Optimizing Initial Comfort of GP Lenses

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Optimizing Initial Comfort

The GP Lens Institute is the educational division of the Contact Lens Manufacturers Association

Why Not GPs?

- Gap practitioner
- Spectacle promotion
- Disposable lenses
- Awareness

GP Candidates

- Astigmatism
- Borderline dry eyes
- Refits
- Irregular corneas
- Presbyopia
- Children
- Orthokeratology / myopia control

GP Candidates

- Astigmatism GPs provide a smoother corneal contour and better VA
- Borderline Dry Eyes More wettable surface; less dryness-induced complications
- Refits Soft lens due to poor vision or complications
- Irregular cornea / keratoconus Smoothes out some of irregularity resulting in better VA

GP Candidates

- Presbyopia Improved multifocal designs result in vision rivaling spectacles
- Children GPs provide good vision and may slow down the progression of myopia
- Orthokeratology GPs are able to reduce existing low myopia
• Quality of Vision

- Result of better optical quality, surface wettability and astigmatic correction
- **Johnson / Schnider study**
  - 20 patients
  - GPs for 6 wks and soft for 6 wks
  - All unadapted wearers and good candidates
  - Vision better and staining less with GPs
  - 8 preferred GPs
  - 15 would be satisfied wearing them

• Quality of Vision

- Ocular Health

- Oxygen transmission 2 to 4x greater than hydrogel lenses
- Added benefit of good tear exchange (versus silicone hydrogel)
- Reduced incidence of GPC
- Reduced ocular infection (Stapleton, et al, 2008) ([www.contactlenssafety.org](http://www.contactlenssafety.org))

• Quality of Vision

- Ocular Health

- Surface Wettability
- Durability/Stability

• Quality of Vision

- Ocular Health
- Surface Wettability
- Durability/Stability
- **Reduction in Myopia Progression**
Studies with young people have demonstrated that corneal reshaping can result in slowing axial length growth:
- LORIC
- CRAYON (Walline)
- ROK (Swarbrick)

**Quality of Vision**
- Ocular Health
- Surface Wettability
- Durability/Stability
- Reduction in Myopia Progression

**Patient Retention**
- GPs are custom devices not commonly available through the internet
- Rarely price-advertised
- Can use service agreement
- With mandatory contact lens Rx requirement, it is likely that GP patients are even more loyal today

**Ames Study**
- 38% of patients were fit into GPs
- 48% of profit was from GP wearers

**Ames/Gunning Study**
- Profit per replacement lens was higher
- 2x as many spectacle sales
- 8x as many service agreements

**A Five Step Approach**
1. Presentation
2. Use of a topical anesthetic
3. Vision
4. Material selection
5. Len design and fitting relationship
Presentation

Perceptions about adaptation

Concerns
• Patient apprehension
• Practitioner apprehension

The new practitioner
• Inadequate education
• Takes too much time
• Too uncomfortable

Presentation Methods

• Gauge patient’s reactions to ocular tests
• High reactors = gradual adaptation
• Offer realistic expectations
• Don’t be tentative in GP description
• Don’t use negative phrases
  – Discomfort, pain, intolerance, failure
  – Use “lens awareness,” “lid sensation”
  – “GP” (not “RGP”)

Presentation Study

“The Effect of Patient Personality Profile and Verbal Presentation on Initial Comfort and Adaptation to Rigid Gas Permeable Contact Lenses”

Edward S. Bennett
Cristina M. Schnider
Bruce W. Morgan
Ruth Davies (et al)

Study Methods

• 49 subjects, non-CL wearers, age and sex matched, randomly assigned to 3 groups
• Fear-Arousing  Observed a video of doctor talking to patient about GP adaptation using fear-arousing terms
• Neutral Non-enthused  Doctor talking to patient using neutral terms but is non-enthused
• Neutral Enthused  Same as previous but doctor has a positive attitude

Study Results

• In the first month, 6 out of 19 dropped out in the fear-arousing group
• 2 out of 17 dropped out in neutral non-enthused group
• 0 out of 13 dropped out in the neutral enthused group

Study Results

• Fear-arousing group submitted only 50% of daily questionnaires
• The neutral non-enthused group submitted 55%
• The neutral enthused group submitted 87% of the questionnaires
Study Conclusions

• Method of presentation of GP lenses can affect success
• If presented negatively, there was a significantly greater risk of discontinuation of lens wear during the first month of wear
• Subjects provided with a positive approach toward GPs were most likely to be compliant with daily questionnaire return

Significance of First Impressions

It is critical for the patient’s first experience to be a positive one with GP lenses. How they react to the first few minutes of lens wear could determine whether they will be successful.

If GP lenses are perceived more positively by patients initially, less negative comments and fewer dropouts should result

A Five Step Approach

1. Presentation
2. Use of a topical anesthetic

Topical Anesthetic Use is Controversial

• Concerns
  — Staining
  — Effect of eye rubbing
  — Potentially mislead patient

Topical Anesthetic Use is Controversial

• Potential Benefits
  — Improved initial comfort
  — Less reflex tearing
  — Less initial chair time
  — Greater patient satisfaction

Anesthetic Use Study

“The Effect of Topical Anesthetic Use on Initial Patient Satisfaction and Overall Success with Rigid Gas Permeable Contact Lenses”

Edward S. Bennett
Jennifer Smythe
Vinita Allee Henry (et al)
### Anesthetic Study Methods

- One month study
- 80 subjects at four institutions (UMSL, SCO, Pacific and OSU)
- All new GP wearers
- At fitting visit
  - 40 given opthaine
  - 40 given placebo

### Anesthetic Study Results

- Dropouts
  - 10 total
  - 8 in the placebo group
- Patient satisfaction
  - Perception of adaptation significantly better with anesthetic

### The Bottom Line

- It is important to allow anesthetic to wear off so the patient experiences realistic awareness
- Topical anesthetic recommended for
  - All new GP patients
  - Children
  - Keratoconics
  - Soft lens refits
  - Any apprehensive patients

  *Remember, you have to compete with soft lenses in efficiency and comfort*

### A Five Step Approach

1. Presentation
2. Use of a topical anesthetic
3. Vision

### Significance of Good Initial Vision

- It is important for the patient’s first experience to be a positive one visually
- It is likely if they achieve good vision with the initial lenses, they will be less cognizant of lens awareness (i.e., the “WOW Factor”)
- This can be accomplished by either empirical or inventory fitting

### Empirical Fitting

- Very easy and successful today due to improvements in manufacturing technology (i.e., thin designs, standard peripheries)
- Typically provide refractive information to laboratory (or use their nomogram)
- Commonly used for spherical and multifocal designs
- Has benefits of good initial vision, ease of fitting and patient satisfaction
  - Psychological benefit to patient
**Inventory**

- Need minimum of 120 to 200 lenses
- Benefits include
  - Good initial vision
  - Fit out of stock
  - Lens replacements
  - Parameter changes

**A Five Step Approach**

1. Presentation
2. Use of a topical anesthetic
3. Vision
4. **Material selection**

**Fluorosilicone Acrylate**

- Fluorine combined with other ingredients of silicone acrylate to enhance mucin interaction with lens surface
- Increases wettability, stability and Dk
- Materials can be divided by Dk
  - Low Dk = 25 to 50 (DW myopes)
  - High Dk = 51 to 99 (hyperopes)
  - Hyper Dk = ≥100 (extended wear)

Also: Greater scratch resistance/High RI

**Plasma Treatment**

- Most materials currently have their plasma treatment process FDA approved
- It is not a coating, but actually utilizes electrical energy to change the electrical structure of lens surface
- Very popular as the treating of GP polymers with plasma is a very effective cleaning method to remove any remaining residues (i.e., oils, solvents, waxes) from the manufacturing process
- Significantly reduces surface wetting angle
- Claims that it increases initial comfort

**A Five Step Approach**

1. Presentation
2. Use of a topical anesthetic
3. Vision
4. Material selection
5. **Lens design and fitting relationship**

**Lens Design**

- **Overall/optical zone diameter**
- Lens-to-cornea fitting relationship
- Blend
- Edge clearance
- Center thickness
- Edge design
• Larger diameters result in better initial comfort whether it is 10mm, intralimbal (11mm or larger) or semi-mini-scleral due to less lens movement with the blink and less lid interaction.

• Use smaller overall diameter and steeper base curve radius when upper lid is at or above the superior limbus (i.e., interpalpebral).

• Otherwise strive for lid attachment.

GP SCLERAL LENS CATEGORIES (SINDT, CLS Oct., 2008)(with Dr. Rob Breece)

- Corneo-Scleral: 12.9 - 13.5mm
- Semi-Scleral: 13.6 - 14.9mm
- Mini-Scleral: 15.0 - 18.0mm
- Full Scleral: 18.1 - 24+ mm
SCLERAL LENS GROWTH (GP Annual Report 2011: Oct., 2011 CLS0)

- The sales of large diameter buttons have increased six fold from 2006 to 2010
- The sales have increased 14% in 2011 from 2010

THE FUTURE: SCLERAL LENSES FOR HEALTHY EYES

- Future corneo-scleral and semi-scleral designs may rival soft torics for astigmatic patients


- Comparison on a soft toric(ST) design, a 14.3mm OAD semi-scleral(SS) design, and a 9.2mm OAD standard GP(SGP)
- 9 subjects evaluated after 5, 15 & 60 min of wear (0 – 10 scale):
  - Comfort(60 Min): ST: 9.3; SS: 7.9; SGP: 6.7
  - Vision: SS: 8.9; ST: 8.9; SGP: 6.9
  - Adaptation: ST: 9.4; SS: 8.2; SGP: 6.8
  - Satisfaction: ST: 9.1; SS: 8.0; SGP: 6.6
Lens Design

- Overall/optical zone diameter
- Lens-to-cornea fitting relationship
- Blend
- Edge clearance
- Center thickness
- Edge design

Fluorescein Patterns

- Alignment Pattern
  - Light, even pooling of fluorescein
  - Slightly denser peripheral pooling due to flatter peripheral curve radius

Good Lid Attachment Fit

Base Curve Radius

- Selected to optimize the lens-to-cornea fitting relationship
- Often fitted close to the flatter keratometry value (i.e., “on K”)

**Bennett’s Base Curve Radius Selection**

<table>
<thead>
<tr>
<th>Corneal Cylinder</th>
<th>Fit</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00D to 0.50D</td>
<td>0.50D to 0.75D flat</td>
</tr>
<tr>
<td>0.75D to 1.00D</td>
<td>0.25D to 0.50D flat</td>
</tr>
<tr>
<td>1.25D to 1.50D</td>
<td>“On K” to 0.25D flat</td>
</tr>
<tr>
<td>1.75D to 2.00D</td>
<td>0.25D steep</td>
</tr>
<tr>
<td>2.25D to 2.50D</td>
<td>0.50D steep</td>
</tr>
</tbody>
</table>

* From the “GPLI Toric and Spherical Lens Calculator”

Lens Design

- Overall/optical zone diameter
- Lens-to-cornea fitting relationship
- Blend
- Edge clearance
- Center thickness
- Edge design
Peripheral Curve Design **Blend**

- Can be light, medium or heavy
- GP lenses should be blended (medium to heavy preferred)
  - Prevent possible sharp junction problems
  - Provide even tear flow / debris removal
  - Minimize adhesion

Lens Design

- Overall/optical zone diameter
- Lens-to-cornea fitting relationship
- Blend
- **Edge clearance**
- Center thickness
- Edge design

Edge Lift / Clearance

- Excessive edge lift / clearance acts in a funnel-like manner, drying out the surrounding tear pool
- “Lid gap” may further exaggerate process
- Edge lift / clearance is decreased by
  - Steepening peripheral curve radii
  - Decreasing peripheral curve (bevel) width
  - Increasing number of curves (width unchanged)
Aspheric Design Benefits

- Better pressure distribution with uniform edge clearance
- Improved lens-to-cornea fitting relationship
- Comfort

Lens Design

- Overall/optical zone diameter
- Lens-to-cornea fitting relationship
- Blend
- Edge clearance
- Center thickness
- Edge design

Center Thickness

- One of the most important improvements in GP lens manufacturing technology is the ability to make ultrathin designs
- Recommend for all patients with $\leq 1.50D$ corneal cylinder
- Every laboratory has several ultrathin designs
- Significantly reduce lens mass and improve the fitting relationship
Lens Design

- Overall/optical zone diameter
- Lens-to-cornea fitting relationship
- Blend
- Edge clearance
- Center thickness
- Edge design

Edge Design

Lenticular Designs

- Results in a more uniform edge thickness so centration and comfort can be improved
- Plus lenticular to thin a high minus edge over ≥ -5.00D
- Minus lenticular to increase edge thickness for all plus and low (≤ -1.50D) minus powers

High Minus Lens Without Lenticular

High Minus Lens With Lenticular

Plus Lens Without Lenticular
Complications
- Reduced / variable vision and flare
- Limbal irritation / 3 & 9 staining
- Lens dislocation
- Poor corneal alignment resulting in excessive flattening and/or steepening with possibility of distortion
- Lens awareness!

Management
- Reduce center thickness (ultrathin)
- Reduce edge clearance
- Proper edge design
  - Minus lenticular less than -1.50D and all plus
  - Plus lenticular greater than -5.00D
- Bitoric on greater than 2.50D corneal cylinder
- Lid attachment design

OAD / OZD at least 0.3mm
Base curve radius at least 0.50D
Center thickness at least 0.03mm
Peripheral curve radius at least 1.0mm
Peripheral curve width at least 0.2mm

GPLI.info
Practitioner Website

GP Clinical Education
GP Lecture Series

GP Lens Institute Resources

GP Lecture Series

GP Case Grand Rounds
Troubleshooting Guide

• Over 70 cases and their management on www.gpli.info
• Cases are all unique and are divided into the following categories: spherical (including comfort, dryness, desiccation and decentration), toric, multifocal, keratoconus, post-surgical and corneal reshaping
• Primary and alternative management options are provided

GP Case Grand Rounds
Troubleshooting Guide

This resource is an online guide that a practitioner can access while in the examination room to help troubleshoot any GP case

Doctor and Staff Resources

• Order online
  – Pocket guides
  – Brochures

Your CLMA Member Laboratory

• Trained consultants
  – Assist with material, design, fitting and problem-solving of both spherical and specialty designs
• Fitting sets and inventories
• GPLI On-Line Product Guide
  – www.gpli.info for member laboratories
  – Lens designs / materials they manufacture

contactlenses.org
Consumer Website
Summary

- GPs are the lens of choice for
  - Astigmatic patients
  - Young people
  - Presbyopes
  - Irregular corneas
  - Critical vision needs

*Comfort does NOT have to be a problem!*

*GP Lenses can BUILD your practice*