



JT

THE 20/20

EXPERIENCE

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- ▶ Clean the forehead and face shields in front of the patient
 - ▶ Set the patient's PD
 - ▶ Dial in the most recent refraction/autorefraction or retinoscopy
 - ▶ Adjust the examination chair to the proper height
 - ▶ Have the patient sit up as straight as possible
 - ▶ Position the phoropter in front of the patient
 - ▶ Adjust vertex distance utilizing forehead rest. 12mm is standard
 - ▶ Adjust horizontal angle to match any head tilt the patient may have

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- ▶ Use near rod to adjust the direction of phoropter to the center of the acuity screen or mirror.
 - ▶ Ask the patient if they are comfortable and aligned with the acuity screen
 - ▶ Tell the patient to try and not push their face into the machine and to let you know if their eyelashes start touching the back of the lens or if they notice fog
 - ▶ Their mask can be lowered to below the nose if the phoropter lenses begin to fog. This has to be presented as a choice to the patient.
 - ▶ Adjust room lighting. Ok to dim but not too dark. The likelihood of over misusing a patient increases in dim illumination.

**THE CLINICIAN'S ABILITY TO MAINTAIN
CONTROL DURING THE REFRACTION IS
DIRECTLY RELATED TO THEIR ABILITY
TO COMMUNICATE CLEARLY WITH THE
PATIENT**

BASIC REFRACTION TECHNIQUE

- ▶ Once the patient is properly positioned occlude the left eye.
- ▶ Present the 20/20 to 20/50 Snellen acuity chart
- ▶ Ask the patient to read the first two letters of the smallest line they can read
- ▶ Adjust the size of Snellen lettering until the patient can read at least the next to the lowest line on the chart.
- ▶ Add +0.50 and ask if the lettering looks better or worse. Keep adding +0.50 until the patient reports the letters are worse/blurred. Note that for every 0.25D added the patient should lose 1 line of acuity. Inversely, each -0.25 added back in should achieve one line of improvement in acuity.
- ▶ Begin to slowly decrease the power in 0.25 steps until best visual acuity is achieved.

REFINING CYLINDER/AXIS POWER

- ▶ Swing the Jackson cross-cylinder (JCC) in front of the patient's eye to refine the cylinder axis and power
- ▶ Generally if the patient's correction via autorefractor/retinoscopy or previous SRX is primarily cylinder and at or greater than 1.00D, start by refining the axis. If less then start with the cylinder power.
- ▶ To check the axis, position the JCC so that the red and white dots straddle the cylindrical axis by 45 degrees on either side
- ▶ Have the patient look at either a single line of letters two lines larger than their best visual acuity found during the initial sphere evaluation. I prefer to have the patient focus on the letters K or R.
- ▶ Start by telling the patient that you are going to give them two choices. To please choose the one that is most clear. Both may be slightly blurred but which is better of the two. It's also possible that they may both be very similar or the same.

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- ▶ You may use choice 1 or choice 2. Or go to 3 and 4, and so forth. Personal preference. I keep it simple at 1 or 2. I often say “different” one or two to let the patient know early in the process that I am not simply repeating the testing they just responded to.
 - ▶ Move the axis in the direction of the red dot, “chasing the red dot”. You will get a feel for how much to move the axis based on how strongly and rapidly the patient responds. Typically move in 15 degree increments until reversal then decrease by 5 refining down to 1 if possible. The goal is to achieve as accurate measurements as possible in the fewest number of questions. The higher the cylinder the greater the accuracy possible. Low cylinder can be within 5 degrees to either side and not have a subjective impact on visual acuity.
 - ▶ To check the cylinder power, position the JCC so that the red and white dots correspond with the cylinder axis. As you turn the JCC lens, it will click into only two positions. 45 degree offset or on axis.

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- ▶ Once again ask the patient which choice is more clear, 1 or 2?
 - ▶ If the patient chooses the white dot, subtract -0.50D of cylinder power while remembering to add -0.25D of sphere power to maintain spherical equivalent.
 - ▶ If the patient chooses the red dot, add -0.50D of cylinder power while remembering to add $+0.25\text{D}$ of sphere.
 - ▶ Once the patient reverses (chooses the red dot after previously choosing the white dot/vice versa) adjust the cylinder power by 0.25D in the opposite direction of your previous change. The spherical power does not need to be adjusted for 0.25D changes.
 - ▶ Once more, check the cylinder power. Remove the JCC and have the patient read the first two letters of the smallest line they can read. Decrease the cylinder power by 0.25D and check for loss of clarity. If no change, remove another 0.25D of cylinder until subjective loss of acuity is achieved. Add back the 0.25D just removed.
 - ▶ The goal is to give the least amount of cylinder necessary to achieve best corrected visual acuity.

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- ▶ If autorefraction/retinoscopy indicates no cylinder power, do a cylinder search.
 - ▶ Position the JCC for power and add 0.25D. Start at 180 moving to 90 then 45 and 135 asking which is better one or two. If the patient chooses the red dot then go through the previous cylinder power and axis procedure. If the patient chooses the white dot, remove the 0.25 and cylinder and refine the spherical power.
 - ▶ My go to verbiage during refraction:
 - ▶ I'm going to show you two choices of lenses each time. Both may not be clear but try and choose the one that looks the most clear. It's also OK to say they are equally blurred. Try not to concentrate too hard on your choices. I'm looking for your first instinct. You can't get this wrong, I will recheck every answer you give during the test in different ways. I will also repeat the questions if needed.
 - ▶ I also double check the sphere power using the red and green slide. This is called the duo chrome test. I isolate a line of letters two sizes larger than their best achieved visual acuity and ask them which side do the letter appear more sharp/crisp? In a mirrored room I always strive for a green response. I then add 0.25 of plus until same or red is achieved. I go back without red/green, isolate smallest best achieve visual acuity individual line and repeat the question ***is the next choice instantly better or just darker and smaller?***
 - ▶ When I get to end of the exam and I am refining the power further I always finish with the choice and instructions of "is this next choice instantly better or just smaller and darker?" You will be surprised how many patient's can still read just as clear with less minus during this final step.

BINOCULAR BALANCE

- ▶ Once the monocular subjective refraction has been completed for each eye, it is time for the binocular balance. This is only performed if the visual acuity is relatively equal between the two eyes.
- ▶ There are several different techniques that can be used. It can be complicated or very simple. Let's try two that are simple.
- ▶ Isolate a line of Snellen letters one line larger than their best achieved visual acuity
- ▶ With the patient still in the phoropter and both eyes open, cover the patient's left eye with your hand then move to the left. Ask the patient which eye is more clear? Add +0.25 to the better eye until reversal. Then subtract 0.25 from the now worse eye. Occlude the fellow eye and make sure the previous best achieved visual acuity is still possible. If not, add another -0.25.
- ▶ The other technique I use is to add base up and base down prism to split the screen.
- ▶ Add 2D base down OD and 2D base up OS. The patient will see two screens. The right eye will see the top and left the bottom image. Tell the patient to ignore any brightness difference. Ask which image is more clear. Add +0.25D to the better eye until you reach equality. Remove prism and occlude the fellow eye and recheck that previous best achieved acuity is still possible. If equality is not possible, leave the dominant eye more clear. Usually is the same as dominant hand.
- ▶ Whether to perform binocular balance on a patient is a judgement call. I'll discuss this further.

DETERMINING NEAR ADD

- ▶ Adjust phoropter PD to near position. Be careful to not pinch the patient's nose during this adjustment.
- ▶ Lower the near point card and adjust to a 16" distance. Turn to the single sentence line representing 20/40
- ▶ Dial in 3.00D of plus. Decrease to +2.50D and ask the patient if the sentence is comfortable to read. I then decrease the ADD by .25D until the patient FIRST notices blur. Add back +0.75 and that should represent the most comfortable near ADD.
- ▶ As a general rule at age 45, the typical ADD is +1.50. at age 50, +2.00 and at age 55, +2.50
- ▶ This is influenced directly by BCVA at distance. Diminished BCVA will result in higher ADD powers and Shorter focal lengths.
- ▶ Remember that the higher the ADD the shorter the corresponding focal length.
- ▶ +3.00 focuses at 12". Lower ADD further, Higher closer.
- ▶ I rarely RX greater than 2.25 for patients that have distance BCVA of 20/20 binocular.

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- ▶ WHAT DOES 20/20 VISION MEAN?
 - ▶ AOA DEFINITION: A PERSON WITH 20/20 VISION CAN CLEARLY READ 9MM LETTERING AT 20 FEET.
 - ▶ EXAMPLE: A person that can read 20/20 can read the same size print at 200 feet that a person that has 20/200 vision has to move to 20 feet away to read.
 - ▶ Why 20 feet? That distance is equivalent to infinity. Light rays traveling from over 20 feet are parallel to one another. When parallel, there is no need for refractive change to focus.
 - ▶ Parallel light rays entering an emmetropic eye require no optical refraction.