OPTOMETRIC TECHNICIAN'S HANDBOOK FOR PRELIMINARY TESTING

by

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A OPTOMETRIC TECHNICIAN'S HANDBOOK FOR PRELIMINARY TESTING

Preliminary testing is very important part of comprehensive eye care. In busy offices there are often technicians to complete this portion of the examination. Unfortunately, there is a lack of consistency from office to office and technician to technician. The Optometric Technician's Handbook for Preliminary Testing will discuss the specific directions for common procedures often left to the technician to complete. This handbook will include the purpose, directions and recording methods for each of the tests. Allowing the technician with sufficient training and information to carefully and efficiently complete these tests and recognize inconsistencies and misinformation during their portion of the examination will improve the technician's portion of the examination.

Acknowledgment

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History

Taking the patient's history sets the tone for their visit. Along with providing comprehensive eye care, it is important to address each patient's individual concerns. Begin by greeting the patient and ask what they are here for today. Ask if they are a new patient and if they are presenting for an emergency visit. If it is outside of their normally scheduled appointment, clearly record the purpose for the visit. Keep in mind, there is more to eye care than just getting new glasses; dry eyes, allergies, red eyes, watery eyes, flashes, floaters, injuries, etc. Use caution though because patients feel obligated to answer questions presented to them. If you ask them if they have any problems with their vision they will find one. The right question to ask would be: *"Are you having any problems with your vision or do you have any concerns that you want the doctor to address today?"*

If the patient does have a specific problem or concern, this is the chief complaint. For each chief complaint at least four describing factors are required for billing. A problem cannot be fully understood or addressed properly without knowing at least four describing factors. A good way to remember how to ask about the describing factors is "FOLDARQ." Use this as a guide to get the best history on a patient.

FOLDARQ

- F= Frequency or how often it occurs?
- O= Onset or when did it start?
- L= Location or where anatomically does it happen?
- D= Duration or how long does it last?
- A= Association or is there anything they associate with it happening?
- R= Relief or are there factors that modify it?
- Q= Quality or how severe are the consequences of it and/or how much is daily life affected?

For example, here are a couple of chief complaints with proper follow-up questions.

Chief complaint: headaches

- Is this a new onset of HAs or does the patient have a prior history of HAs?
- Family history of migraines?
- Do you experience motion sickness?
- Did you experience a visual aura before your HA?
- Do you wake up with HA's?
- Do you have a history of sinus/allergy problems?

Chief complaint: floaters

- Is it a new floater (are there one or more)?
- Which eye?
- Any associated loss of vision?
- How long have you seen the floater?
- How often do you see the floater?
- Is it getting bigger, smaller or stable?
- Is it only in bright light or when looking at white wall or is it not dependent on lighting?
- Do you experience flashes of light as well?
- If the patient says yes to flashes then follow up with:
  - How often?
  - When?
  - Only in the dark or anytime?

In addition to getting a chief complaint we want to review personal, family and social history. Always ask about or review the patient's current mediations, allergies, health conditions and surgeries. If the patient is on ocular medications always ask when their last dose was and if they need refills. If the patient has had any ocular surgeries find out what the procedure was and when it was performed. If the patient has any health conditions note any changes since the last visit.

Diabetic patients require a list of follow-up questions, such as:

- How often do you check your blood sugar?
- What is your average morning blood sugar?
- What is your HbA1c level (which is a three month average of blood sugar)?

As a final question always ask if there is anything else you want the doctor to address or would like the doctor to know about. This gives the patient the opportunity to tell you anything else on their mind and allows them to think of any other questions before they see the doctor.

Visual Acuity

Visual acuity (VA) is one of the simplest yet most important components of the eye exam. A decrease in VA could be due to pathology or due to a simple change of refractive error. In order for optometrists to compare VAs, they are traditionally taken at a distance of twenty feet. Due to space restrictions today this distance is often simulated by mirrors. Each line of the eye chart is assigned a notation in the form of a fraction that represents the visual acuity. The numerator is the distance in feet the patient is from the eye chart. Interpreting the numbers is simple. For example, if the patient can read the 20/40 line, they are able to see at 20 feet what a normal eye could see at 40. This could be a decrease in VA from normal.

VA's can be easily contaminated, so remember to always watch the patient while they are reading the chart. Instruct the patient not to squint and to keep their eyes straight, or in primary position. Make sure patient does not use bifocals for the distance chart.

Instruct the patient to read the line presented; do not ask if they can read the line. Remind the patient it is better to guess and get them wrong than not guess at all. Usually start with a line or two above their best corrected vision with current correction and progressively present smaller/larger lines based on the patient's responses. It may be necessary to isolate letters on each line for a better result. Always push patients to read the next line. Make sure the patient is not "cheating" but also make sure you push them to guess until they guess at least half of the line wrong and indicate this by superscript. For example, $20/20^{-2}$ means the patient got only two letters wrong on the 20/20 line or $20/25^{-1+2}$ means the patient got one letter on the 20/25 line wrong and two on the 20/20 line correct. If the patient cannot read the Snellen chart use the Feinbloom Low Vision chart. If it is not available measure how far from the patient you have to be for them to count your fingers (CF@6ft), see hand motion (HM@3ft), if they have light projection (LPO), light perception (LP) or no light perception (NLP).

Remember to indicate if VA's were taken with or without correction. In addition to recording patient's VA also denote if the patient was slow, confused, had a poor response or if the patient was using eccentric viewing (looking to the side of the object and not using the center of their macula.)

Pinhole Acuity

Always pinhole if distance VA is worse than their best corrected at last visit. Any decrease in vision must be accounted for whether it is from pathology or refractive change. If their VA does improve with pinhole it means that their decrease in VA is usually due to refractive change. Record pinhole acuity as above. Example: ph = $20/25^{-2}$

Near VA

The standard distance for near VA is sixteen inches, or forty centimeters. If the patient has bifocals, make sure they use them for near VAs. If the patient has only single vision spectacles and takes their glasses off to read, then take their VAs that way. Even if the patients VA is HM or CF at distance make sure you take near VAs.

Children and VAs

For children who do not know the alphabet, use the LEA acuity chart so the child can name or match the shapes.

Make sure the chair is high enough so that young children and small adults can see the Snellen chart in the mirror if using a projection system.

Amsler Grid

This test is monitoring the area within a twenty degree diameter of the fovea. It will detect any edema or hemorrhaging in the macular region.

Perform amsler grid testing with the patient wearing their current near prescription and have the patient hold the card twelve inches or thirty centimeters from their eyes. Instruct the patient to cover one eye and look at the center dot during the entire test. Continue to remind them to look at the center dot. Ask the patient if, without moving their eye from the center dot, they can see all four corners of the outside grid. If so, ask patient if any of the lines are wavy or distorted or if any of the boxes are missing. Repeat the test with the left eye.

During the test watch the patients' eyes and make sure they are not moving them. If the patient answers that they can see all four corners of the grid, the grid is complete and none of the lines are distorted then they have a negative amsler grid. If the patient answers otherwise to any of those questions they have a positive amsler. Have the patient describe exactly what they see and draw the defect.

Many patients monitor this at home, especially if they have had a positive result on the test previously. When testing amsler grid with these patients, ask them if the grid looks the same as it did last time they were in the office or if it has changed. Report if the defect is stable or new.

Record the results OD, OS each followed by (+) or (-) indicating a positive or negative result.

Confrontation Visual Fields

There are several techniques to assess visual field. One of the screening tests is the Finger Count Method. Here you are checking the field once in each of the four quadrants by having the patient report how many fingers you are holding up. Again, this method is only a screening which may present large defects and it is not very accurate.

Instruct the patient to concentrate at your nose or face during the entire test. Tell the patient to cover their left eye with their hand or the occluder. Make sure they are looking at your face and hold up one, two or three fingers in all four quadrants and have the patient report how many fingers they see. Good landmarks to divide the visual field into quadrants are a vertical line through the center of the nose and a horizontal line through their eyes. While performing the test you should be at eye level with patient and your fingers should be approximately eighteen inches from the patient. Remember if you do not see your fingers, then the patient probably does not see them either.

If the patient reports the correct number of finger in all quadrants with both eyes, then record FTFC OD/OS, which means full to finger count for left and right eye separately. If the patient has a defect in either eye then draw the defect from the patients view. For example, figure 1 is the shape commonly used to represent the field of vision. Simply draw the shape and shade the quadrant that is defective.

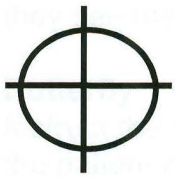

Figure 1

Stereopsis

Stereopsis refers to the ability to appreciate depth. It is the ability to distinguish the relative distance of objects with an apparent physical displacement between the objects. It is the lateral displacement of the eyes that provides two slightly different views of the same object (disparate images) and allows acute stereoscopic depth discrimination. Fusion is the neural process that brings the two retinal images in the eyes to form one single image. Fusion occurs to allow clear, single binocular vision. It is possible to appreciate the relative location of objects using only one eye due to monocular cues. Several strong monocular cues allow relative distance and depth to be judged. These monocular cues include: relative size, interposition, linear perspective, aerial perspective, light, shade or monocular movement parallax.

When the objects are different, suppression, superimposition or binocular ("retinal") rivalry may occur. Suppression occurs to eliminate one image to prevent confusion and often results in a lazy eye. Superimposition results in one image presented on top of the other image what patients perceive as double vision. Binocular rivalry describes alternating suppression of the two eyes resulting in alternating perception of the two images. This usually occurs when the lines presented to the two eyes differ in orientation, length or thickness. Random-dot stereograms are used to eliminate monocular cues so depth perception or stereopsis can only be appreciated when binocular fusion occurs. Random-dot stereograms and the butterfly test for global stereopsis.

Random Dot E

Instruct the patient to wear the polarized glasses. Hold up two targets; one with the "E" and the blank. Ask the patient to point to the target with the "E" in it. If they see the "E" three out of four times, then they pass. Report their results.

Butterfly

Instruct the patient to put the polarized glasses on over their best correction. Ask the patient if they can see anything in the dot pattern. If they cannot see the butterfly, ask them what they see in the box below with the L+R. If the patient reports they can see the L and the R at the same time, then they are not suppressing an eye. If they say they see the L and R but they flash on and off then they are showing rivalry. If they can only see the L or R they are suppressing the eye of the letter that they cannot see.

Stereo Rings

To test local stereo use the animals or the rings on the other side. Tell the patient to look at the donuts or rings in series one and ask them which of them is sticking out at them or coming off the page. Continue until they get two consecutive answers wrong. Their result is the last correct row. The expected result is twenty seconds of arc.

The animals only go down to 100 seconds of arc so if at all possible use the rings.

Record global stereo as either (-) or (+). Record local stereo in the lowest seconds of arc.

Cover Test

Cover test determines the alignment of the eyes or if patient has phoria or tropia. The eyes have a natural resting place when not in use. It is too taxing on the visual system to keep the eyes aligned when not in use. This applies to covering one eye or when we are sleeping. The cover test consists of two parts; the cover-uncover test which differentiates a tropia from a phoria and the alternating cover test which determines the direction and size of deviation. Both tests should be done at distance and near with correction.

Cover-Uncover Test

Differentiates a tropia from a phoria and determines if tropia is consistent or intermittent and alternating or unilateral. During the cover part of the cover-uncover test watch the fellow to see if it moves when the other eye is covered; this signifies a tropia. The uncover part of the cover-uncover test distinguishes an alternating tropia from a unilateral tropia.

A person with an alternating tropia is able to keep either the right eye or left eye, but not both eyes, aligned with the target when both eyes are opened. The eye looking at you will alternate between the patients left or right eye. A person with a unilateral tropia will always fixate with the same eye when both eyes are open. He will only fixate with the troping eye when the other eye is covered.

To perform cover test isolate a letter that is one or two sizes larger than best corrected VA in the weaker eye. Instruct the patient to look at the letter and keep it clear at all times during test. Make sure you do not block the patient's view of the target with your head. In the cover portion of the cover-uncover test you must observe the uncovered eye at the exact time that you are covering the other eye.

To test the right eye start with both eyes open and instruct the patient to look at the letter and keep it clear at all times during the test. Cover the left eye and observe the right eye for movement while the left eye is being covered. If no movement is noted, it indicates that the right eye was fixated on the target at the start of the test when both eyes were open. Remove the occluder and allow two or three seconds for the two eyes to resume their normal resting position. Repeat the process two or three times.

To test the left eye start with both eyes open and instruct the patient to look at the letter and keep it clear at all times during test. Cover the right eye and observe the left eye for movement while the right eye is being covered. If no movement is noted, it indicates that the left eye was fixated on the target at the start of the test when both eyes were open. Remove the occluder and allow two or three seconds for the two eyes to resume their normal resting position. Repeat the process two or three times.

If NO movement is noted in either the right or left eye cover test, the patient does not have a tropia.

Now we will perform the uncover portion of the Cover-Uncover Test to differentiate between alternating and constant tropia.

To perform the uncover portion of the cover-uncover test start with the left eye covered. Observe the right eye for movement as soon as you uncover the left eye. If the right eye does not move when the left eye is uncovered, the patient has an alternating tropia. This means that the left eye is not aligned with the target and the right eye is aligned. Hence when you cover the right eye, the left eye will align with the target and continue to look at the target even when you uncover the right eye. In a person with a constant right tropia, the right eye would have moved out to let the dominant left eye look at the target when it was uncovered. If the right eye moves (out/in/up/down-depending on type of tropia) when the left eye is uncovered because the left eye is now fixating on the target, the patient has a constant right tropia. This means that the patient fixates with the left eye. Since the eyes do not work together the right eye will not be aligned with the target when the left eye is uncovered and looking at the target. Hence when you cover the left eye, the wandering right eye will align with the target and continue to look at the target until you uncover the left eye and then the right eye will return to its off position.

Alternating Cover Test helps determine the direction and magnitude of a phoria or tropia. It does not tell the difference between a phoria and tropia. Instruct the patient to look at the target and keep it clear. Cover the right eye for two or three seconds then move the occluder quickly and cover the left eye. Observe the just uncovered right eye for direction of movement while you are covering the left eye. Leave the occluder in front of the left eye for two or three seconds then cover the right eye while looking for direction of movement of the left eye that you just uncovered. Continue the test for three to five cycles until you determine the direction of movement. Direction of eye movement, as the eye is uncovered (in, out, up, down) is the corresponding direction of deviation.

Possible results of cover test:
If the eye moves in, when it was originally out, then it is exophoric.
If the eye moves out, when it was originally in, then it is esophoric.
If the eye moves up, when it was originally down, then it is hypophoric.
If the eye moves down, when it was originally up, then it is hyperphoric.

In a phoria, under normal binocular conditions, both eyes are aligned with the target.

When recording, remember to indicate if it is with or without correction, and if tested at distance or near. For example, CT cc E, X' means a cover test with correction, esophore at distance and exophore at near.

Color Vision

Color Vision problems can indicate optic nerve damage, a congenital color defect or a defect as a side effect from certain medicines.

Have the patient wear their near spectacle correction. Instruct the patient to cover their left eye. Present the Ishihara's Plates to the patient at a test distance of fifty centimeters and ask them what number they see. The first six plates are screening plates. If they get these plates correct then move on to the left eye. If they get any wrong, go through plates seven through fourteen. If they get any of these wrong, then finish the rest of the book to classify the defect. If they get them all correct the test is done for that eye. Repeat the test for the left eye. If the patient has difficulties responding verbally have them trace the figure with a pointer. Do not let the patient touch the plates with their fingers as the oil from the fingers damage the colors.

Record the plates that the patient got correct or incorrect on the score sheet provided with the Ishihara Plates.

Extra Ocular Motilities

You want to asses the movement of the eyes together in all directions. A restricted field indicates a pathological problem. Instruct the patient to hold their head still and follow the target with their eyes only. For young and elderly patients you may have to hold their chin or forehead. Move the target in a double H pattern as indicated below in figure 2. The vertical lines should be at the nose and just outside of the ears or approximately twenty degrees from center. This pattern is very important because it isolates each of the extraocular muscles (EOMs). While the patient is watching the target observe their eyes closely. Assess movement of eyes and note which direction patient was unable to move eye. Also ask the patient if there was any pain upon movement in any directions and indicate the direction that causes pain.

Also, pay attention to the lid position when testing EOMs. A ptosis in certain positions of gaze can indicate a binocular anomaly.

Record the EOM as "full" or "FROM" indicating Full Range of Motion. Also indicate "s pain" or "c pain" meaning without or with pain.

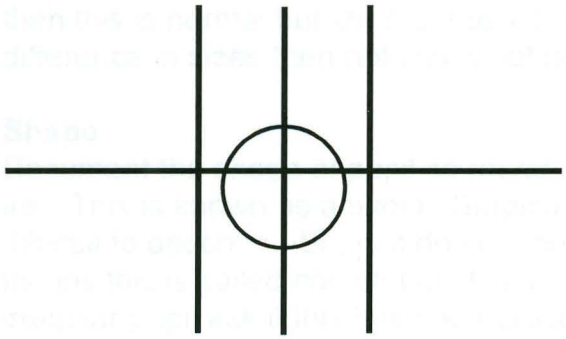

Figure 2

Pupils

Pupils are a very important part of preliminary testing. Positive afferent papillary defect (APD) or Marcus Gunn pupil (MG) can be an indicator of a medical emergency so never dilate until you are sure you have accurately performed pupil analysis. If you have any questions make sure you alert the doctor so that it can be double checked.

By checking the pupils you are testing the amount of light that passes through the third cranial nerve in the eye. A cloudy cornea, dense cataract or vitreous hemorrhage can interrupt the passage of light to the nerve. Thus giving a false positive APD but there are several diseases that can cause a true positive APD. It also tests the nerves ability to assess the amount of light that passed through each eye.

Start by noting the size, shape, color and response of pupils:

Size
Are the pupils the same size? If so, measure them and write down the size. If not, measure them and write down the size of each. Then turn the lights up bright and measure the pupils. If the pupils have the same difference in sizes then this is normal but still must be noted. If they do not have the same difference in sizes then not this is not normal and also must be noted.

Shape
Document the shape of pupil as round (R), oval or irregular. Note if there is no iris. This is known as aniridia. Surgical alteration or injury of the iris can be difficult to describe. So, just do your best or draw it. If the pupil is not centered in the iris this is called corectopia, this should be noted. If a new patient has an irregular pupil ask if this has been brought to their attention before, or if they know if it is newly acquired.

Color
Document the color of the irides. If the irides are different colors note this also. Iris color can change with certain disease processes or when using certain medications.

Response
Shine the bright light into the right pupil and take it away, repeat this a couple of times to assess the direct response of the eye being evaluated. Describe it as brisk, sluggish, fixed or minimal. Hippus is a normal function of the iris where the pupil looks like it is dilating and constricting slightly. This is the balance between the sympathetic and parasympathetic system. Repeat for the left eye.

The Swinging Flashlight Test assesses the indirect response of the pupil. Instruct the patient to look at a distant target, as pupils constrict slightly when

looking at a near target so it could get confusing. Make sure room light is dim. Swing light from shining directly into OD to OS. Perform a minimum of three cycles. If both pupils remain equally constricted as you swing the light, disregarding hippos, this is a negative test. If either pupil seems to dilate at anytime- when the light is in it or when the light is in the fellow eye this is a positive test. The eye that the light is shining in when either of the pupils dilate is the eye that has the positive APD. This is due to poor transmission of the light to the brain via a damaged optic nerve. In normal circumstances, when a light is shone in one eye, both pupils constrict equally. However, when a light is shone in the abnormal eye of a patient with an APD, the pupil of the affected eye paradoxically dilates rather than constricts. This abnormal response signifies the brain is not receiving the message properly.

Reaction to Accommodation

This is tested by having the patient use their best correction for distance and if applicable near. Have the patient alternate between looking at distance and near targets for a minimum of three cycles. Alternating every five to seven seconds. Watch the pupils to be sure they constrict when looking at near and dilate slightly when looking at distance. As patients age their pupils shrink and are less responsive to accommodation so this is often not tested.

A completely normal assessment of the pupils is documented as "PERRLA" which means Pupils are Equal Round Reactive to Light and Accommodation.

Brightness Acuity Test

This test is done to evaluate the detriment that a cataract causes to a patients VA in a bright environment. This test is required for most medical insurances to cover the surgical removal of cataracts.

To determine the patients BAT VA have the patient hold the Brightness Acuity Test (BAT) handheld instrument to their eye with their best correction on so they can see the Snellen chart through the center hole of the bowl portion. Have the patient close their eyes and open the chart so that there are several lines up and the line of their best corrected acuity is at the bottom of the screen. Turn the BAT on medium and have the patient open their eyes. Immediately direct the patient to read the smallest line they can on the chart. It is very important to have their immediate response and not allow the patient to study the chart for any time.

In the event that an actual handheld BAT is not available a very bright transilluminator may be shined in the pupil from a couple inches away as a substitute.

Record and label the BAT VA similar to that of the original VA. EX: BAT OD 20/60 OS 20/80.

Lensometer

This skill takes continuous training to master. Begin by determining the type of lens in the spectacles: single vision, bifocal, trifocal, progressive, etc. Center the right lens under the reticule with the temples of the glasses pointing away from you, unless the lenses are high plus lenses then the temples go toward you. Put the clip down to hold the lens in place. Adjust frame bar height to level frame straight across or the axis will be off. Look in the objective lens of the scope and center the cross hairs with the bull's eye. If centering cannot be accomplished then suspect prism in the lenses. If the crosshair is not able to be centered have the patient put the glasses on and mark the pupil with a grease pencil and use that as the optical center.

Turn the dial all the way down to the highest plus and slowly turn away from you, toward the minus until you see the crossing "railroad" lines. If the lens is spherical both sets of lines will come in clear at the same time. If the lens is toric focus the two skinny lines first. If the three thick lines come in first then turn the axis wheel ninety degrees and then focus until they are solid and straight. Once the axis is set do not move it. Write down the number on power dial and the number on the axis wheel when the two skinny lines are perfectly clear. This is the sphere power and the cylinder axis. Now continue moving into the minus until the second set of lines comes into focus; they are the three thicker lines. Calculate the difference between the current reading from the previous reading. This is the cylinder power. For example, if the two skinny lines are clear at +1.00 and axis 080 and the three thick lines are clear at -2.00 on dial then the prescription of the lens is +1.00 -3.00 X 080.

If the lens is a bifocal follow the same steps as above but then move the lens up so that the top, center of the bifocal is centered in the clip. This is the optical center of the bifocal. Move the power dial towards the plus until the 3 large lines are in focus (pass up the two single lines.) Subtract the new number from the last number. For example, if the two skinny lines are clear at +1.00 and axis 080 and the three thick lines are clear at -2.00 on dial and after centering the bifocal and re-focusing the thick lines at +0.50 then the prescription of the lens is +1.00 -3.00 X 080, +2.50 add.

If the lens is a progressive bifocal start by marking the optical center with the guide and look for bifocal power in the lens. Read the distance power in the optical center that you marked and the add is given to you via the first two numbers only. For example if you see 1.2 the lens is a +1.25 add.

If the lens has prism in it then you mark the optical center while the patient is wearing the glasses. When you put the mark in the center of the reticule, measure the amount and direction of prism by where the two sets of lines cross in comparison to the bull's eye. For example, if it is centered on the second ring to the right of center then the prism is two prism diopter base right.

Auto Refraction

The auto-refractor allows a quick check of the patient's prescription but should not be used as the final prescription until refined with a subjective refraction. This can be of valuable for patients with small pupils, dense media opacities or are unable to have retinoscopy or a subjective refraction performed.

Align the patient with their chin in the chinrest and forehead against the forehead rest. Instruct the patient to hold eyes wide open and look straight ahead at the stimulus. Remind patients that they can blink as needed. Align the patient's pupil with the crosshairs in the autorefractor and press the button or allow time for the automatic measurement to be taken. Repeat to take at least three readings per eye.

Print out the measurements and attach to the exam form. No recording is necessary.

Tonometry

Measuring Intraocular Pressure (IOP) is important in every comprehensive eye exam. It is a screening test for glaucoma and can indicate other ocular problems or side effects of medications or trauma.

Non Contact Tonometry (NCT)
The NCT machine is an alternative to applanation tonometry (TAP). NCT is quicker for the technician to perform and less invasive for the patient. This test, however, is considered a screening test and is not as accurate as TAP. This test is what most patients call the "Puff Test." If they are very apprehensive of it, reassure the patient that it will not hurt them and it is just uncomfortable for a moment. If the patient is adamant that they do not want the test, or if they are a glaucoma patient or a glaucoma suspect, TAP will be performed by the optometrist.

Align the patient with their chin in the chinrest and forehead against the forehead rest. Instruct the patient to hold eyes wide open and look straight ahead at the stimulus. Align the patient's pupil within the target area in the screen on the NCT and press the button or allow time for the automatic measurement to be taken. Repeat if the readings for the two eyes are not within 3 mmHg of each other. If a reading of 99 shows, this means the patient blinked at the time of the measurement.

Record the reading as NCT OD and OS with a comma between the consecutive readings for each eye.

Tonopen
The tonopen is very handy for handicapped patients that cannot fit into the slit lamp or NCT machine. It too is less accurate than TAP but and slightly more invasive than the NCT.

Anesthetize the eye with one drop of paracaine in each eye. Hold the tonopen with the tip down and press the button. If the tonopen is ready, two rows of dashed lines will appear on the screen and the instrument will beep. If the tonopen screen says "CAL" when you press the power button, keep the pen with the tip pointed down and hold the button until you hear a beep then release. Next the screen will say "UP." At this time flip the tonopen so the tip is pointed up and wait for the beep. The tonopen should now have the two dashed lines on the screen and is ready to take a measurement; if not then it still needs to be calibrated.

Now hold the patient's lids wide open, instruct the patient to look at the E on the Snellen chart. Tap the apex of the cornea with the tip of the tonopen which is held perpendicular to the cornea until you hear a few "tics" and a beep. This

indicates that enough measurements have been taken to give the IOP measurement.

Record the IOP as Tt OD and OS with a comma between the consecutive readings for each eye. Also note the confidence rate for the measurement. This is the number along the bottom of the screen that is underlined. This indicates the reliability of the reading.

Humphrey Topography

Of all the technology currently available, corneal topography provides the most detailed information about the curvature of the cornea. Using a very sophisticated computer and software system, thousands of measurements are taken and analyzed in just seconds. The computer then generates a color map from the data. This information is useful to evaluate and correct astigmatism, monitor corneal disease, detect irregularities in the corneal shape, planning refractive surgery, fitting contact lenses, and calculating intraocular lenses. The map is interpreted much like other topographical maps. The cool shades of blue and green represent flatter areas of the cornea, while the warmer shades of orange and red and represent steeper areas. This corneal map allows the physician to formulate a "3-D" perspective of the cornea's shape.

Turn the topographer on with the switch that is located to the right of the screen which you are facing. The computer will open in windows like a regular computer. Wait about thirty seconds and the Atlas program will automatically open. On the menu along the left side click "Full Exam" which is second down. Click "Name" and type in last, first name. Then click "OK" on the bottom right of the screen. Then enter patient's social security number as the patient number, their date of birth and click whether it's a male or female. Then click "OK" again. Now have the patient set their chin in the chinrest with their head against the forehead rest. Also have the patient angle their head so that they are looking at the center of the Placido's Disc (the tube with lots of white rings) with their right eye. Choose Right eye on the menu. Have the patient open their eye as wide as they can so the eye lashes don't get in the way and center the "+" in the crosshairs. Once the image is clear and centered press "Capture Image." A message will ask to capture another image. Click "Yes" and repeat. Always take at least two images of each eye. After capturing both images, click "No" when the pop-up comes up again. When saving the image be sure to choose your name as the operator, the group that the image is a part of, for example "keratoconus", and then press save. If the message "Overflow" comes up just click "Ok" as it's the only option.

Sonomed Pachymeter

Pachymetry is done most commonly in preparation for refractive surgery or to aid in the management of glaucoma.

To prepare the patient put one drop of proparacaine in both eyes. Warn the patient not to rub the eyes for the next 30 minutes. To turn the machine on, press the button that is located on the back of the machine, which is located on the left side. There are 3 settings: OFF, CGF and ON- turn to ON. Once the opening screen comes up, press the "measure mode" button along the top row of the keypad. Remove the cap from the probe and press the foot pedal one time. After the beep, have the patient blink and then hold the lids. Hold the probe perpendicular to the cornea and touch the center of the cornea. When a reading is taken the machine will beep once more. Repeat the procedure for the left eye.

Sometimes it is easier to do pachymetry if you have the patient look at the eye chart to distract them from what you are doing.

Humphrey Visual Field

A visual field is done for several reasons including monitoring glaucoma progression, a stroke, or detriment from a ptosis. There are several types of computerized visual field machines and these directions are specific for the Humphrey visual field. There are also several modes of visual fields.

Sita Fast 24-2 or 30-2

Dim or shut off the room lights. Power up the machine with toggle switch which is located behind the "bowl" on the bottom right of the machine. The switch for the printer is located to the right of the paper output. The machine takes about 5-10 minutes to warm up, so turn it on well before you need it. The opening screen is the Main Menu. Select Sita-Fast Central 24-2. The next pop-up has 3 buttons: Left, Right, and Cancel. Always choose right first unless the patient is monocular or it is noted otherwise. The Patient Data screen comes up next. Begin by pressing the icon that says "Clear Patient Data."

For a new patient:
Enter the patient data (name, date of birth and patient number, if applicable.) Press Trial Lens, and then Calculate and enter the prescription for right eye first (sphere, cylinder, axis) and repeat for the left and press calculate.

For a returning patient:
Press the recall patient data icon, next proceed and type in the patient's last name. An alphabetical list of patient's names will appear. Scroll down to the correct patient and click on their name. A check will appear to the left of it. Press the proceed icon and the next screen will bring up all of the patient's most recent data. Always double check the patient prescription and re-enter the data if it is inaccurate.

Once all of the data is updated press the proceed icon located at the bottom right of screen. Prepare the patient by putting the patch on their left eye and giving them the clicker. Begin aligning the patient by having them put their chin in the left side of the chin rest and their forehead against the forehead rest. Instruct the patient to look straight ahead and align their pupil in the crosshairs by using the keypad below the bottom left of the screen.

Explain the directions of the test. "This is a side vision test. I have your eye that we are not testing patched and you have the *clicker.* I would like for you to keep your chin in the chinrest and your forehead against the forehead rest during the whole test. Do you see the light at the end of the bowl? You are going to look at that the whole time. While you are looking at that light you will notice flashes of light off to the sides, some of them bright and some very dim. I want you to press the button each time that you see a flash. Make sure that you are looking at the green light. The machine will put flashes in areas that it knows that you cannot

see if you are looking at the green light. Also, if you miss a flash just keep trying to do your best it does re-check each area."

When you and the patient are ready to begin press the start icon. A pop-up saying "Initialize Gaze Monitor" appears to let you know the machine is not starting but still preparing the patient. Tell the patient that the machine is going to begin to take a measurement and to hold very still with their eyes wide open. Press start. If the measurement was not taken a message that says "Initialize Gaze Failed, Give additional instructions." In this case retry to initialize gaze OR turn off gaze tracking. If you turn off the gaze tracking a message comes up that says "Warning: Gaze tracking turned off," press continue.

If the measurement was taken a message saying "Test starts now" appears. Click ok and tell the patient that the test is starting now. During the test if the patient's eyes are wandering remind them to keep looking at the center light. When the test is finished a pop-up appears which says it is analyzing the data. This takes about 60 seconds. The next pop-up asks if you want to save the test.; click save. During this time switch the patch to the other eye. After the computer is done saving the data click "Test other eye."

Repeat alignment with chin now on the right side of the chin rest. Repeat the test and briefly remind the patient of the instructions. After both eyes have been saved press the print icon. When the print screen comes up make sure "Single Field Analysis" is selected OD/OS. Click "Print All Selected Items." To exit the current patient, click the top icon on the menu bar.

Ptosis Visual Field

This is the same in general as the regular 24-2 except that you will select the *Ptosis field* and repeat the test twice; once with the lids taped open and once with the lids like they are normally.

Stratus Optical Commerence Topography

The OCT does a scans which measures the thickness of the layers of the retina. It can quantify the thickness of the retina to compare it at various stages of a disease process.

After the computer powers up, click on the Stratus OCT Host icon. The program will open and a message will come up that asks if you would like to archive the previous exams. Click no. Now you will be at the home screen and can begin by clicking on the patient icon on the tool bar. Next to where it says "Patient:" click Add. On the patient data screen enter the patient first and last name, DOB and gender. Then click ok.

The main three tests ran are the Fast Macular Thickness Map, Fast Optic Disc and Fast RNFL Thickness (3.4).

Fast Macular Thickness Map
Double click the Fast Macular Thickness Map icon first. Align the patient in the center of the chin rest with their forehead all of the way against the forehead rest. To move the machine, click the button on the top of the joystick- this locks and unlocks the machine. Move the machine back so you can see the pupil. Move in on the pupil until you see the "fan" beginning to turn on the retina. Instruct the patient to keep looking straight ahead at the light. Keep moving the machine straight toward the eye. When the machine beeps stop. Press the button on the joystick to lock the machine.

Click the "Optimize" icon for the z-offset. When that is done press the "Optimize" icon for the polarization. When both are optimized you may have to still re-align the scan. That can be done using the up and down arrows near the Z offset icon. Click "Scan" on the bottom right of the screen. Watch for three to five complete scans throughout all six boxes and press "Freeze with Flash." Press "Review" to see the scans. Choose the scan that looks the best and has the highest reliability value and press save. Press the button on the joystick to release the lock and move to the left eye and repeat.

Fast Optic Disc
This test is done the exact same as the Fast Macular Thickness Map but the flashing light or target now moves in. This brings the Optic Nerve into view. Also click on the "fan" and hold the mouse button down as you center the fan over the ONH.

Click "Scan" on the bottom right of the screen. Watch for three to five complete scans throughout all six boxes and press "Freeze with Flash." Press "Review" to see the scans. Choose the scan that looks the best and has the highest reliability value and save. Press the button on the joystick and move to the left eye and repeat.

Fast RNFL Thickness

This test is done in the same manner as the Fast Optic Disc but the target used is a ring that should be centered around the optic nerve.

As a recommendation, begin by doing Fast Macular Thickness Map OD and OS then Fast Optic Disc OS, Fast RNFL Thickness OS, and then repeat Fast Optic Disc OD, Fast RNFL Thickness OD as the targets are not switching back and forth therefore it is more efficient and less confusing for the patient.

Print out the analysis of OD/OS of the Fast Macular Thickness Map and Fast RNFL Thickness then single analysis of Fast Optic Disc for each eye.

Abbreviations

i	one
ii	two
iii	three
A	Angle of anomaly or Atropine
a	before
Abd	abduction
Abn	abnormal
AC	Anterior chamber
ac	before meals
ACA	Accommodation-convergence accommodation ratio
Acc	Accommodation
ACIOL	Anterior chamber IOL
Add	adduction
AF	Aquaflow surgical procedure
ah	every other hour
AIDS	Autoimmune deficiency syndrome
AION	Anterior ischemic optic neuropathy
aka	also known as
Alt	alternate/alternating (strabismus) or altitudinal field defects
ALT	Argon laser trebeculoplasty
AMBL	Amblyopia
ANA	Antinuclear Antibody
APD	Afferent pupil defect
AR	Auto refractor
ARC	Anomalous retinal (cortical) correspondence
ARG	Angle recession glaucoma
ARMD	Age related macular degeneration
ARN	Acute retinal necrosis
AS	Anterior synechiae
ASA	Aspirin
ASAP	As soon as possible
ASC	Anterior subcapsular cataract
A/V	Artery to vein ratio
AVM	Arterio-venous malformation
b	twice
BAK	Benzalkonium chloride
BARN	Bilateral acute retinal necrosis
BAT	Brightness Acuity Test
BBB	Blood brain barrier
BC	Base curve
BCBS	Blue Cross-Blue Shield
BCC, BCCA	Basal cell carcinoma
BCL	Bandage contact lens
BD	Base down prism
BDR	Background diabetic retinopathy
BF	Bifocal or Black female
BFP	Binocular fixation pattern
BI	Base in prism
bid	twice a day
bil	bilateral
BIO	Binocular indirect

B/L	Bilateral
Bleph	blepharitis
BM	Black male
BMR	Bilateral medical rectus recession
BO	Base out prism
BRAO	Branch retinal artery occlusion
BRVO	Branch retinal vein occlusion
BSS	Balanced salt solution
BSV	Binocular single vision
BU	Base up prism
BUT	Break up time
BVA	Best corrected vision
Bx	Biopsy
c	with
C	Cyclogyl
CA	carcinoma
CAC	Convergence-accommodative converence ratio
CAD	Coronary artery disease
CAG	Closed angle glaucoma
CAI	Carbonic anhydrase inhibitor
cat	Cataracts
CAT	Computerized axial Tomography
CBC	Complete blood count
CC	Chief complaint
CCTV	Closed circuit television
C/D	Cup to disc ratio
c/f	cell and flare
CF	Count fingers or Central fixation
CFF	Critical flicker frequency
CHA	Compound hyperopic astigmatism
CHF	Congestive heart failure
CHRPE	Congenital hypertrophy of the RPE
C/L	Contact lens
cm	centimeter
CMA	Compound myopic astigmatism
CME	Cystoid macular edema
CMV	Cytomegalovirus
CNAG	Chronic narrow angle glaucoma
CNLDO	Congenital nasal lacrimal duct obstruction
CNVM	Choriodal neovascular membrane
CNS	Central nervous system
c/o	Complains of
COAG	Chronic open angle glaucoma
Cone	Keratoconus
Conj	Conjunctiva
Cont	Continue
COPD	Chronic obstructive pulmonary disease
CR	Chorioretinal
CRA	Central retinal artery
CRAO	Central retinal artery occlusion
CRV	Central retinal vein
CRVO	Central retinal vein occlusion
C+S	Culture and sensitivity
CSME	Clinically significant macular edema
CSR	Central serous retinopathy

CT	Cover test
CT Scan	Computerized tomography
CV	Color vision
CVA	Cerebral vascular accident
CVF	Confrontation visual field
Cyl	Cylinder
D	Diopter
D-15	Farnsworth D-15 color vision test
D 250	Diamox 250 mg
dbl	Double
D&B hem	Dot and blot hemorrhages
D/C	Deep and clear (anterior chamber) or discontinue
DD	Disc diameter
DDX	Different diagnosis
DFE	Dilated fundus exam
dil	dilate
DIPL	Diplopia
DLEK	Deep lamellar endothelial keratoplasty
DM	Diabetes mellitus
D,M,V	Disc, macula, vessels
D+N	Distance and near
DOB	Date of Birth
DPT	diphtheria-pertussis-tetanus
D&Q	Deep and quiet
DR	Diabetic retinopathy
DV	Distance vision
D&V	Ductions and versions
DVD	Dissociated vertical deviation
DWSCL	Daily wear soft contact lens
Dx	Diagnosis
Dz	Disease
E	Esophoria at distance (6M)
E'	Esophoria at near (33 cm)
EBMD	Epithelial basement membrane dystrophy
EBV	Epstein Barr Virus
ECCE	Extracapsular cataract extraction
ECD	Endothelial cell density
ECG	electrocardiogram
EDTA	Ethylene diamine tetra acetate
EEG	Electroencephalogram
EF	Eccentric Fixation
EKC	Epidemic keratoconjunctivitis
ELISA	Enzyme-linked immunoabsorbent assay
E-mycin	Erythromycin
Enc	Lasik enhancement procedure
EOG	Electro-oculogram
EOM	Extraocular muscles
epi	epithelium
EPI	Epinephrine
ERG	Electroretinogram
ERM	Epiretinal membrane
ESR	Sedimentation rate
ET	Esotropia at distance (6M)
ET'	Esotropia at near (33 cm)

E(T)	Intermittent Esotropia at distance
E(T)'	Intermittent esotropia at near
EW	Edinger-Westphal nucleus
EWCL	Extended wear contact lens
FA, FANG	Fluorescein angiography
FAV	Foveal avascular zone
FB	Foreign body
FBS	Fasting blood sugar
FC	Finger counting
FHx	Family history
FOH	Family ocular history
FP	Fixation preference
FPL	Forced preferential looking
FROM	Full range of motion
FT	Full time
FTA	Fluorescent treponema absorption
FTFC	Full to finger count
f/u	follow up
Fx	Findings
g	gram
GCL	Ganglion cell layer
Glc	Glaucoma
Gonio	gonioscopy
GP	Gas permeable
GPC	Giant papillary conjunctivitis
GTT	Glucose tolerance test
gtts	drops
GVF	Goldman visual field
H	Objective angle
H/A or Ha	Headache
Hb	Hemoglobin
HE	Hard exudates
HEMA	Hydroxyethylmethacrylate
HCTZ	Hydrochlorothiazide
HIV	Human immunodeficiency virus
HLA	Human leukocytic antigen ie B27
HM	Hand motion
H/O	History of
HOH	Hard of hearing
HPI	History of present illness
HPPM	Hyperplastic persistent papillary membrane
HR	Heart rate
Hr	Hour
hs	Bedtime
HSK	Herpes simplex keratitis
HSV	Herpes simplex virus
HTN	Hypertension
HVF	Humphrey visual field
Hx	History
Hypo	hypotropia
HZV	Herpes Zoster Virus
I&R	Insertion and Removal

I/A	Irrigation-aspiration
ICCE	Intracapsular cataract extraction
ICE	Iridocorneal epitheliopathy
ICG	Indocyanine green
ICSC	Idiopathic central serous choroidopathy
IDDM	Insulin dependent diabetes mellitus
Ig	Immunoglobulin
IHD	Ischemic heart disease
IK	Interstitial keratitis
ILM	Internal limiting membrane
INL	Inner nuclear layer
INO	Intranuclear Ophthalmoplegia
Int	Intermittent
IO	Inferior oblique
IOFB	Intraocular foreign body
IOL	Intraocular lens
IOP	Intraocular pressure
IPD	Interpupillary distance
IPL	Inner plexiform layer
IRMA	Intraretinal microangiopathy
IV	Intravenous
J	Jaeger near acuity
JODM	Juvenile onset diabetes mellitus
JRA	Juvenile rheumatoid arthritis
K	Keratometry or Curvature or Potassium
KCS	Keratoconjunctivitis sicca
KP	Keratic precipitate
L	Left or Lid
LASIK	Laser in situ keratomileusis
LD	Lattice degeneration
LE	left eye or Left esophoria
LET	Left esotropia
LFBS	Last Fasting Blood Sugar
LL	Lower lid
LLL	Left lower lid
LLR	Left lateral rectus
LMR	Left medial rectus
LOG	Logmar
LOV	Loss of vision
LP	Light perception
LPI	Laser peripheral iridotomy
LR	Lateral rectus
LRI	Limbal relaxing incision
LSO	Left superior oblique
LSR	Left superior rectus
LTG	Low tension glaucoma
LTP	Laser trabeculoplasty
LTS	Lateral tarsal strip
LUL	Left upper lid
LV(A)	Low vision (aid)
LXT	Left exotropia
M	Meter or Manifest refraction

MA's	Microaneurysms
MB	Muscle Balance
MCE	Microcystic edema
MEM	Monocular estimate method
MEWDS	Multifocal evanescent white dot syndrome
MFS	Monofixation syndrome
MG	Marcus gunn pupil or Myasthenia gravis
MGD	Meibomian gland dysfunction
MI	Myocardial infarct
MIO	Monocular indirect ophthalmoscopy
mm	millimeter
MM	Malignant melanoma
MR	Manifest refraction or Medial rectus
mr	minimal reaction
MS	Multiple sclerosis
MVA	Motor vehicle accident
Mx	Management (plan)
N	near
NA	Non applicable
Na	Sodium
NaCl	Sodium chloride, saline
NAG	Narrow angle glaucoma
NdYAG	Neodymium yittrium-aluminum garnet laser
NFL	Nerve fiber layer
NI	No improvement
NID, NIDDM	Non insulin dependent diabetes mellitus
NKA	No known allergies
NKDA	No known drug allergies
NLD	Nasal lacrimal duct
NLDO	Nasal lacrimal duct obstruction
NLE	Natural lens extraction
NLP	No light perception (amaurosis)
nm	nanometer
noct	at night
NPA	Near point of accommodation
NPC	Near point of convergence
NPDR	Non proliferative diabetic retinopathy
NR	Non reactive
NRC	Normal retinal correspondence
NS	Nuclear sclerosis
NSAID	non steroidal anti-inflammatory drug
N(V)	Near vision
NVD	Neovascularization at disc
NVE	Neovascularization elsewhere
NVG	Neovascular glaucoma
NVI	Neovascularization of the iris
NVM	Neovascular membrane
Ø	None
OA	Overactive muscle
OAD	Overall diameter
OAG	Open angle glaucoma
OD	Right eye (oculus dexter) or Doctor of Optometry or Optic disc
ODM	Ophthalmodynamometry
OHTN	Ocular hypertension

OFHx	Ocular family history
OHx	Ocular history
OKN	optokinetic nystagmus
ON	Optic nerve
ONA	Optic nerve atrophy
ONH	Optic nerve head
oph	ophthalmic
OPL	Outer plexiform layer
OR	Over-refraction
Ortho	orthophoria
OS	Left eye (oculus sinister)
OU	Both eyes (Oculus uterque)
OZ	Optical zone
P√	Intraocular pressure check
p	after, often with a dash on top
P	pupils
PAL	Progressive Add Lens
PAM	Potential acuity meter
PAS	Peripheral anterior synechiae
PC	Peripheral curve
pc	after eating
P/C	Posterior chamber
PC	Posterior capsule
PCF	Pharyngeal conjunctival fever
PCIOL	Posterior chamber IOL
PCN	Penicillin
PCO	Posterior opacification
PCP	Primary care physician
PD	Prism diopter or Interpupillary distance
PDR	Physicians Desk Reference or Proliferative diabetic retinopathy
PE	Phaco extraction
PED	Pigmentary epithelial detachment
PEE	Punctate epithelial erosion
PEK	Punctate epithelial keratitis (keratopathy)
PERRLA	Pupils equal, round, react to light & accommodation
PF	Pred forte
pH	measure of acidity
PH	Past history or Pinhole
PHN	Post herpetic neuralgia
PHPV	Persistant hyperplastic primary vitreous
PI	Peripheral iridectomy or Peripheral Iridotomy
PK, PKP	Penetrating Keratoplasty
PLT	Preferential looking technique
PMH	Past medical history
PMMA	Polymethylmethacrylate
po	by mouth
PO	Post operative
POAG	Primary open angle glaucoma
POH	Previous ocular history
POHS	Presumed ocular histoplasmosis
PPD	Purified protein derivative (tuberculin skin test)
PPM	Persistent papillary membrane
PRK	Photorefractive keratectomy
PRN	As needed (pro re nata)
PRP	Panretinal photocoagulation

PS	Posterior synechiae
PSC	Posterior subcapsular cataract
PSD	Paving stone degeneration
Pt	Patient
PTC	Pseudotumor cerebri
PTK	Phototherapeutic keratectomy
PVD	Posterior vitreous detachment
Px	Prognosis
PXE	Pseudo-xanthoma elasticum or Pseudoexfoliation syndrome
PXG	Pseudoexfoliation glaucoma
q	every
q12h	every 12 hours
qd	daily
qh	every hour
qid	four time daily
qod	every other day
R	Right
R&R	Recess and resection of EOM
RAPD	Relative afferent papillary defect
RB	Retrobulbar anesthesia
RB stain	Rose bengal stain
RBC	Red blood cell/red blood count
RBON	Retrobulbar optic neuritis
RD	Retinal detachment
RDE	Random dot E stereogram
RE	Right esophoria or Right eye
Ref	Refraction
REM	Rapid eye movement
ret	retinoscopy
RET	Right esotropia
RGP	Rigid gas permeable
RHEG RD	Rhegmatogenous RD
RHT	Right hypertropia
RIO	Right inferior oblique
RIR	Right inferior rectus
RK	Radial keratotomy
RLL	Right lower lid
RLR	Right lateral rectus
RMR	Right medial rectus
RO	Reading only
R/O	Rule out
ROP	Retinopathy of prematurity
ROS	Review of systems
RP	Retinitis pigmentosa
RPE	Retinal pigment epithelium
RPR	Syphilis blood tests
RSR	Right superior rectus
RTC	Return to clinic
RTO	Return to office
Rxn	reaction
RUL	Right upper lid
Rx	Prescription
RX	Right exophoria
RXT	Right exotropia

s	Without (sine), often with a dash on top
S	Subjective angle
SB	Scleral buckle
SBV	Single binocular vision
sc	without correction
SC	Secondary Curve
SCC	Squamous cell carcinoma
SCH	Subconjunctival hemorrhage
SCL	Soft contact lens
SEI	Subepithelial infiltrates
SLE	Slit lamp examination or Systemic Lupus erythematosus
SLK	Superior limbic keratoconjunctivitis
SO	Superior oblique
SOAP	Subjective, objective, assessment, plan
Soln	Solution
S/P	Status post
Sph	Sphere
SPK	Superficial punctuate keratitis of thygeson
SR	Superior rectus
SRF	Subretinal fluid
SRM	Subretinal membrane
SRNV	Subretinal neovascularization
SRNVM	Subretinal neovascularization membrane
SS	Scleral spur
S/S	Signs and symptoms
Strab	Strabismus
STT	Schirmer tear test
STTb (BS)	Basal schirmer tear test
Susp	Suspension
SV	Single vision
SVP	Spontaneous venous pulsation
SVRO	Single vision reading only
Sx	Symptoms
T	Tension/Tonometry
Ta	Tonometry applanation
Tt	Tonopen tension
TA	Temporal arteritis
tab	tablet (tabella)
TAP	Tension by applanation
TB	Tuberculosis
T/c	To consider
TDx	Tentative diagnosis
TF	Trifocal
TIA	Transient ischemic attack
tid	Three times daily (ter in die)
TLA	Tarsal levator advancement
TM	Trabecular meshwork
TPPV	Trans pars plana vitrectomy
Tr	trace
TRAB	Trabeculoplasty
TRD	Tractional retinal detachment
TRIC	Trachoma
Tx	Treatment or therapy

UA	underactive (muscle)
ul	Upper lid
ung	ointment
URI	Upper respiratory infection
US	Ultrasound
ut dict	as directed (ut dictum)
UTI	Urinary tract infection
V	Vasculature
VA	Visual Acuity
VDRL	Venereal disease research lab
VEP	Visual evoked potential
VER	Visual evoked response
VF	Visual field
VFc	Visual fields by confrontation
VFg	Visual fields by Goldman perimeter
VID	Visible iris diameter
Vis Sig	Visually Significant
Vit	vitreous
VKH	Vogt Koyanagi Harada syndrome
VS	vital signs
W-4-D	Worth 4 dot
WBC	White blood cells
WC/LS	Warm compresses/lid scrubs
WD	Working distance
WD WN	Well developed well nourished
WF	White female
Wk	week
WM	White male
WNL	Within normal limits
WTR	With the rule astigmatism
w/u	Work up
x	Axis
X	Exophoria at distance
X'	Exophoria at near (33cm)
XT	Exotropia at distance
XT'	Exotropia at near (33cm)
X(T)	Intermittent exotropia at distance
X(T)'	Intermittent exotropia at near (33cm)
YAG	yittrium-aluminum-garnet laser
YagPC	YAG posterior capsule
Yag PI	YAG peripheral iridotomy
y/o	years old
Δ	Prism, change
$\approx$	Approximately
$\leq$	Less than
$\geq$	Greater than
♀	Female
♂	Male
$\uparrow$	Increase
$\downarrow$	Decrease
1°	Primary
2°	Secondary

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