What is traditional surfacing?

- Lens blanks are generated to a rough curve in 1 or 2 meridians

- The rough curve is smoothed against a hard lap shaped to the proper curve
- The smooth curve is polished against a padded hard lap
Traditional Surfacing

- These are only basic curves (spheres & Cylinders)

What is digital surfacing?

- Lens blanks are generated to a super smooth surface using sophisticated equipment.
- These surfaces can be basic or very complex

What is digital surfacing?

- The smooth surface is polished using a soft lap

How is digital surfacing better?

- We can produce superior accuracy (.01D)
- Progressives, bifocals and SV produced
- Aspheric or atoric curves and prism
- Or all, on one or both sides!
- The potential is boundless but it’s the design that counts.

What makes it better?

Design
Distortions

• Defocus
• Astigmatism
• Spherical Aberration
• Coma

Distortion Occurs when

• The Wavefront is changed When:
  • Light strikes a lens surface at an oblique angle or from the edges
  • Light focuses differently from the edge of a lens than the center
  • Etc.

Changes in wearing conditions create aberrations

Changes in position of wear creates aberrations

11/18/2019
What about all these NEW measurements?

- Actually, measurements like Vertex, Pantoscopic Tilt and Wrap Angle (Position of Wear measurements) are not new.

- Lens designers have been using average or “default” values when creating a new lens for years.

- Now the ECP has the ability to take these measures for each patient individually – personalizing the product for that specific person.

**Vertex**

- Vertex is the distance between the back surface of the lens and the apex of the cornea.

**Pantoscopic Tilt**

- Pantoscopic Tilt is the angle of the frame on the face in degrees.

**Wrap Angle**

- Wrap angle is the angle of the frame itself measured in degrees.

**New Measurements**

**Eye Data**

- ERC (Eye Rotation Center)

**Behavioral Data**

- Natural Head Posture (Head Cape)
- Head/Eye Ratio
- Stability Coefficient

**Eye Rotation Center (ERC\(_d\))**

- Eye Rotation Center (ERC\(_d\)) is the distance between the back of the lens and the point around which the eye rotates
- The ERC can be different for each eye.
Natural Head Posture

- Natural Head Posture (Head Cape Angle) refers to how a patient’s head rests naturally on the neck and shoulders. This has a direct impact on alignment of the design.

H/E Ratio & Stability Coefficient

- Some people move their head more to see things, while other people move their eyes more.
- The Head / Eye Ratio is a value that measures this.
- The Stability Coefficient determines how consistently the patient sticks to his or her H/E Ratio.

What makes it better?

- Design can reduce traditional aberrations like marginal astigmatism.
- Extremely high accuracy allows for very nuanced design.
- Design can eliminate traditional distortions through lens shape changes at any point on the lens – EVERY POINT ON THE LENS!

What Do The Designers Consider?

- Pantoscopic Tilt and Face Form
  - Tilting a lens in relation to the wavefront can cause distortion and refractive changes “as worn”.
- Eye Rotation Centers
- Head Cape
- Pupil Size

What Do The Designers Consider?

- Frame size
- Fitting Height
- Eye / Head movement
Advantages

• Fewer Higher Order Aberrations
• Higher contrast sensitivity
• Optimized visual zones
• Personalized
  – Considers wearer’s optical needs
  – Considers frame dimensions
  – Natural head position
• Super Wow factor!