excessive force when plugging in since this may damage the OtoSim™ Base Unit, the computer USB port or your cable permanently. Your main screen should flash briefly as the unit is reconnected. Check the back of the unit to ensure the USB cable is seated properly. Make sure the USB port on your computer that you are connecting the OtoSim™ Base Unit to is functional. Try a different USB port to see if the problem still exists. Both the OtoSim 2™ Sensor Box and the Base Unit are powered by the computer they are plugged into. Make sure that the computer has power. If all measures fail and

you are still having problems connecting the OtoSim™ Base Unit to your computer, uninstall and reinstall the OtoSim 2™ software.

If you are still having trouble or require technical support, please feel free to contact us:

Toll Free North America: 1-866-964-5186

Outside of North America: 1-647-255-1321

Email: info@otosim.com

We will typically respond within 24 hours, Monday to Friday. Thank you for your continued support for our medical training and simulation products.



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