WORKING WITH CUSTOMIZED AND PERSONALIZED FREE-FORM LENSES

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Why You Should Offer Personalized Lenses to Your Patients

- It allows you to offer customized lens products that your competition may not offer
- Provides an enhanced visual experience
- Increases profitability of your practice

Why?

- Many discriminating patients want to take advantage of technological advances
- Many are willing to make a more significant "investment" in their eyewear if the reward is improved vision

Why?

- Understanding the products you choose to feature is critical to success with customized/optimized products
- The sale starts in the exam chair and sharing the fact that the doctor introduced the products should be discussed during the doctor/dispenser hand-off

Making Money

- Take advantage of training of office personnel that may be available from lens manufacturer or your optical laboratory
- Remember to educate the patient as well. They want you to provide them with value for their investment
- Address these products in all marketing, both online and within the waiting room and dispensary

Free-form Technology

- Free-form (also referred to as all-format or direct lens surfacing) is to lenses what hand tailoring is to clothing.
- Although the technology was introduced in the U.S. in 1996, and has been utilized for several years
- Free-form technology is not limited to lens manufacturing

Free-form Process

- The free-form process revolves around the appropriate software, programs, and equipment to produce premium PAL and single vision lenses.

- A free-form generator is a lathe-to-polish machine.

Free-form Process

- Free-form is descriptive of the computer-controlled process
- A liquid monomer is cast in a mold, resulting in a single vision semi-finished lens blank which is “free-formed” under the guidance of sophisticated software
- This process includes calculation, cutting, and polishing.

Why Recommend Free-form ?

- Free-form lenses offer crisp vision in every zone, with a wider field of view.
- Because the lenses are personalized, no two lenses are alike, so each offers finely-tuned vision appropriate for an individual.
- They are also thinner, so users will have crisper, sharper, more natural vision with more wearing comfort, and the lenses will look great.

HIGHER-ORDER ABERRATIONS (HOAS)

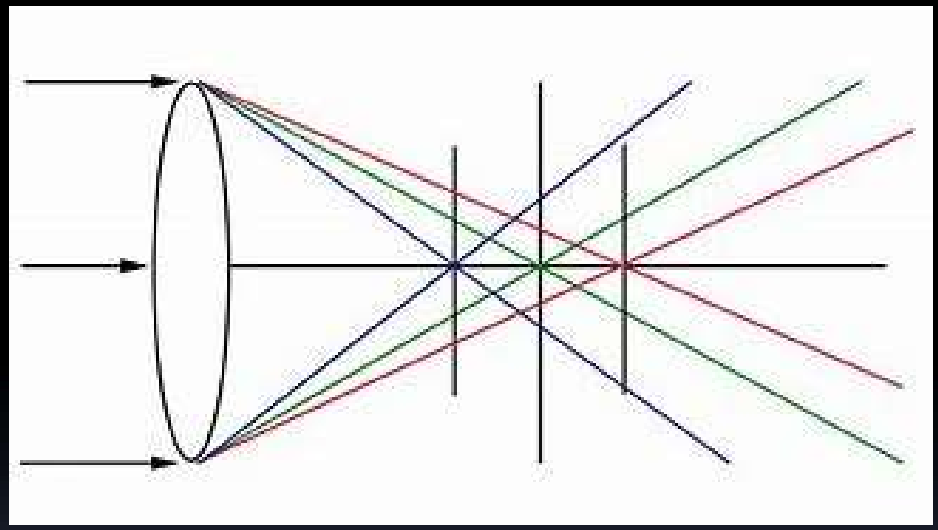
- Focusing errors that are more complex than myopia, hyperopia, and astigmatism.
- These aberrations (such as coma and trefoil) manifest themselves as peripheral errors and are not measured in traditional refractive exams.
- .

HIGHER-ORDER ABERRATIONS (HOAS)

- HOAs can degrade visual quality, especially in low-light conditions when the pupil is enlarged.
- The most advanced freeform lens designs work in conjunction with a system that tests for HOAs and calculates surface designs to address them.
- While a spectacle lens prescription cannot correct HOAs, it can be optimized to minimize their effects

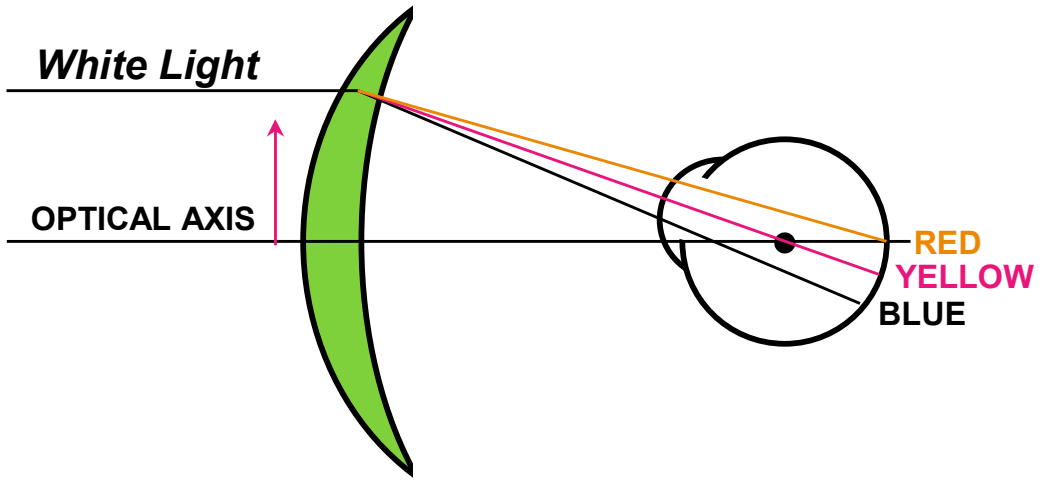
Chromatic Aberration

- Tends to be a problem in low Abbe value lenses that are often used in high powers



Chromatic Aberration

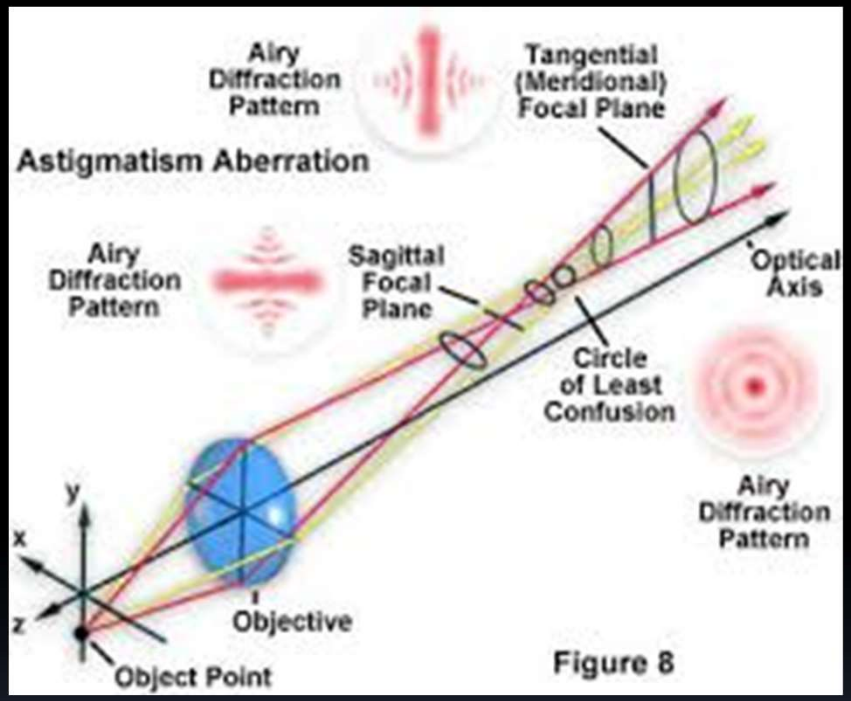
- Proper lens design reduces the intolerance to the chromatic aberration of lenses



Lateral chromatic aberration

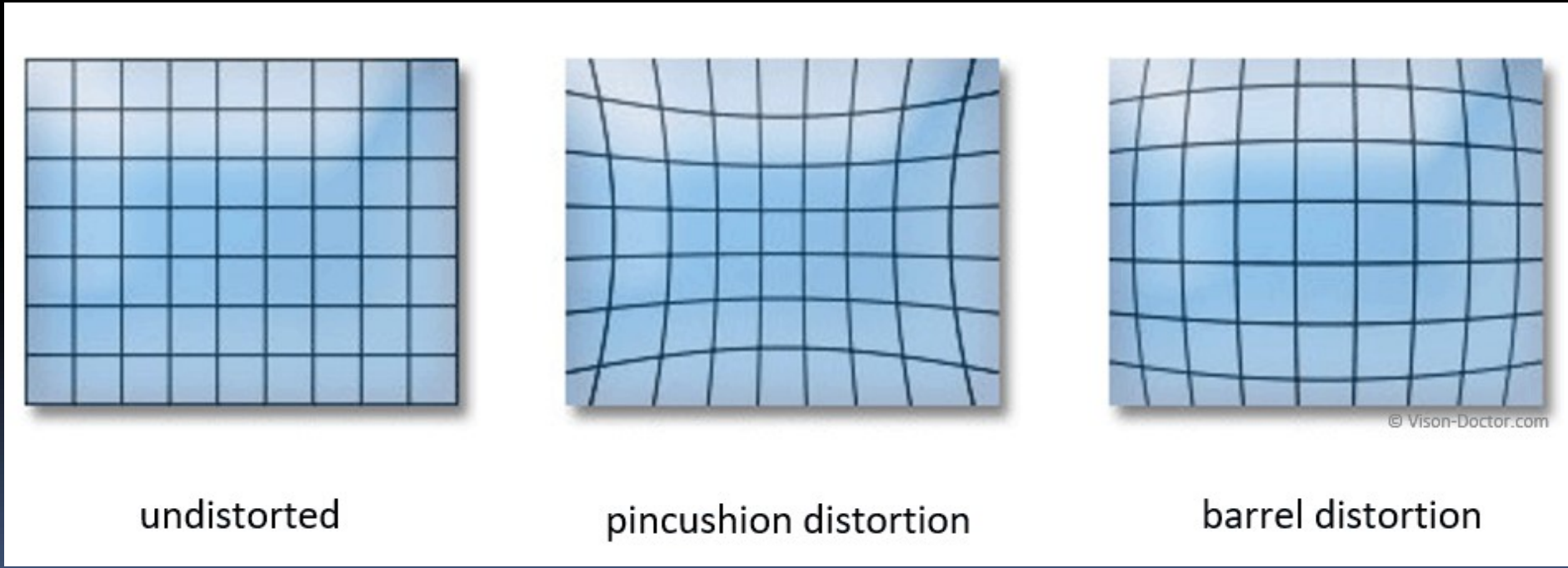
Oblique Astigmatism

- Oblique astigmatism is an aberration of off-axis rays that causes radial and tangential lines in the object plane to focus sharply at different distances in the image space.



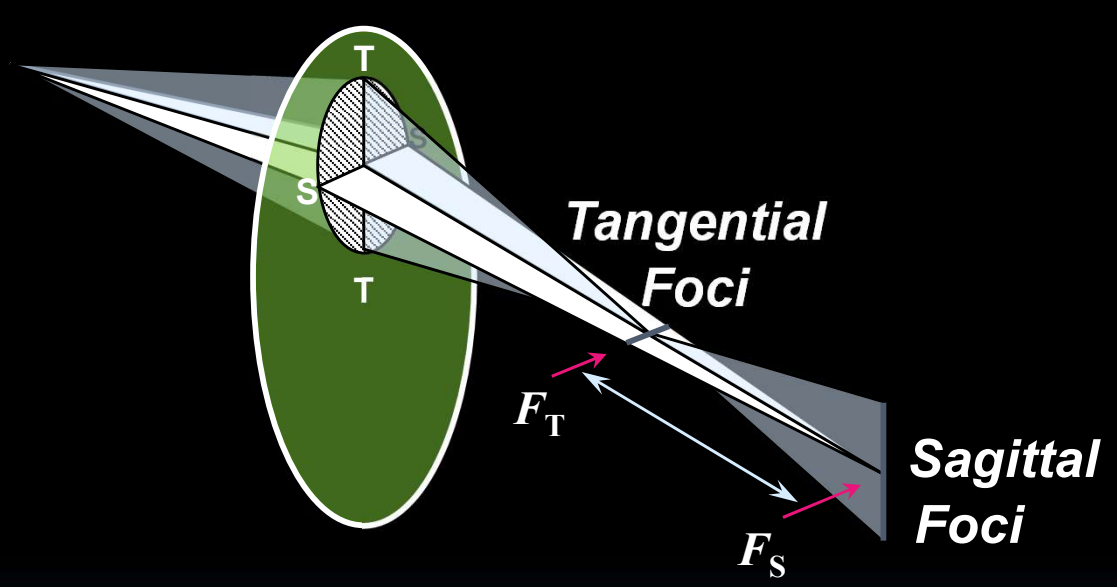
Distortion

- In ophthalmic optics, "pin-cushion" distortion occurs with plus lenses whereas "barrel" distortion occurs with minus lenses A visual image of the effects of distortion in plus and minus lenses



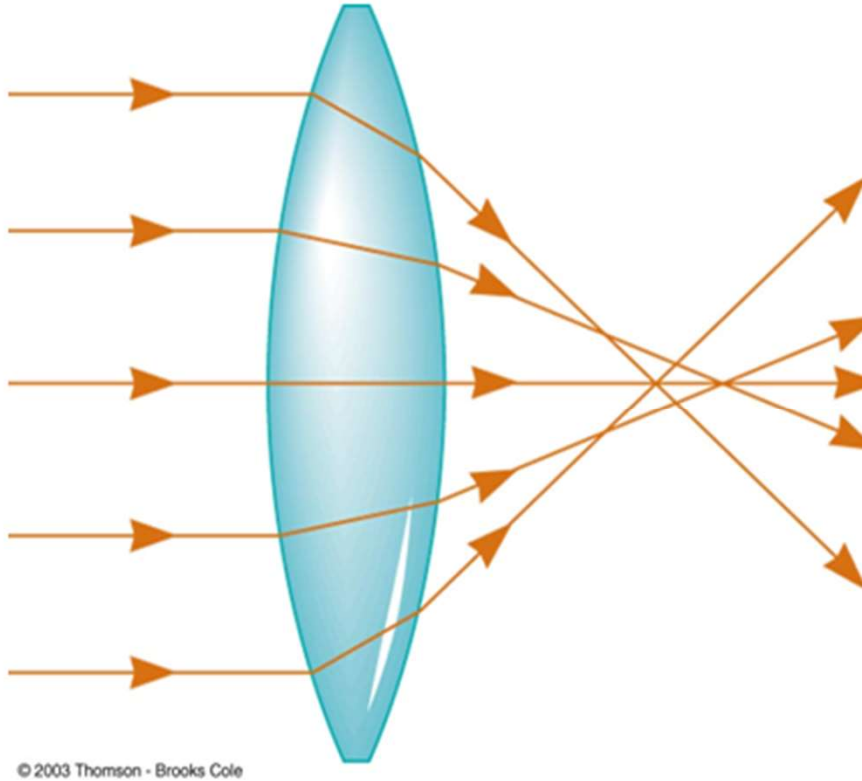
Oblique Astigmatism

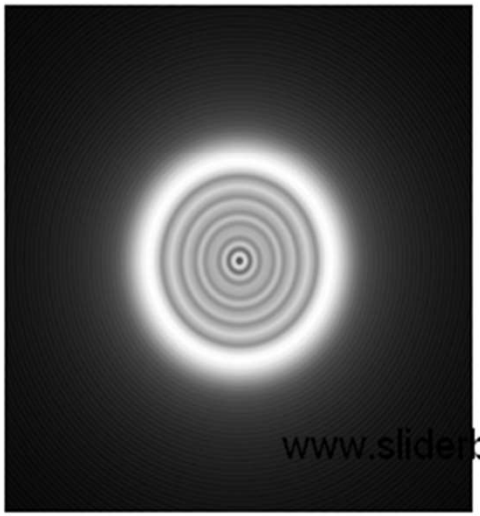
- Also called marginal astigmatism
- Light passing through the lens focuses away from the horizontal or vertical meridians
- Lens designers can usually control the problem



Spherical Aberration

- For a lens, spherical aberration results from the focal points of light rays far from the principle axis are different from the focal points of rays passing near the axis





Coma Aberration

- A defect in the imaging of objects off the optical axis in which there is a bright central area and a tail of lesser brightness

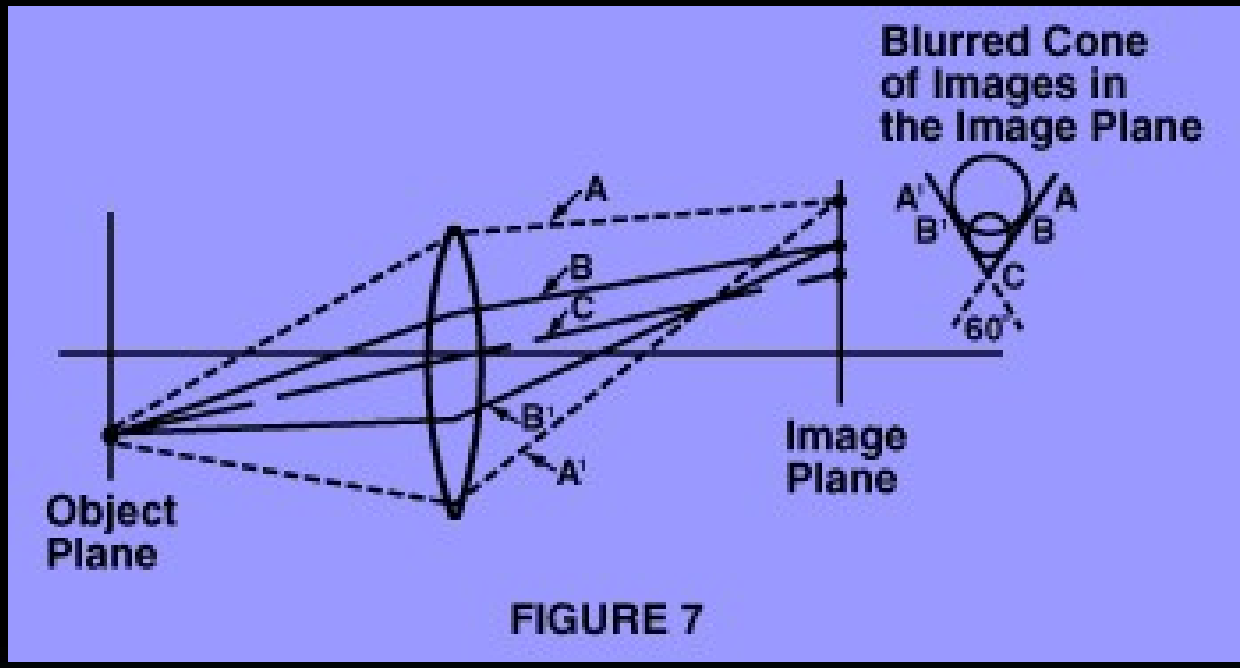
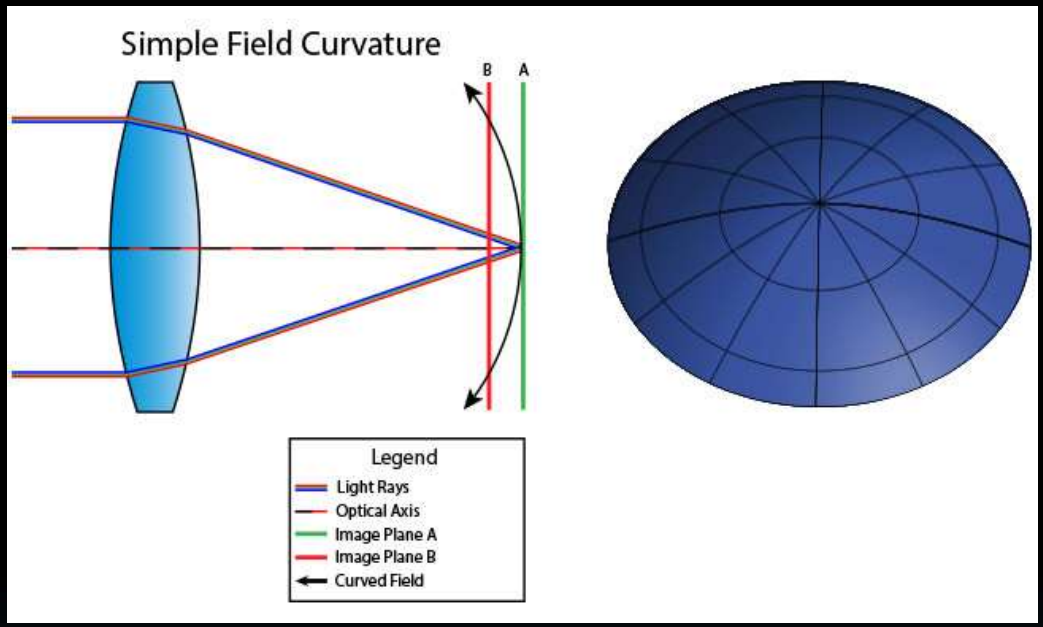


FIGURE 7

Curvature of Field

- The center of the image is in focus, while the periphery is out of focus



Free-form Technology

- Free-form lenses are fabricated differently than any other type of lens design.
- The lenses currently cost more than traditionally produced lenses, but the visual benefits are immediately apparent.

Free-form Technology

- Using proprietary software and computer numerically controlled (CNC) technology, the required patient specification can be very rapidly interpreted as the design criterion, which is then fed to high speed and precision free-form machinery.

Free-form Technology

- This consists of three dimensional diamond cutting spindles, which grind the highly complex lens surfaces to an accuracy of 0.01D.
- It is possible to grind either or both lens surfaces using this method.
- With the latest generation of progressives, some manufacturers retained the molded semi-finished blanks and use free-form technology to produce the optimum prescription surface.

Free-form Fundamentals

- Free-form is based on two fundamentals
- Design - the correct geometrics for the optimal optical surfaces must be found
- Production - intricate surface designs can be produced with Free-form equipment

Are Free-form Lenses Better?

- The resulting lens is only as good as the measurements, software computations, and generator/processing quality allows.
- So, the ECP (measurements), manufacturer (software design), and lab (processor) are each responsible for the success of the final lens product.
- Free-form manufacturing creates lenses unique to each company's proprietary designs and process.

Are Free-form Lenses Better than Traditionally Surfaced?

- Free-form manufacturing creates lenses unique to each company's proprietary designs and process.

Using Both Sides of a Lens

- Front-side and backside free-form typically places Rx curves on the lens's back surface, while, depending on the manufacturer's design requirements, free-form design can be placed on one or both sides of a lens.

- Any design that's been researched and developed can be created

Three levels of free-form processing - Basic

- Like a high-quality off-the-rack shirt.
- Lenses feature aspheric, atoric, or aspheric and atoric design, resulting in thinner, typically lighter, and slightly more defined vision than standard lenses.

Three levels of free-form processing – Semi-personalized

- Like an off-the-rack suit with tailoring.
- These lenses feature everything a basic lens does and can be fabricated to fit the individual Rx, resulting in wider, more usable fields of vision.

Three levels of free-form processing - CUSTOMIZED

- Lenses incorporate all the basic and semi-personalized features and benefits, plus can be fabricated to fit each individual Rx, complex measurements, frame shape and size, how the wearer uses their eyes, and even particular lifestyle usage

Are Free-form Lenses Better?

- The manufacturing process yields the product; free-form production results in a lens.
- The difference with free-form from the traditional processing and product is that the lens is designed by advanced software that inputs specific data into free-form generators.

Benefits to Progressives Wearers

- Minimized oblique astigmatism & reduction of power error in the whole field of view
- Correct power experienced by the wearer over a much larger part of the lens surface

Benefits to Progressives Wearers

- Exact lens power is accurately computed at any point on the lens (more than 100,000 points on a progressive lens
- Easier adaptation for new wearers – reduced rejection rate

Benefits to Patient

- While everyone can benefit to a certain extent from customized lenses, people with complex prescriptions and progressive wearers will notice the greatest visual improvements.

- Free-form lenses can reduce glare and halo effects caused by light sources at night, such as car headlights

Progressive Lenses

- Lens design can be individualized for each patient, taking into consideration:
  - the frame selected
  - individual traits
  - hobbies & use of spectacles
  - eye movement
  - vertex distance
  - pantoscopic and faceform angle

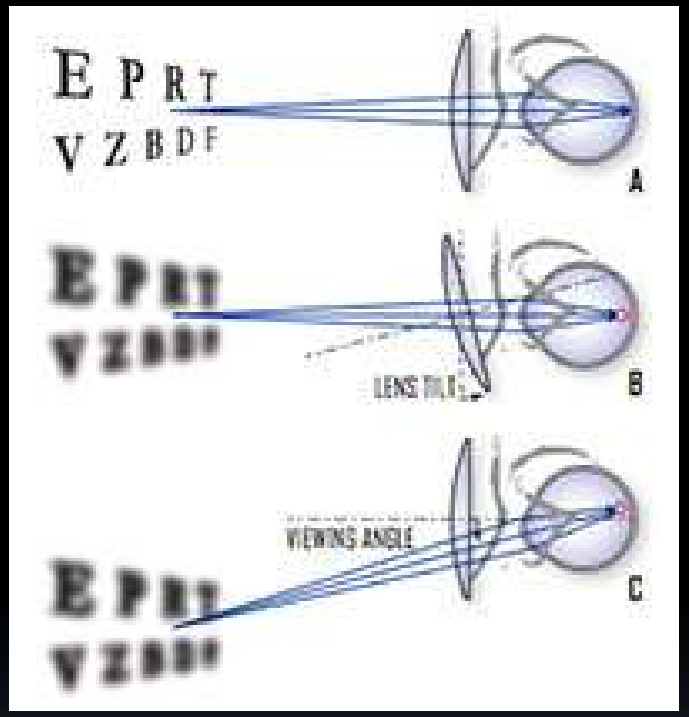
Fit and Frames

- Once you select your frame, several new measurements can be made, including how close the frame sits to the front of your eye, how the frame is angled in relation to your eye, how the frame wraps around your face, and even how you tilt your head.

- These customized measurements ensure that when you wear your new high-tech glasses, your prescription will be as clear as it was meant to be.

Position of Wear

- POW or "position of wear" is a term that is used to describe the way that an eyeglass frame positions lenses in front of the eye.
- When the tilt, face-form and vertex distance of lenses change in front of the eye, the effective power of the lens also changes as well as vision through the lens' periphery.
- It's no longer the actual prescription.



Position of Wear

- Since virtually every eyeglass wearer has different facial features, asymmetry and varying ear positions, the same frame fits many faces differently.
- That means that to deliver the right prescription with more precision, POW should be considered.

Position of Wear

- When POW values are considered during the surfacing process, lens powers can be optimized to deliver the best prescription for the differences created by the frame.

- Due to the optical effects associated with oblique refraction through a lens, the position of wear can have important visual consequences for the wearer.

POSITION OF WEAR

- The placement and orientation of the lens is relative to the wearer's eye allowing for more precise optical calculations.
- This includes segment height and position relative to center pupil, pantoscopic tilt, face form/wrap, and measured back vertex distance.

POSITION OF WEAR

- Standard spectacle prescriptions are typically determined assuming an average for those measurements which can compromise the optics by inducing unwanted astigmatism or altering the perceived power.

- Free-form software compensates the lens design based on lens placement and orientation, maintaining a patient's optimal prescription regardless of frame fit.

Fitting

- Both a monocular PD and fitting height should be taken for optimized single vision lenses.
- This will ensure that the design is correctly centered in the lens based on pupil center height and the vertical and horizontal tilt of the lens.

Measuring Fitting Height

- Next, have the patient put their glasses back on and stand up
- Have them look out the front window at something that is at eye level more than 20 feet away.
- Stand in front of them and verify pupil center
- The line should go through pupil center

Measuring Fitting Height, Tilt and Wrap

- To measure tilt and wrap the easy way i.e., before you can afford a digital measuring system, practice this method with a colleague in your office.

- This method gives you tilt and wrap values for single vision and progressives and is done when measuring fitting or segment height. That saves time.

Measuring Fitting Height

- Adjust the patient's frame to its final wearing position.
- Seated in front of the patient, with your eyes at the same height as their eyes, dot pupil center (fitting height).

Measuring Fitting Height

- They should be looking directly at you so each of their eyes are looking straight ahead, (I highly recommend a height adjustable chair)
- First use your left eye to dot the right lens and then the right eye to dot their left lens.
- Then take their glasses from them and draw a straight line across the dot

Measuring Vertex Distance

- A simple hand-held device, the distometer can measure the Back Vertex distance
- The manufacturer provides a wheel that allows you to determine compensated power(s)

Measuring the Ratio of Head to Eye Movement (Eye Tracking)

- **Eye tracking** is the process of measuring either the point of gaze (where one is looking) or the motion of an eye relative to the head.
- An **eye tracker** is a device for measuring eye positions and eye movement
- Eye trackers are used in research on the visual system
- There are a number of methods for measuring eye movement. The most popular variant uses video images from which the eye position is extracted..

Free-form

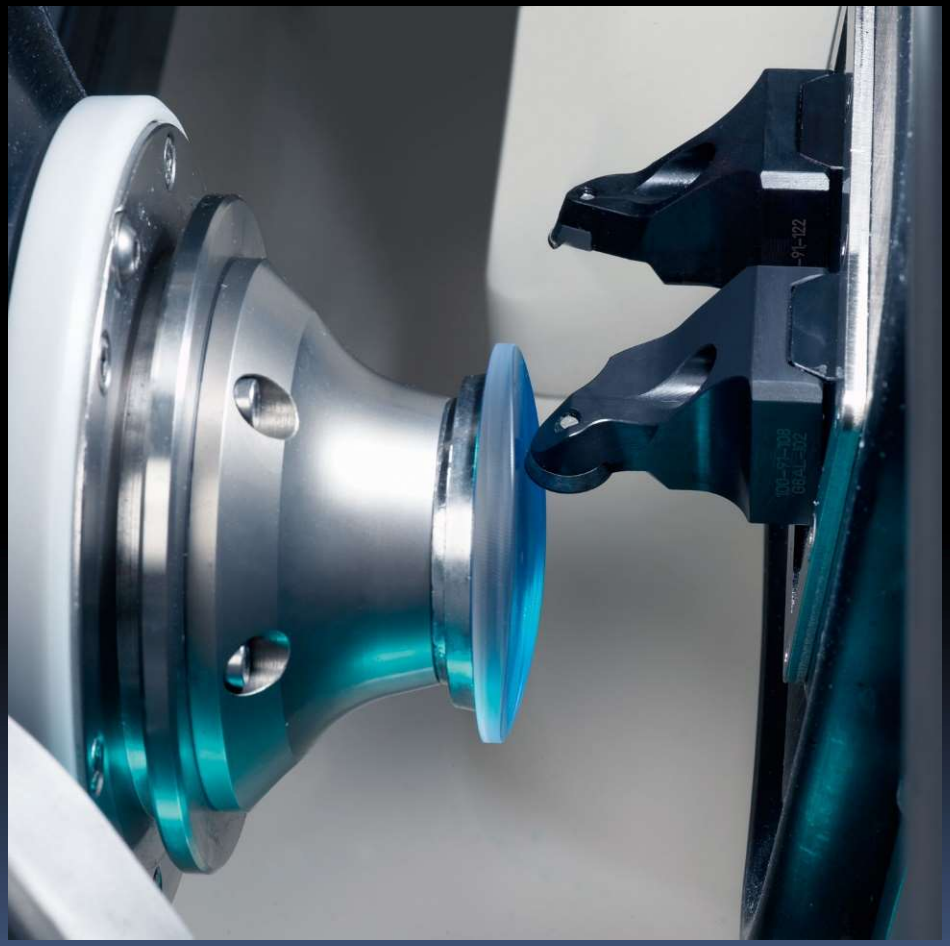
- Natural, crisp, sharp vision is the most commonly reported benefit of free-form produced lenses.
- Wearers in high power ranges are likely to have a “wow” visual experience when they first put on their new lenses.

FREE-FORM GENERATOR

- A multiple-axis machine that produces a design on a lens surface with CNC instructions from software.
- Free-form generators are actually lathes utilizing a “single-point” diamond cutting tool.

Freeform generator

3-D Lens Generation



Free-form

- Only some free-form PALs require additional measurements such as pantoscopic tilt and vertex distance, and a few require use of unique measuring tools.
- Check with the manufacturer or lab to ensure that the proper training, fitting techniques, and tools are used.

Free-form

- While many free-form lenses return from the lab with a compensated Rx (typically the practice receives an as-prescribed/as-worn Rx and a compensated Rx), the Rx should be verified by using a lensometer and the compensated Rx paperwork.

FREE-FORM GENERATOR

- As the lens blank spins, a single point diamond cutter passes along its surface like a record needle, distinctly carving each point into the lens.
- This allows for a more refined design than traditional surfacing generators to a much smoother surface, requiring less fining and polishing

POINT FILE

- A software file that translates the lens design into a ‘language’ that describes, in mathematical terms, the directions to a 3+ axis generator to cut the optimal curve(s) for thousands of points on a particular lens surface.

- The point file is the key in directing the free-form surfacing equipment.

Devices for Measuring Pantoscopic Tilt

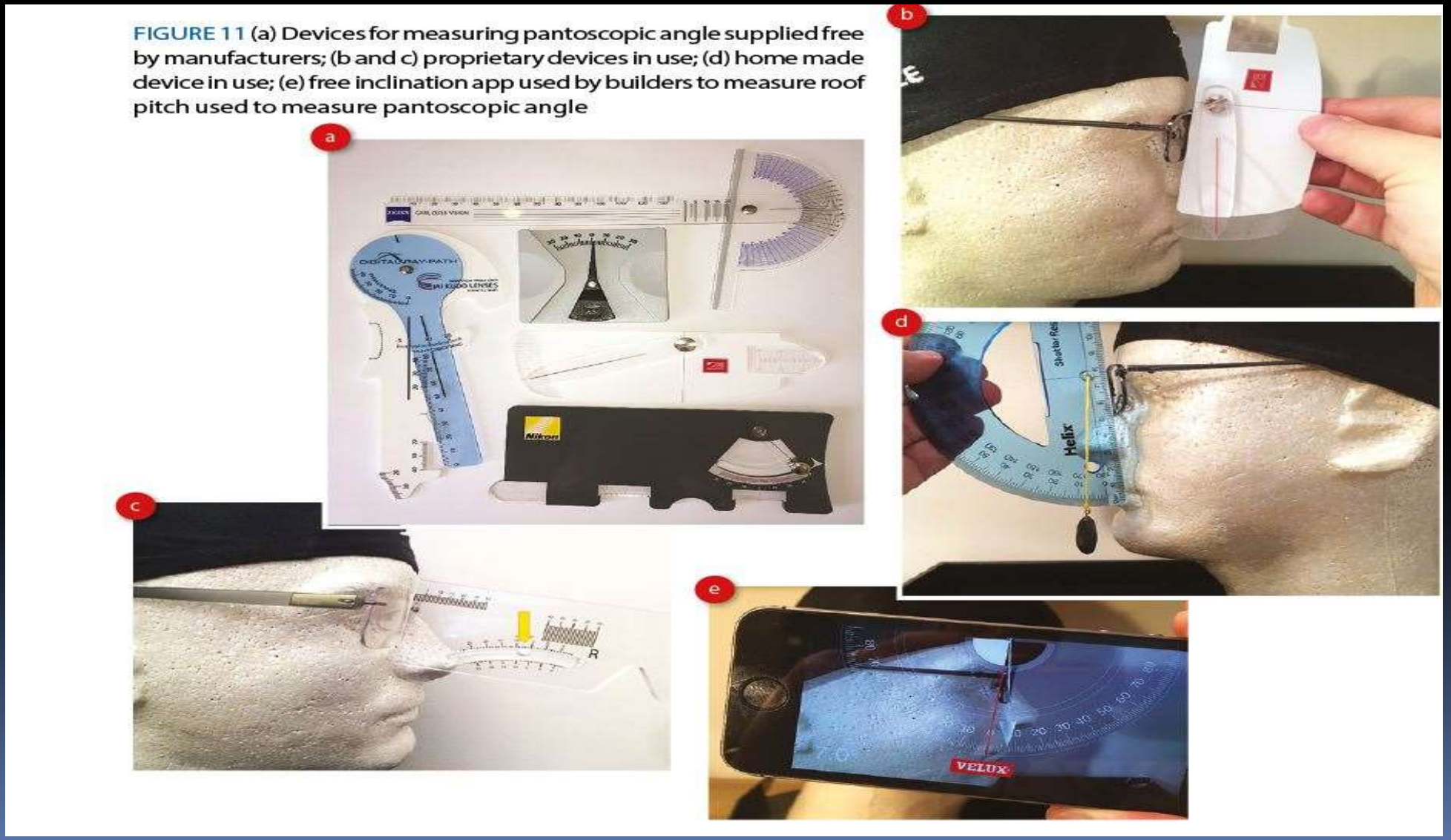


FIGURE 11 (a) Devices for measuring pantoscopic angle supplied free by manufacturers; (b and c) proprietary devices in use; (d) home made device in use; (e) free inclination app used by builders to measure roof pitch used to measure pantoscopic angle

Measuring Monocular P.D

- I am a big believer in accurate monocular measurements, including PD and multifocal segment heights

Frame Wrap

- Frame wrap angle describes the horizontal angle of the lens plane in front of the eyes.

- The total frame wrap angle is measured with a common protractor, with one lens placed along the baseline of the protractor, and tracing a line tangent to the nasal and temporal limits of the opposite eyewire.

(Santini 20/20)

Frame Wrap

- **The total wrap angle is then halved to obtain the angle for an individual eye.**

- Unlike Pantoscopic tilt, frame wrap is a non-yoked measurement, meaning the tilt of a lens is opposite for each eye.

(Santini 20/20)

Ocular Dominance

- Ocular or eye dominance is the tendency to prefer visual input from one eye to the other
- It is somewhat analogous to the laterality of right- or left-handedness; however, the side of the dominant eye and the dominant hand do not always match
- This is because both hemispheres control both eyes, but each one takes charge of a different half of the field of vision, and therefore a different half of both retinas. There is thus no direct analogy between "handedness" and "eyedness" as lateral phenomena.

Eye Dominance

- Approximately two-thirds of the population is right-eye dominant and one-third left-eye dominant however in a small portion of the population neither eye is dominant.
- Dominance does appear to change depending upon direction of gaze due to image size changes on the retinas

Digital Measuring Instruments

Digital Measuring Devices

- A new generation of eyewear dispensing technology is helping eyecare professionals
- The new technologies by Carl Zeiss Vision, Essilor, Optikam, ABS and Shamir Insight—range from cutting-edge dispensing systems that take digital photographs and measurements to simple hand tools.
- What they have in common is the ability to precisely capture patient measurements, including how the frame fits the patient and the position in which it is worn.

Digital Measuring Devices

- Combining this biometric data with the patient's prescription and a digital lens design enables the optical laboratory to produce one-of-a-kind lenses that optimizes the performance of the lens and gives the wearer a totally personalized viewing experience. -

Digital Measurements

- Consider purchasing a computerized digital measuring system.
- The added frame reference device allows exact measurements of monocular and binocular PDs, fitting heights, pantoscopic angle, vertex distance and frame wrap in one step.
- It also may record near PDs and frame dimensions. Think of the immediate precision added to any office, the consistency of measurements across all staff and the improved information supplied to the lab.

Digital Measuring Devices

- Patients are often favorably impressed with the high tech look and feel of the dispensing system itself
- Taking digital photos of consumers trying on their new eyewear and then emailing them the photos, or demonstrating premium lens options is a byproduct.

Digital Measurements

- In Germany more than 60 percent of offices use sophisticated digital camera type measuring systems, and 30 percent of lenses are personalized.
- Personalized lenses are only a few percent in the U.S. the need for better measurements will grow as the use of personalized lenses increases.

DIGITAL FITTING MEASUREMENTS

- These are done with a device that takes precise position-of-wear measurements and, often, additional biometric measurements that influence the lens design.

DIGITAL FITTING MEASUREMENTS

- These electronic systems measure PD, fitting height, pantoscopic tilt, wrap, and vertex distance along with other fitting parameters more exactly than handheld mechanical devices.
- In addition, some of these aids assess wavefront data, eye-rotation center, and other factors that lead to truly personalized lenses.

Digital Measurements

- The added frame reference device allows exact measurements of monocular and binocular PDs, fitting heights, pantoscopic angle, vertex distance and frame wrap in one step.
- It also may record near PDs and frame dimensions.
- Think of the immediate precision added to any office, the consistency of measurements across all staff and the improved information supplied to the lab.

COMPENSATED RX

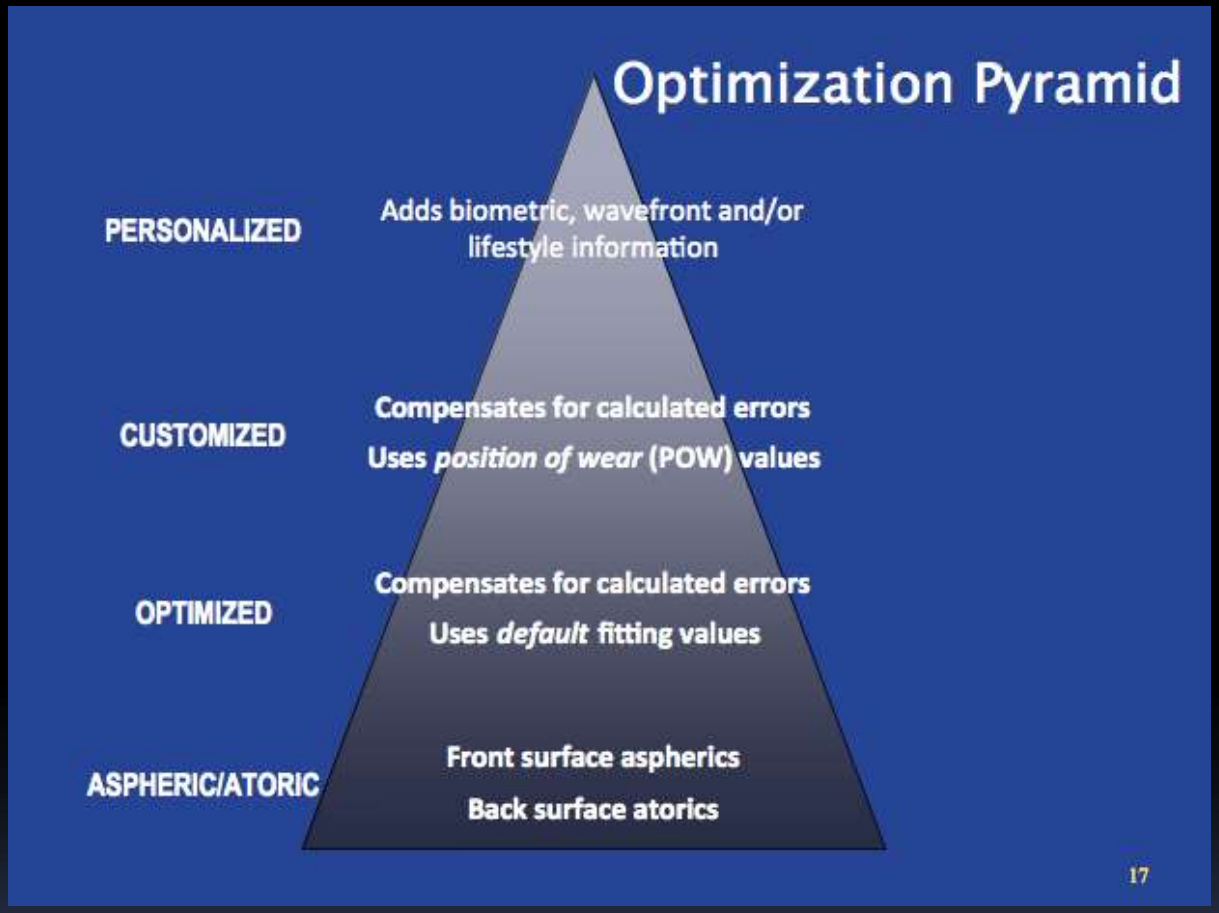
- A prescription compensated by free-form design that takes into account position-of wear measurements.
- This recalculated Rx is slightly different in power from the written Rx, but it assures that the wearer experiences the intended prescription.
- When completing a free-form lens job, the lab will usually send a card showing both the written and compensated prescriptions for neutralizing purposes.

The Optimization Pyramid

- Free-form and optimization allow new tiers of opportunities for wearers and opticians alike.
- The pyramid builds on best form lens designs, adds the correct asphericity for each principle meridian and optimizes the design from edge to edge using the actual way that the lens sits in front of the eye.

The Optimization Pyramid

- The result is that there is an "optimized" lens for any budget.
- At the top of the pyramid are the most complex and sophisticated of lenses.



The Optimization Pyramid Personalized

- Personalized lenses redesign each prescription using sophisticated instrument data plus the actual fitting and position of wear measurements.

- They might refine the prescription with wavefront measurements (higher and lower order aberrations), eye rotation center distance data or lifestyle input from the wearer.

The Optimization Pyramid Personalized

- For the office that prefers to be able to deliver the best in the category, invest in new measuring instruments and recommend the most personalized of lenses.

- Another option is to add monitors at the dispensing table to input lifestyle data.

The Optimization Pyramid Customized

- Don't intend to invest in new specialty instruments yet?
- Customized lenses are your best option.
- Take actual vertex, tilt and wrap measurements, along with monocular PD and fitting heights. Provide these values when ordering lenses.

The Optimization Pyramid Customized

- This allows the laboratory's free-form software systems to cut each individual prescription and lens design for each individual order.
- Contact your lab or lens supplier for tools to measure vertex, tilt and wrap angles.

The Optimization Pyramid Optimized

- If your office chooses not to use actual position of wear measurements yet, the lab will substitute a series of default values.

- This delivers an optimized lens. For example, one of the major lens manufacturer's labs will use a vertex of 14.5 mm, pantoscopic tilt of 9 degrees and wrap angle of 5 degrees for progressives.

The Optimization Pyramid Optimized

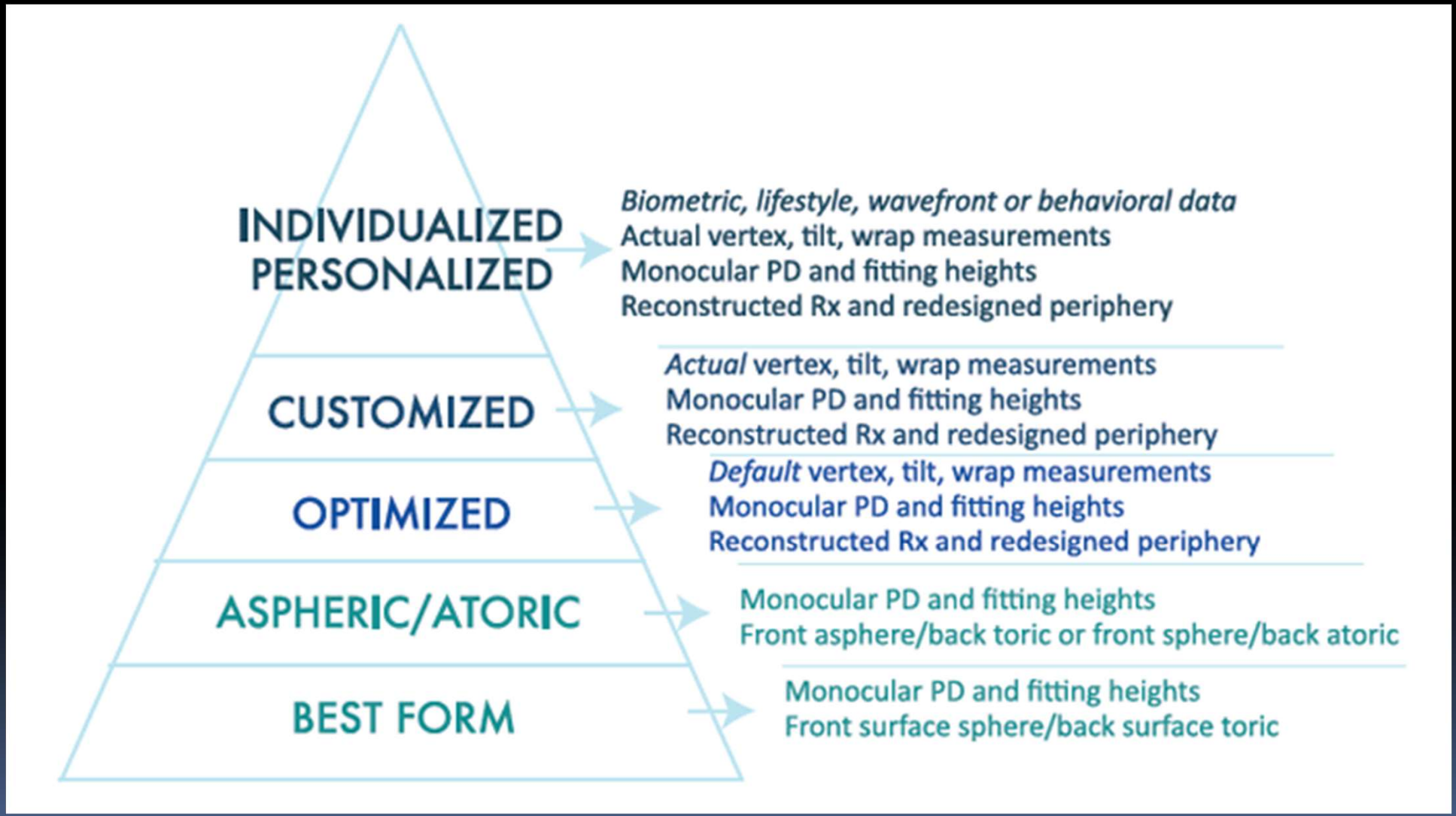
- In each case for personalized, customized and optimized, the result is a lens redesign of both the lens power delivered and a peripheral design that reflects each manufacturer's design philosophy.

- Optimization considers the errors that the progressive design creates at a particular vertex, tilt and wrap angle

LENS OPTIMIZATION

- A design philosophy that attempts to minimize lens aberrations so that every wearer obtains the same design advantage.
- In traditional design, lenses of different powers and with different base curves have different degrees of aberrations.

The Optimization Pyramid



ASPHERIC/ATORIC

- **Atoric lenses** have a spherical front surface and aspherized cylinder curves on the back surface.
- **Lens** designers can precisely optimize both the sphere meridian and the cylinder meridian to the base curve on the front **lens** surface. Atoricity offers a significantly wider field of vision.
- Adding aspheric curves, correcting for each meridian of power should be your new standard starting point in lenses.
- Not ready to jump from current lenses (base curves and best form designs)? Consider aspheric/atoric lenses.

LENS OPTIMIZATION

- Optimized freeform lenses attempt to keep aberration degrees the same across a range of prescriptions.
- Position-of-wear measurements are necessary to achieve optimal design.

LENS CUSTOMIZATION

- Lenses that anticipate wearer needs and address them.
- For example, some customized lenses have intermediate corridors with variable insets and lengths to correct for prism induced by the prescription.
- Some have several fitting heights or variable fitting heights in 0.1mm increments.

LENS PERSONALIZATION

- These are lenses that have been tailored in one or more ways so that they become as uniquely perfect for the wearer as possible.

- Personalization can be accomplished using wavefront measurements, eye rotation data, eye-movement/head-movement measurements, and wearer lifestyle information in addition to fitting parameters and Rx.

The Prescription

- Your eyes are digitally scanned by specialized, automated equipment that collects a number of data points on each eye.
- This data helps the equipment's software find the prescription that will not only account for your refractive error, but also the unique variations in the shape and surface of your eyes.

PRIVATE-LABEL LENSES

- These are house-brand lenses. Because free-form lenses can be produced by labs or optical retailers that have free-form equipment, some are producing their own house brand free-form lenses using software provided by the major-brand software vendors.

- This approach has been growing in popularity because it allows labs and retailers to present their own free-form lenses as a less expensive alternative to major-label freeform lenses as well as to have a lens that patients cannot buy elsewhere.

Free-form

- A free-form surface can be created on the front, back, or both sides of a lens blank.
- Each design—front side, backside, or both—claims different benefits for wearers.

Free-form

- Free-form production in and of itself doesn't assure that these lenses will be any different than traditional semi-finished lenses.
- The proprietary design is what can make free-form produced lenses more beneficial.

Free-Form Two-Step Process
Step 1 - Design

- Proprietary software inputs precise Rx data into the generator.
- Software guides the production of the lens.
- A point (data) file is strictly single-use as it holds specific information for only that Rx.

Step 2
SURFACE GENERATING

- The Computer Numerically Controlled (CNC) generating process includes roughing, finishing, and polishing.

- This system is known as cut-to-polish, and it eliminates the use of stock lenses since lenses are made on an as-needed basis.

Surfacing

- Prism thinning reduces lens thickness by equalizing the edge thickness at top and bottom.
- The same amount of prism thinning is added to both right and left lens so the result is a pair of lenses without imbalance.

Free-form Single Vision Lenses Surfacing

- In the lab, the lens will be blocked on the geometric center of the lens blank.
- Then, the lab's calculation system, using the blank's base curve, fitting parameters, PD and frame dimensions will calculate the final vertical location of the Prism Reference Point (or O.C.)

Prism Thinning

- Remember, in a prism-thinned prescription, the OC's will be at different heights however at the fitting point, there is no vertical imbalance.
- Also, prism thinning and prescriptions with oblique cylinders will have unequal thicknesses at the top and bottom of the lens.

VARIABLE CORRIDOR:

- A progressive with a corridor that lengthens or shortens based on the B measurement of the frame in which it will be inserted. Some free-form lenses adapt to individual frame heights as opposed to having a fixed corridor length.

SOFT POLISHER

- A tool made of foam or similar substance that polishes free-form surfaced lenses after the design has been cut into it by a freeform generator.

- Because the free-form lens design is so precise, special care must be taken during the polishing process not to alter the design.

SOFT POLISHER

- Luckily, free-form generators are so accurate that a heavy-handed polishing method is not needed.
- Traditional surfacing uses hard tools, sandpaper (fining pads), polishing pads soaked with a compound to polish lenses to 0.12D or 0.10D increments.

SOFT POLISHER

- This would destroy the 0.01D accuracy of free-form lenses.
- The free-form process uses foam polishers that are softer and more pliable, which is possible because of the vastly improved surface quality provided from a free-form-generator.

Final Inspection

- Measuring the distance between the fitting points checks the PD, the fitting height is measured from the fitting point to the point that is lowest on the lens.
- The power, Rx Prism and vertical prism are all checked at the fitting point.
- When verifying prism thinning; there should be no vertical imbalance between the two lenses.

CHECKING POWER AND PRISM

- Dot the laser engravings and then using a centration chart, dot the fitting point.
- Check the power at the fitting point.
- If there is also prescribed prism, verify any vertical prism at this point.

Final Inspection

- Like you verify a progressive, the laser engravings and the fitting point are marked for your use.

- In most cases, the 180-line and the PRP are at the fitting height. The lens' optical center will usually be located lower and at different heights if the prescription is different vertically in each eye.

The Prescription

- The resulting prescription is written to 1/100th of a diopter, which provides the best balance of vision at all pupil sizes, improving night vision while preserving daytime vision.

When Edging in Office

- Digital SV lenses should be laid out for edging as if they are progressives.
- The engravings will be along the 180-line and the fitting cross is moved to correspond to the PD and Fitting Height.

Manufacturing

- Your glasses order is sent to a lab where your lenses are created on a computer-driven, free-form generator that can read and respond to your new, high-tech prescription written to 1/100th of a diopter.

Manufacturing

- Additionally, the lenses are created to account for the variations in your eyes across the surface of the lens.
- This may not only help you see better, but help you see better across more of your lens.

Benefits to Patient

- Can provide exceptional contrast perception:
- Free-form lenses can sharpen vision and provide exceptional color vision
- They can maximize the optics built into your lenses, providing brighter and more intense colors

Single Vision

- For single vision—The free-form process cuts and polishes a new optimized/customized surface on the back of a spherical front surface semi-finished lens blank.

Flat Tops

- The free-form process cuts and polishes an aspheric (for spherical Rx's) or atoric (for cylinder Rx's) back surface on a spherical front surface semi-finished lens blank

100% Back Surface

- A spherical front surface is combined with a back surface that combines the progressive Add, the Rx and the fitting and lens shape requirements.

More Complex Approaches

- Another method is to use a more complex front surface like a progressive, partial Add progressive or bitoric surface
- Then free-forming a back surface to deliver the design and powers as required.

Follow-up With Patient

- When the patient's new free-form created eyewear returns to the practice from the lab, there are often two Rx printouts enclosed: One is the as-prescribed Rx and the other is the compensated Rx.

- The as-prescribed Rx indicates the doctor's prescription, while the compensated Rx shows the Rx after free-form compensation.

Follow-up With Patient

- Check the Rx for accuracy in the lensometer by using the compensated Rx.
- Troubleshooting free-form is typically the same as for standard PALs and single vision lenses.
- Double check PDs and OCs for accuracy in case of blur or acclimation problems.

Follow-up With Patient

- For PALs, lower the frame if there's distance blur, raise the frame if there's trouble finding the reading zone, and create more face form if there's peripheral blur
- Overall, you should not need to make any significant modifications to the fit if you have taken careful measurements

Matching the Patient With the Lens

Matching the Patient With the Lens

The Profitability of Multiple Pairs

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Accessing Resources and Educational Materials

Accessing Resources and Educational Materials

- Kate Jacobs - Scheie Eye Institute
- Jobson Publishing – Optician Handbook
- Shamir Optical
- Andrew Karp - Lenses and Technology
- Barry Santini – Jobson 20/20
- Deborah Kotob, ABOM– Jobson 20/20