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## Specialty Soft and Hybrid Contact Lenses

B.W. Phillips, NCLEM, FCLSA

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## History of Hybrid Lenses

- Hybrid lenses
  - Rigid gas permeable optic zone
  - Hydrogel peripheral zone
  - Have been available for 40+ years
  - Their use in keratoconus was first described by Little in 1971.



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# SoftPerm Lens

- Originally considered ideal s/p PKP, KCN, irregular corneas
  - Larger OAD allowed better centration.
- Excellent stability and moderated astigmatism correction



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# New Hybrid Technology

- **2005** SynergEyes receives FDA approval for *SynergEyes® A* and *SynergEyes® KC*
- **2006** SynergEyes receives FDA approval for *SynergEyes® PS* and *SynergEyes® Multifocal*



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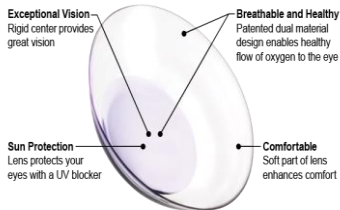
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# Duette 2<sup>nd</sup> Generation



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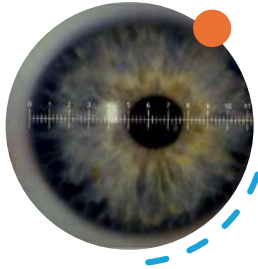
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### The Importance of HVID?

- Both parts of your SynergEyes iD lenses are personalized for you based on the shape and vision requirements of your unique eyes, providing you comfortable, personalized vision.
- What is HVID?




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### HVID/CORNEAL SIZE

- THE IMPACT OF HVID, or cornea size, is an important parameter to consider when fitting contact lenses, as it is the controlling factor for sagittal height
- An average HVID is approximately 11.8mm.
- When HVIDs are larger or smaller than average, base curve adjustments are required for properly fitted lenses.




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**SynergEyes iD Hybrid Design**

14.5mm Overall Diameter

**SynergEyes iD Hybrid Lens Design**

- SynergEyes iD hybrid lenses are individually designed to each patient's unique ocular anatomy utilizing Keratometric readings, HVID and Refraction to personalize precise lens parameters.

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### What are Specialty Lenses?

- Custom soft lenses
- Hybrids
- Custom soft toric lenses
- Therapeutic/bandages lenses
- Piggyback/tandem lens system
- Pediatric contact lenses
- SCLERALS
- Drug Eluting contact lenses

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### FDA Approves First Drug-Eluting Contact Lens

- March 3, 2022 — The U.S. Food and Drug Administration has approved Johnson & Johnson Vision Care, Inc.'s daily disposable contact lens with an established antihistamine—the first in an entirely new category of contact lenses.

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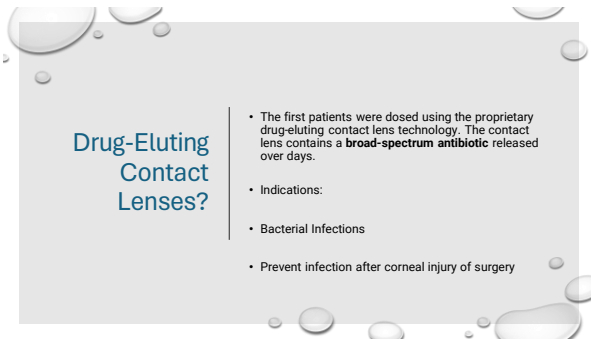
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### Drug-Eluting Contact Lenses?

- The first patients were dosed using the proprietary drug-eluting contact lens technology. The contact lens contains a **broad-spectrum antibiotic** released over days.
- Indications:
  - Bacterial Infections
  - Prevent infection after corneal injury of surgery

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**LATANOPROST**

- Latanoprost (Xalatan) pressure reducing eye drops are the first-line of defense against glaucoma.
- Side effects:
- Burning and difficulty in instilling drops



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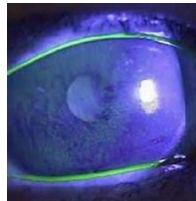
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New CL drug delivery system for DED- Research only now/Rabbits

- **Contact lenses soaked in melatonin analogs may be able to address aqueous tear deficient dry eye disease.**
- Three commercially available silicone hydrogel contact lens materials
- PureVision, Comfilcon A
- (Biofinity, CooperVision),
- Stenfilcon-A (MyDay, CooperVision)),
- Two conventional hydrogel contact lens materials



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Smart Contact Lenses that Diagnose Cancer

 Smart contact lenses have been developed by scientists that diagnose cancer by detecting tumor chemicals found in tears during the early stages of the disease.

 It captures the signals of transporters called 'exosomes', which are a little like secret messengers within our bodies.

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**Smart Contact Lenses Detect Cancer**

Found within cells, they end up in various fluids and have a wealth of proteins on their surfaces which can be used as hallmarks of cancer, viral infections, or injury.

This simple technique eliminates these issues. Tears are also a better and cleaner source of exosomes than other bodily fluids.

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**What are Exosomes?**

Exosomes are extracellular vesicles and are just 30 to 150 nanometers across. In other words, they're tiny sacs that house cells. Their central task is to connect all cells by allowing them to communicate.

Similar to e-mailing:

Exosomes are how one cell emails another cell. As exosomes help to connect cells, they also send signals through the information they bear. The purpose is for cells to turn on particular functions or to react in a specific way.

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**Therapeutic/Bandage Contact Lenses**

- What is the difference?
- Difference applications?
- How to determine?

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Leaking bleb fitting/How to Fit

- Measure from center of pupil to apex of the bleb
- Double that number
- Add 2mm



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How Many Toric Lens Designs Are Available?

- 54!!!
- Powers range from +30.00 to -30.00D
- Cylinder power range up to 10.00D
- Any axis



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TIME OF FITTING

- Fit as soon as possible
- Two weeks post-surgery
- Contact lenses can be fitted while patient is under general anesthesia



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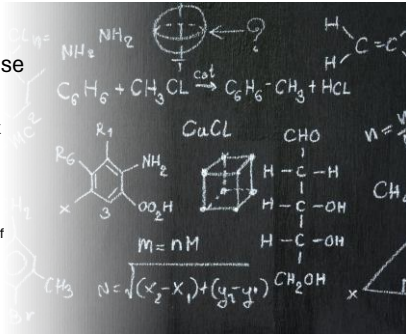
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### How to Determine Base Curve?

- Determine the Flattest K Reading:
- Subtract 4 Diopters
- Convert to millimeters of radius



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## Soft Contact Lenses For Keratoconus

- This lens type's center thickness is typically three to six times that of a traditional custom soft hydrogel lens.
- Enhanced center thickness helps to mask anterior corneal irregularities and decrease HOAs.

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### A recent study

Patients aged 10-40 years were defined as the relevant age category for newly diagnosed keratoconus and the annual incidence of newly diagnosed keratoconus was determined.

The prevalence of keratoconus was estimated based on the annual incidence, mean age at diagnosis, and average life expectancy. Main outcome measure was the annual incidence and prevalence of keratoconus.

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RECENT STUDY

- The annual incidence of keratoconus was 1:7500 in the relevant age category (13.3 cases per 100 000, 95% confidence interval [CI]: 11.6-15.2) and the estimated prevalence of keratoconus in the general population was 1:375 (265 cases per 100 000, 95%.
- These values are 5-fold to 10-fold higher than previously reported values in population studies. The mean age at diagnosis was 28.3 years and 60.6% of diagnosed patients were male.



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