



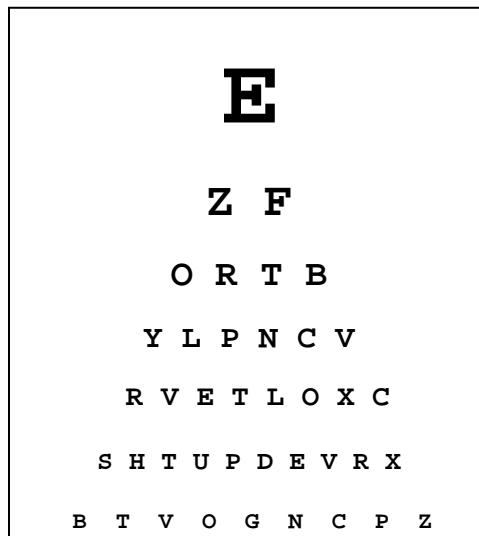
Special Olympics



Lions Clubs International



Guidelines for a Standardized Vision Screening



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CONSENT/ASSENT

For informed consent/assent to participate in a vision screening and research study*.

Informed consent: Consent needs to be obtained from the athlete or a legal guardian if the athlete is not his or her own legal guardian or if the athlete is less than 21 years of age.

Assent: Assent is obtained from the athlete if he/she is a minor or is not his or her own legal guardian.

Explain to the Athlete:

You are being asked to be a part of a vision screening and a research study* looking at the vision problems of Special Olympics Athletes. When you have finished the screening you will be given information about your eyes. Please understand that this is a screening and is NOT a full exam. The information obtained from your participation will help us understand the visual problems in people with mental retardation and whether they are able to get the eye care they need and deserve.

Information the Athlete agrees to by participating:

The Athlete understands that this vision screening is not a full eye exam and they are responsible for any follow up eye care.

The Athlete allows for the information from the screening (test results, photographs, and other pertinent information) to be inspected (reviewed) and/or used for the purpose of research, education, scientific studies, or other professional purposes.*

During the screening, the screening team will explain the benefits and risks of the tests to me.

Present the information to the Athlete. Ask the Athlete if they understand the information and if they have any questions. If they do understand and they have no questions, you may proceed to the History section.

Informed consent should be obtained prior to the event whenever possible. If that is done, check to be sure that the legal guardian already signed an informed consent when the Athlete was registered for the games prior to the screening (where appropriate).

*Even if no research is conducted, consent is required for participation even without research intentions.

HISTORY

The following information needs to be filled out as accurately and neatly as possible.

- A. Begin by obtaining personal information about the athlete as indicated below. The athlete may be wearing a badge or an armband that contains some of this information. If you are using the HAS system and entering information directly during the screening, most of this information should be previously entered.

- Name: First name, then last – PLEASE PRINT.
 HAS ID: Fill in the identification number assigned to the athlete.
 Date: Fill in the date of the screening.
 Gender/Sex: Circle male or female since the name may not reflect gender.
 Date of Birth: If the athlete knows this information, please write it in.
 Age: In years.
 Event: Please log in the type of event (World games, National, or State)
 State/Country: For World, Multinational, Regional Games, please indicate the country or state. For Local, State, or Country Games, please record the county or other identifying locality.
 Unified Athlete: By checking the box indicate if the athlete is a regular athlete or a unified partner and participating as a member of a unified team. Unified partners are people who are not intellectually disabled but compete with Special Olympic athletes.
 Sports: List all sports the athlete participates in even if they are not competing in them at this event.
 Delegation: Specific program that the athlete represents.

First name		Last name		HAS ID _____	
Date	<input type="radio"/> Male	<input type="radio"/> Female	DoB	Age (years)	<input type="radio"/> Not sure
Event	Location		<input type="radio"/> Athlete	<input type="radio"/> Unified partner	Sport
Delegation			SO Program		

First or Subsequent screening:

Please ask the athlete if they have previously participated in a SOLCIOE screenings. We want to ensure that the athletes do not obtain all their eye care from our screening. Remind them that this is **not** a complete eye exam and that they still need to see their own eye care practitioner.

Is this your first time through an SOLCIOE Screening? <input type="radio"/> Yes <input type="radio"/> No

- B. Explain to the athlete that you would like to ask them a few questions about their eyes.
1. Have you ever had your eyes tested? If they say, “at school”, let them know that school screenings are not exams. Explain that we would like to know if they have ever been to an eye doctor. If the answer is “No,” check the box marked never. If the answer is “I do not know,” check the box marked unknown. If the Athlete answers “Yes,” ask how long ago and check the appropriate box.

2. Do you wear glasses or contact lenses? If no, check the no box and move to the next question. If yes, check all the boxes that apply. If they are wearing glasses, ask them if they use them for sports or if they wear that pair all the time. Do they wear them for seeing objects up close or for far away? If they have glasses but did not bring them, ask if they are broken. If they are not broken, investigate why they are not wearing them. Briefly record their responses. This will aid in determining whether new glasses will be recommended.

3. Do you have any problems with your eyes? Difficulty seeing? Blurred vision? Headaches? Are your eyes sensitive to light? Do you ever see double (2)? Check all that apply.

4. Ask the athlete if they have ever had injuries, surgery, or infections of their eyes. Once again, write the answer in brief terms, ex: eye turn surgery, styes.

<p>When was your last eye exam?</p> <p><input type="radio"/> Less than 1 year</p> <p><input type="radio"/> 1-3 years</p> <p><input type="radio"/> More than 3 years</p> <p><input type="radio"/> Never</p> <p><input type="radio"/> Unknown</p> <p>Do you wear corrective lenses (glasses or contacts)?</p> <p><input type="radio"/> Yes <input type="radio"/> No</p> <p style="margin-left: 20px;"> <input type="checkbox"/> Standard Rx <input type="checkbox"/> Full time <input type="checkbox"/> Near only <input type="checkbox"/> Far only <input type="checkbox"/> Sport </p> <p style="margin-left: 20px;"> <input type="checkbox"/> Sports Rx <input type="checkbox"/> Full time <input type="checkbox"/> Sport </p> <p style="margin-left: 20px;"> <input type="checkbox"/> Contact lenses <input type="radio"/> Soft <input type="radio"/> RGP </p>	<p>Do you experience any of the following</p> <p><input type="checkbox"/> Difficulty seeing</p> <p style="margin-left: 20px;"><input type="checkbox"/> Far <input type="checkbox"/> Near</p> <p><input type="checkbox"/> Headaches</p> <p><input type="checkbox"/> Sensitivity to light</p> <p><input type="checkbox"/> Double vision</p> <p style="margin-left: 20px;"><input type="checkbox"/> Far <input type="checkbox"/> Near</p> <p>Have you ever had an:</p> <p><input type="checkbox"/> Injury Details: _____</p> <p><input type="checkbox"/> Surgery Details: _____</p> <p><input type="checkbox"/> Infection Details: _____</p>
--	---

C. Indicate whether the athlete is wearing glasses or contact lenses during the screening by checking the appropriate box. If they are presenting without glasses or contacts, check without Rx. If they are wearing glasses, check the box that says with Rx. If they are wearing contact lenses, check the box to the left of with contact lenses.

<p>Screening Please check one: <input type="radio"/> Without Rx <input type="radio"/> With Rx <input type="radio"/> With contact lenses</p>
--

- D. Before sending the athlete to the next screening station, please review the identifying information to make certain that it is completely filled out and is legible. Please be neat and make certain to mark all of the appropriate boxes.

- E. Tell the athlete that they are ready to begin the vision screening. Direct them to the first station, which is lensometry and pupillary distance.

LENSOMETRY / P.D.

Before collecting any information indicate whether or not the screening is to be performed with the glasses, without glasses, or with contact lenses. Check appropriate box.

If the athlete has glasses, check the prescription with the lensometer for both of the right and left eye. Be sure to include the bifocal power if they are present in the glasses. Record the sphere, cylinder, and axis.

Current prescription	Sphere	Cylinder	Axis	ADD	PD
Right eye					/
Left eye					

Procedure:

1. Turn the lensometer on.
2. Focus the eye piece:
 - First turn the eyepiece outward, counterclockwise. (fig. 1)
 - Set the lensometer power wheel to zero.
 - Look into the eyepiece and slowly turn the eyepiece clockwise until the crossed lines and concentric circles come into clear focus.
3. Place spectacles on the stage of the lensometer with the right lens directly below the scope and the ear pieces pointing away from you. (fig. 2)
4. Begin locating the sphere lines by turning the power wheel to high plus, then slowly decreasing plus/increasing minus until the small narrow lines come into focus. If the entire cross comes into clear focus at the same time the lenses are spherical. Document the plus or minus amount read off of the power wheel.
5. Once the sphere line is found, place the center cross of lines in the center of the smallest concentric circle pattern (you may need to adjust the lens up, down, left, or right). If both of the cross hairs do not come into focus at the same time, then the spectacles have cylinder present. You may need to turn the axis wheel to bring the spherical cross hair pattern into focus, making sure the lines aren't broken. Note the axis location (0 degrees to 180 degrees).
6. After the spherical portion is noted, turn the power wheel in the more minus direction until the wider cross hairs come into focus. Note this number. The difference between the sphere amount and the cylinder amount is the actual cylinder prescribed (i.e. sphere cross hairs = +3.00D, clear at x 065; cylinder cross hairs = +2.00D; spectacle Rx = +3.00 -1.00 x 065).
7. Correctly position the left lens in the stage in order to be read.

8. If the spectacles contain a bifocal portion, remove the glasses and turn them backwards with the ear pieces facing you. Now measure the distance power of the lenses while the spectacles are in this orientation.
9. Leave the glasses with the ear pieces facing you. Move the lenses so that the bifocal is being measured. Increase the power wheel in the plus direction to determine the add. “The difference between the distance and near powers is the Add (i.e. back distance power = -5.00D; back near power = -3.00D; Add = +2.00D)
10. This procedure is used for high-powered lenses to compensate for the spectacle thickness.
11. Progressive/no line bifocals are measured essentially the same way, however, you use the given markings to locate the distance corridor (usually slightly above the major reference point) and the near corridor (may be narrow or wide depending on the brand of lens). In addition, you do not need to turn the glasses around to measure.
12. Please record all pertinent information neatly, making certain that the signs (+/-) of the sphere and cylinder are clear delineated.

**These procedures may vary depending on model of lensometer used

Take the distance and near pupillary distance (P.D.). Record as far/near. **Please note this is not the glasses P.D.**



Fig. 1: First focus the eyepiece before



Fig. 2: Place the right lens on stage

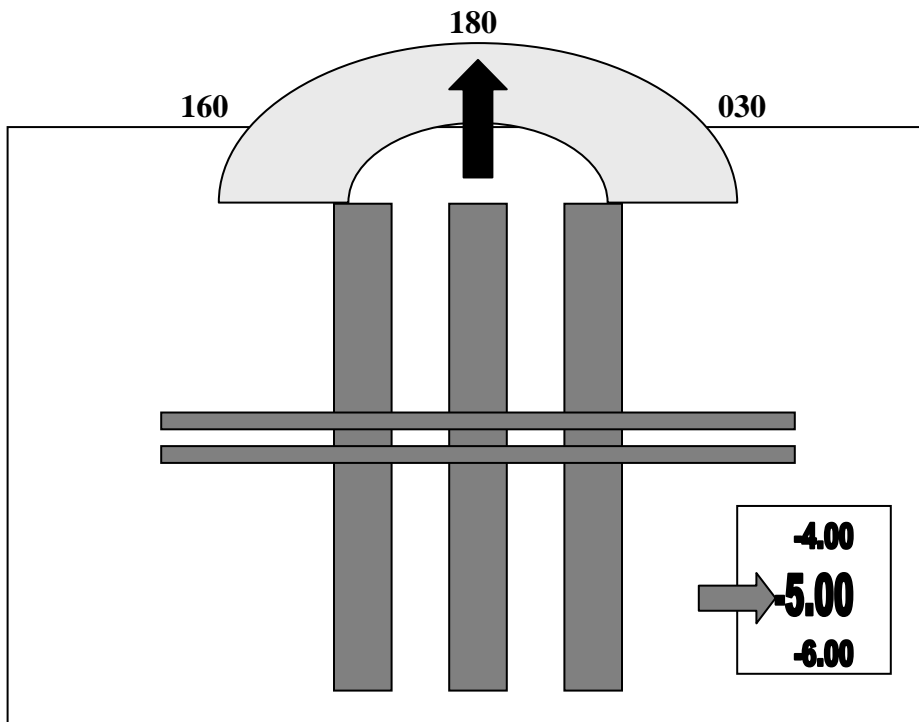


Fig. 3: -5.00 sphere

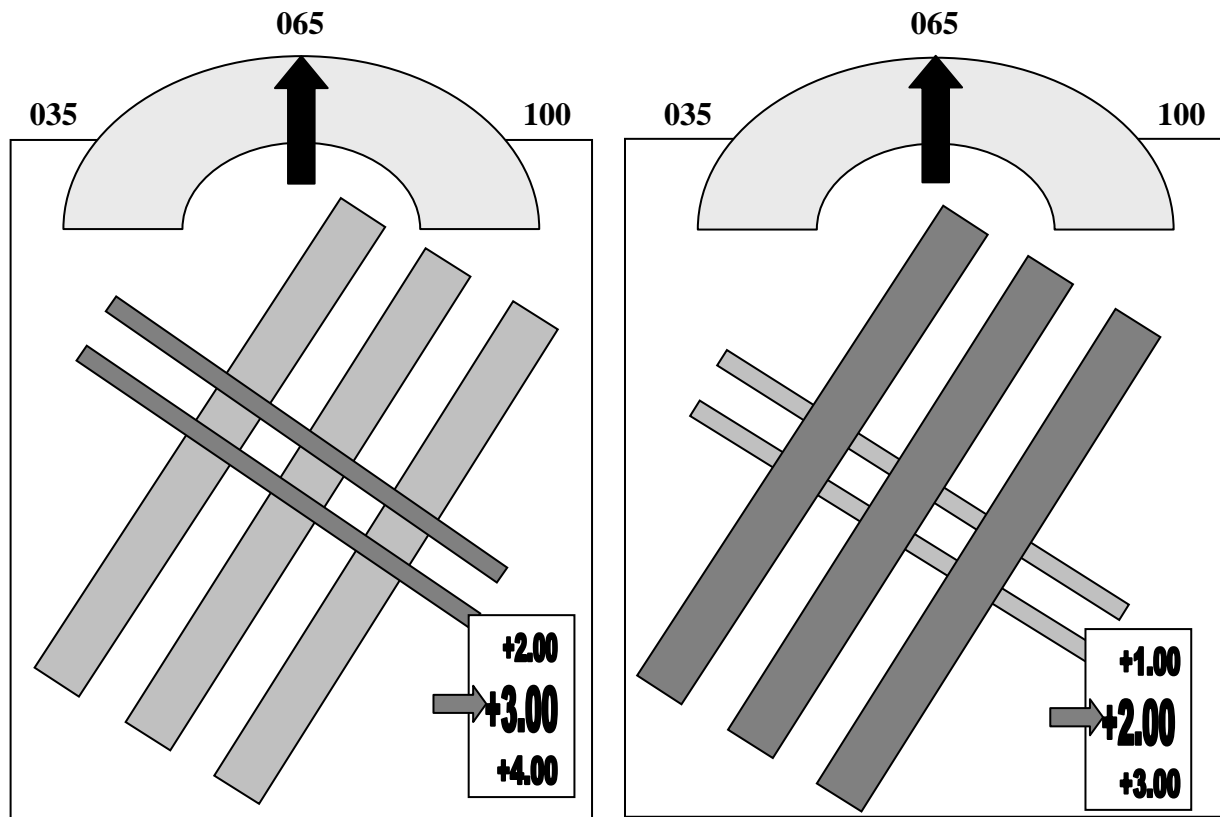


Fig. 4: +3.00 - 1.00 x 065

VISUAL ACUITY

LEA SYMBOLS AT DISTANCE

Evaluates: Monocular visual acuity with chart set 10 feet (3 meters) from the patient.

Illumination: Standard lighting.

Referral Criteria: 20/40 (10/20) or worse OD or OS. Athlete must be able to correctly identify 4 out of 5 symbols within any one line.

Procedure for verbal Athlete:

1. Ask the athlete to look at some pictures. The athlete should be wearing glasses that are regularly worn for far viewing. Present the 4 symbols (house, circle, apple, square) at 40 centimeters with both eyes. (fig. 1) Point to each picture and ask, "What is this a picture of?"
2. If the athlete is able to accurately name the pictures, direct the athlete's attention to the chart set at 10 feet/ 3 meters and begin by testing the right eye. Cover the left eye with a patch, occluder, or special frames designed to permit isolation of an eye. Carefully watch the athlete to make certain that only one eye is being used at a time and they are not peeking from behind the cover.
3. Begin the test with the largest symbol on the top on the side of the chart with the 20/20 line. At 10 feet, point to the first symbol of at one end each line in a descending order until a symbol is incorrectly identified. Initially, if the responses are quick, you can skip lines until you notice that the athlete is having some difficulty in discriminating the symbol. If the athlete cannot see the top symbol, turn the card over and use the larger symbols found there. If the athlete still is unable to see the symbols, allow the athlete to slowly walk up to the chart until they are able to discriminate the symbol.
4. Return to the line located directly above the incorrectly identified symbol and ask the athlete to read all of the symbols in that row.
5. If all the symbols are correctly identified, continue with the next smaller rows until less than 4 out of 5 stimuli on the line are correctly identified.
6. Repeat procedure with left eye, by covering the right eye.
7. When pointing to the individual symbols, point to each object outside of the box that surrounds the line of symbols.
8. Record visual acuity as the smallest line that the athlete correctly identified at least 4 out of the 5 items tested for each eye.

Procedure for non-verbal Athlete:

1. Present the demonstration chart at 40 centimeters to the Athlete.
2. Point to the largest of the symbols on the chart at 10 feet and ask the Athlete to point to the matching symbol. Do this at least 3 times to make certain the athlete understands the task.
3. If task is understood, begin testing the right eye first. Use a patch, occluder, or special frames designed to cover to the left eye
4. At 10 Feet, point to the first symbol of each line in a descending order until a symbol is incorrectly identified.
5. Return to the line located directly above the incorrectly identified symbol and ask the Athlete to point to the matching symbols for all of the stimuli in that row.
6. If all the symbols are correctly identified, continue with the next rows until less than 4 out of 5 stimuli on the line are correctly identified.
7. Repeat procedure with left eye.
8. Record visual acuity as the smallest line that the athlete correctly identified at least 4 out of the 5 items tested for each eye.

Recording:

Eye tested – record the visual acuity level in the space for each eye. Use the Snellen equivalent for a twenty foot working distance.

Visual acuity method – record Lea for the type of acuity. This information is important for the doctor doing the follow-up care. The copy of the screening form that the athlete is provided at the end of the vision program will reflect the type of acuity test used for screening purposes.

Mark pass, fail, or unable to test. If the athlete fails either eye at distance, i.e. the visual acuity is 20/40 or poorer in either eye, mark **fail** for distance VA. Do not complete the information for near visual acuity. This should be completed at the station that is doing that testing.

Visual acuity											
Pass	Not Pass	Far	OD	<input type="checkbox"/>	Unable to test	20 / ____	OS	<input type="checkbox"/>	Unable to test	20 / ____	
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	Lea	<input type="checkbox"/>	Other	<input type="checkbox"/>	<input type="checkbox"/>	Lea	<input type="checkbox"/>	Other
					<input type="checkbox"/>	Walk up		<input type="checkbox"/>		<input type="checkbox"/>	Walk up
					<input type="checkbox"/>	Light projection		<input type="checkbox"/>		<input type="checkbox"/>	Light projection
					<input type="checkbox"/>	Light perception		<input type="checkbox"/>		<input type="checkbox"/>	Light perception
					<input type="checkbox"/>	No light perception		<input type="checkbox"/>		<input type="checkbox"/>	No light perception
					<input type="checkbox"/>	Other		<input type="checkbox"/>		<input type="checkbox"/>	Other



Fig. 1: LEA distance acuity.

VISUAL ACUITY

LEA SYMBOLS AT NEAR

Evaluates: Binocular visual acuity with chart set 40 centimeters from the patient.

Illumination: Standard lighting.

Referral 20/40 (10/20) or worse OU at 40 cm (16 inches). Athlete must be able
Criteria: to correctly identify 4 out of 5 symbols within any one line.

Fig.1: Near Lea chart

Procedure for verbal athlete:

1. Ask the athlete to look at some pictures. The athlete should be wearing glasses that are regularly worn for near viewing. Present the near point test chart at 40 centimeters. Use the string attached to the card to measure the distance from the card to the athlete's eyes. Point to each picture located at the bottom of the card and ask, "What is this picture?" If the Athlete is able to accurately name the pictures or consistently uses the same terms repetitively for the objects begin near point testing. Allow the athlete to use the pictures at the bottom for matching purposes if they were nonverbal.
2. Begin the test with the largest symbol on the top on the side of the chart with the 20/20 line. Point to the first symbol of at one end each line in a descending order until a symbol is incorrectly identified. Initially if the responses are quick, you can skip lines until you notice that the athlete is having some difficulty in discriminating the symbol. If the athlete cannot see the top symbol, turn the card over and use the larger symbols found there. If the athlete still is unable to see the symbols, allow the athlete to move closer to the chart until they are able to discriminate the symbol.
3. Return to the line located directly above the incorrectly identified symbol and ask the Athlete to read all of the symbols in that row.
4. If all the symbols are correctly identified, continue with the next rows until less than 4 out of 5 stimuli on the line are correctly identified. If less than 4 are correctly identified move up to the next larger set of symbols until 4 out of 5 on a specific line are correctly identified.
5. Record visual acuity as the smallest line that the athlete correctly identified at least 4 out of the 5 items tested.
6. If the athlete is still unable to identify the largest symbol after moving the card closer to the athlete's eyes, then ask them to count fingers at 16 inches, move closer if you

need to. If still no response, present a transilluminator to the unoccluded eye and ask if they can see it and where it is. Record finger counting at ___ (fill in distance), light projection (can localize light), light perception (can only notice that the light is there but cannot localize it).

Recording: Record the visual acuity level in the space. Use the Snellen equivalent for a 16-inch (40 cm) working distance.

Visual acuity method – record Lea for the type of acuity. This information is important for the doctor doing the follow-up care. The screening form that the athlete is provided at the end of the vision program will reflect the type of acuity test used for screening purposes.

Mark pass, fail, or unable to test. If the visual acuity is 20/40 or poorer, mark **fail** for near VA. Do not complete the information for distance visual acuity. This should be completed at the station that is doing that testing.

Pass <input type="checkbox"/>	Not Pass <input type="checkbox"/>	Near	<input type="checkbox"/> Unable to test	OU 20 / ____
<i>Do not Pass if 20/40 or worse</i>			<input type="checkbox"/> Lea <input type="checkbox"/> Other	

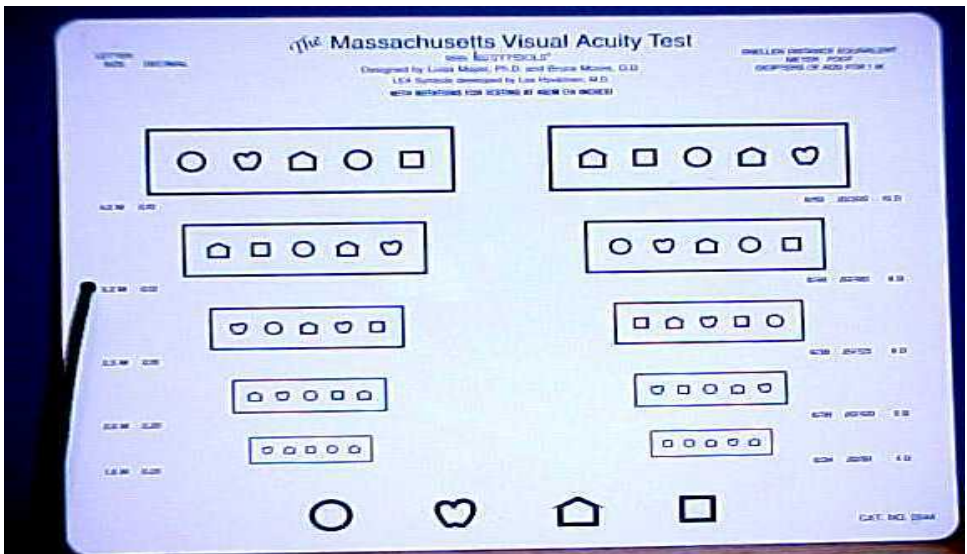


Fig. 1: Near Lea chart



Fig. 2 Lea chart presented at 40 cm.

COVER TEST

Evaluation: The presence, magnitude, and direction of a phoric or strabismic posture at 10 feet (3 meters) and 16 inches (40 centimeters).

Illumination: Make certain that the athlete can resolve the image for testing with each eye and that the lighting on the athlete's eyes is sufficient to see both clearly.

Critical factors:

- Use a single letter "A" or picture with detail at the threshold acuity of the **poorer** eye.
- It is very important that the athlete is instructed to attend to the specific area designated on the top of the target (top of A) in an effort to control fixation.
- Instruct the athlete to keep the target clear during the testing.
- The athlete should be wearing their habitual correction. If the athlete wears their glasses for near work only, they should be tested with the glasses on at near only.

Procedure:

1. Explain to the athlete that this test measures the ability of their eyes to work together.
2. Begin testing with the distance target at least 10 feet from the athlete.
3. Instruct the Athlete to look at the very top point of the target **A** or other target used and to keep it clear throughout the entire test. (fig. 1 and 2)
4. Begin the **unilateral cover test** with both eyes uncovered and fused.
5. Using the occluder slowly cover and uncover the **right eye** allowing the eyes sufficient time to pick up fixation between each motion. Repeat this several times. **Watch the left eye carefully** for any movement immediately after the right eye is covered (up, down, in, or out movement). (fig. 3)
6. Next, slowly cover and uncover the **left eye** only. Be sure to **watch the right eye** for any movement immediately after the left eye is covered. Repeat this several times.
7. If NO movement is found in the eye not being covered on the unilateral cover test, then the Athlete probably does not have strabismus. Proceed on to the alternate cover test to determine if a phoric posture exists. If movement is present on the unilateral cover test, estimate the magnitude, determine if intermittent or constant, and record the direction of the deviation. The alternate cover test is used to identify the type of strabismus or phoria present (laterality, magnitude, and frequency). (fig. 4)

8. Movements for a phoric posture on the ACT are qualified the same as the UCT. Deviations are as follows:
 - movement in toward nose horizontally = exo
 - movement away from nose horizontally = eso
 - movement up vertically = hypo
 - movement down vertically = hyper
 - combination of a vertical and horizontal
 - NO movement is an orthophoria (i.e. no phoria)

9. Estimate the magnitude of deviation with a prism bar or loose prism set. (fig.5, 6)
 - Base IN for an exo deviation,
 - Base OUT for an eso deviation
 - Base UP for a hypo deviation
 - Base DOWN for a hyper deviation

Increase prism amount until reversal of eye movement is detected. The prism amount just before the reversal is the measurement of the magnitude (i.e. at 10 BI the eye moves in, at 14 BI the eye moves out, the magnitude is ~12 BI). Record the magnitude in prism diopters. Be sure to indicate if the posture is a strabismic or a phoric posture. Remember this is a screening only.

10. Estimate the laterality, from the UCT, if a strabismic deviation is present. Left only – the left eye moves when the right eye is covered and there is no movement of the right eye when the left eye is covered.
Right only – the right eye moves when the left eye is covered, and there is no movement of the left eye when the right eye is covered.
Alternating – each eye moves as the other is covered. Indicate which eye is preferred the most

11. Estimate the frequency from the UCT if strabismic deviation is present. Constant – 100% of the time the eye moves. Intermittent – 1%-99% of the time the eye moves (indicate percentage of time the deviation is present).

12. Repeat the unilateral cover test and the alternate cover test at near using the correct threshold target letter. Follow steps 3-10.

13. Indicate if any latent nystagmus was observed, i.e. nystagmus that is present when one eye is covered. If so, send athlete back to the distance monocular visual acuity station to have acuity's redone with a blurring lens instead of an occluder.

Referral Criteria: Any strabismus that is present at either distance.

Record: Ortho, phoria, or trope (strabismus), magnitude (prism diopters), laterality (left, right, or alternating), direction (eso, exo, or hyper), and frequency (constant or intermittent).

Pass	Not Pass	Cover test	Far			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Unable to test	<input type="checkbox"/> ortho	<input type="radio"/> phoria	<input type="radio"/> trope	
<i>Do not pass if any trope is present</i>				<input type="radio"/> eso	<input type="radio"/> eso	
				<input type="radio"/> exo	<input type="radio"/> exo	
				<input type="radio"/> hyper	<input type="radio"/> hyper/eso	
				range 02-99 ____	<input type="radio"/> hyper/exo	
					<input type="radio"/> hyper	
			<input type="radio"/> Latent Nystagmus		<input type="radio"/> Constant	<input type="radio"/> Intermittent
					range 02-99 ____	
			Near			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Unable to test	<input type="checkbox"/> ortho	<input type="radio"/> phoria	<input type="radio"/> trope	
<i>Do not pass if any trope is present</i>				<input type="radio"/> eso	<input type="radio"/> eso	
				<input type="radio"/> exo	<input type="radio"/> exo	
				<input type="radio"/> hyper	<input type="radio"/> hyper/eso	
				range 02-99 ____	<input type="radio"/> hyper/exo	
					<input type="radio"/> hyper	
					<input type="radio"/> Constant	<input type="radio"/> Intermittent
					Range 02-99 _____	

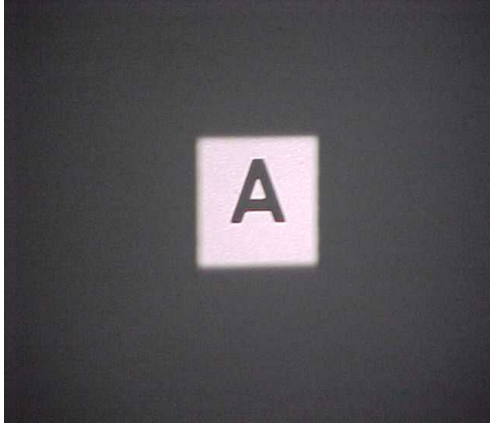


Fig. 1: Distance target.



Fig. 2: Near target

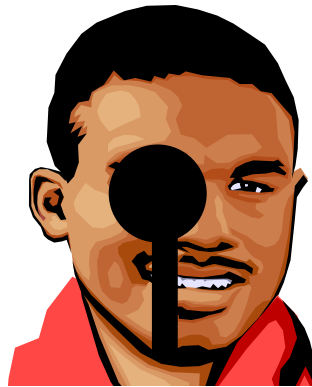


Fig. 3: Unilateral cover test.



Fig. 4: Alternating cover test.

COLOR VISION

Color Vision Testing Made Easy™

Evaluation: For the detection of any Red-Green color deficits.

Illumination: Standard illumination.

Requirement: Binocular testing at 45-75 centimeters

Procedure for verbal and non-verbal Athlete:

1. Present the demonstration card to the binocular Athlete at 45 to 75 cm. (fig. 1) The Athlete should be wearing the glasses used for reading.
2. Ask the Athlete to report if they see a ball or circle on the cards. Then ask them to localize the circle with their finger or a pointer (cotton swab). Allow at least 3 seconds per plate. (fig. 2) **DO NOT LET THE ATHLETE TOUCH THE PLATES WITH FINGER OR HANDS.**
3. Ask the Athlete if they understand. If they do and appropriately responded, proceed to the actual testing.
4. Present all 9 plates, asking the Athlete to localize the circle on each plate. Mentally, keep track of the number of correct responses. If the Athlete was able to correctly identify at least 8 out of 9 circles the test is complete.
5. If the Athlete understood the sample plate but scored less than 8, present all 9 of the plates a second time. Keep track of the number correct out of 9 on the second trial.

Recording: Record the number of correct responses made out of 9 (X/9). by the appropriate Trial number. If information is recorded on Trial 2, please also indicate the number correct on trial 1 to ensure that the protocol was followed correctly. Don't include the demonstration card in this number.

Referral: Less than nine correct responses out of the nine plates on the **second** trial.

Pass	Not Pass	Color vision				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Unable to test	Trial 1	___ / 9	If less than 8/9 Trial 2	___ / 9
<i>Do not Pass if Trial 2 < 9</i>						



Fig. 1 Test Athlete binocularly at 45-75 cm.



Fig. 2 Ask Athlete to trace circle with cotton swab.

STEREOPSIS

Random Dot E™

Evaluates: Near sensitivity to binocular disparity at 50 centimeters.

Illumination: Standard illumination. Try to ensure that the front surface of the targets are glare-free.

Requirements: The Athlete must be able to localize the Random Dot E card that contains the hidden E, 5 out of 6 times. NO head tilting or turning is permitted.

Procedure for verbal and no-verbal Athletes:

1. Place the polaroid glasses on the Athletes face, over habitual correction if worn. (fig. 1) Present the letter E to the athlete and ask the Athlete to describe what they see. If they have difficulty verbalizing it, point to the E and say, "This is an E" or "Eeee."
2. Next, hold up the model E card next to the stereo blank card at 40 cm. (16 inches). Ask the Athlete where the E is. If the athlete can correctly locate the model from the blank at least in 2 out of 3 trials, move to the actual testing.
3. Present the stereo blank and the test plate next to each other. Make sure when presenting the Stereo E, the figure shows the word "raised" at the top. (fig. 2) Try to hold the cards at the same level in a fronto-parallel plane. Try to make sure lighting is equal on the front surface of the test plates. Ask the athlete to locate the card with the E on it.
4. Once they localize the correct card, switch the cards behind your back and then present them again to the Athlete. Ask them to indicate where the E is located. (fig. 3)
5. Repeat step 4 a total of 6 times, switching them behind your back each time. Try to randomize the position of the E.
6. Refer if the athlete had less than 5 correct responses out of 6 trials.

Record: The number of trials the Athlete correctly responded to out of 6. If the athlete correctly identified the stereo E in at least 5 out of 6 trials they pass the test. Stereoacuity is based on test distance used: 504 seconds of arc at 50 cm or 630 seconds of arc at 40 cm.

Pass	Not Pass	Stereopsis	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Unable to test	___ / 6
Do not pass if < 5/6 correct value			

Reverse side of the targets or the side facing the examiner.

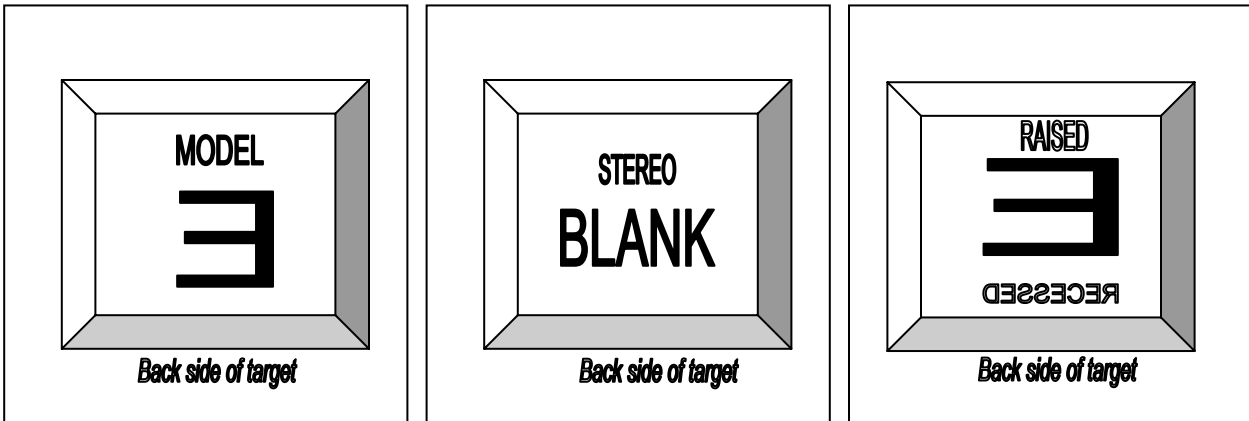




Fig. 1: Place polaroid glasses on Athlete.



Fig. 2: Ask the Athlete to point where the E is.



Fig. 3: Switch the cards behind your back and show Athlete again.

AUTOREFRACTION

Evaluation: Objective measurement of refractive error by an automated instrument.

DESK TOP

Position: Seated position with chin in chin rest and forehead against the forehead rest.

Procedure:

1. Turn on instrument. Adjust chin rest and the instrument for Athlete. Position the instrument so to test the right eye first. Instruct the Athlete to fixate on specified target.
2. Look at monitor to ensure proper alignment and fixation. Use instruments landmarks designated for proper alignment. Push button that will begin the objective evaluation.
3. Instrument may voluntarily move to left eye once the right eye testing is finished. If not, manually adjust it to test the left eye.
4. Press the print button to receive a readout of the indices found.

HAND HELD: Nikon Retinomax

Set Up: *The power on the base of the Retinomax and the side of the printer should be on at all times. This allows the batteries to continually charge. If the battery in the handle loses its charge, remove the plate from the side of the handle and replace that battery with the extra battery found below the printer. Place the spent battery in the bottom of the printer to recharge it. When not in use, place the Retinomax on the stand with the forehead rest pushed in. (fig. 1) This allows the handle to charge if charge button is pushed and is illuminated.

*Before starting, focus the eyepiece for the examiner by rotating it until the test inside is clear. Release the forehead rest by pushing in gently. The angle of the eyepiece can be adjusted to the examiner and Athlete's height. The goal is to ensure that the instrument is held **perpendicular** to the line of sight.

Procedure:

1. Ask the Athlete to remove their glasses (if they have any). Direct them to look into the Retinomax. They will see a character riding a rocket to the moon or a Christmas tree. Ask them to keep looking at the picture throughout the testing. Advise them it may get blurry.
2. Always start with the right eye. If properly set on automatic, the instrument will assume the right eye is tested first. Hold the instrument so that the notch on the left side of the Retinomax lines up with the lateral canthus and the hash mark on

top of the instrument is aligned with the middle of the pupil. If the instrument is in the correct position, when you look in the eyepiece, the pupil should be centered. The forehead rest should be extended and resting on the Athletes forehead. (fig. 2 and 3) The instrument should be held so that it is perpendicular to the plane of the corneal surface. (fig. 4)

3. The examiner should move in and out until the circle of dots found in the center of the eyepiece is focused clearly. Once this is accomplished, press the trigger on the handle. The instrument will automatically begin to take readings.
4. The instrument needs at least eight readings to accurately average the information. Before the first reading is taken you will see on the right in the eyepiece in the lower portion of the screen "R0/L0". The number just to the right of the R (right eye) & L (left eye) represent the number of reliable readings the instrument has taken on each eye. As reliable readings are taken for the right eye, the number next to the R will increase up to a maximum of eight. Once you reach R8/L0, you are ready to test the left eye.
5. If you have the instrument set to record both autorefraction and autokeratometry, there will be a second set of "R0/L0" on the top of the screen. The R0/L0 on the top refers to keratometry. Don't be concerned about this information at this station. The instrument will record this in the same manner as the retinoscopy information. The readings for keratometry are dependent on the eye being wide open. If the eye is not open wide enough, you may obtain autorefraction readings without autokeratometry.
6. If set on automatic, the Retinomax will automatically respond to the shift of the instrument from the right eye to the left eye. You only need to be sure that you are centered in the middle of the pupil of the left eye when you change eyes with the circle of dots focused clearly. You do not need to touch the trigger again. Continue to take readings until the screen reaches R8/L8.
7. Aim the Retinomax toward the front of the printer at a distance of 40-50 centimeters. Press the print button located on the top of the Retinomax for 2-3 seconds until you hear a beep from the Retinomax and a responsive beep from the printer. The tones are slightly different so that you can distinguish them. (fig. 5 and 6)
8. The printer will begin to print immediately after the beep. Record the autorefraction information on the screening form. Please write clearly. The reading with the asterisk is the averaged reading (indicated by the arrows on following figures). This is the one to record. Please make certain to record the signs and the numbers in the following order: sphere, cylinder, and axis. Staple the paper to the top copy only. This information will be helpful if the Athlete needs additional testing. (fig. 7)

9. When the instrument is not being used, close the forehead extension and place the instrument properly on the stand to recharge the battery. Be sure to press the charge button.
10. If the image is wavering or is no longer clear, the battery power is low and needs to be changed. Slide the plate on the side of the Retinomax handle down. The battery will fall into your hand. Remove the printer from the base of the Retinomax. The battery is stored on the bottom. Slide the lock away from the battery to release it. The battery will fall out. Place the battery with the full charge in the handle by placing one end in and lean it in towards the handle. Notice there are 3 metal contacts on the battery that match the contacts in the handle. Please the spent battery in the space below the printer in the same manner. Make certain the switch is in the locked position. Reattach the printer to the base of the Retinomax, turn the power to on, and press the charge button for the printer.
11. If the paper is gone, please ask the Clinical Director to change the paper. Figure 8 shows how to change the battery and paper.

Hand held NIDEK Autorefractor (Fig. 9)

1. Press the power button on the control panel. The LCD screen will illuminate and “HANDY REF/KERATOMETER ARK-30” will appear. After about 3 seconds, it will beep twice and the initial screen will be displayed.
2. Press the start button on the control and the unit will be in measurement mode.
3. Press the R/K button to select measurement mode. It should be set to R/K mode.
4. Draw out the forehead rest and clean it. Also open the eye mask. (Fig. 10)
5. Instruct the Athlete to remove glasses or contacts and to look through the window. He should see a picture of a balloon.
6. Bring the unit close to Athlete’s eye and place the forehead rest against the forehead. The eye level marker acts as a guide for the vertical position. (fig. 11)
7. Adjust the position of the unit so that the Athlete’s eye appears on the screen. Adjust the focus with back and forth movements.
8. Make sure the left-eye or right-eye indication of the eye being measured is properly shown.
9. Perform fine alignment until the corneal luminous spot is placed inside the square target. When the spot is within the target, the focusing indicators will appear. Adjust the focus until one bar is shown on each side of the box. (fig. 12)

10. The measurement starts automatically when the eye is aligned and focused. A beep will sound to indicate this.
11. If there is a problem getting a measurement, it will be easier to make a measurement in the QUICK measurement mode. Press the start button again and change the mode. <QUICK> will appear on the screen. Simply push start again to cancel the QUICK mode.
12. When each eye is measured more than 5 times and the data is stable, "FINISH" will appear and the measurement will be complete.
13. Up to 10 measurements can be stored for each eye.
14. Start measurement on other eye.
15. Print the results by pressing \print button aiming the measuring window on the measuring until at the light receiver window on the station or put the measuring unit onto the stage and press the print button.
16. After printing, press the start button the start the measurement.
17. If measurement fails, the following may be causes: Athlete may have blinked during measurement, eyelid or eyelash is on or around target, pupil is too small, cataract, or corneal distortion.

Autorefractation		Sphere	Cylinder	Axis
<input type="checkbox"/> Unable to test	OD			
<input type="checkbox"/> Unable to test	OS			



Fig. 1: When not in use place the Retinomax on the stand.



Fig. 2: Align the instrument

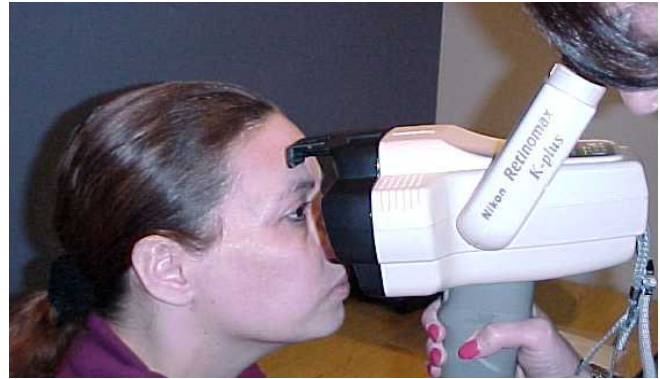


Fig 3: Test the right eye first



Fig. 4: Align Retinomax perpendicular with Athlete's eye.



Fig. 5: Aim the Retinomax at the printer.



Fig. 6: Press the print button.

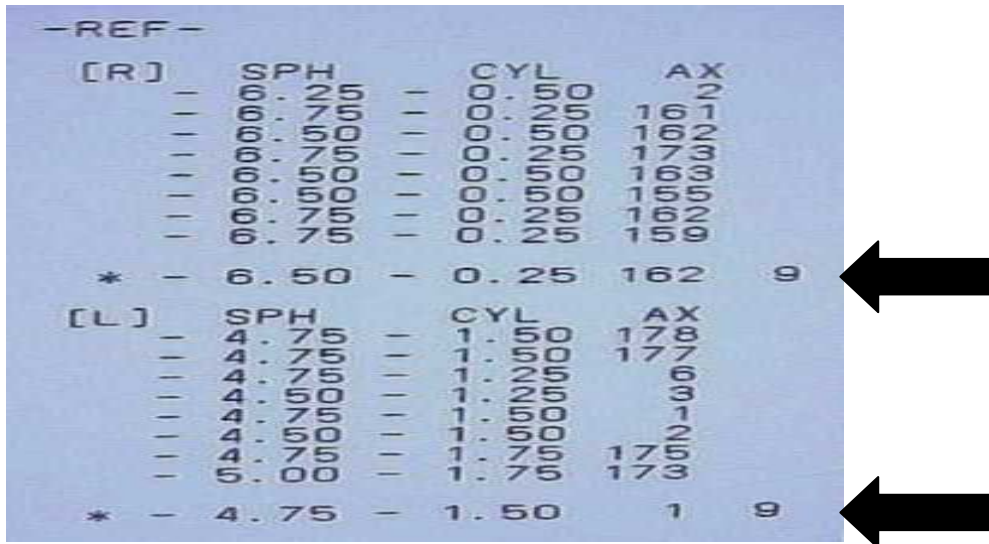


Fig. 7: Record the asterisked readings on the exam form.

Nikon Hand Held Auto Refract-Keratometer *Retinomax K-plus 2* (Please read instruction manual for detailed information)

Melody

Press and hold the Melody key to play a melody. It stops when reading button is pressed or the key is pressed again.

Quick mode

(For REF function)
 Press if eye moves often.
 Simple fogging.

Press twice to cancel.

How to prepare backup batteries

Remove battery from printer.

Insert EXTRA battery.

Press printer CHARGE key.

LED goes off automatically when charged.

Keep 2-3 spare batteries.

AC adapter available. For long time use.

For everyday use

Keep station power on.

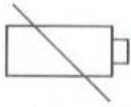
Place main unit and printer on station for auto-charging.

LED ON: charging
OFF: enough power

CHARGE Press CHARGE before extended use.

RENEW Press RENEW when battery power is low. (Note: It takes 4.5 hours)

When measuring unit battery power runs out



Battery mark appears on LCD display.



Remove battery from grip.



Replace with back-up from printer.

or



Connect AC adapter.

Paper feed (width 58mm)



Take off cover.



Insert new paper.



Hold paper.



Turn power ON and press FEED.

Before making a service call



Check model eye power.



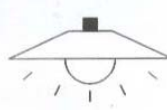
Clean window with alcohol.



Unit position.



Is unit plugged in firmly?



Is light too bright?



Use eyepiece tilt and try not to pick up eyelashes.

Fig. 8: Troubleshooting



Fig. 9: Nidek Hand Held Autorefractor



Fig. 10: Nidek Autorefractor held in line with Athlete's eye.

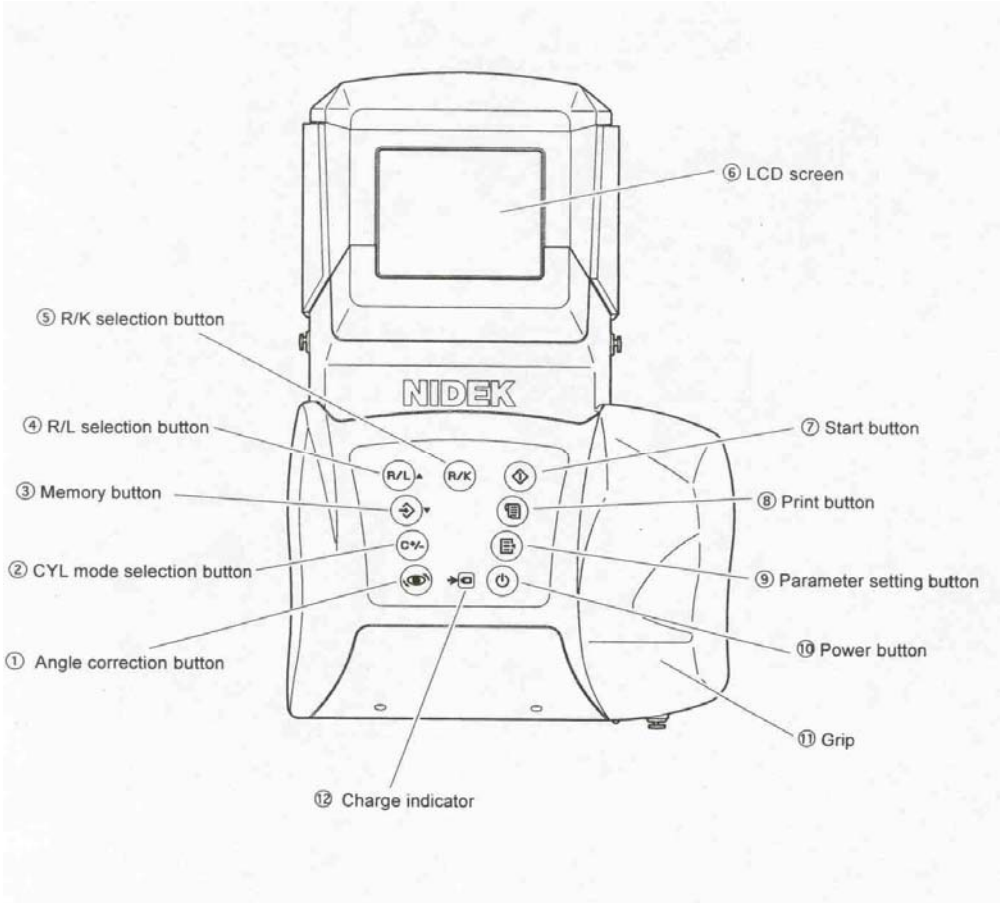
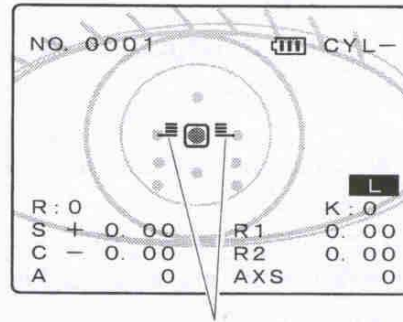


Fig. 11: Nidek Autorefractor display.

Adjust the focus.

When the corneal luminous spot is placed inside the target, the focusing indicator will appear. If the focusing indicator does not appear, it means that the eye is not positioned in the range of focus detection.

Adjust the focus, paying attention to keep the measuring unit horizontal to the patient and not to misalign the target. Tilt will cause an error in the AXIS value.



Focusing indicator

1) Move the measuring unit back and forth until the focusing indicator shows the best state “-□-”.



Too close to the patient's eye.

The bar increases as the measuring unit is moving closer to the patient's eye (maximum four bars).



Move the measuring unit away from the patient's eye.



Best state.

One bar is shown on each side.



Bring the measuring unit close to the patient's eye.



Too far from the patient's eye.

The bar increases as the measuring unit is moving away from the patient's eye (maximum four bars).

Fig. 12: Nidek Autorefractor Alignment examples.

NON-CONTACT TONOMETRY

Evaluates: The manual measurement of Athlete's intraocular pressure.

Illumination: Do not perform directly under stand light.

Procedure:

Pulsair Easy Eye (Fig. 1&2)

Short form instructions also located underneath the base unit.

1. Before you can use the Pulsair Easy Eye, remove the transit knob at the bottom of the unit as instructed by the label. Take the power supply unit and replace the blanking plate with the appropriate mains plug adapter.
2. Once the power plug is in place, turn the on/off switch to |. The display will show a value of 8.8 to note that all segments of the display are functioning. A O will then show and indicates that the unit is ready for use.
3. Lift hand unit from the holster and remove orange dust cover. Two green LED's will illuminate and the pump will start, taking about 2 seconds before it's ready for use.
4. Press the DEMO button to release any dust or moisture from the unit.
5. The unit is automatically set to the right eye, but if you wish to change, just press the CHANGE EYE button.
6. Ensure the Athlete is comfortable and relaxed with spectacles or contacts removed.
7. Demonstrate the procedure on the back of the Athlete's hand before taking a reading by positioning hand unit above hand and press DEMO. The Athlete will feel a gentle puff of air.
8. From about 25 cm (10 inches) look through the eyepiece and locate Athlete's eye. Slowly move closer and rest your free hand against Athlete's forehead. Rest the Easy Eye on top of your hand.
9. Continue to move in toward athlete until two green dots appear. Move closer until a red reflex appears. At approximately 15 mm a bow tie image appears. Centralize this image and the Easy Eye will fire. If you see filaments you are too close. The Easy Eye will take a reading automatically when focused properly.
10. Take 4 readings with a break of a few seconds in between readings.
11. If a non-event or bad event occurs the 30+ mode is activated. This allows pressures of up to 50 mmHg to be read.

12. An average reading will be displayed of all the readings taken on each eye. If you want to review readings that were taken simply press the REVIEW button.
13. Press the CHANGE EYE button to take measurements on the left eye. The left arrow above the CHANGE EYE button will illuminate.
14. Return the hand unit to the holster and the results will automatically print if the printer is turned on. If the printer is turned off when unit is returned to the holster, turn the printer on and press the CHANGE EYE button and the last recorded results will print.
15. When finished for the day, turn the ON/OFF switch to O and cover the puff tube with the orange cap.

Troubleshooting:

1. To change the paper, lift the cover of the Pulsair Easy Eye and remove the empty roll. Place a new roll of paper in and make sure the free end is loose at the top of the roll. Feed the free end of the paper through the gap in the cover and close.
2. Make sure cell phones are turned off as the Pulsair Easy Eye is affected by electromagnetic interference.
3. A flashing yellow light means that battery is low. Connect unit to mains as soon as possible. A stable yellow light means the battery is charging and the unit can be used by the mains power.

Reichert Hand-Held Portable NCT (Fig. 3)

1. Fully charge battery before use by plugging base into power source. Plug the battery handle into the receptacle inside the handle. An amber LED will illuminate while charging and will go out when fully charged. This usually takes 3 hours to charge the battery.
2. Press SETUP and select TONOMETER option. Make sure it is set to mmHg. Illumination can be varied to take measurements in low light environment. Communications menu allows you to set the date/time as well as the printer. Follow instructions with the printer for setup.
3. Press exit from the setup mode or any button to take the instrument out of sleep mode. This brings you into measurement mode.
4. Hold the PT 100 with two hands with one on the handle and the other between Athlete's brow and top-front of instrument for stabilization. (Fig. 4)
5. Press LEFT/RIGHT button to select eye.

6. Look through the eyepiece positioning the back circle over the pupil. Instruct Athlete to keep their eyes wide open, try not to blink and to look at the green fixation spot with glasses or contacts removed.
7. Slowly move towards the eye until the alignment system activates.
8. Distance indicators are located on the left with directional indicators surrounding the pupil. Move the PT100 either closer or further from the eye following the cues from the distance indicator. The center green LED illuminates when the appropriate distance has been achieved. (Fig. 6)
9. Move the PT100 in the direction the red arrows indicate.
10. When the correct alignment has been achieved, the PT100 will automatically take a measurement. You will hear a puff of air and see all of the alignment indicators briefly illuminate.
11. Keep in position and repeat. It is recommended to take 3 readings per eye to obtain accurate measurements.
12. Results can be cleared at any time by pressing CLEAR or printed by pressing PRINT and pointing the IR window of the PT100 at the IR window on the printer. An hourglass will show during transmission. Continue pointing towards the printer until the hourglass disappears. If data did not print properly simply try again. The data is held in memory until a new measurement is taken or CLEAR is pressed. Make sure printer is on and not on sleep mode. The PT100 should not be more than 18 inches from the printer and within 30 degrees of center of the printer's IR window.
13. Low confidence readings are indicated by an asterisk. (*) This reading will remain on the screen until a 4th measurement is taken which replaces the low confidence reading.
14. Reading with brackets means they are more than 4 mmHg higher or lower than the other two. This will also remain on the screen until a 4th measurement is taken.
15. If a measurement did not take place, "No applanation" will appear on the screen. This disappears and the measurement screen will return.
16. For Athletes who are having trouble fixating or have corneal problems, the OVERRIDE function allows easier measurement by widening the auto-measurement zone. The override symbols will appear on the screen as well as the printout.

Pass	Not Pass		IOP		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Unable to test		<input type="checkbox"/> OD	<input type="checkbox"/> OS



Fig. 1: Pulsair Easy Eye

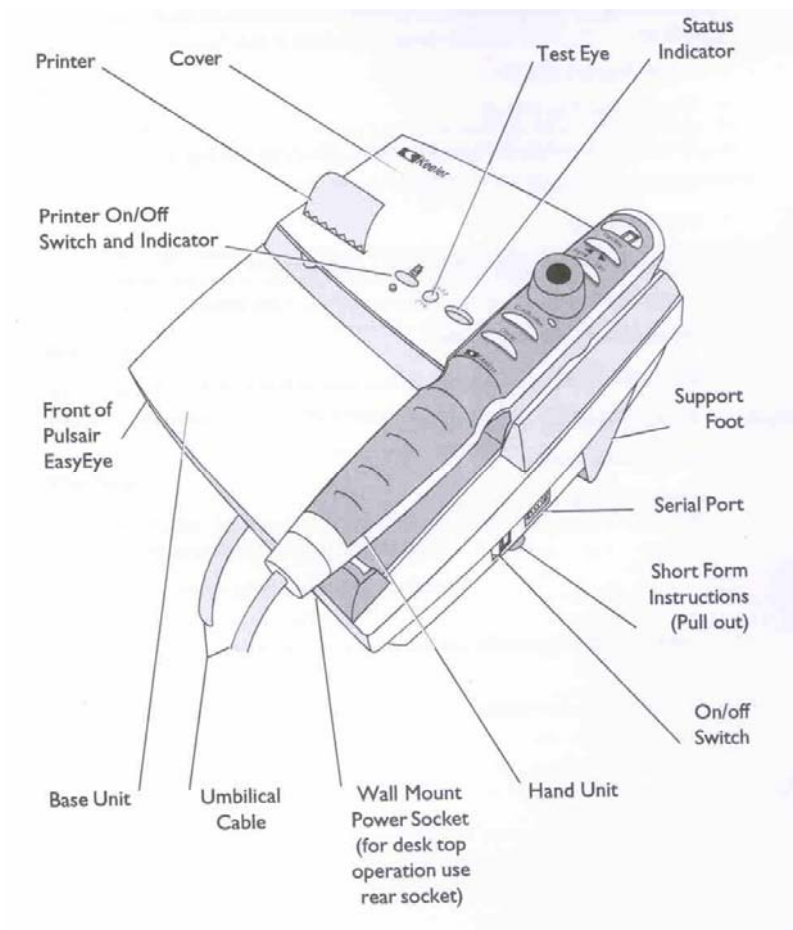


Fig. 2: Pulsair Easy Eye



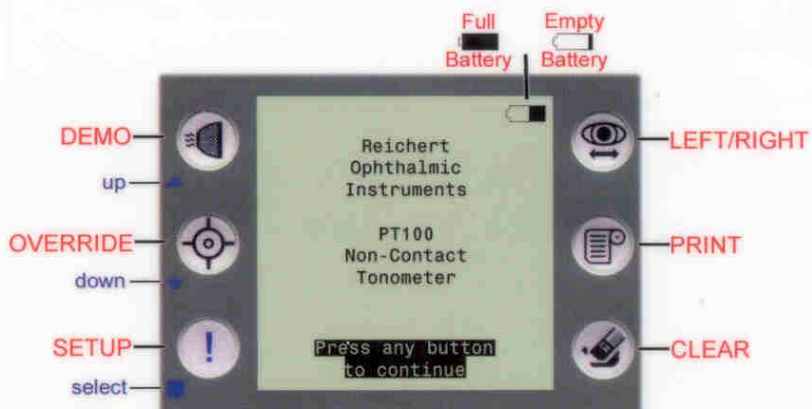
Fig. 3: Reichert PT100



Fig.. 4: Stabilize PT 100 in front of Athlete's eye.

PT100 Quick Reference Sheet

Display and Control Panel



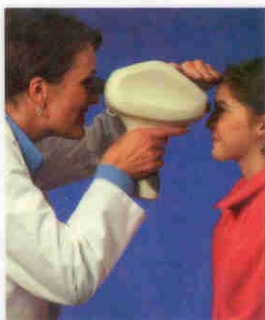
Function Icons

- DEMO** Press to allow patient to feel demonstration air puff
- OVERRIDE** Permits quicker measurement of difficult patients
- SETUP** Enables access to the setup menu of the instrument
- LEFT/RIGHT** Press to select the patient's right or left eye
- PRINT** Transmits measurement data to printer or IR COM device
- CLEAR** Erases current measurement data from display screen

Setup Icons

- up** Setup menu only. Moves up through menu options.
- down** Setup menu only. Moves down through menu options.
- select** Setup menu only. Activates the new setting.

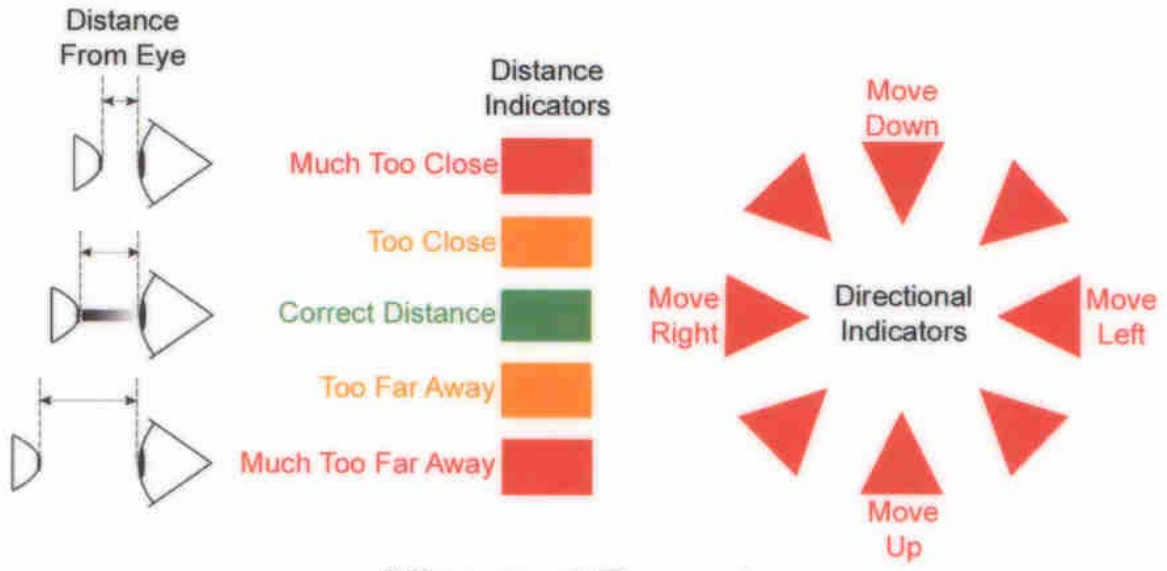
Holding the PT100



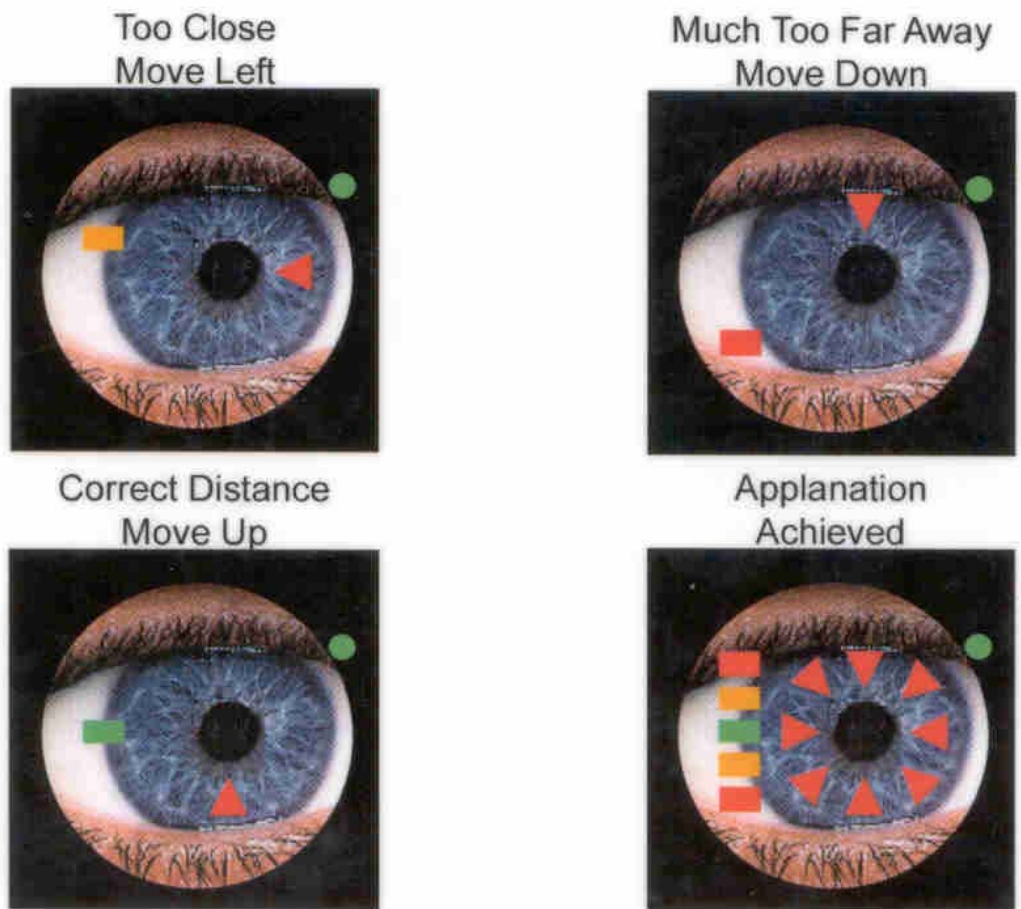
- Place one hand on the handle and the other between the top-front of the instrument and the patient's brow.
- Look through the eyepiece and position the black circle over the pupil.
- Slowly move the PT100 towards the eye until the alignment system activates.

13850-102 Rev. A

Fig. 5: PT100 Reference Sheet



Alignment Examples



13850-102 Rev. A

Fig. 6: PT100 Alignment examples

EXTERNAL EVALUATION

Evaluates: The external and anterior segment of the eye.

Position: Athlete is seated behind the biomicroscope/slit lamp. Direct the Athlete to place their chin on the chin rest and their forehead against the forehead bar throughout the examination. If using a hand held slit lamp, instruct Athlete to sit straight and look forward. (Fig. 1)

Procedure:

1. Educate Athlete that this procedure will look at the health of the front of the eye.
2. Ask the Athlete to place their chin in the chin rest and to place their forehead against the forehead rest. Indicate that they need to keep their head still.
3. Direct Athlete to look at a steady fixation target: your ear, the fixation light, a spot on the slit lamp, etc.
4. Begin by evaluating the integrity of their eyelashes, eyelids, puncta, conjunctiva, sclera, tear layer, cornea, anterior chamber, iris, and the lens. Please try to stay away from abbreviations. Remember one copy of the screening form is provided to the athlete at the end of the screening. The family doctor needs to be able to read the information that you wrote.
5. Record any apparent pathology.

Record:

Status of all structures evaluated. The most common problems are listed and the appropriate box should be checked and described. If you see a problem that is not listed, write it in the section under abnormality. If you see something that should be referred out, record it in the left column.

Note: Please clean head and chin rests between athletes.

Pass <input type="checkbox"/>	Not Pass <input type="checkbox"/>	External	Right Eye	Left Eye
<i>Record abnormalities and if referral required to whom</i>			<input type="checkbox"/> Unable to test	<input type="checkbox"/> Unable to test
			<input type="checkbox"/> Normal	<input type="checkbox"/> Normal
			<input type="checkbox"/> Lid anomaly	<input type="checkbox"/> Lid anomaly
			<input type="checkbox"/> Blepharitis	<input type="checkbox"/> Blepharitis
			<input type="checkbox"/> Conjunctivitis	<input type="checkbox"/> Conjunctivitis
			<input type="checkbox"/> Pterigium/pinguecula	<input type="checkbox"/> Pterigium/pinguecula
			<input type="checkbox"/> Corneal anomaly	<input type="checkbox"/> Corneal anomaly
			<input type="checkbox"/> Ptosis	<input type="checkbox"/> Ptosis
			Abnormality	Abnormality
			<input type="text"/>	<input type="text"/>



Fig.1: Hand held slit lamp.

PUPILS

Evaluates: Direct, consensual, and afferent pupillary response.

Illumination: Dim illumination.

Procedure for Verbal and Non-Verbal Athlete:

1. Explain to the Athlete that this procedure evaluates their pupils. Ask the Athlete to look at the target across the room, and to continue looking in that direction even if you (the examiner) get in their way of the view.
2. Shine the light into the Right Eye and observe the size of the pupil and the speed of the constriction in the Right Eye for three cycles. This is the DIRECT RESPONSE of the right eye. (Fig. 1)
3. Continue to shine the light in the Right Eye, while observing the pupil of the Left Eye for 3 cycles. This is the CONSENSUAL RESPONSE. (fig. 2)
4. Shine the light into the Left Eye and check for the left pupil's direct response for 3 cycles and the consensual response or the Right Eye for 3 cycles. (fig. 3)
5. Check the Athletes pupils for an Afferent Pupillary Defect (APD) by moving the light alternately between both eyes rapidly, while sustaining a period of 4 seconds per eye. Observe the responses of the eyes as the light moves to each of them. Be sure to indicate for each eye if constriction occurs (normal) or if dilation of the pupil occurs (abnormal) as the light shines on them. (fig 4)

Record: Relative pupil appearance (pupils equally round: PER)
 Response to light (RL, speed)
 Presence or absence of an APD (+ or -)
 Abnormalities: difference of sizes or shapes

Referral

Criteria: Any abnormal response

Pass	Not Pass	<input type="checkbox"/> Unable to test	Pupils	<input type="radio"/> Normal	<input type="radio"/> Abnormal	Abnormality:
<input type="checkbox"/>	<input type="checkbox"/>					

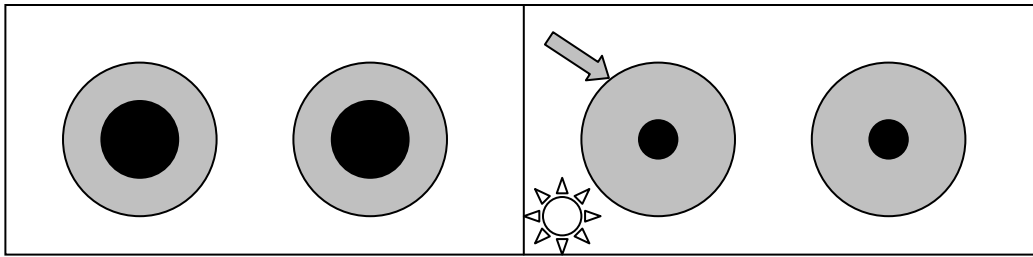


Fig. 1: Test the direct response of the right eye.

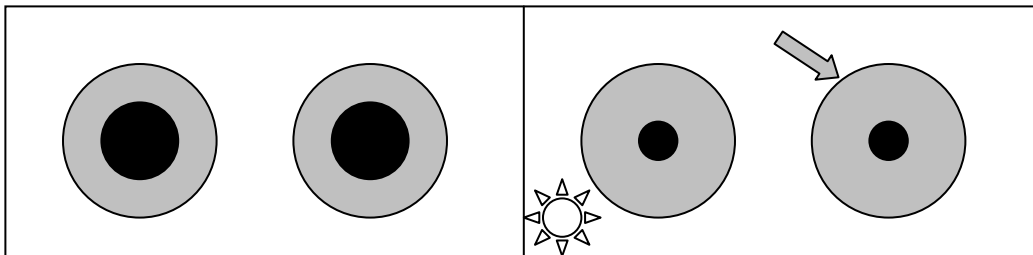


Fig. 2: Test the consensual response of the left eye.



Fig. 3: Shine light into the left eye to test the direct response OS and consensual response OD.

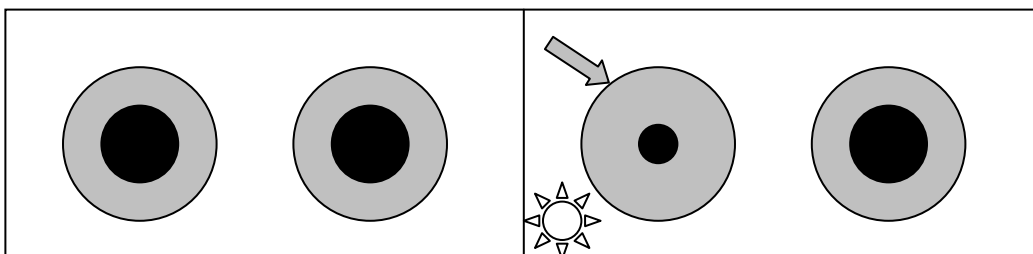


Figure 4: Afferent pupillary defect.

INTERNAL EVALUATION

Evaluates: The internal health status of both eyes.

Illumination: Dim lighting enough to encourage dilation of pupils.

Procedure:

1. Educate the Athlete that the procedure will evaluate the health inside of their eyes. Ask them to look across the room at the target indicated and to continue looking in that direction even if the examiner's head gets in the way of the view.
2. Hold the ophthalmoscope with your **right** hand, placing it over your **right** eye to examine the Athletes **right** eye. When examining the **left** eye, hold the ophthalmoscope with your **left** hand, placing it over your **left** eye. (Fig. 1)
3. Position yourself at about 15 degrees off the axis of the eye, so that the Athlete may continue to fixate on the target directed in the distance.
4. Dial in +8.00D to +10.00D and investigate the iris of the Athlete.
5. Slowly reduce the power in the scope (less plus/more minus) to focus in on the vitreous. Monitor for clarity.
6. Continue to reduce the plus as you focus on the fundus (look for the red reflex).
7. Evaluate the optic nerve head: disc margin, rim tissue (contour and color), and cup/disc size and depth.
8. Evaluate the adjacent posterior pole including the foveal/macular area and vasculature (arteries and veins). Note the following: color and clarity of macular area, presence of foveal reflex, A/V ratio, and presence or absence of A/V crossings.
9. Record any aberrant findings. Refer for any abnormality found that needs further investigation or care in the left column.

Recording: Any abnormality, use check list and describe in brief terms.

Pass	Not Pass	Internal	Right Eye	Left Eye
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> Unable to test	<input type="checkbox"/> Unable to test
			<input type="checkbox"/> Normal	<input type="checkbox"/> Normal
			<input type="checkbox"/> Iris anomaly	<input type="checkbox"/> Iris anomaly
			<input type="checkbox"/> Cataracts	<input type="checkbox"/> Cataracts
			<input type="checkbox"/> Coloboma	<input type="checkbox"/> Coloboma
			<input type="checkbox"/> Retinal anomaly	<input type="checkbox"/> Retinal anomaly
			<input type="checkbox"/> Optic nerve anomaly	<input type="checkbox"/> Optic nerve anomaly
			<input type="checkbox"/> Glaucoma suspect	<input type="checkbox"/> Glaucoma suspect
			<input type="checkbox"/> Nystagmus	<input type="checkbox"/> Nystagmus
			Abnormality	Abnormality



Fig. 1: Evaluate the internal health of Athlete's eye.

RETINOSCOPY/ REFRACTION

Evaluates: The manual measurement of Athlete's refractive error.

Illumination: Dim illumination.

Procedure:

Hyperopes (farsighted) will show a **with motion** reflex. The reflex will move in the same direction as the streak. Use plus lenses to neutralize with motion. (Fig. 1)

Myopes (nearsighted) will show an **against motion** reflex. The reflex will move in the opposite direction of the streak. Use minus lenses to neutralize. (Fig. 2)

1. Seat the Athlete comfortably behind the phoropter or place trial frames upon the Athlete. (fig. 3)
2. Fog the Athlete to about 20/60. This may not be possible if the BVA is worse than 20/60. If their BVA is better than 20/60 but their entering acuity is worse, add lenses to improve vision to 20/60.
3. Direct Athlete to view a distant target (a cartoon, person, letter, etc.) Ask the Athlete to focus on the distant target and to not look into your light. Allow both eyes to view target, do not occlude.
4. Place yourself as close to the visual axis as possible without interfering with the view of the fixation target. Pick a constant working distance from the Athlete to yourself, so that you may subtract out this distance from your final determining power. Most commonly used are 66 cm (+1.50D) and 50 cm (+2.00D).
5. Place your retinoscope in the plane mirror setting, which is sleeve down in most cases. The streak should be wide and blurry if it is focused on a wall at about 1-foot.
6. Always begin with the Athletes RIGHT eye.
7. Begin scoping the different meridians of the eye, rotating the light streak 360 degrees. Notice the speed, brightness/dullness, and width of the reflex:
 - *Speed - The reflex will increase in speed the closer to neutral. Speed will be slower the further away.
 - *Brightness/dullness - The closer to neutral, the brighter the reflex. The further from neutral, the duller the reflex.
 - *Width – The closer to neutral, the wider the reflex. The further from neutral, the duller the reflex.
8. Neutralize the least minus/most plus meridian first. This is the sphere power. Neutralize the most minus/least plus meridian second. This is the cylinder power.

9. If one meridian is **with motion** and the other is **against motion**, neutralize the **with motion** first. If both of the meridians are **with motion** neutralize the one that is slower, dimmer, and thinner first. If both of the meridians are **against motion**, neutralize the faster, brighter, thicker reflex first.

10. Remove your working distance from the end sphere result for the phoropter. For trial frame/skiascopy you must subtract your working distance from both.

*Figure 4: Retinoscopy examples in phoropter and trial frame/skiascopy.

Retinoscopy Refraction				
	OD	20/ ____	OS	20/ ____
	Add		20/ ____	

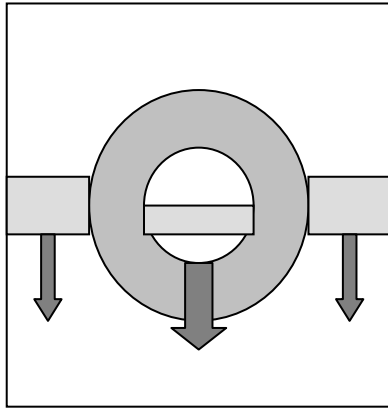


Fig. 1: With motion

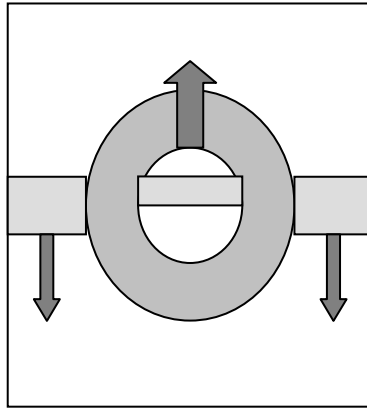


Fig. 2: Against motion



Fig. 3: Retinoscopy using trial frame and skiascopy bars.

(Fig.4)

For Phoropter:

Step 1: Rotate light streak 360 degrees

Step 2: Neutralize the meridian with the most plus/least minus.

Step 3: Rotate streak 90 degrees and neutralize the meridian.

Step 4: Subtract out working distance from the sphere only.

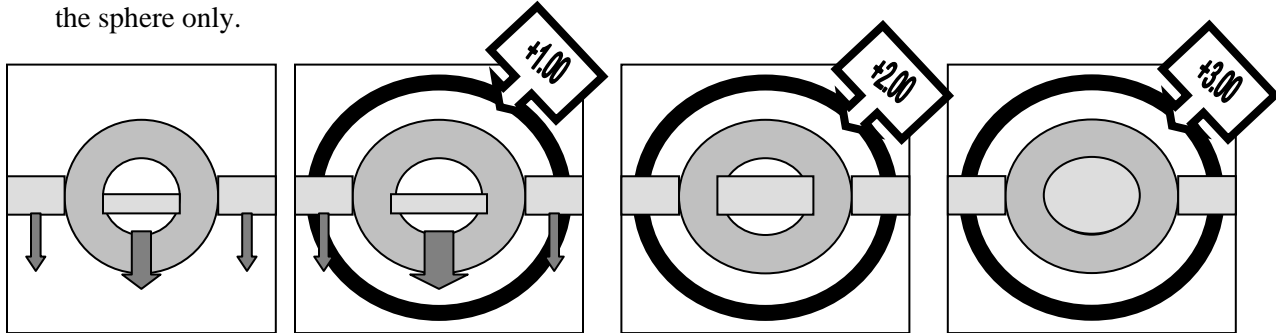
For Trial Frame/Skiascopy bars:

Follow steps 1-3

Step 4: Transpose both meridians to an optical cross.

Step 5: Subtract working distance from both sphere and cylinder.

See the next page.



Fogged to 20/20 with a +2.00 D lens

+1.00 D lens

+2.00 D lens

+3.00 D lens

Box 1: With Motion is scoped in meridian 090 (axis 180).

A working distance of 66 cm used = +1.50 D.

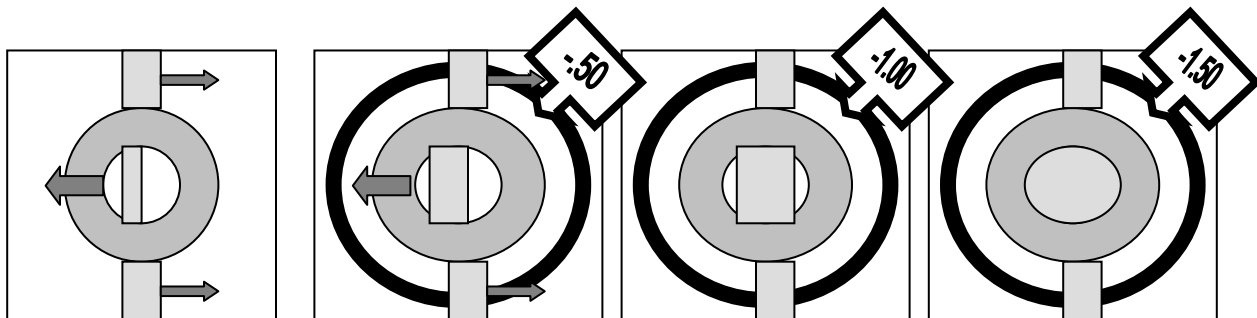
Box 2: Add +1.00 lens to begin neutralizing meridian.

Box 3: A +2.00 lens is used, but the meridian isn't neutralized yet.

Box 4: With a +3.00 lens neutralization is achieved.

A total of +5.00 should be in the phoropter (2.00+3.00).

Total: (+2.00 D lens to fog) + (total of +3.00 D lenses added)- (Working Distance)



Fogged to 20/60 with a +2.00 D lens

-0.50 D x 090

-1.00 D x 090

-1.50 D x 090

Box 5: Against Motion is scoped in meridian 180 (axis 090).

Box 6: -0.50 D cylinder x 090 is added.

Box 7: Against Motion is still detected -0.50 D more added, totaling -1.00 D.

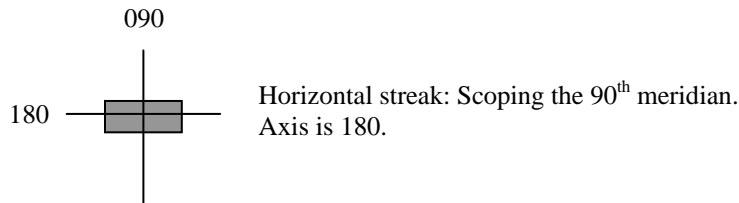
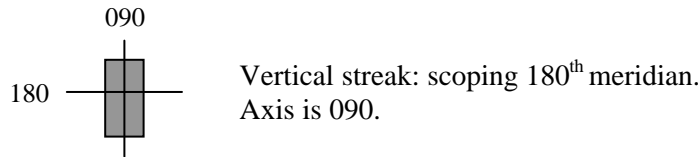
Box 8: Neutralization is achieved with a total of -1.50 D.

You do not need to subtract your working distance from the cylinder when working in the Phoropter.

For a trial frame or skiascopy bar, the power found in each meridian needs to be put on an optical cross and working distance subtracted from both.

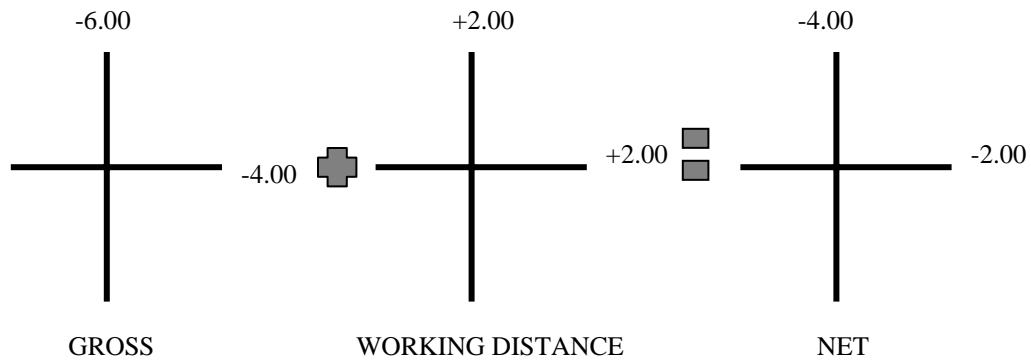
Trial Frame / Skiascopy Example:

Important: The position of the streak represents the meridian you are scoping and the axis lies 90 degrees away.



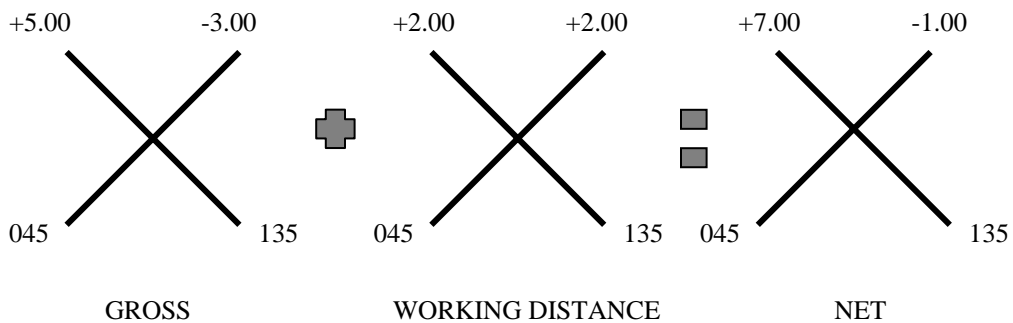
Example 1:

1. In meridian 180 (axis 090) you scope -4.00 D.
2. In meridian 090 (axis 180) you scope -6.00 D.
3. Your working distance is 50 cm (+2.00 D).



4. Calculate the final findings from the spherocylinder NET.
Sphere: -2.00 D (meridian with the most plus/least minus).
Cylinder: $(-4.00) - (-2.00) = -2.00 \times 090$
5. Record final prescription: -2.00 -2.00 x 090

Example 2:



1. Calculate the final findings from the spherocylinder NET.
2. Sphere: +7.00D
Cylinder: $(-1.00) - (+7.00) = -8.00 \times 045$
3. Final prescription: =7.00 - 8.00 x 045

EYEWEAR DISPENSING

The following information is to assist you in choosing a pair of spectacles for the Athlete.

Frame selection:

Choose a frame style most appropriate for the Athlete based on the size and shape of their face, pupillary distance, and the amount of correction prescribed. The frames need to be comfortable and properly fit. Some Athletes will require special fitting of frames.

Prefit the frame before taking any measurements; adjustments may be necessary. Adjust the frame so there is a pantoscopic tilt of 7-12 degrees. The frame should sit about 10-12 cm from the face to ensure minimum vertex distance.

Take monocular distance PD. A pupilometer may be utilized. The Athletes eyes must center within each lens.

For bifocal measurements, fit frame properly and measure from the bottom of the inside wire of the frame to the lower lid margin. If they are children, depending on the reason for the bifocal you may want to measure 3mm above the lower lid margin or just place the of the bifocal in the middle of the pupil. No line bifocals require monocular bifocal measurements. Measure from the inside wire on the bottom of the frame to the center of the pupil. Regardless of bifocal type, always measure from the deepest part of the frame.

Most of the lenses prescribed will be polycarbonate. For higher prescriptions, use small eye size frames to reduce the thickness and weight of the lenses.



Fig. 1: Dispensing Eyewear.

CHECK OUT

Before completing the summary section, review all of the Athlete's data for reliability. If a finding doesn't make sense, ask the Athlete to repeat a particular station. Once the data is complete and appears accurate, you need to decide what additional testing, if any is needed. Use the following information to help make a final decision.

If all findings appear to be within normal limits, complete the summary form and give the athlete the form folded properly. The form is folded in half with the title **VISION REPORT CARD** on the front.

If no glasses are recommended or there is no change in the glasses that the athlete has, mark "no new rx" and also mark the one that applies: no glasses recommended or no change in glasses recommended.

If it appears that the Athlete might benefit from a new prescription or lens replacement, refer them to the retinoscopy/refraction station to have them tested. After the refraction is complete, the athlete will return to check out and you will need to complete the lower section of the HAS form. If no new glasses are needed, follow the guidelines described in the paragraph above.

If a new prescription was written, mark all sections that apply to the new glasses. First mark "New Rx". Mark the type of glasses required, legibly record the prescription, and the corrected visual acuity information for all glasses that will be provided (i.e.: full time, distance only, close work only, and/or sports). If the athlete is simply receiving plano sports glasses, you will need to mark new rx. , sports goggles and plano. If the athlete receives plano sunglasses, you will need to indicate that as well.

<input type="radio"/> No new Rx <input type="radio"/> No glasses recommended <input type="radio"/> No change in glasses recommended						
<input type="checkbox"/> New Rx						
<input type="checkbox"/> Full time Rx	Sphere	Cylinder	Axis	VA Distance	VA Near (OU)	ADD
Right eye				20 / ____	20 / ____	
Left eye				20 / ____		
<input type="checkbox"/> Distance only						
Right eye				20 / ____		
Left eye				20 / ____		
<input type="checkbox"/> Close work only						
Right eye					20 / ____	
Left eye					20 / ____	
<input type="checkbox"/> Sports goggles						
<input type="radio"/> Plano						
<input type="radio"/> Rx						
Right eye				20 / ____	20 / ____	
Left eye				20 / ____		
<input type="checkbox"/> Sunglasses (plano)						

If a referral is necessary to an outside source, immediately or when the athlete returns home, mark the summary section accordingly with the reason for referral and to whom.

Referral to

- Optometrist
- Ophthalmologist
- Neurologist
- Primary care physician
- Other

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Additional comments

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Fig. 1: Checking out Athlete.

PRESCRIBING

At the conclusion of the screening, the data needs to be thoroughly reviewed. This is perhaps the most challenging part of the Special Olympic Opening Eyes screening program. Information that will help the clinician to make a decision includes:

A. Current Rx:

1. What prescription is the Athlete wearing?
2. How well does the athlete see with this prescription?
3. Is the Athlete satisfied with their vision through this current prescription? (If the Athlete is happy with the current prescription, you may not need to change it)

B. Visual Acuity:

1. Is the visual acuity with or without the current prescription adequate for the Athletes visual demands?
2. Is the change in visual acuity enough to warrant a change in prescription?
3. As you look at the visual acuity with the old prescription and consider the Athlete's assessment of their vision, would you predict a change in the prescription?

C. Autorefraction and Retinoscopy:

1. Does the autorefraction or retinoscopy show a significant change from the Athlete's current prescription?
2. If there is a change, does it make sense with the visual acuities?
3. Is the change in prescription likely to resolve the Athlete's visual problem or complaint?
4. If only a small change in the prescription was found, consider whether the change will improve the visual status or resolve the Athlete's complaint. (Remember that the Athlete may be disappointed with the new prescription because of a concurrent visual condition such as cataracts, optic atrophy, or macular problems.
5. Did the autorefractor show a significant change in the astigmatism? Do the entering visual acuities predict this change?

D. Age:

1. How old is the athlete? Changes in prescription are not always well tolerated by older, as well as many handicapped athletes. This population generally has difficulty adapting to a new prescription.

2. In general, it is wise to avoid sphere or cylinder power changes that are greater than 1.00D. Younger Athletes more easily accept changes. Be sure not to over minus them.

E. Visual Needs:

1. What type of visual acuity is needed for the Athlete's daily activities?
2. Does the Athlete need protective eyewear to compete safely in their sport?
3. What working distances are important for the Athlete?
4. What lighting condition does the Athlete work under?
5. How much time during the day is the Athlete engaged in visual tasks?
6. Are there occupational or recreational hazards in significant visual activities?
7. What is the Athlete's ocular status? Any strabismus or amblyopia present? Be advised that the monocular Athlete always needs protective eyewear for their sport and polycarbonate lenses in their everyday eyewear.

General Guidelines:

I. Myopia:

- A. For a young Athlete with decreased visual acuity due to myopia, prescribing to 20/20 will create a noticeable improvement in vision.
- B. What do I do if there is an increase in myopia in a mature Athlete? Since increasing myopia in adults can be due to lens changes, you need to consider several possibilities.

First, consider if it is possible that the Athlete is undiagnosed, or a poorly controlled diabetic. Is there a family history of diabetes in immediate blood relatives? Is the Athlete obese? Is the athlete experiencing symptoms related to diabetes: constant, unquenchable thirst? Frequent urination?

If you suspect that the Athlete is diabetic, do not prescribe if possible. Explain to the coach or guardian and to the Athlete that they need to be examined by a medical doctor before their prescription can be finalized. If you make a change in the prescription before the Athlete sees the doctor, be aware that if the Athlete is subsequently started on medication to help control their sugar levels, the prescription may change. It will be likely to shift in a more hyperopic, less myopic direction.

Second, it is possible that the shift in myopia is due to cataracts. You should be suspicious of these in older Athletes (greater than 50 years old) especially if their vision is not correctable to a sharp level of acuity. A dilated pupil will identify if this problem exists.

C. What to do if the Athlete is overminused.

If the Athlete is overminused, the potential for problems, particularly with near visual tasks, is increased. Let the Athlete's visual demands and symptoms dictate how aggressive you need to be in solving their problems. Be aware that changes of greater than 1.00D are not tolerated well even if they are overminused and symptomatic. If they are symptomatic and overminused, you can do any of the following options: leave them alone at distance and near, partially change the prescription, or leave them overcorrected at distance and prescribe a bifocal at near.

II. Astigmatism:

A. It is important to recognize that a change in cylinder power and/or cylinder axis may cause distortion and/or adaptation difficulties. This problem may become more significant as the Athlete ages, if the cylinder power increased, and as axis changes are made away from WTR or ATR.

B. In general, children tolerate a new prescription or change in prescription better than an older individual. With some children you can prescribe the full amount and with others it may be advisable to be cautious about prescribing it due to normal developmental changes. Be certain that the astigmatism is stable and permanent.

C. One difficulty in prescribing for young, astigmatic Athletes is the lack of reliable subjective responses. Utilize your keratometry findings effectively to help decide upon the best astigmatic correction for young, astigmatic Athletes with unreliable subjective responses.

D. In an adult Athlete, approach the habitual prescription cautiously if their current prescription is spherical and you find cylinder. If the Athlete is asymptomatic and there is no significant reduction in visual acuities be wary about changing the prescription.

E. If you detect that an Athlete is under corrected for cylinder, examine their current visual acuity, as well as keratometry findings carefully. Ask yourself if the cylinder found improves acuity or relieves the symptoms presented.

F. Are the results of the refraction prescribable? If this is a symptomatic adult, you may want to change the prescription. If the change is greater than 0.75D expect some discomfort prior to adaptation. The adaptation process depends on how much the Athlete perceives an improvement in their visual acuity over their current prescription.

G. Sometimes a compromise needs to be made with the prescription in order to make the athlete comfortable and prescribe optimally. One suggestion may be to partially increase the cylinder power while maintaining the spherical equivalent.

H. If a change in cylinder axis is detected, anticipate problems that may arise. The amount of difficulty the Athlete experiences will be related in part to the amount of astigmatism present. The higher the astigmatic powers, the harder the adaptation.

- I. If the athlete is currently asymptomatic and has reasonable visual acuity, even though the axis is not correct, do not be motivated to fix a problem the Athlete does not perceive.
- J. When symptoms are present, look at the amount of change you have found, the amount of astigmatism present, and the location of the axis. If the axis shifts from WTR or ATR towards the oblique axis, anticipate further adaptation problems.
- K. If the Athlete prefers the new cylinder axis location and it is 90 or 180 degrees different than their current prescription, try to locate an axis closer to the original axis where the Athlete can still appreciate and improvement in visual acuity.

III. Hyperopia

- A. Hyperopia presents special challenges, particularly with younger Athletes who have active accommodation. Uncorrected hyperopia can be totally or partially compensated for by accommodation. Assess for vision discomfort or other visual performance problems to recognize the link between the magnitude of hyperopia and accommodation
- B. When you prescribe for hyperopic Athletes, consider the following: what are the Athletes visual needs, their occupation, and their age?
- C. Consider the information received from the cover tests when determining the final prescription. An Athlete with accommodative problems may demonstrate abnormalities with their convergence status (accommodative esotropia).
- D. For Athletes between the ages of 8 and 16, try to balance your near point findings and their comfort at near. In the instance of an esotropia or esophoria, you will be more likely to prescribe more plus at distance with or without the assistance of a bifocal at near.
- E. It is common for an adult hyperope to present with symptoms and often have never worn a prescription. You may also find an adult who wore a correction for near as a child. These individuals rarely tolerate the full plus.

IV. Conclusion

Upon giving a new prescription to the Athlete, indicate clearly to the Athlete, guardian, and/or coach what the prescription is for. Address the following:

- A. Which of the symptoms will be resolved with the glasses.
- B. The impact the new prescription will have on their vision.
- C. When the prescription should be worn: full time, when reading, viewing television.
- D. How long the adaptation problems should persist.
- E. What the Athlete should do if the symptoms persist beyond this time period

Allow the athlete to ask questions. Be sure this information is understood.