What Can Possibly be New in Contact Lenses?

By: Susan Janik, OD

Course Objectives
This course will familiarize attendees with new and upcoming contact lenses and their uses. Uses including diagnosis and treatment.

Transitions™ in CTLs?
1. Challenging light environments:
   a. playing sports
   b. working under office lights
2. Provides enhanced color contrast
3. Price: slightly higher than Oasys for Astigmatism
4. Filtering blue light and blocking harmful UV ray

Transitions™ in CTLs?
- 8.4 mm base curve/14.0 mm diameter
- 8.8 mm base curve/14.0 mm diameter

Power Ranges
-6.00 D to +6.00 D (0.25 D steps)
+6.50 D to +8.00 D (0.50 D steps)
-6.50 D to –12.00 D (0.50 D steps)
Including plano

Transitions™ in CTLs?
1. ACUVUE® OASYS with Transitions™ are the only contact lens that provides 100% protection against UVB rays.
2. Not a replacement for sunglasses

Disclosures and Contact Information
I am currently or have been on a speakers bureau or advisory board for the following companies:
- BioTissue
- CooperVision
- PRN
- Shire

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We Know J & J has UV protection, Anyone Else?

CooperVision:
- Clarity
- Avaira
- MyDay

Menicon:
- Miru 1day

We Know Acuvue has UV protection, Anyone Else?

VII:
- Naturalvue multifocal
- B & L
- Ultra
- Biotrue 1 Day

Speaking of Air Optix, Have you Seen Their Colors?

App on patient’s phone
- iPad in the office

What Else is NEW?

Do You Remember Triggerfish?

Sensimed Triggerfish Contact Lens Sensor CLS

- Designed to detect intraocular pressure-related changes in an eye over a 24-hour period.
- Safe and well tolerated, and provides reproducible results.
Sensimed Triggerfish Contact Lens Sensor CLS

One challenge of using the Triggerfish CLS is that it may only provide data on relative changes in intraocular pressure rather than absolute intraocular pressure.

- Its validity at estimating intraocular pressure compared to other methods is still controversial.

Recent study in JAMA Ophthalmology said that Triggerfish can be used to predict visual field progression.

What About the Contact Lens for Diabetics to Monitor Blood Sugar?

- Scientists from Korea have been testing it on rabbits.
- Electric power that activates the LED pixel → glucose sensor is wirelessly transmitted to the lens through the antenna. After detecting the glucose concentration in tear fluid above the threshold, this LED pixel turns off.

Wait, I Thought One was Being Made by Google and Novartis?

Shelved for now because blood sugar readings were inconsistent → very difficult to do, considered impossible. Researchers have tried with sweat, saliva and now tears.

Google/Novartis will continue to explore smart lens technology such as:

Bionode, a startup affiliated with Purdue University

- Off-the-shelf contact lens
- Customized to each wearer
- Enhanced with a thin, gold insert around the edge, which acts as a biocompatible electrode

Any Other Smart Lenses?

Alocon-Google Collaboration Can Transform Eye Care
Smart Lenses

How does it work?
- Trace of gold receives an electromagnetic field that transmits from a specially equipped pair of glasses to convert the field into a current.
- The current is then delivered to a very specific part of the eye's anatomy to achieve the desired therapy.

Can they put Medications in Contacts?

They sure can!
Biggest disease they're trying to treat?
Glaucoma!

Uses for Drug-Loaded Contact Lenses

<table>
<thead>
<tr>
<th>DRUG</th>
<th>TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antifungal</td>
<td>econazole</td>
</tr>
<tr>
<td>Dry Eye</td>
<td>cyclopentolate</td>
</tr>
<tr>
<td>Ocular Inflammation</td>
<td>dexamethasone</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>latanoprost and timolol</td>
</tr>
<tr>
<td>Allergic Conjunctivitis</td>
<td>ketotifen</td>
</tr>
</tbody>
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Extended Treatment?

Harvard Medical School researchers: contact lenses that can dispense medication directly into the eye over the course of days or weeks.
Drugs are effectively delivered to the back of the eye and can potentially treat:
- macular degeneration
- diabetic retinopathy
- retinal vein occlusion
Wait, there’s more!

Extended-wear contact lens, developed by Biomedical researchers at Auburn University.

Meant for post-LASIK, post-cataract and corneal abrasions

All in One:
- anti-inflammatory
- antibiotic
- NSAID

Delivered evenly over time
Can potentially reduce recovery time and post-operative complication

Why Bother?
- Patient compliance is very poor (as low as 24%)
- Accurate administration of eye drops is rare
- Tear turnover and poor bioavailability causes loss of drug
- Estimated that <5% of a topically administered drug reaches intraocular tissues

Another Multifocal Toric? No Way!
- Proclear Multifocal Toric – Post Peds cataract surgery
- Ultra Multifocal for Astigmatism
- J & J

Sclerals for Dry Eye and Everything Else
- A lot easier that it was before to fit
- Many options – find a company you like, take advantage of their fitters
- Patients are more open to it and have an easier time getting supplies

S/P K Transplants
- After a corneal transplant, complete healing can take up to 24 months, and fitting will usually start around 6-12 months.
- Custom soft lenses can help with aberration control.
- While scleral costs can be higher, may be able to fully vault the graft, neutralize astigmatism, and, in some cases, reduce aberration.

Post Surgical Corneas
- Talk to the patient and check expectations
  S/P Cross-Linking -- can fit in 2-3 weeks
  Usually surgeon refers, never hurts to double check
One Word: Vault

Scleral Telescope for ARMD? That’s Crazy!

How it works:
- telescopic contact lenses
- must be paired with a pair of modified glasses
- originally made for viewing 3D television.

The liquid crystals contained within the glasses block either the magnifying portion of the contact lens or its unmagnified center by electrically changing the orientation of polarized light.

Scleral Telescope for ARMD? That’s Crazy!

- User controls through winking:
- RIGHT eye for magnification
- LEFT eye for normal vision
- Small light source and light detector in the glasses distinguish these intentional winks from simple blinks.

Crazy/Cool

Myopia Control

50% of the global population set to become myopic by 2050

Typically starts between ages 6 and 12

http://www.preventmyopia.org/
https://www.brienholdenvision.org/
Facebook Groups
Vision Therapy Friends

Myopia Control
Who cares? I DO!

Potential Risks:
- Retinal detachment
- Maculopathy
- Glaucoma
- Corneal Infection due to contact lens use

Myopia Control

Distance center multifocal, off label but is it enough?

MiSight 1 Day

After 3 years children wearing MiSight 1 Day:
- 59% less myopia progression compared to control group
- 52% less axial eye growth than control
- Not in the US...yet

History of Ortho K
- The ancient Chinese, thousands of years ago
  - placed tea bags filled with sand on the closed eyelids during sleep to improve vision in myopes
- In the 1940s with glass then 1960s, with rigid contact lens (PMMA), a handful of optometrist noted and studied how patients experienced improved eyesight after removing their rigid lenses
Ortho K

- Pumpkin effect – stop wearing and goes back to baseline within 72hrs
- Work with your CTL distributor (ie ABB) on fit sets and use the fitter to help give you the ideal fit for your patient
- iPhone videos
- Schedule often in the beginning, then taper
- Not every night
- Adults too

Corneal Refractive Therapy (CRT)

- iPhone videos
- Schedule often in the beginning, then taper
  - Not every night
  - Adults too

Mail Order Lenses

- Lens Ferry -- CooperVision
- J & J
- Lens Butler is now BoxSee -- Any CTL company

Recycling

- B & L – Sends to TerraCycle Plastic and foil only
  - Now, all brands
  - Donation made to Optometry giving Sight
- J & J but only in the UK
  - All brands

Recycling

CooperVision

Contacts – #5
Cartons – CooperVision’s are made from recyclable paper (#21 PAP or #23 PAP, depending on location)
As a company, they are minimizing waste of all kinds
On average, more than 95% of the materials in their production processes are recycled - including cardboard, wood, paper, and oil

Is it Really a Big Deal?

At the American Chemical Society’s 2018 national meeting and exposition, a study was presented that showed 21 percent of contacts wearers flush their contacts down the toilet or sink, instead of throwing them in the trash!
Where do They Go?

- End up in wastewater treatment plants
- Farmland as sludge
- So pliable, they slip through filters

Another Thing to Worry About?

- Broken down into dangerous microplastics (found in bottled water)
  - Detrimental to wildlife
  - Environmental health
  - Human health???
    - So far NO: Most microplastics remain in the guts of fish and do not move into muscle tissue (what we eat).
    - Or, we just don’t have the technology yet to measure it

Recycling Plastics — What do Those Numbers Mean?

1. **PETE — Polyethylene Terephthalate**
   The easiest of plastics to recycle. Used for bottles and many common food packages. Gets recycled into bottles and polyester fibers.

2. **HDPE — High density Polyethylene**
   Readily recyclable – Mostly used for packaging detergents, bleach, milk containers, hair care products and motor oil. Is recycled into more bottles or bags.

3. **PVC — Polyvinyl Chloride**
   In almost everything — pipes, toys, furniture, packaging. Difficult to recycle, PVC is a major environmental and health threat.

4. **LDPE — Low-density Polyethylene**
   Used for many different kinds of wrapping, grocery bags and can be recycled into more of the same.

5. **PP — Polypropylene**
   Contact Lenses and blister packages. Foil can also be recycled. Also, clothing, bottles, tubes and ropes. Usually recycled into fibers.

6. **PS — Polystyrene**
   Cups, foam food trays, packing peanuts. Polystyrene (also known as styrofoam) is a real problem because it’s bulky, very lightweight and makes it difficult to recycle. Only good news: can be reused.

7. **Other**
   Could be a mixture of any and all of the above or plastics not readily recyclable such as polyurethane. Avoid it – recyclers generally don’t want it.

APPs

OptExpert — CooperVision
   -- Includes MF toric

Virtual Consultant — Alcon
   eye2eye

Helps you find the best toric or multifocal lens for the modality you want, quickly!
The most significant finding:

- A substantial number of Acanthamoeba infections are polymicrobial, with 44% being co-infections with fungi, 12.5% with bacteria, and 5% triple infections. In its entirety, co-infections constituted 55% of all Acanthamoeba infections.

Already known — Ring infiltrates and stromal edema are frequently associated with Acanthamoeba keratitis, as well as in Acanthamoeba co-infections.

New — Ring infiltrates in particular were more frequently seen in the AK-FK group (8/16) and they were often yellowish with hyphate edges (versus ring infiltrates only, which are seen in the patients with AK alone).