National Academy of Opticianry

Continuing Education Course

Approved by the American Board of Opticianry

Eyewear Problem Solving with SOAP

National Academy of Opticianry
8401 Corporate Drive #605
Landover, MD 20785
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PREFACE:

This continuing education course was prepared under the auspices of the National Academy of Opticianry and is designed to be convenient, cost effective and practical for the Optician.

The skills and knowledge required to practice the profession of Opticianry will continue to change in the future as advances in technology are applied to the eye care specialty. Higher rates of obsolescence will result in an increased tempo of change as well as knowledge to meet these changes. The National Academy of Opticianry recognizes the need to provide a Continuing Education Program for all Opticians. This course has been developed as a part of the overall program to enable Opticians to develop and improve their technical knowledge and skills in their chosen profession.

The National Academy of Opticianry

INSTRUCTIONS:

Read and study the material. After you feel that you understand the material thoroughly take the test following the instructions given at the beginning of the test. Upon completion of the test, mail the answer sheet to the National Academy of Opticianry, 8401 Corporate Drive, Suite 605, Landover, Maryland 20785 or fax it to 301-577-3880. Be sure you complete the evaluation form on the answer sheet. Please allow two weeks for the grading and a reply.

CREDITS:

The American Board of Opticianry has approved this course for two (2) Technical, Level II Continuing Education Credit toward certification renewal. To earn this credit, you must achieve a grade of 80% or higher on the test. The Academy will notify all test takers of their score and mail the credit certificate to those who pass. You must mail the appropriate section of the credit certificate to the ABO and/or your state licensing board to renew your certification/licensure. One portion is to be retained for your records.

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INTENDED AUDIENCE:

This course is intended for opticians of all levels

COURSE DESCRIPTION:

This article is intended to expand the optician's knowledge and improve his/her ability to provide superior eye care.

Objectives:

Upon completion of this program, the participant should be able to:

1. Understand the SOAP method of medical record documentation, break it down into its four categories, and know how to use it to help problem solve patient vision complaints
2. Know the steps to take and in what order, to get to the root of the patient's problems
3. Have a better understanding of ocular and medical issues that can affect visual acuity
4. Determine the possible cause of the problem the patient is having with their glasses through having an in-depth knowledge of how to interpret the patient's complaints
5. Understand the concept of accommodation and add power determination, to calculate lens powers for specific working distances
6. Have the knowledge and confidence to face patient complaints head-on, and often resolve the patient's problems without the need for a return visit with the doctor.

NOTE: It is not the intention of the author to encourage opticians to step outside their scope of practice as determined by the licensing regulations of their State. This article is intended to expand the optician's knowledge and improve his/her ability to provide superior eye care. The author in no way promotes medical diagnoses being made by the optician. In addition, the optician should always discuss findings with the prescribing doctor prior to making any changes to the prescription.

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Eyewear Problem Solving with SOAP

How often have opticians heard the words, “I can’t see through these?” To be successful the optician must possess the optical and medical knowledge to be able to assess and evaluate the specific problem the patient is having to know the appropriate steps to get to the root of the problem, and most importantly, to advise, educate, and counsel the patient. Is the poor acuity simply a case of requiring additional adaptation time? What was the best corrected visual acuity (BCVA) determined by the doctor? How well can the patient expect to see? Does the patient have medical conditions that could be affecting acuity? Is this a first prescription for the patient? Is this a first multifocal for the patient? How much change has there been in the patient’s prescription?

All these questions and more will be discussed in this two-hour course. In addition, examples of real patient eyewear complaints will be presented during which the steps taken to determine a solution will also be examined. The intended purpose: to empower the optician with problem-solving skills and knowledge that enable him or her to more efficiently resolve a patient’s complaints and visual concerns, resulting in increased patient satisfaction.

Let’s set the scene for two possible scenarios . . .

In the first scenario, the patient is here for the final dispense of his/her glasses which have been carefully adjusted to fit perfectly. The patient then utters those words that every optician dreads to hear. Either “I can’t see through these,” “I can see better with my old glasses,” or “I can see better without them on!”

An alternate scenario would be the patient returning to the office with similar complaints after wearing his or her glasses for a period of time after dispensing. In either scenario, to resolve the patient’s problems, the optician must now switch roles and don their Sherlock Holmes deerstalker cap to investigate the cause(s).

By using interview techniques, combined with a solid optical and medical knowledge, the skilled optician can begin the process of getting to the root of the patient’s difficulties. A highly effective tool to help accomplish this goal is what can be referred to as a ‘SOAP sheet’. Such a SOAP sheet provides a highly efficient approach to problem-solving the patient’s complaints and concerns.

The SOAP Sheet

S.O.A.P. is an acronym for “Subjective, Objective, Assessment, Plan.” And the SOAP method is universally recognized as the basis for the purpose of medical record documentation, and that used by optometrists and ophthalmologists during the eye exam. Create a SOAP sheet like the example shown and use it to document the problems your patient is experiencing with his or her glasses. This will aid in gathering clear and concise details which will ultimately help both the optician and the doctor resolve the patient’s complaints.

The categories should be as follows:

- Subjective: The patient’s chief complaint
- Objective: The optician’s evaluation which should include all the steps taken during the evaluation process
- Assessment: Conclusions/findings based on all the details gathered during the subjective and objective processes
- Plan: The plan based on all findings.

Example of SOAP Sheet for Problems with Glasses

Patient Name: _____ **Date:** _____

Original Exam Date: _____ **Dr:** _____ **Disp. Date:** _____

S: Chief Complaint:

O: Rx Verification:

Seg height measured from lenses: PD measured from lenses:

Base Curves: OD: horizontal: + vertical: +

OS: horizontal: + vertical: +

Previous glasses information (if available):

Rx Verification:

Seg height measured from lenses: PD measured from lenses:

Base Curves: OD: horizontal: + vertical: +

OS: horizontal: + vertical: +

A: Assessment:

P: Plan:

Optician Name:

The Approach

To get to the root of the problem, there is a specific order in which the various steps should be taken, and these go hand-in-hand with the SOAP method of documentation.

S = Subjective

Step 1: Investigate the patient's specific complaints. For example, is the patient experiencing distance problems, near problems, problems at all distances, a pulling sensation, the "goldfish-bowl" effect (swimming sensation), or distortion of horizontal or vertical objects. Is the vision poor on an intermittent or constant basis? If intermittent, under what circumstances is it noticeable? Has the vision always been the same since receiving the new glasses, or has the patient noticed a gradual decline? Some of these questions would only apply if the patient was returning with problems, not problems noticed at final dispense. The optician must ask open ended questions to help the patient open up to them. Some patients have difficulty articulating their specific problems – they just know something is not right. Remember, unless dealing with an engineer - in which case, good luck – most patients are unaware of all the variables involved in making their eyewear and how these variables can occasionally cause problems. Show compassion and help the patient feel comfortable expressing their concerns. Many patients feel like they're complaining which can put them on the defensive. Showing you truly care and want to resolve their problems will make them feel at ease. It will form a long-term connection between the patient and optician that can lead to building a reputation in your community for being a true professional who cares about taking care of the patient throughout the entire process and providing outstanding eye care.

O = Objective

Step 2: Recheck the adjustment and make sure the glasses are fitting well. Ensure the appropriate amount of pantoscopic angle is applied to the frame – typically 5 to 15 degrees (figure 1). The nose pads should be adjusted to keep the loop of the pad arm small to keep the distance of the frame lower rim to the face, to a minimum. This is especially important in the case of a multifocal to ensure a smooth transition from distance to near and to provide good acuities at all ranges. The frontal angle, splay angle, and vertical angle should be adjusted to ensure optimum comfort and vision (figure 2).

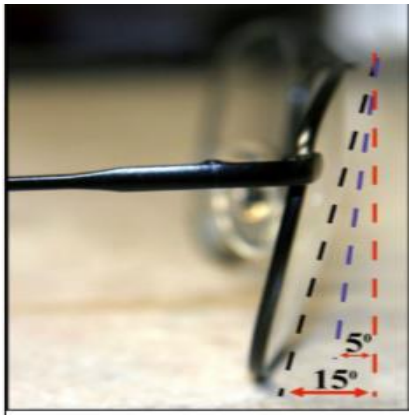


Figure 2: Nose pad Adjustments

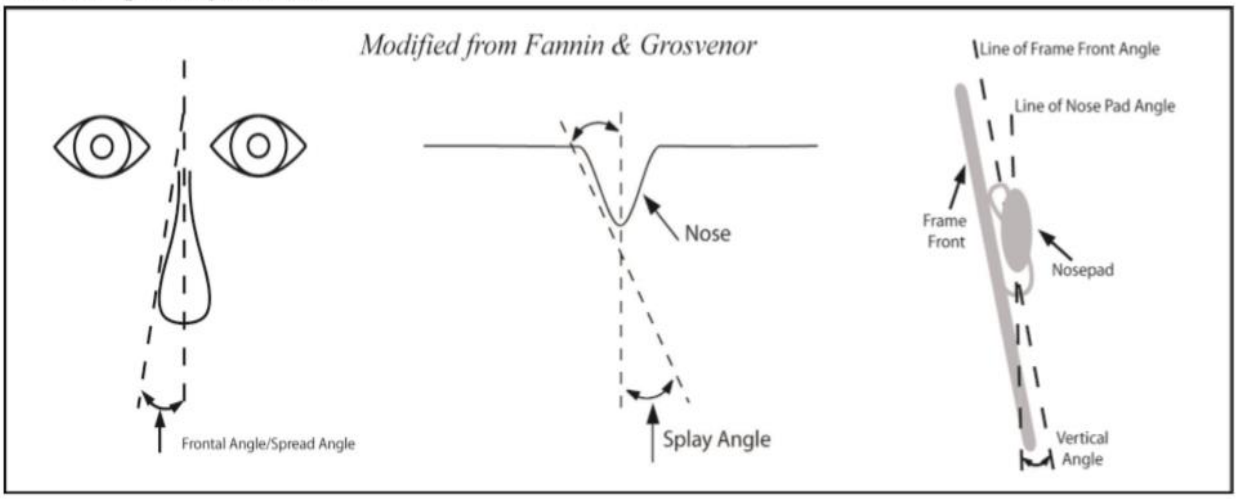


Figure 1: Pantoscopic angle extremes

Step 3: Re-verify the lenses to the doctor's written prescription, as opposed to the order written up by the optician. Numbers can occasionally get transferred over, incorrectly. If the patient has brought his/her old glasses, neutralize them to compare to the new. In addition to verifying the prescription, double check the PDs, optical center (OC) heights, segment/fitting heights, and base curves of each. (Since progressive lenses don't actually have a 'segment', per se, the term 'fitting height' is preferred over 'segment height'). The precise base curve of a progressive lens cannot be measured using a Geneva lens measure (lens clock), due to its natural asphericity, especially with today's free-form designs. However, placing the lens clock vertically on the lens along the progressive corridor will give a ballpark reading to at least compare different pairs of eyewear. Similarly, for any aspheric lens, measuring a precise base cannot be accomplished using a lens clock.

Common errors to re-verify:

- Make sure the numbers weren't transposed or misread.
- Make sure the signs were written correctly.
- Compare the written prescription to the *manifest* refraction (see side bar); look for any major variations.
- Compare the written prescription to the patient's old prescription, if available.

Unless the patient has had ocular surgery, a dramatic change in the prescription is irregular and definitely raises a red flag as a possible reason for the complaint. A significant change in prescription can also result in increased adaptation time.

Step 4: Determine the patient's Best Corrected Visual Acuity (BCVA) for distance and near, typically recorded by the doctor on the examination report. Entry acuities are also useful at this point to help determine how the patient was seeing either uncorrected, or habitually using their old correction. It is beneficial for the optician to become fluent in interpretation of the examination report for purposes such as these and to be able to more competently answer the patient's questions. However, all medical questions should always be referred to the doctor. If unsure, or items are unclear, request a few minutes with the doctor so they can explain the meaning behind all the areas on the examination report. The doctor will usually appreciate the optician wanting to increase their knowledge and thus enable the optician to more frequently problem-solve patient issues, and hopefully reduce the number of return visits to the doctor for re-checks.

If the patient's BCVA for distance and/or near is less than 20/20 there may be medical issues with the eyes that contribute to the reduced acuities. Once again, the optician should always exercise caution to remain within the boundaries of his/her scope of practice. If the prescription is from an outside doctor, a call to the doctor would be recommended at this point to obtain a history, or at least the BCVA expected. Such conditions that could result in a reduced BCVA include, macular degeneration, cataracts, corneal irregularities, dry eye syndrome, amblyopia, and diabetes, to name a few.

Step 5: Evaluate how much change in prescription has taken place, and what the change is. If the optician is confident in trial lens over-refraction procedures, start with +0.25 and -0.25 over the distance zone using a flipper to see if the patient notices improvement. If the over-refraction doesn't improve things, and if nothing jumps out to the optician as an obvious reason for the problem (transposed numbers or a misprinted prescription), it's time to refer the patient back to the prescribing doctor. If the patient is wearing a multifocal and the patient is experiencing poor near vision, a simple trial lens over-refraction over the reading area starting with 0.25 OU is a good starting point, plus or minus, depending on the specific complaint, again, using a flipper. If the patient wishes their near working distance to be closer, increasing the add power will reduce the working distance, possibly improve fine detail work, but also narrow the field of view. If the patient is requiring their near working distance to be further away, reducing the add power will increase the working distance, make fine detail work more difficult, and

increase the field of view. Always, document the results of over-refractions and evaluations.

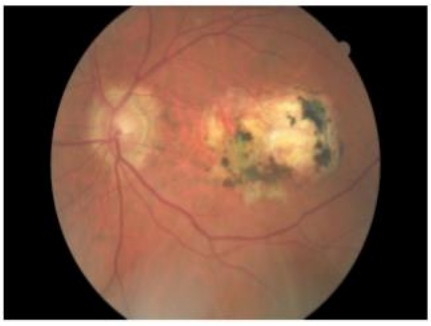
NOTE: In most States, refracting does not fall within the optician's scope of practice. However, the above over-refraction procedures are no different from those performed by opticians when fitting contact lenses and should not be confused with full refractions.

SIDE BAR: Manifest Refraction or 7A This is one of the doctor's findings during the eye exam, based on subjective responses from the patient. Occasionally, the doctor may deviate from this in the finalized prescription based on the doctor's objective evaluation of the patient's responses throughout the entire exam. For this reason, it is never safe to assume the manifest refraction is the actual prescription. However, it is often close and can be referenced when checking for possible errors in the final written prescription. The manifest refraction is often referred to as "7A" which comes from a list of twenty-one optometric tests dating back to the early days of optometry. The manifest refraction was number 7A on the list.

Ocular Medical Issues That Can Compromise Visual Acuity

NOTE: For information & education purposes only –<u>NOT</u> to be used for diagnosing purposes

ARMD or AMD



Age Related Macular Degeneration comes in two forms – wet and dry. Dry AMD involves degeneration of the retinal tissue without fluid leakage. Wet AMD indicates leaking fluid beneath the retina, usually from abnormal blood vessel growth. Both forms damage the macula, the area responsible for central vision since it is the area of the retina with the highest concentration of cones – light receptors present within the retina. If this area is damaged, the BCVA is reduced to less than 20/20. Vision from dry AMD can be anywhere from normal to very poor,

while wet is usually associated with poor central vision. In both forms peripheral vision generally remains intact, unless there is an additional ocular disease process involved.

Cataracts

Cataracts are opacities that form in the crystalline lens of the eye. This causes a reduction in contrast sensitivity and a reduction in BCVA to less than 20/20. Contrast sensitivity is a measure of the eye's ability to function in low light and how well objects can be distinguished from similarly colored or shaded backgrounds. As the cataracts mature the patient's BCVA becomes increasingly reduced. Cataracts can also cause monocular diplopia (double vision) due to internal light scatter within the crystalline lens. A patient will also typically become more myopic as the cataracts mature due to changes in the refracting properties of the crystalline lens. In some cases, however, the patient can become more hyperopic.

Corneal Irregularities

The cornea provides the most refractive properties of the eye. It is naturally avascular in order to maintain its transparency. If the cornea has any irregularities such as edema, neovascularization, irregular astigmatism, or keratoconus, this can affect the BCVA attainable.

Graphic: Corneal neovascularization - blood vessels extending From the sclera into the cornea

SIDE BAR: *Common Terminology*
Avascular: Lacking blood vessels
Edema: Swelling caused by trapped fluid
Neovascularization: Growth of new blood vessels
Regular Astigmatism: Corneal astigmatism in which the refractive meridians are separated by 90 degrees.
Irregular Astigmatism: Corneal astigmatism in which the refractive meridians are separated by an angle other than 90 degrees.
Keratoconus: A degenerative corneal disease in which the structure of the cornea deteriorates with gradual bulging from the normal round shape to a cone shape combined with corneal thinning.
Emmetropia: No refractive error present
Ametropia: Refractive error present

Dry Eye Syndrome

The healthy cornea is constantly kept hydrated by a continuous re-application of lubricating tears. There are two types of tears – natural lubricating tears and reflex tears. The natural tears possess the lubricating qualities necessary to keep the cornea hydrated and healthy. When patients have problems with dry eyes, either the patient isn't producing enough of the natural tears, or the trilaminar (three layer) structure of the natural tears has some abnormalities. For example, if the outer lipid layer is inadequate, the middle aqueous layer can evaporate more quickly than normal. The reflex tears will then kick into action, often in excess, in order to compensate for the inadequacies of the natural tears. When patients complain of their eyes constantly tearing (epiphora), this can often be the cause. Ironically, too much tearing can be due to dry eye syndrome, a concept often difficult for the patient to comprehend. Clear vision is maintained by the cornea remaining hydrated and clear. If the cornea loses some of its hydration, this can cause blurring. Ask the patient if after blinking vision is improved, even temporarily. If so, dryness can be contributing to a reduced BCVA. Frequently, when patients are doing excessive work on a computer they forget to blink. Sometimes reminding the patient to occasionally look away from their computer will make a substantial difference to long-term quality vision. Remember the "20-20-20 rule": Every 20 minutes spend 20 seconds looking at something at least 20 feet away, and blink! Emphasize the 'blinking' step to maintain good corneal hydration from the eyelid's ongoing distribution of the tear film.

Amblyopia

Also known as "lazy eye," indicates a reduced BCVA in one eye. It is a congenital condition that can either be associated with a strabismus (turned eye), or a refractive condition. In the case of a patient with a strabismus, the turning causes the rays of light entering the eye to be focused on the retina at a point other than the macula. Stereopsis, or fusion of the two dissimilar images the eyes are receiving is difficult for the brain and diplopia (double vision) can occur. To avoid this diplopia, the brain will often shut off the weaker eye, the good eye takes over, and the weaker eye fails to develop a strong connection with the brain and ultimately fails to develop a good visual acuity. The brain often reacts in a similar way when the amblyopia is due to a refractive condition. Anisometropia is a condition where there is more than 1diopter difference between the refractive errors of each eye; antimetropia is a condition where one eye is myopic and the other hyperopic. When there is a large amount of either of these conditions present, only one eye at a time can be perfectly in focus. Fusion of the two substantially different sized images becomes difficult for the brain; once again, it shuts off one of the eyes. Note: Typically, the ocular structures of the eyes are normal in a

patient with amblyopia. It is a deficiency in the link between the eye and the brain that causes the reduced level of visual acuity in one eye.

Diabetes

Diabetes can affect vision in various ways. It can cause bleeding inside the eye (a vitreous hemorrhage), which can substantially reduce vision because, quite literally, it is hard to see through blood. Diabetes can also cause retinal ischemia – a general lack of oxygen throughout the entire retina, or large sections of it. Ischemia causes both reduced contrast sensitivity and BCVA. Proliferative Diabetic Retinopathy refers to neovascularization beneath the retinal tissue (new vessel growth), the eye's natural response in an attempt to remedy the ischemia. Unfortunately, the structural integrity of these vessels is poor, and they often leak blood.

First Time Correction for Hyperope

An adult patient with hyperopia, or hypermetropia, will occasionally have adaptation problems with their first distance correction. Typically, the hyperope will have more difficulty adjusting to a first-time prescription than a myope. The hyperopic patient is used to being able to accommodate to overcome their hyperopia for distance work. However, as the hyperopic patient evolves into an emerging presbyope, it becomes increasingly more difficult to focus up close. While such patients will often present with only near-vision complaints, the doctor frequently discovers a degree of underlying latent hyperopia which, up until now, has gone unnoticed by the patient, due to their ability to accommodate to overcome it.

For example, consider a 2-diopter hyperope. To see clearly at optical infinite, the patient must accommodate by 2 diopters, and for a near working distance of 40cm, they must accommodate by a total of 4.50D (see example below). And while this might be easily accomplished by 'younger' patients, the eye's natural aging process results in a gradual decline in accommodative ability, making such focusing demands increasingly more difficult.

Example: How much accommodation is required by a 2D hyperope to see clearly at 40cm?

- For clear vision at infinity, by definition, 2D of accommodation is required
- For clear vision at 40cm: using the lens power equation . . .
    - Lens power = 1 / Focal length in meters
    - Lens power = 1 / 0.40m
    - Lens power = +2.50D

- Since 2D of accommodation is already required for clear vision at infinite, this must be added to the additional accommodation required for a near working distance of 40cm
- Accordingly, the total accommodation required for a 2D hyperope to see clearly at 40cm = 4.50D

When this hyperopic patient first receives their new eyewear, they'll definitely appreciate the help up close, but if latent hyperopia has also been corrected with some type of multifocal lens, the patient may occasionally report the distance power feeling "too strong". An adaptation time of one to two weeks should be recommended before making changes, in order to fully evaluate the patient's acuities with the new prescription. This can easily be perceived by the patient as being "blown off" so it is important to educate the patient as to what they are dealing with. Reassure them that what they are experiencing is normal and that if things do not improve, changes can be made. It's important for the patient to know the optician will stand behind the product.

A = Assessment

Interpretation of the Patient's Vision Complaints

Let's review a few common patient complaints, together with their possible causes.

Complaint: pulling sensation

Can be related to:

- PD or OC issues –
  - PD could have been measured incorrectly and ordered accordingly.
  - PD could have been measured correctly and ordered incorrectly – for example, a distance PD used instead of a near PD.
  - PD could have been measured and ordered correctly, but the lenses could have been made incorrectly.

NOTE: With a high-powered lens, even a small deviation in OC placement from the required PD can create visual discomfort for the patient due to induced lateral prism. The amount of induced prism can be calculated using Prentice's Rule.

Prentice's Rule states: P = d x D

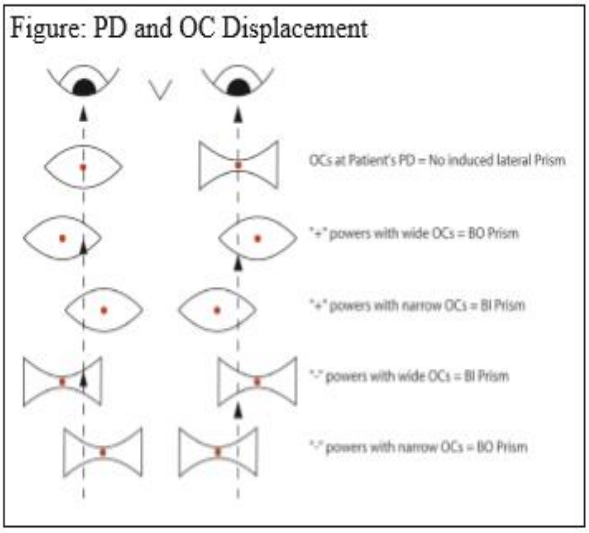
P = Prism

d = Distance from OC in cm

D = Lens power in relevant meridian

It is important to be aware of how a displaced OC relative to a patient's PD will influence the induced lateral prism: *(Refer to graphic on right).*

Figure: PD and OC Displacement



A pulling sensation can also be related to:

- Changes in base curve from the patient's previous eyewear.
  If a small change in prescription has taken place (less than 1 diopter), the base curve should be matched to the patient's previous eyewear. Base curve changes have always been a topic that creates great confusion. Often the doctor will request the optician "match the base curve" of the previous eyewear. However, routinely matching the base curve of the previous eyewear can occasionally adversely affect the new eyewear, resulting in negative outcomes. After all, base curves selection depends directly on the prescribed powers, serving to minimize the effects of oblique astigmatism in a best form/corrected curve lens. So, here's a guideline rule of thumb: If there is more than 1-diopter of change in the patient's prescription, it is best to have the lab compute the best base curve for the specific prescription. However, if there is less than 1-diopter of change, the base curve of the previous eyewear should be matched. In addition, if an aspheric lens is being used, it is once again recommended to let the lab compute the best base curve needed for the specific prescription. The benefits of the aspheric design can be diminished if the best base curve for the specific prescription is not used. When using digitally designed lenses, it is recommended to always "trust" the computer program and its BC selection for the ordered prescription, in order to fully optimize its design and benefits.

- OC height.
  Either not being specified, or if pantoscopic tilt was not considered when measuring and ordering the OC height. NOTE: For traditionally surfaced lenses, for every 2 degrees of pantoscopic tilt applied to the frame, the OC height must be dropped by

1mm. For free-form lens designs, pupil center height should be specified along with the patient's Position of Wear (POW) measurements (pantoscopic tilt, vertex distance, and wrap). The free-form software will calculate compensated powers based on POW measurements to provide optimal results.

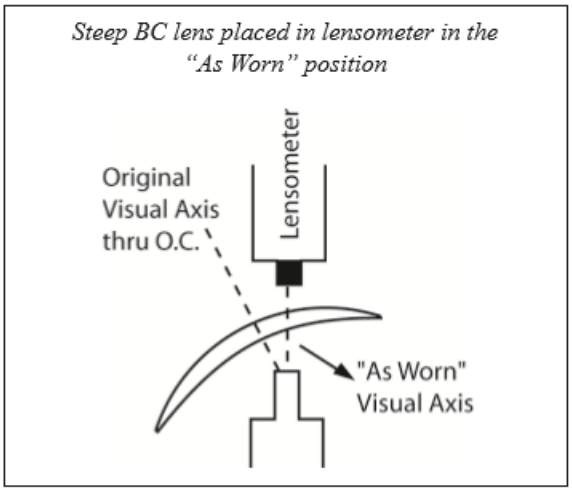
- Frame wrap.
  The amount of face form, positive or negative, applied to the frame. Sunglass frames made on steep base curves are notorious for causing visual discomfort (even in a plano sunglass with poor lens optics) unless "wrap compensation" is applied to the prescription when making prescription sunglasses. When working with wrap eyewear using lenses with base curves in the +8D range, the effect on the lens OC is the same as applying positive face form. For this reason, when working with wrap eyewear, it is important the prescribed Rx be modified, resulting in a "wrap compensated Rx." When the patient wears the eyewear, the compensation corrects for power changes induced by the rotation of the lens around a vertical axis and the patient's vision is optimized. When neutralizing wrap eyewear made with a wrap compensated Rx, it should be positioned in the lensometer in the "As Worn" position, viewing through the lenses in the same way and along the same optical axis the patient will use when wearing them. When neutralized in this manner, the Rx obtained should match the originally prescribed powers. If the lens is placed flat against the lens stop, and NOT in the 'As Worn' position, the Rx obtained should match the compensated Rx, as indicated on the lab invoice.

The compensation is based on "Martin's Formula for Lens Tilt":

$$\mathbf{D_{sph} = D\,(1 + \sin^2 \alpha\,/\,2n)}$$

$$\mathbf{D_{cyl} = D_{sph} \times \tan^2 \alpha}$$

Where . . . *Alpha, α = degree of tilt*
D = sphere power in the meridian of tilt
n = refractive index
D_{sph} = New sphere power
D_{cyl} = induced cylinder



The meridian of tilt is the one around which the tilt is applied: with wrap eyewear and positive face form - the 90˚ meridian; with pantoscopic tilt - the 180˚ meridian.

SIDE BAR: Examples of Wrap Compensated Rx

1) Original Refraction: -4.00 -2.00 x 180 Compensated Rx for frame with 20-degree wrap: -3.12 -2.50 x 125
2) Original Refraction: -4.00 -2.00 x 090 Compensated Rx for frame with 20-degree wrap: -3.25 -2.25 x 102

These modified prescriptions were computed by laboratory software for example purposes only.

Grinding this modified Rx gives the patient the original prescription when looking through the new visual axis created by the position of wear (POW).

Digital surfacing technology now makes the manufacturing of such precise prescriptions possible.

With traditionally surfaced lenses, lowering the OC 1mm for every 2 degrees of pantoscopic tilt removes the need to apply Martin's formula. However, it is NOT recommended to modify the location of the OC in the horizontal meridian to compensate for positive, or negative face form, because lateral prism would be induced. Free-form lens designs, especially those specifically intended for use with high-wrap frames, will always result in the best visual experience. In addition, the free-form design software will automatically calculate the wrap compensated powers, eliminating the optician's need to perform complex and time-consuming calculations.

With regards to prism, wrap eyewear will naturally induce Base Out (BO) prism, regardless of lens power. This induced prismatic effect can negatively impact visual acuity resulting in a "pulling sensation" affecting the patient's long-term visual comfort. Compensating for this BO prism with the addition of Base In (BI) prism will help optimize a patient's acuity and visual comfort. High-end sunglass manufacturers automatically compensate for such optical effects, even in their plano products. As they say, you get what you pay for!

In addition, to offset the influence wrap has on horizontal displacement of the OC, for every 10˚ increase over a baseline of 6˚, the measured monocular PDs should be increased by 1mm for each eye.

For example: Measured PDs = 30/32
Frame wrap = 26˚

Ordered PDs should be 32/34 (each increased by 2mm OU due to the 20˚ increase over the 6˚ baseline).

Complaint: diplopia - monocular and binocular

If the patient complains of diplopia, or double vision, first ask them to cover one eye to determine if diplopia is still present, thus identifying the diplopia as either monocular or binocular. As discussed earlier, monocular diplopia can be related to many conditions, one of which is cataracts. If diplopia is still present with one eye occluded, refer to the doctor's notes from the exam for references to cataracts. Binocular diplopia can be caused by severe anisometropia or antimetropia, especially up close. Both binocular and monocular diplopia can also be caused by the patient looking through the ledge of a bifocal or trifocal segment – especially with the thick ledge of an executive (more noticeable with a lens material other than glass since glass incorporates a fused design as opposed to having the ledge molded onto the front surface of a plastic lens). An AR coating can sometimes help reduce this visual complaint since occasionally this complaint can be aggravated by light scatter from the ledge of the segment. A sudden onset of binocular diplopia can also be a symptom of serious systemic disease, such as a brain tumor or aneurysm. The optician must be aware of all the possible causes for the particular complaint. If the optician is unable to resolve the diplopia by adjustment, the patient should be referred to the doctor.

Complaint: distortion

Visual issues related to distortion of horizontal and/or vertical objects, can be related to factors such as:

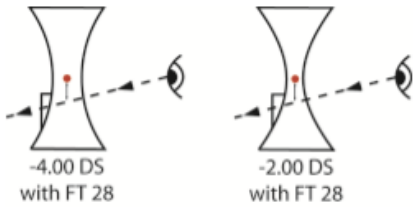
- Warping due to sizing issues:
  Some patients experience visual discomfort from warping in a lens caused by incorrect sizing during the lens finishing process. A lens measuring one base curve horizontally and a different one vertically, or vice versa, was probably sized incorrectly during finishing and then squeezed into the frame.
- Material incompatibility:
  Some patients experience visual discomfort from certain lens materials such as high index materials, or polycarbonate. Aspheric designs can also create similar types of discomfort.
- Color dispersion:
  Patients will occasionally notice color dispersion (visible light being broken down into its spectral components), from materials such as polycarbonate and high index plastics. This phenomenon is known as chromatic aberration which is

exacerbated by low abbe values. The abbe, or aberration value of a material is a measure of its dispersive properties. And there is an inverse relationship between refractive index and abbe value: materials with a higher refractive index have lower abbe values and, subsequently, higher dispersive properties, making them more likely to exhibit such aberrations. This is one disadvantage of high refractive index materials.

- Objects appearing to shift, or double-up, with lined multifocal lenses:
  Patients with anisometropia or antimetropia can often experience vertical imbalance from their multifocal lenses, especially with near tasks. Vertical imbalance can be induced when a patient uses a multifocal lens as their line of sight shifts away from the lens optical center to look through the multifocal segment. When there is a power difference greater than 1.5D between each eye in the 90˚(vertical) meridian, the induced imbalance can cause symptoms such as visual discomfort and diplopia, making near work difficult.

Vertical Imbalance Example

Vertical imbalance results from the induced prismatic effect of each lens, at the near point. Prentice's Rule, as stated earlier, can be used to calculate the amount of prism induced: P = d x D
Consider this scenario:



Assuming 10mm (or 1cm) from the OC to the point viewed through when using the bifocal seg: OD: Prism = 10mm (or 1cm) x 4 = 4 prism diopters and since the lens is "minus," the prism is Base Down (BD)

OS: Prism = 10mm (or 1cm) x 2 = 2 prism diopters and once again is Base Down (BD)

Vertical Imbalance = 4BD – 2BD = Net of 2 prism diopters: stereopsis at near would be compromised.

The most common method used to compensate for this imbalance is "slab off" prism, also referred to as "bicentric grinding." Alternatively, "reverse slab" can also be used.

Slab off, or bicentric grinding, incorporates Base Up prism ground to offset excessive Base Down prism, and it should always be applied to the least plus, or most minus lens. Reverse slab used molded Base Down prism to offset excessive Base Up prism, and it should always be applied to the most plus, or least minus lens. However, both slab off and reverse slab will achieve the same objective: resolve the effects of vertical imbalance.

So, 2 diopters of slab off prism should be applied to the OD lens to neutralize the resultant vertical imbalance, or 2 diopters of reverse slab off to the OS.

It should be noted that vertical imbalance, under most circumstances, is independent of the add power and only affected by the distance power in the 90˚ meridian and the distance from the OC to the point in the lens viewed through when using the full add power – assumed to be 10mm as a standard for calculation purposes. Good binocular vision is also necessary for patients to experience vertical imbalance; accordingly, patients with compromised best acuities will generally be unaffected.

- Depth perception issues:
  Patients receiving glasses for the first time or glasses with a dramatic change in prescription will often require an adaptation period to get used to the different sized images the eyes are receiving, compared to what the brain is used to seeing as "real." In addition, a patient with anisometropia or antimetropia will often have initial, if not long-term problems with stereopsis and depth perception. Keeping the lens thickness and vertex distance to a minimum will help minimize image disparity as much as possible and reduce the potential for such outcomes.

P = Plan

Step 6: Evaluate the information obtained and consult with the prescribing doctor to discuss your findings. The doctor will then decide whether, or not, they wish to re-refract the patient, or simply incorporate the changes based on your report. Note: Some patients, especially the elderly, regardless of whether the acuities attainable may be the best possible, need to hear this directly from the doctor. This can help put their minds at ease, being forced to deal with such harsh realities.

Now, let's explore come real patient examples . . .

Patient Example #1

S: 38-year-old female presented with headaches and experiencing a swimming sensation after wearing her new prescription for more than 30 minutes.

O: Time since dispense: 5 days.
Prescription verifies as ordered except for PD and Prism – should be 1BO OD.
Verification:

-3.25 DS 3/4BO Prism OD
-3.25 -0.50 x 034

PD ordered 30mm OU, received 32/30

BC: OD: vertical +3.25, horizontal +3.25
OS: vertical +3.25, horizontal +4.00

Patient's previous prescription:
-3.00 DS 1BO Prism OD
-3.00 DS

BC: OD: vertical +3.00, horizontal +6.00
OS: vertical +5.00, horizontal +5.00

A: Minor change in Rx.
Warping worse in old glasses than new.
Horizontal OCs off by 2mm OD = 0.2cm.

Induced prism caused by incorrect horizontal OCs, using Prentice's Rule calculates as:
P = dD = .2 x 3.25 = .65 Prism Diopters

The OCs are wide on a minus lens and therefore the prism is Base In.

P: Rx check with doctor. Re-make glasses on the closest BC available to a +4.50 (an average from the patient's old glasses), ensure no warping during finishing and perfect horizontal OCs.

Result: following Rx check with doctor, Rx re-written as:
-3.00DS 1BO
-3.00 – 0.25 x 040

Glasses were re-made and verified exactly as ordered, no warping and perfect OCs. Patient immediately noticed an improvement at dispense.

Patient Example #2

S: 50-year-old female presented with distance and near problems with her new progressives.

O: Time since dispense: 15 days
Prescription verifies as:
Pl -0.62 x 037 Add: +1.62
+1.25 -0.50 x 141 Add: +1.62

Ordered as:

-0.25 -0.50 x 037 Add: +1.75
+1.25 -0.50 x 137 Add: +1.75

Previous Rx: OTC +2.50 readers

OCs and seg heights verify as ordered.

A: Patient tilts head down to improve distance marginally, but not a great improvement.

OD off by -0.25DS and add power only measuring +1.62 OU probably due to shape of frame cutting off part of the add – steep nasal cut and seg fit at minimum necessary for progressive selected.

Referring to exam info:

- Patient had no initial complaints with distance, just difficulties at near;
- OS congenital amblyopia – BCVA 20/50+2, OD BCVA 20/20-1;
- History of a retinal tear OD more than 10 years ago, and patient reported a concussion in 2009 resulting in a noticeable change in vision.
- Amblyopia OS possibly contributing to adaptation problems with progressives.
- Anisometropia probably not a contributing factor due to reduced acuities OS.
- Otherwise, an unremarkable medical history.

Increased pantoscopic tilt improves the distance by an inadequate amount.

NOTE: Patient now requests single vision readers only.

Trial lens over-refraction (O/R) at near point: +0.25/+0.50 OU – patient likes +0.50 OU.

Near is much improved.

Trial frame full prescription to confirm:

OD +2.00 -0.50 x 037
OS +3.50 -0.50 x 137

Patient likes trial frame powers for near.

P: Discuss findings with doctor and recommend re-making glasses as single vision readers.

Doctor okayed single vision readers re-made to new Rx. At dispense, patient happy with vision and absence of progressive.

Patient Example #3

S: 58-year-old female presents with distance problems wearing her new progressives – near is good.

O: Time since dispense: 7 days
Rx verifies as ordered:

+2.50 -0.75 x 090 Add: +2.50
+2.25 -0.75 x 085 Add: +2.50

Previous Rx verifies as:

+2.25 -0.75 x 097 Add: +2.25
+2.00 -0.75 x 088 Add: +2.25

A: No improvement in distance with lowering of chin. Patient used her own frame for new lenses, and segment height and OCs verify as ordered, and match the previous lenses. Progressive lens style also matches the patient's previous lenses. Minor change in prescription +0.25 OU in distance combined with +0.25 increase in add power OU.

Trial lens O/R with +/- 0.25 over distance. Patient likes -0.25 much better, which reverts the patient's Rx to her old distance powers.

P: Discuss findings with doctor and recommend Rx change to:

+2.25 -0.75 x 090 Add +2.50
+2.00 -0.75 x 085 Add +2.50

Doctor agreed with recommended Rx change. Re-make glasses to new Rx. Patient liked vision from the revised Rx.

Note: In two out of the three above situations, the patient's complaint was resolved by the optician without the need for a return visit with the doctor.

SIDE BAR*: Accommodation and Add Power Determination*

Accommodative ability is a measure of how much a patient can accommodate (increase the converging power of the crystalline lens to focus up close). The patient's add power is determined by factoring in how much accommodative ability the patient has and supplementing it with additional power in the glasses to equal the accommodation necessary to work at the required working distance. The doctor will typically prescribe an add power that allows for the patient to use some of their accommodative ability. Patients over approximately 65 years of age, in addition to those who have had cataract surgery, have no accommodative ability; in which case, all the focusing power needed will be provided by the glasses.

The standard working distance for near is 40cm, or 16 inches, and an emmetropic patient would need to apply 2.50D of accommodation to focus at this distance.

This is calculated as follows:

Working Distance (WD) in meters = 40cm = 0.4m

Power = 1 / focal length (or WD) in meters = 1 / 0.4 = 2.50D

If the patient requested their near working distance to be 80cm = 0.8m

Power = 1 / 0.8 = 1.25D

Note: WD is twice the standard and the accommodation needed at that increased distance, for an emmetropic eye, is half the standard. This is an inverse linear relationship.

This knowledge can be used to determine the add power needed at any working distance providing the add power is known for a specified distance.

SIDE BAR*: Accommodation and Add Power Determination, continued*

Example 1:
The doctor has written a prescription with a +2.00 add power, which we know will allow the patient to work at 40cm, or 16 inches. However, the patient requests a working distance of 32 inches (80cm).

We know that the relationship between WD and add power is inversely linear:
Therefore, if we double the WD, we need to halve the add power.
Thus, the add power needed for 80cm would be +1.00.

Things become a little more difficult when dealing with adds such as +2.25 where half would equal +1.12D which is an impractical add power. In such a scenario, is it better to give the patient a +1.00 or +1.25 add? The safest way to determine this is by asking the doctor.

Example 2:
The doctor has determined a +2.00 add will allow the patient to work at 16 inches or 40cm. The patient is requesting a pair of music glasses to work at 25inches.
25 inches = 62.5 cm = 0.625m

There is a mathematical way of precisely calculating the add power needed, but there is a much easier way:
62.5cm is a little more than halfway between 40cm and 80cm.

We know:
A WD of 40cm would require a +2.00 add
A WD of 80cm would require a +1.00 add

Therefore…
A +1.25 add would give a WD of 70cm
A +1.75 add would give a WD of 50cm

So, a WD of 60cm would require a +1.50 Add – the closest add available for the WD required.

Understanding problem-solving techniques, such as these, will help the optician and doctor get to the root of the patient's problem more efficiently. It also expands the optician's role as an eye care professional and demonstrates his/her advanced knowledge to the patient. Clearly, an optician who possesses such problem-solving skills will serve multiple needs including:

- Elevating society's perceived role of the optician to that of a valuable and knowledgeable member of the eye care team.
- Providing an opportunity for the patient's complaints to be resolved without having to schedule a return visit with the doctor.
- Opening an appointment slot for a billable patient instead of a no-charge, prescription re-check.

Do opticians dread hearing complaints? Of course. . . who doesn't? However, such occurrences should also be embraced as a challenge and opportunity to learn and grow as an eye care professional and provider.

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