

## **PowerRefractor II**

### ***What Are You Testing?***

The PowerRefractor II is an automated infra-red videoretinoscope that identifies eye misalignment, cataract, myopia, hyperopia, anisometropia (a difference in focusing power between the two eyes), and astigmatism. It also measures dynamic pupil size, interpupillary distance, and dynamic accommodation (the ability of the eyes to change focus).

### ***What You Need to Do the Test:***

1. Camera system, including: camera, infra-red retinoscope, ultrasound transducer and receiver.
2. Power cable for the measurement system.
3. Instrument cart.
4. Infrared glasses.
5. A cover for the skylight/vent.
6. Two marks on the wall, 1 meter apart. One mark indicates the location of the child's eyes; the other mark indicates the location of the PowerRefractor II camera face.

### ***Getting Ready:***

1. Center the PowerRefractor II on the instrument cart, lined up with the mark on the wall.
2. Put the camera head on the hinge on top of the PowerRefractor II.
3. Plug the power cable into the 44-pin plug at the back of the unit at the base of the screen.
4. Slide the protection strip over the cable.
5. Plug the PC power cable into the PC unit.
6. Plug the mouse cable into one of the two USB ports on the PC unit.

Any and all use of these documents should cite the following reference: The Vision in Preschoolers Study Group. Comparison of Preschool Vision Screening Tests as Administered by Licensed Eye Care Professionals in the Vision in Preschoolers Study. Ophthalmology 2004;111:637-650.

7. Press the Start button on the right side of the monitor. Start the PowerRefractor II before the printer.

***How You Do the Test:***

1. When the screen appears, click on the box that says **Full Refraction**.
2. When the screen opens after you click Full Refraction, the camera automatically starts.
3. Have the child sit 1 meter in front of the camera with their eyes lined up with the mark on the wall.
4. Tilt the camera so that the child's eyes are shown in the middle of the video display area.
5. Move the PowerRefractor II toward and away from the child until the pupils and corneal reflex are in good focus. When focus is correct, the **Distance of patient** box on the screen will be green. [Note: The instrument is very sensitive to correct fixation distance. Measurements will occur only when the **Distance of patient** box is green. When fixation distance is incorrect, the **Distance of patient** box is red.]
6. It is permissible to use a finger puppet immediately above the camera to attract the child's attention.
7. Ask the child to open the eyes wide as if he/she is surprised and look at the flashing red lights on the camera.
8. Look at the screen display and, using the mouse, press the **Start Measurement** box. The measurement will stop automatically when testing is completed or the instrument times out. [If necessary, you can stop the measurement by clicking on the **Stop Measurement** box.]

NOTE: If the camera "times out" during setup, before you start the testing, you can restart the camera by clicking **Start Measurement**, then **Stop Measurement**, and then **Start Camera**.

9. During testing, green squares should appear around the child's pupils on the video screen.
10. The PD line connecting the green boxes should be close to horizontal.

11. If the green squares do not appear, do the following:
  - a. Be sure eyelids are not covering pupils. If they are, remind the child to open the eyes wide.
  - b. If the images of the pupils are too bright or too dark, use the mouse to adjust the image brightness bar on the screen.
  - c. If the pupils are too small (less than 3 mm), reduce room lighting and/or put on infrared glasses.
  - d. If the pupils are too large (greater than 7.5 mm), increase the room lighting.
  - e. If the pupils and corneal reflex are out of focus, adjust the distance between the PowerRefractor II and the child by moving the instrument.
12. When the instrument stops, print the screen and “**Add Result.**” Affix the label with the child’s ID number and name to the printed image.
13. Then review the screen to see if a retest is needed.
14. If the numbers in the **Refraction OD** and **Refraction OS** boxes are both green in color, the readings are usable.
15. You will retest the child in the following cases:
  - a. If the numbers in both refraction boxes are red: Retest binocularly with “**HiSpeed**” box checked.
  - b. If the numbers in both refraction boxes continue to be red when tested with “**HiSpeed,**” test each eye monocularly, making sure that the image of the eye is on the proper side of the screen.
  - c. If the numbers in one of the refraction boxes are red: Retest that eye monocularly, making sure that the image of the eye is on the proper side of the screen.
  - d. You may test a child or an eye up to 3 times. Print and “**Add Result**” for each display.
16. To print the display, use the mouse to click on **File** (upper left corner of screen), and then to click on **Print**. Affix the label with the child’s ID number and name to each printed image.
17. For “**Add Result**”, enter the child’s ID number and name code. Use the mouse to key in the numbers and code by clicking the cursor on the onscreen keyboard. When entry is accurately completed, click the **Save** box on the display window that opens above the onscreen keyboard. [**NOTE: Check to make sure this is accurate**].

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18. The screen display will reappear. Click on the box that says **Start Camera** to begin the next test. You are ready to re-measure the child or to test the next child.
19. If you never get refractive error in one or both eyes, record unable on the label.
20. At the end of the session, go to the main menu and use the mouse to click on the **Finish** box, to end the session. The system will automatically shut down.

***What You Tell the Child:***

1. Tell the child to sit very still and to look at the red and green lights on the camera.
2. Tell the child to open his/her eyes wide “like you are surprised” and to keep them open.

***What You Write Down:***

1. Apply the identification label to the PowerRefractor printout.
2. Be sure to use the label that indicates whether the picture was the first, second, or third picture for that child.
3. If you are unable to measure refractive error in each eye, check the “Unable” box.
4. If the PowerRefractor printer fails to produce a paper copy of the readout, record the results displayed in the screen on the **PowerRefractor II Back-Up Form**. If multiple readings are taken, apply the label and complete a separate back-up form for each reading.

***Remember!***

1. Adjust the tilt of the camera so that the eyes are in the center of the screen.
2. Adjust the distance between the child and the instrument until the images of the pupils and the corneal reflexes are in good focus.
3. If Refraction OD and/or Refraction OS are displayed in red, print the display, apply label, press and complete “**Add Result**”, and then retest the child.