


Welcome to the Orthotool Orthokeratology Custom Design Lens System. In this section of the certification, you will learn to use the unique design methodology behind Orthotool custom lenses and begin optimizing your orthokeratology treatment for success.

Each Orthotool lens is custom designed for the unique patient wearing it. Our philosophy is simple: we give the practitioners complete control in designing a lens specifically catered to the patient's needs. Provided with a patient's age, refraction, corneal topography, and visual needs, the Orthotool system allows for a high degree of customization across multiple zones in the contact lens. Designs can vary from simple, allowing the fitting software to take control and select the initial lens parameters; to complex, allowing the practitioner to control every lens curve.




Orthotool™ Online: Choose the Initial Design

**Orthokeratology
(Reverse Geometry)**

- a) Basic
- b) Advanced

Custom GP

- a) Single vision
- b) Front-surface multifocal
- c) Toric/Bitoric


PATIENTS ORDER HISTORY RESOURCES

Here you can create templates for future designs.
?
?
?

Lens Settings

Material: Boston XO Boston XO

Index: 1.415 1.415

FVP / BVP: BV BV


Toric PC:

Patient Rx


	RIGHT	LEFT
HK Reading		
VK Reading		
VK Axis		
Eccentricity		
HVID		
VVID		
CCT		
Sphere		
Cylinder		
Axis		
Vertex		
Add Power		

Tear Film

Right Tear Film



Left Tear Film



Lens Rx

Base OZ

Flat Base

Steep Base

Flat Power

Steep Power

Front Eccentricity

Add Power

Diameter

Alignment 1 Curve

Alignment 1 Width


Alignment 2 Curve

Alignment 2 Width





Peripheral Curve

Peripheral Width

Front OZ

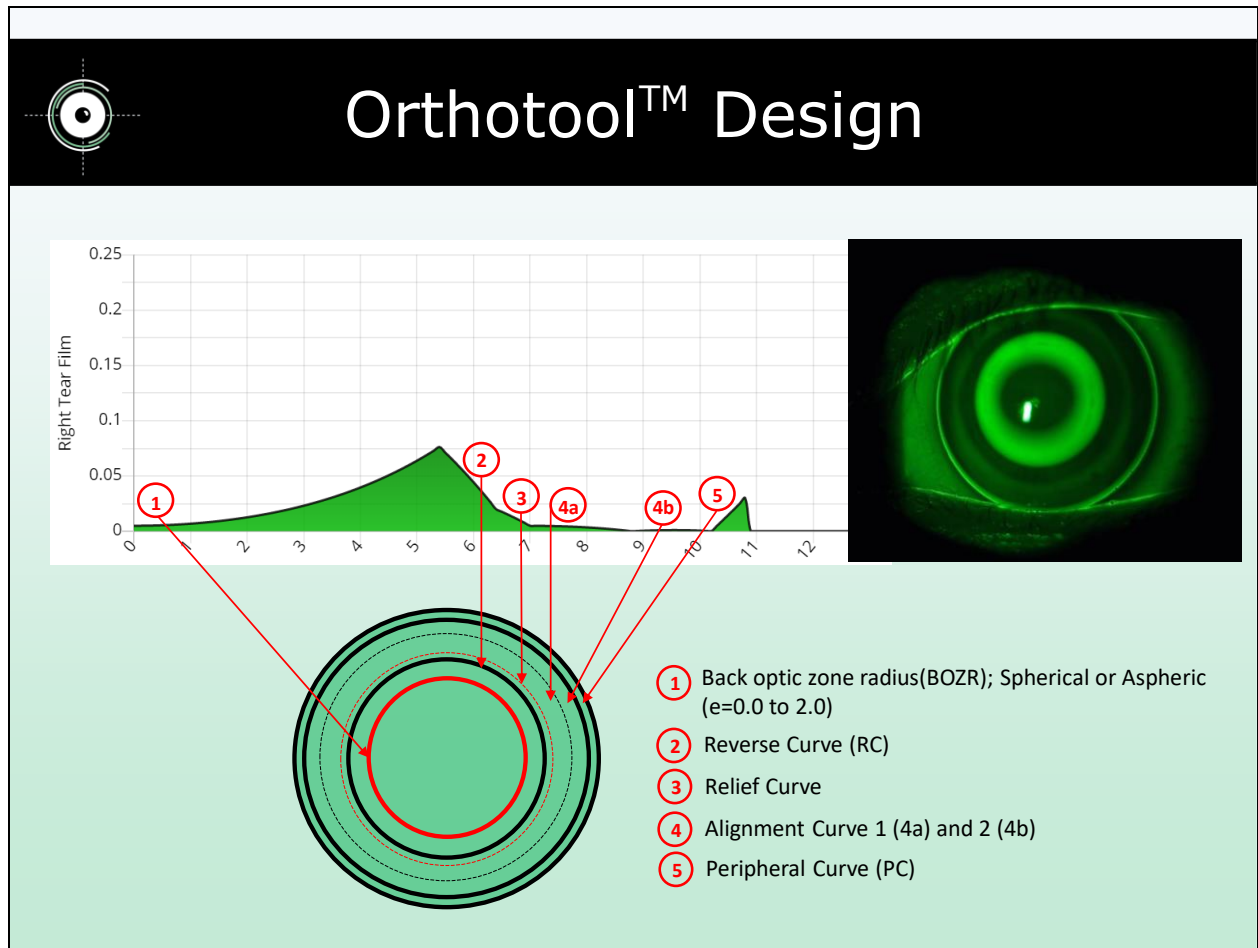


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With the Orthotool design system, a full range of custom rigid gas permeable lenses can be created with a wide range of lens-building options. In basic mode, you can provide patient Rx and topography and allow the Orthotool software calculator to create a lens design based on an optimal tear layer diagram fitted to the corneal topographic data. Alternatively, you can take the initial calculated parameters, and custom tailor each parameter based on the patient's visual needs, such as optic zone size, or centration focused alignment curves. Alternative designs can be created as well, such as single vision and multifocal lenses.

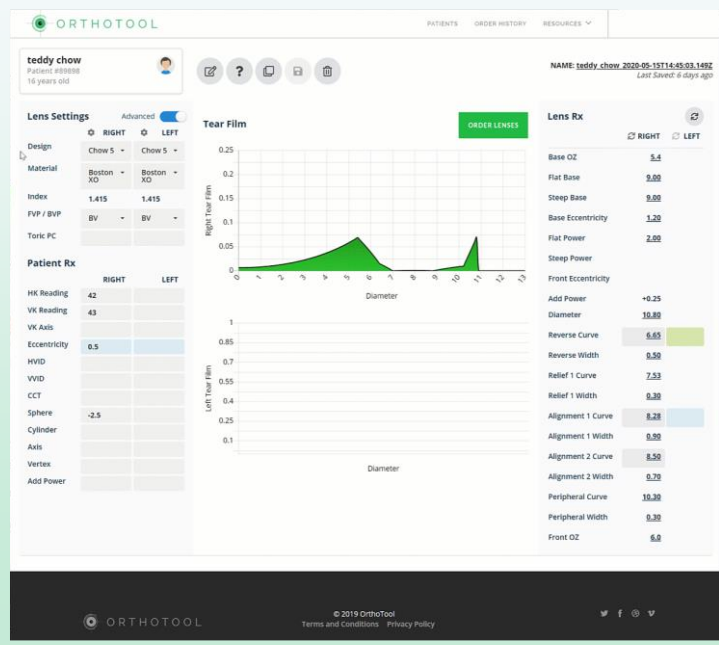
Integrated within the Orthotool Online platform is an automated order form that automatically sends your lens design directly to the OrthoTool partner lab manufacturer of your choice for fast and easy ordering.




Orthotool is a 5-zone orthokeratology lens construct, each of which can be customized as required. Customization of these zones are intended to optimize myopia treatment, centration and comfort of lens wear. It is available in rotationally symmetric and toric variants.



Overall Diameter (OAD)





HOW?

- Choose diameter approx **0.4mm smaller** (0.2mm each side)


WHY?

- Ideally, biggest allowable OAD provides for proper containment of all necessary curves

RANGE: 9.6-11.6mm

Using a ruler or topographic image, measure the patient's HVID. Then choose a diameter approximately 0.4mm smaller (0.2mm on each side of the lens). The reason we do this is to provide the largest allowable OAD to contain all necessary curves. This allows the alignment curve to cover as much area as possible for effective centering force. This will be discussed later.

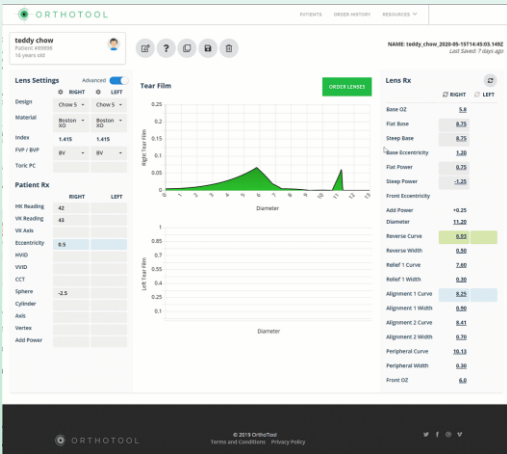
Notice there are multiple ways to conveniently modify the diameter of the lens from the shortcut buttons on the graph to manually entering in the value on the Lens Rx section.



Back Optic Zone Radius


Back Optic Zone Radius (BOZR)
 Chosen based on Jessen Factor. Orthotool will automatically calculate the required Base Curve Radius (BCR) based on entered prescription to optimize the tear film.

$$\text{BOZR} = \text{flat K (in D)} + \text{Spectacle Rx} + \text{Jessen Factor}$$
 Example: $42.00\text{D} + (-2.50) + (-1.50) = 38.00\text{D}$ or 8.88mm



NOTE:
 Every 0.10mm change in BCR
 = 0.50D refractive change

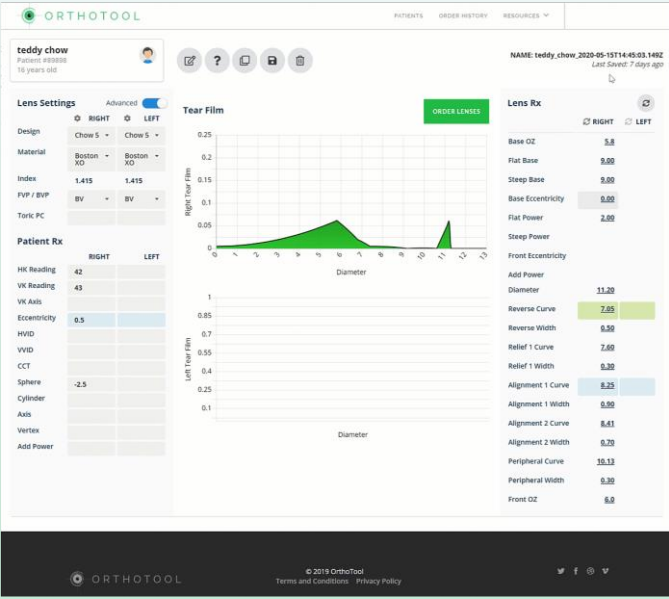
The back optic zone diameter is the inner most zone of the Orthotool lens. This curve reflects the amount of myopia needed to be treated. The compressive forces required to mold the corneal shape for treatment is determined by the base curve radius. This zone will be automatically calculated by the Orthotool software. The practitioner can then further refine the necessary treatment by flattening or steepening the initial value calculated by the software. A flatter base curve radius (higher value in mm) will create a greater myopic treatment effect, whereas a steeper base curve radius (lower value in mm) will create less myopic treatment.



Base Optic Zone Radius: Eccentricity

Base Optic Zone Radius (BOZR): Spherical vs. Aspheric

Optimize myopia treatment, especially for low myopic individuals



HOW?


- Choose e-value,
- Range: 0.00 (sphere) to 2.00 (aspheric)**
- Low Rx: -0.50 to -1.75DS
 - Use 1.4 to 1.6
- High Rx: -2.00 or higher
 - Use 0.00 to 1.2

WHY?

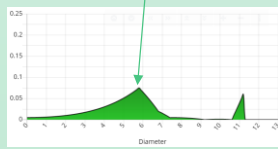
- Control myopia treatment effect, allows for best outcome in patients

Rx: -1.00DS

e=0.00 (Sphere)



e=1.60 (aspheric)



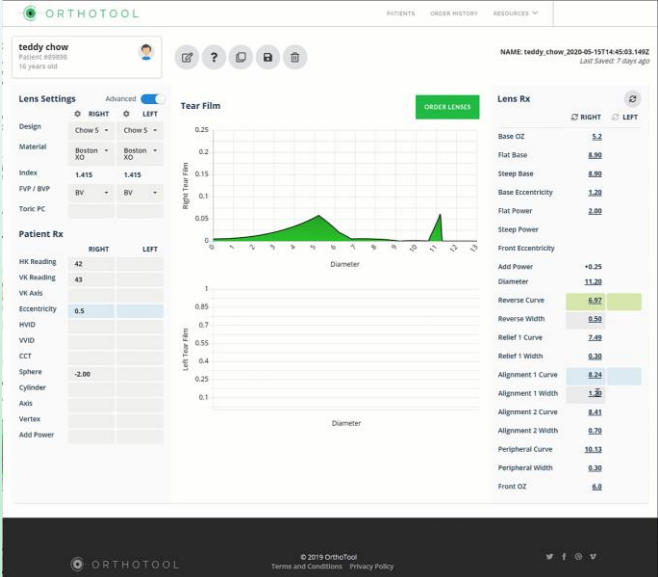
A unique feature of the Orthotool software is its ability to further control the degree of myopia treatment effect, often reflected in the peak tear layer thickness (TLT). However, low myopes in spherical back optic zone designs ($e=0.00$) cannot produce a significantly high TLT for their myopic treatment. By progressively increasing asphericity in 0.10 increments (from 0.00 up to 2.00), one can choose the appropriate aspheric base curve that will result in the best patient outcome, regardless of prescription.

***NOTE: Video does not show the eccentricity buttons!

Back Optic Zone Diameter

Back Optic Zone Diameter (BOZD)

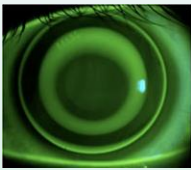
Optimize clarity (adult) and myopic treatment (children)



The screenshot shows the Orthotool interface for a patient named teddy chow. It includes sections for Lens Settings (Design, Material, Index, FVP/BVP, Toric PC), Patient Rx (Hx Reading, Vx Reading, Vx Axis, Eccentricity, HVID, VVID, CCT, Sphere, Cylinder, Axis, Vertical, Add Power), Tear Film, and Lens Rx (Base OZ, Flat Base, Steep Base, Base Eccentricity, Flat Power, Steep Power, Front Eccentricity, Add Power, Diameter, Reverse Curve, Reverse Width, Relief 1 Curve, Relief 1 Width, Alignment 1 Curve, Alignment 1 Width, Alignment 2 Curve, Alignment 2 Width, Peripheral Curve, Peripheral Width, Front OZ). The BOZD graphs show Right Tear Film and Left Tear Film curves against Diameter.

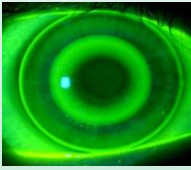
Adults:
Larger optical zones

- Minimize aberrations



Children:
Smaller optical zones


- Greater peripheral plus power
- Greater positive spherical aberration



Range: 5.0mm to 6.4mm in 0.1mm increments

An additional level of control within the back optic zone is the diameter of this zone. Adults require larger back optic zones such that the treatment zone can be maximized and pushed beyond the pupillary margin. This will help improve clarity (especially during nighttime activity) by removing unwanted aberrations. Conversely, children with smaller base curve zones will result in greater peripheral plus power and positive spherical aberration entering their pupillary margin, relevant to their myopic treatment effect.

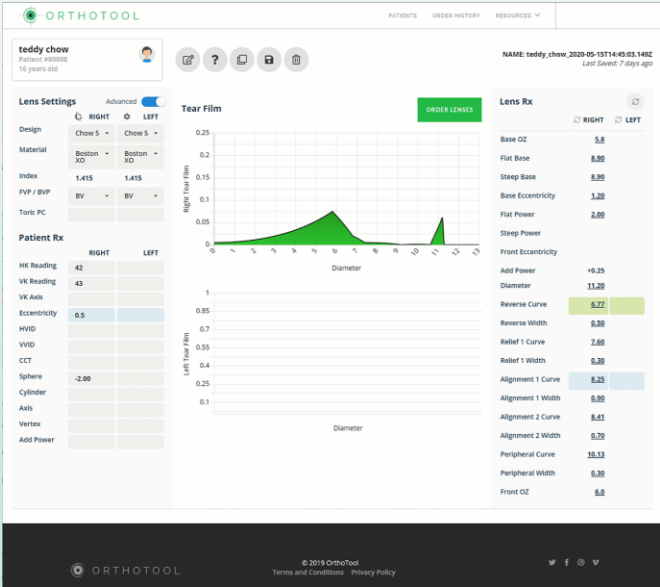
This additional layer of control is beneficial, especially in optimizing treatment across a wider range of Rx's.



Apical Clearance

Tear Layer Thickness (TLT) at Apex of Cornea

Optimize stability and treatment effect



The screenshot shows the OrthoTool interface for a patient named teddy chow. It includes sections for Lens Settings (Design, Material, Index, PVP/BVP, Toric PC), Patient Rx (Hx Reading, Vx Reading, Vx Axis, Eccentricity, WVD, CCT, Sphere, Cylinder, Axis, Vertex, Add Power), and Lens Rx (Base Oz, Flat Base, Steep Base, Base Eccentricity, Flat Power, Steep Power, Front Eccentricity, Add Power, Diameter, Reverse Curve, Reverse Width, Relief 1 Curve, Relief 1 Width, Alignment 1 Curve, Alignment 1 Width, Alignment 2 Curve, Alignment 2 Width, Peripheral Curve, Peripheral Width, Front Oz). The Tear Film section displays two graphs: Right Tear Film and Left Tear Film, both showing thickness (mm) vs. Diameter (mm). The Right Tear Film graph shows a peak of approximately 0.15 mm at a diameter of 10 mm. The Left Tear Film graph shows a peak of approximately 0.1 mm at a diameter of 10 mm. The Reverse Curve is highlighted in green with a value of 6.27.

IDEAL

- Always maintain a minimum of **2-3 μ m** of clearance

HOW?


- Directly inputting value into lens parameters
- Adjust reverse curve radius
- Adjust alignment curve radius

RANGE: 3 to 20 μ m

The apical clearance refers to the tear layer thickness (TLT) at the apex of the cornea. The clearance in this area is critical in generating the fluid forces underneath the lens that controls the corneal molding during treatment. Moreover, either insufficient or excessive apical clearance will result in an unstable lens, causing the lens to decenter or corneal staining.

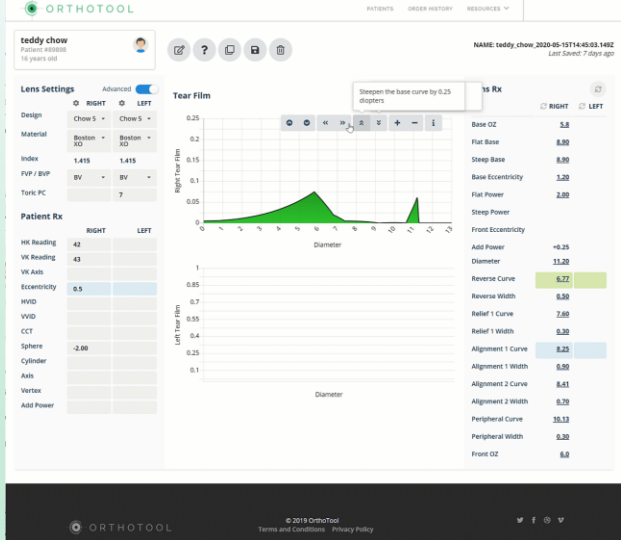
Zero or insufficient apical clearance will result in poor molding and therefore treatment effect and possibly superior decentration of the lens. Excessive clearance will result in inappropriate molding and inferior decentration.

Apical clearance can be controlled either directly by inputting the value in Lens Parameters, or adjusting the reverse curve or alignment curves.



Reverse Curve

Reverse Curve Radius – Connect Base Curve and Alignment Curve Control Overall Sagittal Depth of Lens



IDEAL

- Orthotool optimizes Reverse Curve (RC) to match preset apical clearance


HOW?

- Steepen RC to *increase* apical clearance (overall steeper fit)
- Flatten RC to *decrease* apical clearance (overall flatter fit)

0.1mm RC radius = 5µm change in clearance
RANGE: 5.0mm to 9.0mm

The second zone in the Orthotool lens is the reverse curve. The reverse curve not only connects the base curve and the alignment curve, but controls the entire sagittal depth of the lens. That is, changing the reverse curve radius can make the overall lens flatter or steeper.

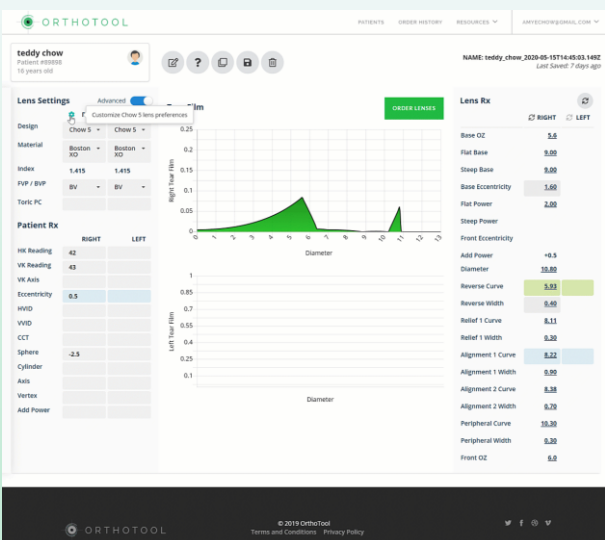
The practitioner can first enter in a desired/preset apical clearance value (e.g. 5 microns). The Orthotool software will then automatically calculate the appropriate reverse curve radius required to give the desired apical clearance. As with all other parameters in Orthotool, fine tuning of this curve is possible by manually making the reverse curve steeper or flatter. Making the reverse curve steeper (decrease value) by 0.1mm will steepen the fit of the lens by 5 microns. Making the reverse curve flatter (increase value) by 0.1mm will flatten the fit by 5 microns.



Relief Curve

Relief Curve Radius

Transition between reverse and alignment curves



IDEAL


- Preset desired relief curve clearance of **20µm**

HOW?

- Decrease clearance: aggressive transition, greater force
- Increase clearance, soft transition, weaker force

RANGE: 1 to 25µm

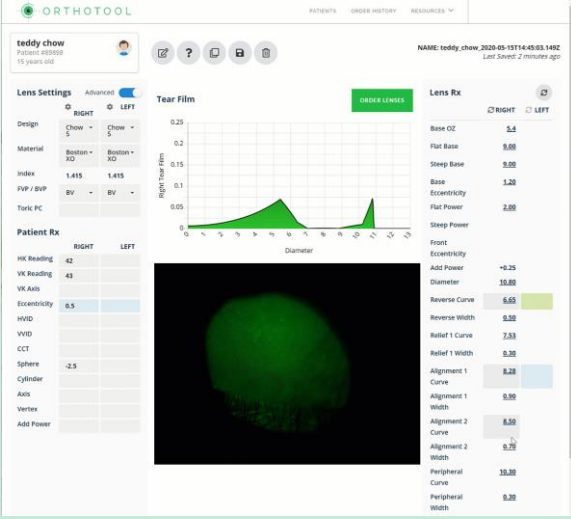
The Orthotool lens adds a curve that connects the reverse zone to the alignment zone. The reverse zone has typically the steepest curve in the lens, whereas the alignment zone holds the flattest. The relief curve allows the practitioner to customize this transition, making the transition between the two more aggressive or gradual.



Alignment Curves

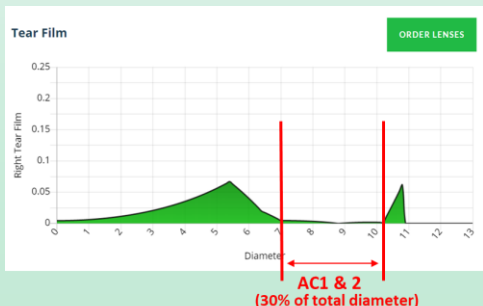
Alignment Curve 1 and 2

Optimize Lens Centration



- The “landing zone”
- Provides lens movement & assists **centration**

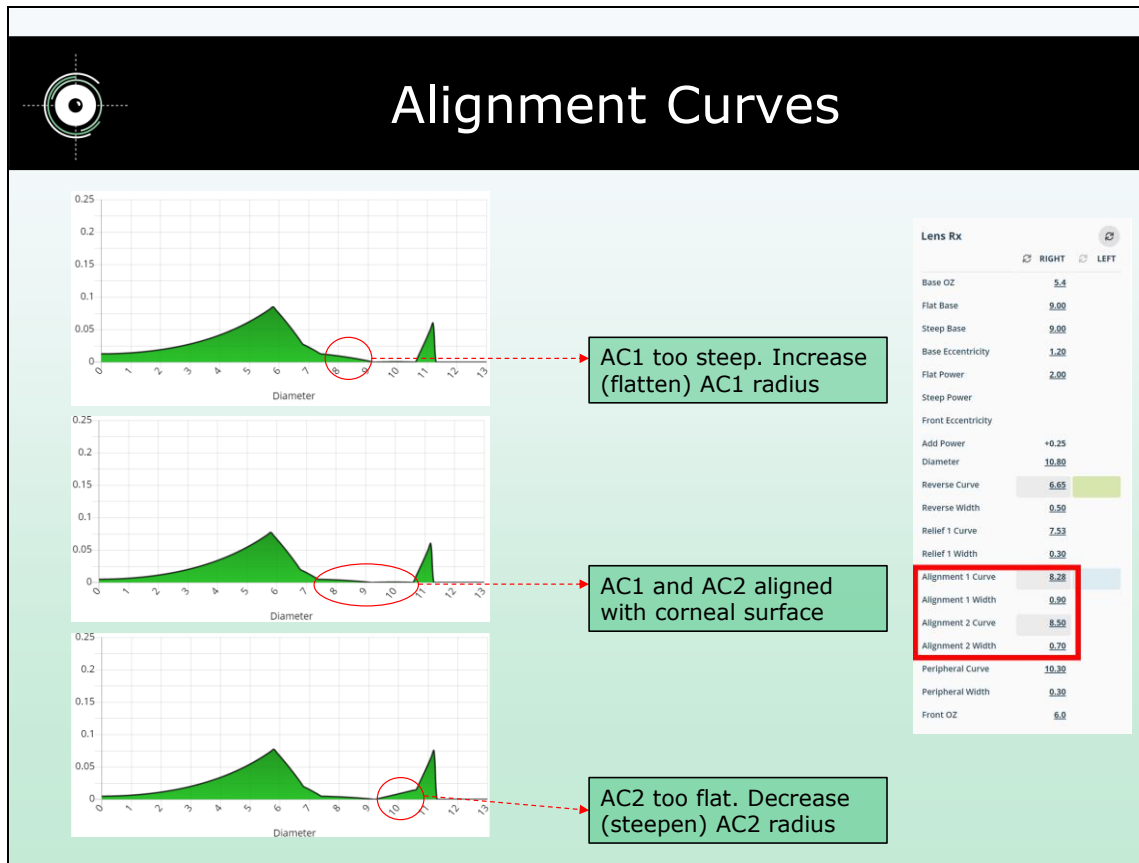
Corneal Eccentricity	AC1
0.0	0.25D flatter than K
0.1-0.3	0.25-0.75D flatter than K
0.4-0.6	0.75-1.50D flatter than K
0.7-0.9	2.00D-3.25D flatter than K



The alignment curve (AC) is the part of the Orthotool lens that lands and stabilizes itself on the corneal surface. As such, this curve is critical in ensuring a well-centered contact lens. To maximize stability and flexibility, the alignment curves are divided into two separate curves, AC1 and AC2, which together take up at least 30% of the total diameter of the lens. The larger alignment zone ensures greater surface area contact and therefore stability.

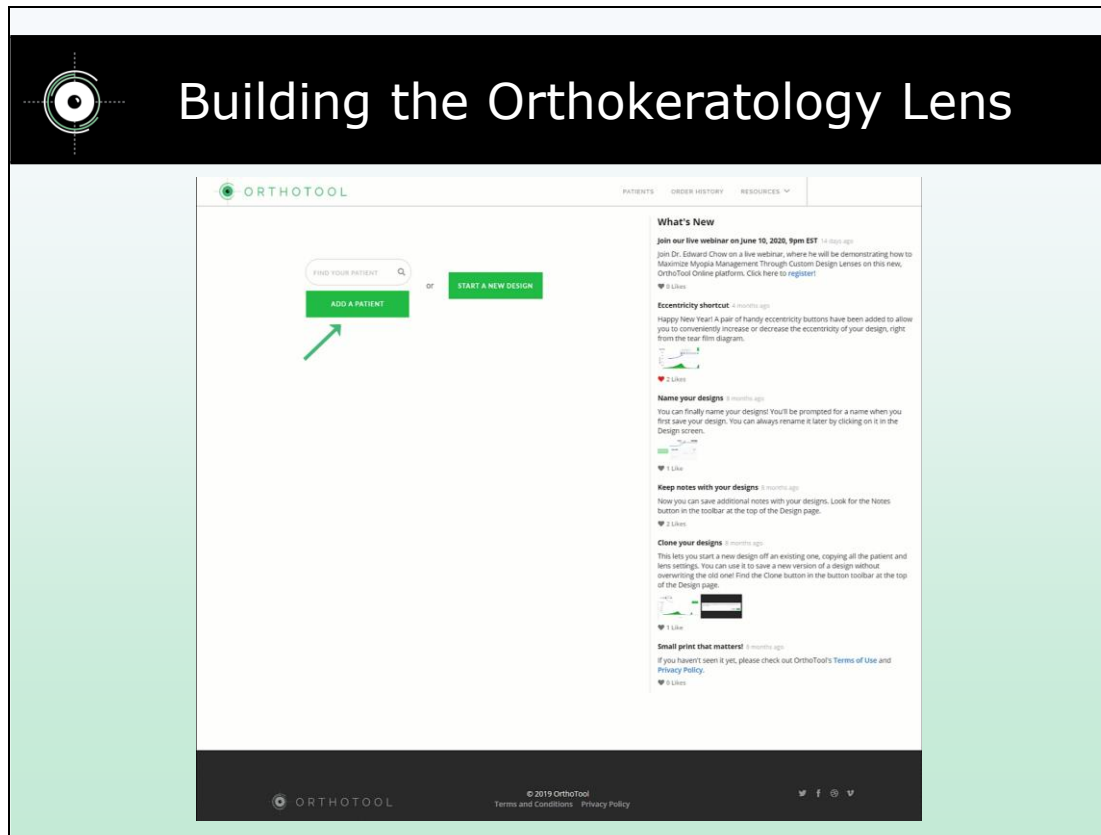
The Orthotool software calculates an initial alignment curve based on the corneal eccentricity of the patient. From here, practitioners can manually adjust AC1 and AC2 to further optimize comfort and centration.

As the alignment zone is where the contact lens must land on the cornea, it is critical that the alignment area contacts the cornea and there is minimal tear layer beneath this zone.




As the alignment zone is where the contact lens must land on the cornea, it is critical that alignment area contacts the cornea and there is minimal tear layer beneath this zone. Reasons for excessive tear layer under the alignment zone would be an excessively steep (AC1 radius too low in value) or the alignment zone is excessively flat (AC2 radius too high in value).

Manually adjusting the AC1 and AC2 curves, while monitoring the tear film diagram will allow the practitioner to find the perfect radius that will allow the alignment zone to optimally rest on the cornea.



Start by adding a patient and entering in their data. When creating a new design, you can either start from scratch or select from a template with pre-designed lens parameters. After setting OAD, and optic zone diameters under preferences, enter in the patient Rx information. Orthotool's software algorithm will automatically calculate the ideal contact lens design optimizing a myopia treatment tear film diagram. Fine adjustments can now be made, such as adjusting the Jessen factor, diameter, and optic zone diameter. When ready, use the automated order form to automatically send your lens design directly to the OrthoTool partner lab.

You can also switch from Basic to Advanced mode, where you can adjust a wider range of lens parameters such as lens eccentricity, apical TLT, and much more, all aimed at maximizing myopia treatment and lens fit for your unique patient eye.



Customized Design Templates

ORTHOTOOL

PATIENTS ORDER HISTORY RESOURCES AMYCHOW@GMAIL.COM

What's New

Join our live webinar on June 10, 2020, 9pm EST

Join Dr. Edward Chow on a live webinar, where he will be demonstrating how to Maximize Myopia Management Through Custom Lenses on this new, OrthoTool Online platform. Click here to register!

0 Likes

Eccentricity shortcut 4 months ago

Happy New Year! A pair of handy eccentricity buttons have been added to allow you to conveniently increase or decrease the eccentricity of your design, right from the near-vision diagram.

0 Likes

Name your designs 4 months ago

You can finally name your design! You'll be prompted for a name when you first save your design. You can always rename it later by clicking on it in the Design screen.

0 Likes

Keep notes with your designs 4 months ago

Now you can save additional notes with your designs. Look for the Notes button in the toolbar at the top of the Design page.

0 Likes

Clone your designs 4 months ago

This lets you start a new design off an existing one, copying all the patient and lens settings. You can use it to save a new version of a design without overwriting the old one! Find the Clone button in the button toolbar at the top of the Design page.

0 Likes

Small print that matters! 4 months ago

If you haven't seen it yet, please check out OrthoTool's Terms of Use and Privacy Policy.

0 Likes

Save design as template

Save this Design

LOW MYOPIA PATIENT

Cancel Save

Name the design


Start with a template design

Start your design from a template

You can start your design for this patient by choosing from one of your existing design templates

Low Myopia, High Force

When creating a new design, you can either start from scratch or select from a template with pre-designed lens parameters. In this way, you can quickly start from lens parameters targeting specific patient populations, such as adults vs. children, high vs low myopes, etc.



Dispensing Day 1

INITIAL EVALUATION ON EYE

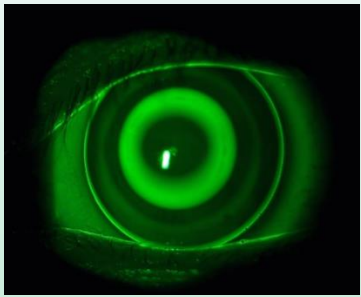
- Inspect and clean lenses before placing initial inspection
- Fill lens bowl with 1 drop of saline and NaFl
- Insert lens with patient in head down position to ensure no bubble is present
- **Allow ample time** for NaFl and tears to settle – excessive tearing, epiphora and blepharospasm will compromise proper fluorescein pattern and evaluation
- Observe behind slit lamp with cobalt blue filter and yellow Wratten filter attached

EVALUATE THE ZONES AND OVERALL DIAMETER

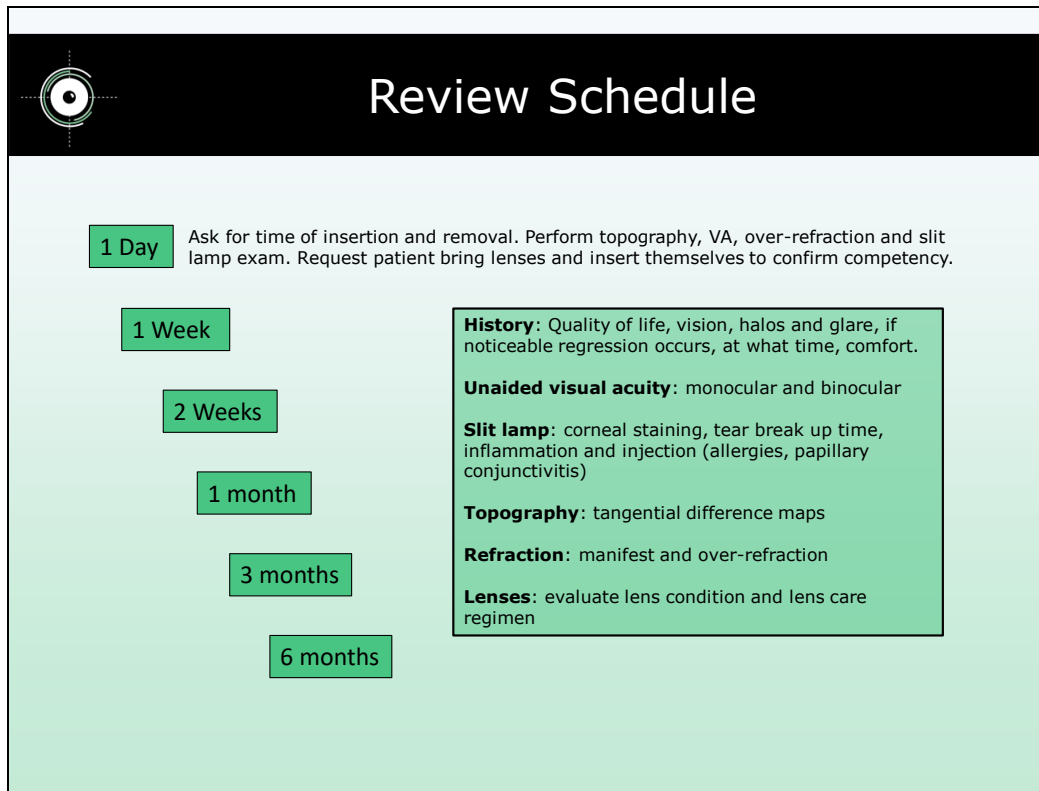
- Use eyelids to manipulate lens to a central position for best assessment of overall diameter
- Monitor overall sagittal fit of lens – too steep? Too flat?
- Observe individual zones for fine-tuning if necessary

RECORD AND BEGIN ORTHOKERATOLOGY TREATMENT

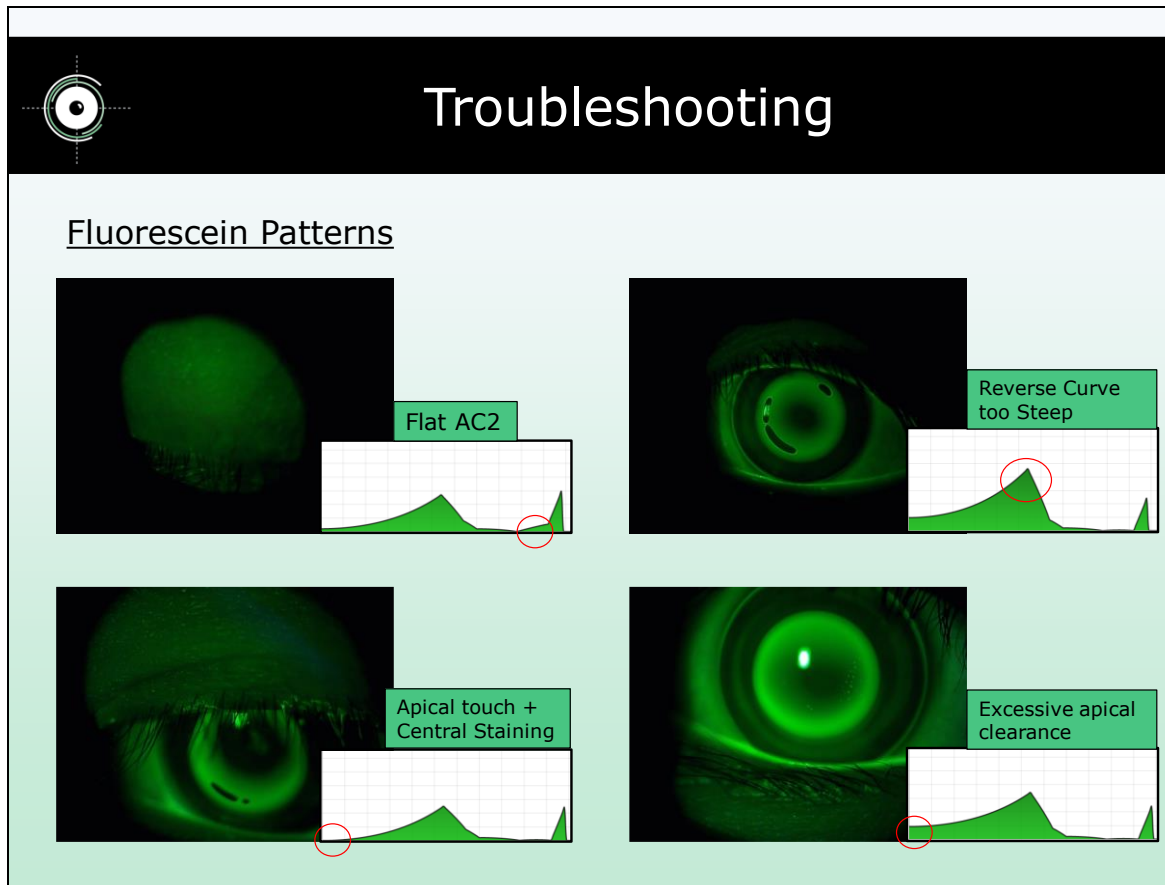
- If possible, photograph NaFl pattern
- Perform over-refraction
- Provide insertion and removal training
- Provide care and maintenance instructions
- Schedule next day visit



Please read from slide



Please read from slide



Shown are some possible fluorescein patterns post-treatment:

Flat AC2: excessive fluorescein can be seen in the peripheral alignment zone region. The contact lens will be flat and may decenter superiorly. Simply adjust by targeting the AC2 in the Orthotool software and steepen the curve (make value smaller)

Reverse Curve: with an overly steep reverse curve, bubbles may appear in the reverse zone with possible fluorescein seen in the center indicating excessive apical clearance. Adjust by flattening the reverse curve (make the value higher) or widening the reverse curve width.

Apical touch: when there is central staining, there may be insufficient apical clearance. Correct by steepening the reverse curve or alignment curve (make values lower)

Excessive apical clearance: significant fluorescein can be seen centrally. Adjust by flattening the reverse curve or alignment curve (make value larger)



Question 1

Overall Diameter: A patient's visible iris diameter measures 11.6mm. What would the overall diameter of your contact lens be?


- a) 10.6mm
- b) 10.8mm
- c) 11.2mm
- d) 11.8mm
- e) Cannot predict



Question 2

Orthotool Lens Design: The Orthotool Lens is a five-curve design which allows fine-tuning of every curve.

- a) True
- b) False



Question 3

Base Curve Eccentricity: It would be helpful to use an aspheric curve ($e \neq 0$) for a patient with Rx: -1.00DS

- a) True
- b) False



Question 4

Apical Clearance: What changes can be made to a lens with insufficient apical clearance?

- a) Increase reverse curve radius (flatten)
- b) Decrease reverse curve radius (steepen)
- c) Increase alignment curve radius (flatten)
- d) Decrease alignment curve radius (steepen)
- e) A and C
- f) B and D



Question 5

Jessen Factor: This factor is applied to which curve in an orthokeratology lens?

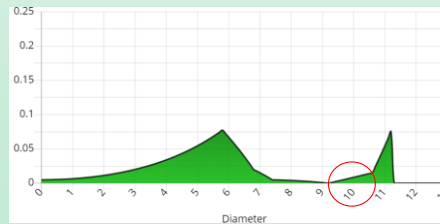
- a) Base Curve
- b) Reverse Curve
- c) Alignment Curve
- d) Peripheral Curve



Question 6

Alignment Curve: On dispensing, you notice the fit is slightly flat, with excessive clearance (tear film) underneath the alignment curve. What adjustment would you make?

- a) Steepen (make value lower) AC2
- b) Flatten (make value lower) AC2
- c) Steepen (make value lower) AC1
- d) Flatten (make value lower) AC1





Question 7

Alignment Curve: The initial alignment curve chosen should always be FLATTER/STEEPER/SAME as the patient's Flat-K?

- a) Flatter
- b) Steeper
- c) Same



Question 8

Base Curve Diameter: A large optic zone would be advantageous for what reasons?

- a) Greater aberrations
- b) Less aberrations
- c) Older age adults with nighttime driving
- d) High myopes
- e) B and C
- f) A and D

Question 9

Reverse Curve: Steepening the reverse curve will *increase* the apical tear layer thickness

- a) True
- b) False



Question 10

Alignment Curve: The ideal alignment curve (AC1 + AC2) should take up what percentage of the overall diameter (OAD) of the lens?

- a) 10%
- b) 20%
- c) 30%
- d) 40%