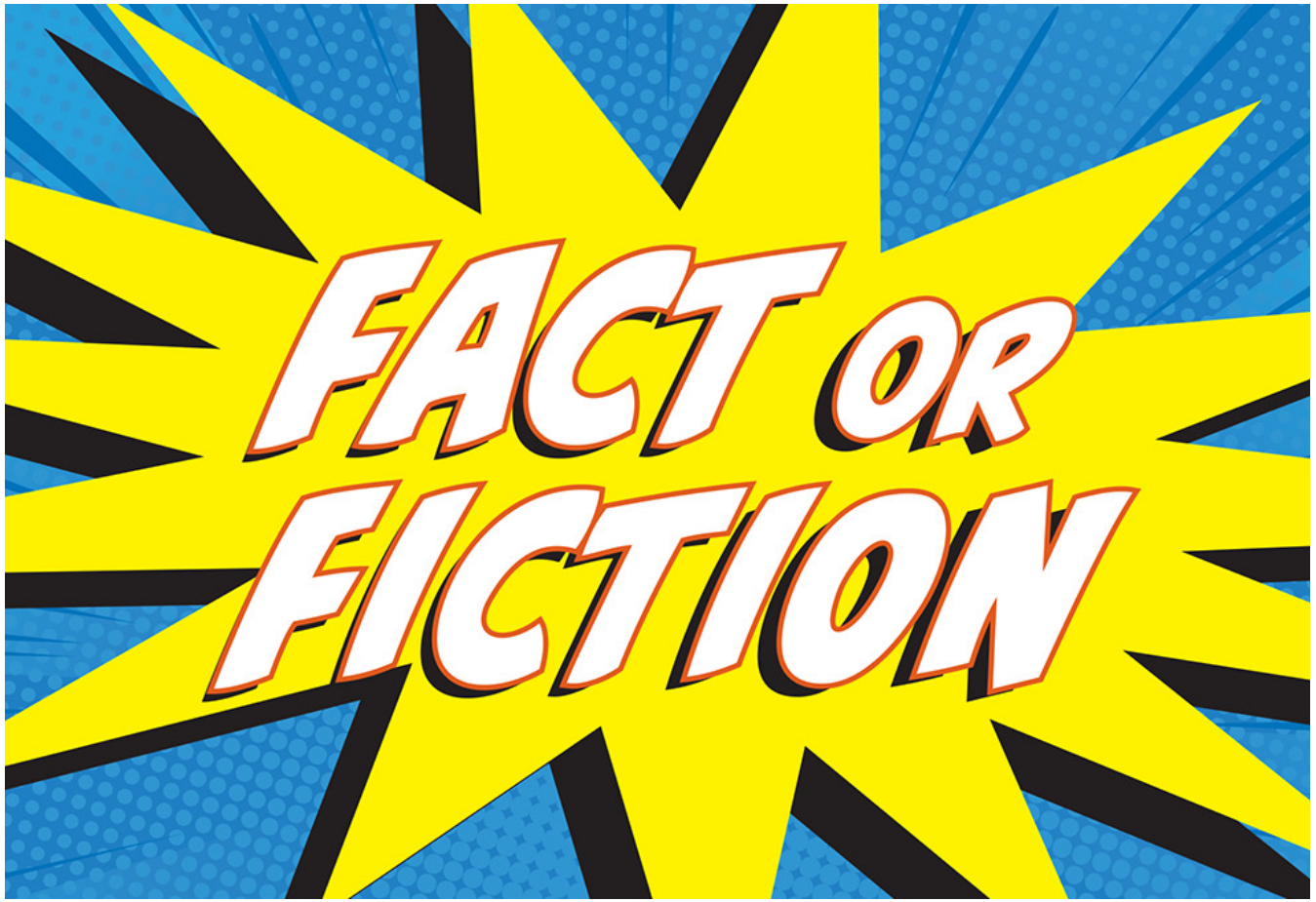
# Fact vs. Fiction - Tackling Common Contact Lens Myths

Melissa Barnett, OD, FAAO, FSLS, FBLCA



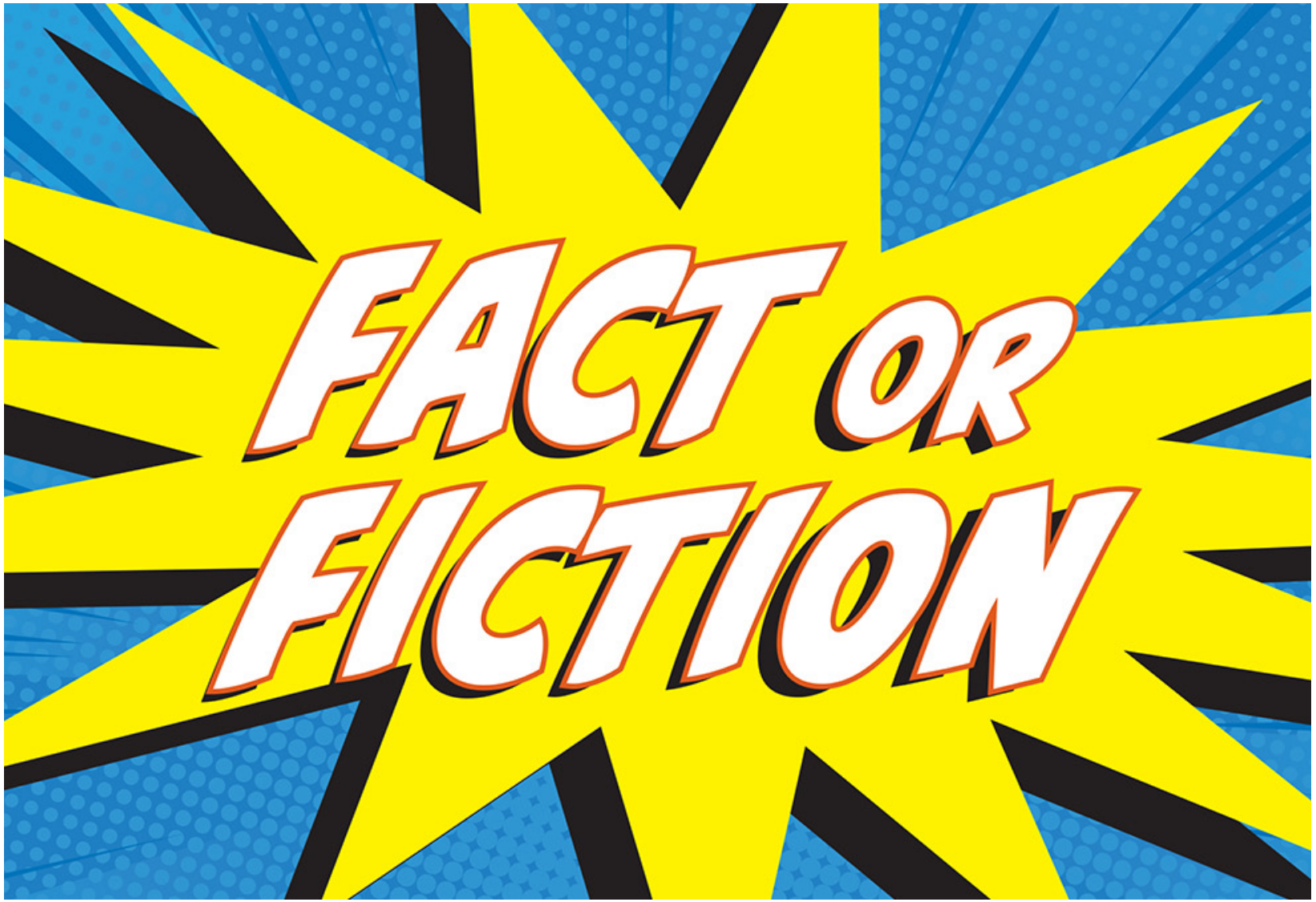
# Disclosures

- Acculens
- Allergan
- Bausch + Lomb
- BCLA
- Bruder
- BostonSight
- Contamac
- CooperVision
- Dompé
- EveryDay Contacts
- Gas Permeable Lens Institute (GPLI)
- JJVC Vistakon
- Lenstechs
- Mojo Vision
- Novartis
- Ocusoft
- Oyster Point
- Percept
- RVL Pharmaceuticals
- Science Based Health
- Scleral Lens Education Society
- STAPLE program
- SynergEyes
- Sun Pharma
- Tangible Science
- Tarsus
- Visus Therapeutics

**drmelissabarnett**

GlobalEyes

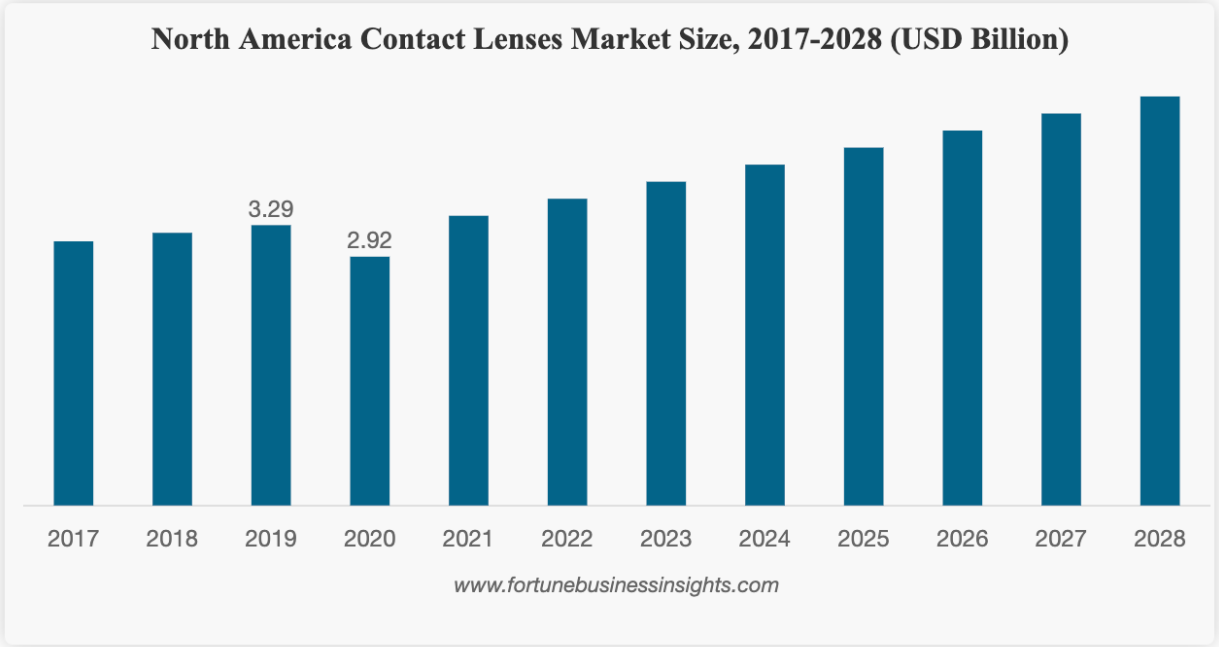
Contact Lens Wearers Must Wear Lenses Full Time



# Global Contact Lenses Market

- Valued at USD 7.84 billion in 2020
- Global CL market expected to grow from $8.58 billion in 2021 to $12.56 billion in 2028
- CAGR of 5.6% in forecast period (2021-2028)

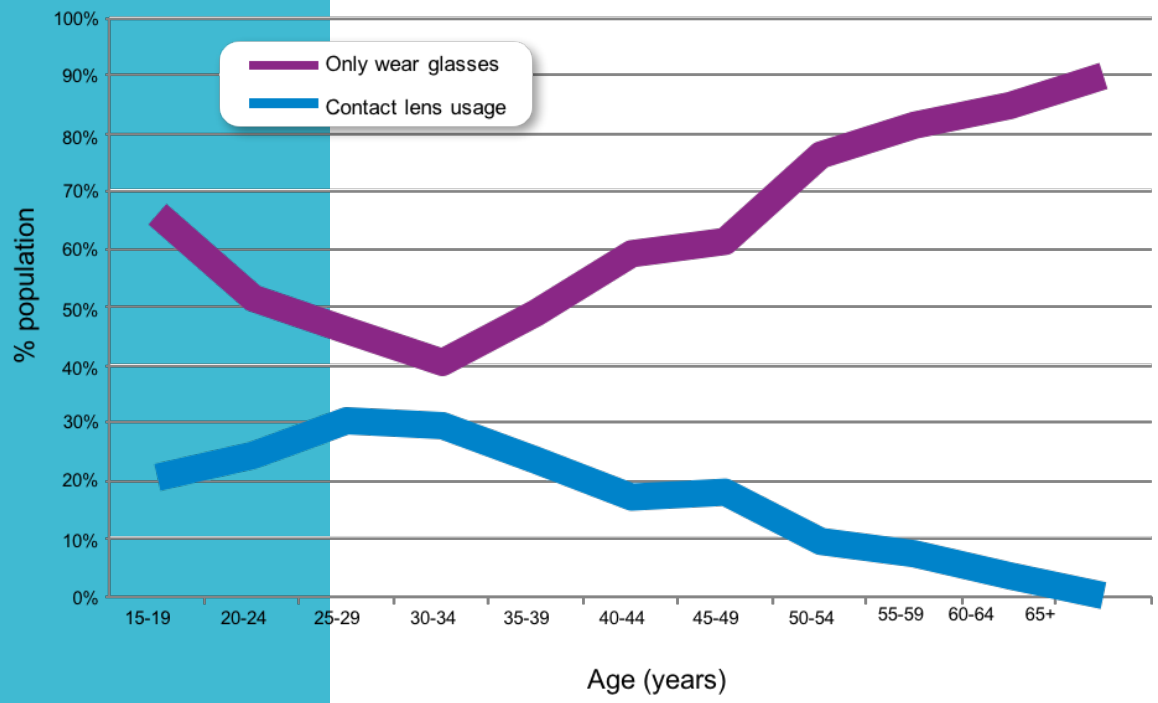
https://www.grandviewresearch.com/ Accessed February 2022
https://www.fortunebusinessinsights.com/industry-reports/contact-lenses-market-101775 Accessed February 2022




- USD 4.45 billion in 2021
- 6.37 billion by 2026
- Growing at a CAGR of 7.45% from 2021-2026

https://www.grandviewresearch.com/ Accessed February 2022
https://www.fortunebusinessinsights.com/industry-reports/contact-lenses-market-101775 Accessed February 2022

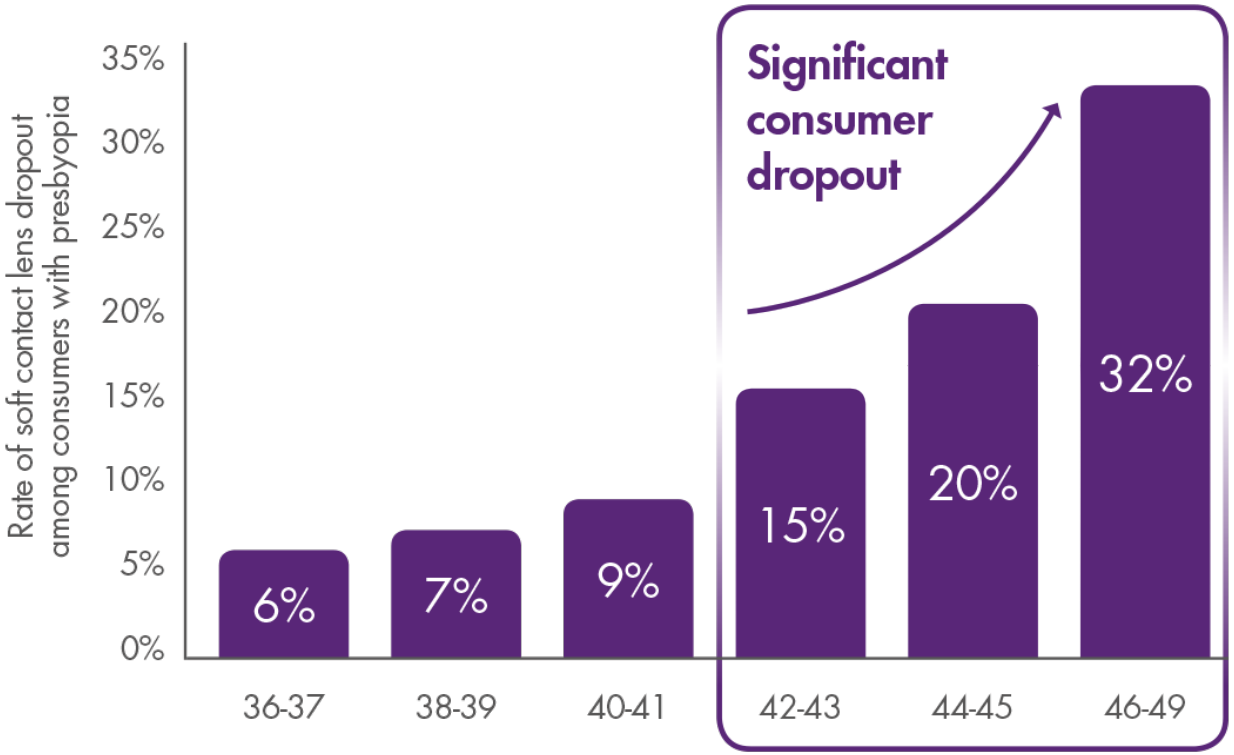
# HUGE opportunity for CLs as ametropia increases




Ametropia **doubles** past 45 years[1]

**Half** of CL wearers drop out past 45 years

1. Independent market research, 2014/15 in 7 markets including Europe and Russia N=28,700 (2014); N= 14,000 (2015)




- Contact lens usage dramatically drops off with age[1]
- 93% of presbyopes were not wearing multifocal lenses at dropout[1]

https://alconsa.co.za/multifocal-healthcare/

# Contact Lens Benefits

# Benefits of Contact Lenses

- Freedom
- Peripheral vision
- Youthful appearance
- Glasses-free
- Part-time wear
  - Social
  - Sports

# Practice Benefits

- Reduce self prescribing of OTC
- Filling a need and a want
- Differentiate your practice & services
- Make patients happy
- Improve patient retention and loyalty
- Increase referrals
- Increase revenue

# Mask associated dry eyes (MADE)

- Drying effect on the ocular surface when air blows upward instead of outward
- Increases tear film evaporation and leads to ocular irritation and discomfort
- Poorly fit facemasks are often the cause and are contributory

Moshirfar M, West WB Jr, Marx DP. Face Mask-Associated Ocular Irritation and Dryness. *Ophthalmol Ther*. 2020;9(3):397-400. doi:10.1007/s40123-020-00282-6

# Mask Associated Dry Eye (MADE)

**Wearing masks is essential to helping reduce the spread of COVID-19, but may lead to symptoms of dry eye. Why does this occur and what can you do?**

## Cause

1. Air from breathing out is channeled up, out the top of the face mask, and over the surface of the eye.[1]
2. Movement of air over the eye causes tears to evaporate, leaving the surface of the eye dry.
3. Eyes may feel dry, gritty, irritated, itchy, watery and look red.

## Solution

1. Ensure your mask fits well, and consider taping the top edge of the mask for prolonged wear.
2. Lubricating eye drops may help alleviate dry feeling eyes. Consult with your eye care professional for their recommendation.
3. Limit time in air-conditioned environments where possible, and take regular breaks from digital devices.

**Remember! Avoid touching your face and rubbing your eyes with unwashed hands.**

CORE Centre for Ocular Research & Education

UNIVERSITY OF WATERLOO FACULTY OF SCIENCE School of Optometry & Vision Science

COVIDEyeFacts.org

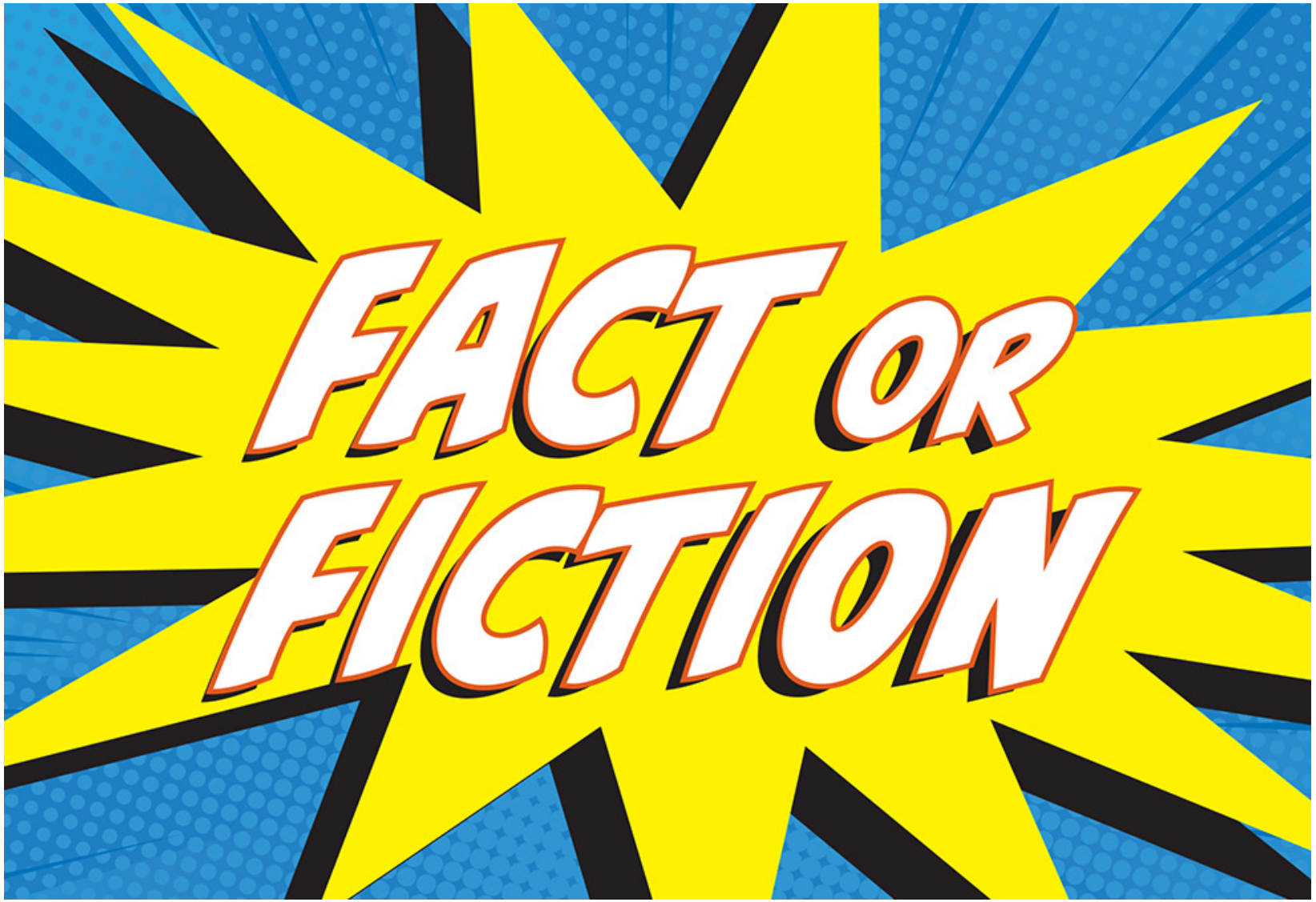
1. Moshirfar, M., West, W.B. & Marx, D.P. Face Mask-Associated Ocular Irritation and Dryness. Ophthalmol Ther (2020). https://doi.org/10.1007/s40123-020-00282-6



# Strategies to Alleviate MADE

- Taping top of mask to the face (helps with fogging and MADE)
  - Caution to avoid pulling on the eyelid → lagophthalmos
  - Masks with pliable nose – wires preferred option
- Lubrication with eyedrops
- Limit time in air conditioning
- Breaks on digital devices
- Hydration

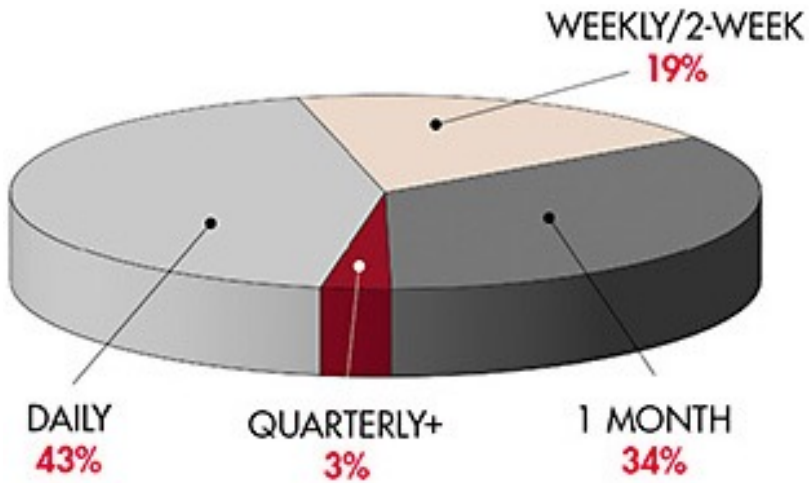

# Daily Replacement Contact Lenses are Wasteful

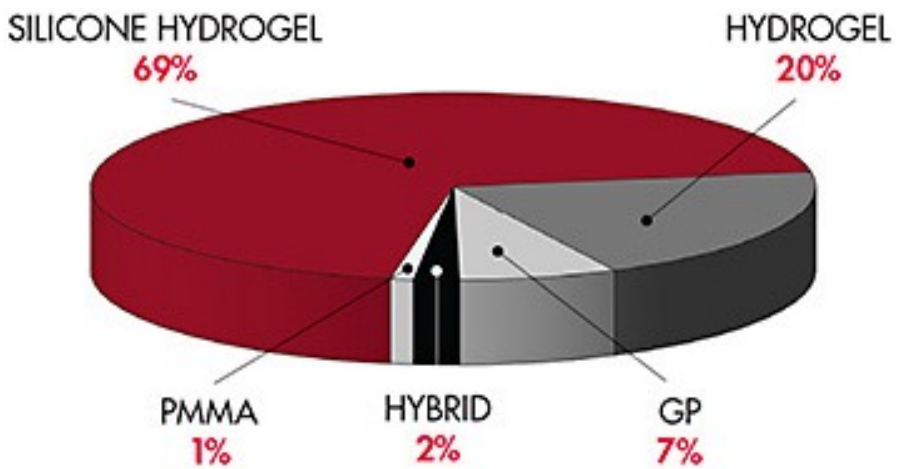


- Plastic is everywhere!
- 32% of plastic packaging ends up in the ocean each year
- 91% of plastic has never been recycled

# Daily Replacement Contact Lenses are Wasteful

- Daily replacement contact lenses market penetration




Nichols J, Starcher L. The global contact lens market continues to remain resilient as the industry adjusts to life with the COVID-19 pandemic. Contact Lens Spectrum. January 2022.

# Daily Replacement Contact Lenses are Wasteful

15 to 20% of contact lens wearers flush contact lenses down the sink or toilet[1]

Annual supply of daily disposable CLs (365 pairs) produced 11.36 g of dehydrated plastic waste

Compared to 20 oz. water bottle, equivalent weight of 1,586 dehydrated CLs (a 2.17 year supply)

1. https://asunow.asu.edu/20180819-discoveries-asu-scientists-1st-nationwide-study-environmental-costs-contact-lenses

# Daily Replacement Contact Lenses are Wasteful

Reusable lenses (biweekly and monthly wear) require solution bottles and cases

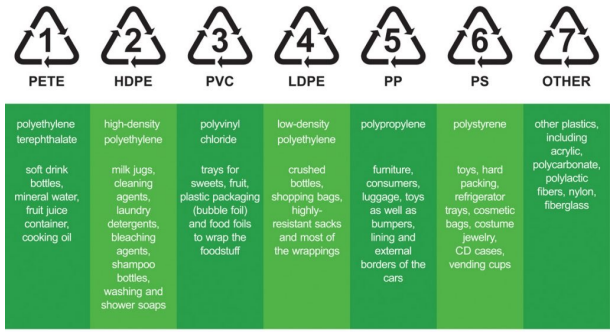
Single bottle of MPS average weight equivalent to 2.5 years of daily replacement CLs

Peroxide case is equal to more than 8 years of CLs

1. https://asunow.asu.edu/20180819-discoveries-asu-scientists-1st-nationwide-study-environmental-costs-contact-lenses

# Daily Replacement Contact Lenses are Wasteful

- Contact lens cases, solution and cleaner bottles
- Recycled plastic number 5 recycling
- Polypropylene
- High melting point

# Recycling Programs

## Bausch + Lomb

- Bausch + Lomb
- One by One and Biotrue Eye Care Recycling program
- Recycled a total of 48,235,850 million units (290,145 pounds) of used CLs, eyecare and lens care materials
- Equivalent of the weight of approximately 31 elephants

https://www.visionmonday.com/business/sustainability/article/contact-lens-companies-amplify-their-sustainable-commitments/

# Recycling Programs

# CooperVision

- CooperVision
- "First-of-its-kind plastic neutrality initiative"
- Expanded to include additional countries in Europe and Latin America
- Will soon launch in select Asian countries

https://www.visionmonday.com/business/sustainability/article/contact-lens-companies-amplify-their-sustainable-commitments/

# Recycling Programs

## Alcon

- Alcon
- Earned the GreenCircle Zero Waste to Landfill Certification for three ophthalmic drop and solutions manufacturing facilities
  - Two in Fort Worth, Texas, and one in Singapore

https://www.visionmonday.com/business/sustainability/article/contact-lens-companies-amplify-their-sustainable-commitments/

## Recycling Programs

## Johnson & Johnson Vision

Committed to achieving carbon neutrality in all its operations by 2030

Two important changes how some products are made and distributed to benefit the planet

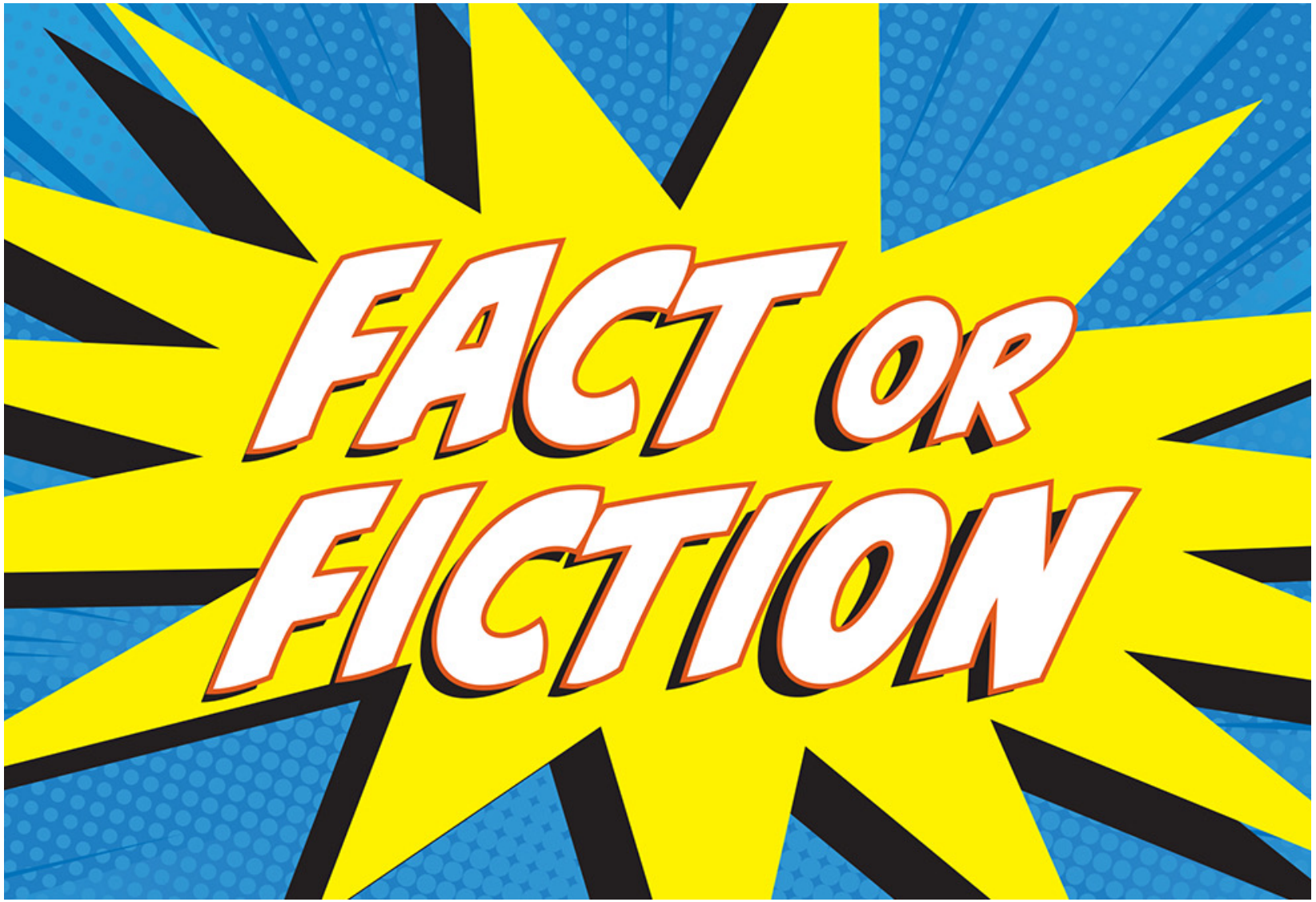
April 2022

All Acuvue brand contact lenses are now made with 100% renewable electricity

Global climate goal of sourcing 100% of the company's electricity needs from renewable energy two years early

https://www.visionmonday.com/business/sustainability/article/contact-lens-companies-amplify-their-sustainable-commitments/

# Multifocal Contact Lenses Don't Work



pres·by·o·pi·a – a form of farsightedness occurring after middle age, caused by a diminished elasticity of the crystalline lens.

Origin of presbyopia –Modern Latin from Classical Greek -presbys

presby- word-forming element meaning "old," from Greek *presby-*, combining form of *presbys* "elderly, aged," as a noun

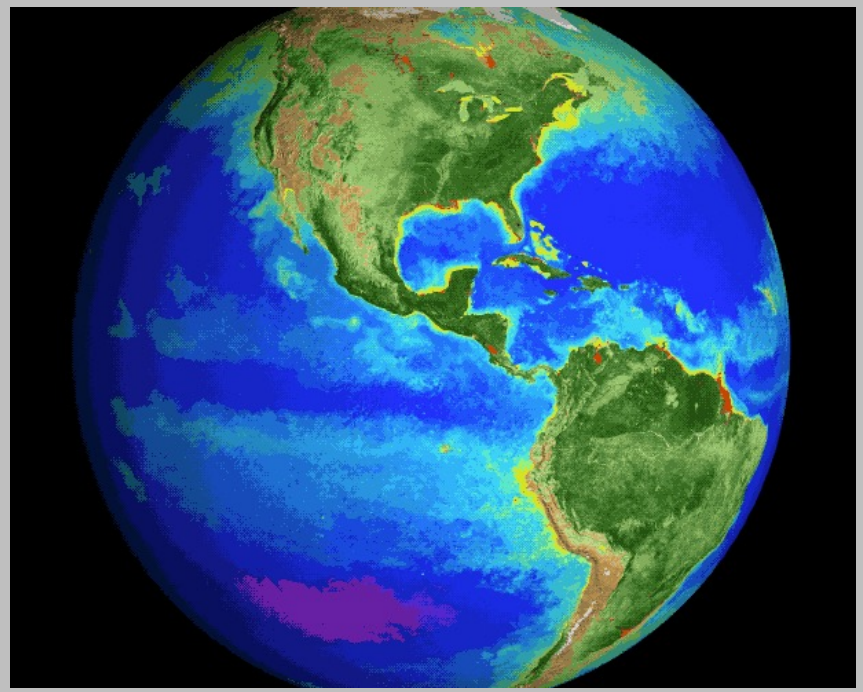
# Presbyopia

Inevitable and affecting more people than ever

128 million American presbyopes[1]

~ 1.8 billion affected globally[2-4]

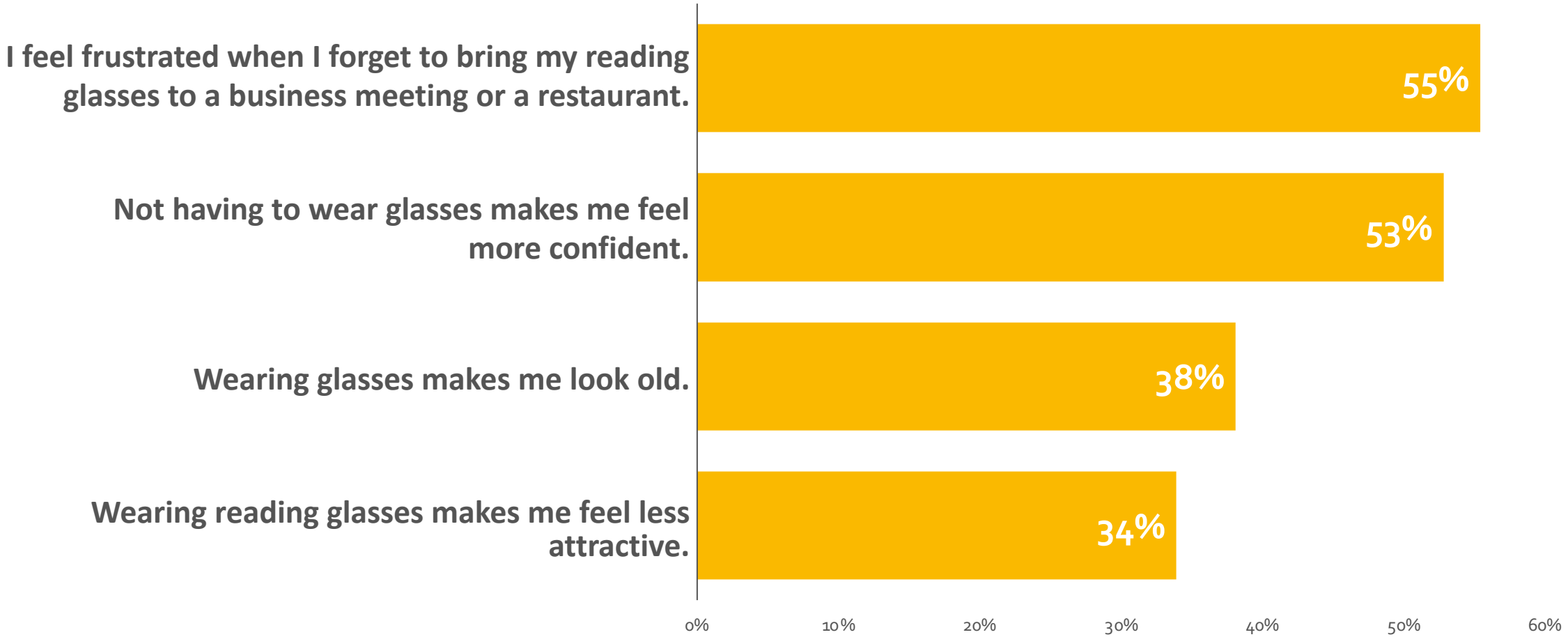
30.9 million buy OTC readers[5]



Determined based on U.S. Census data.

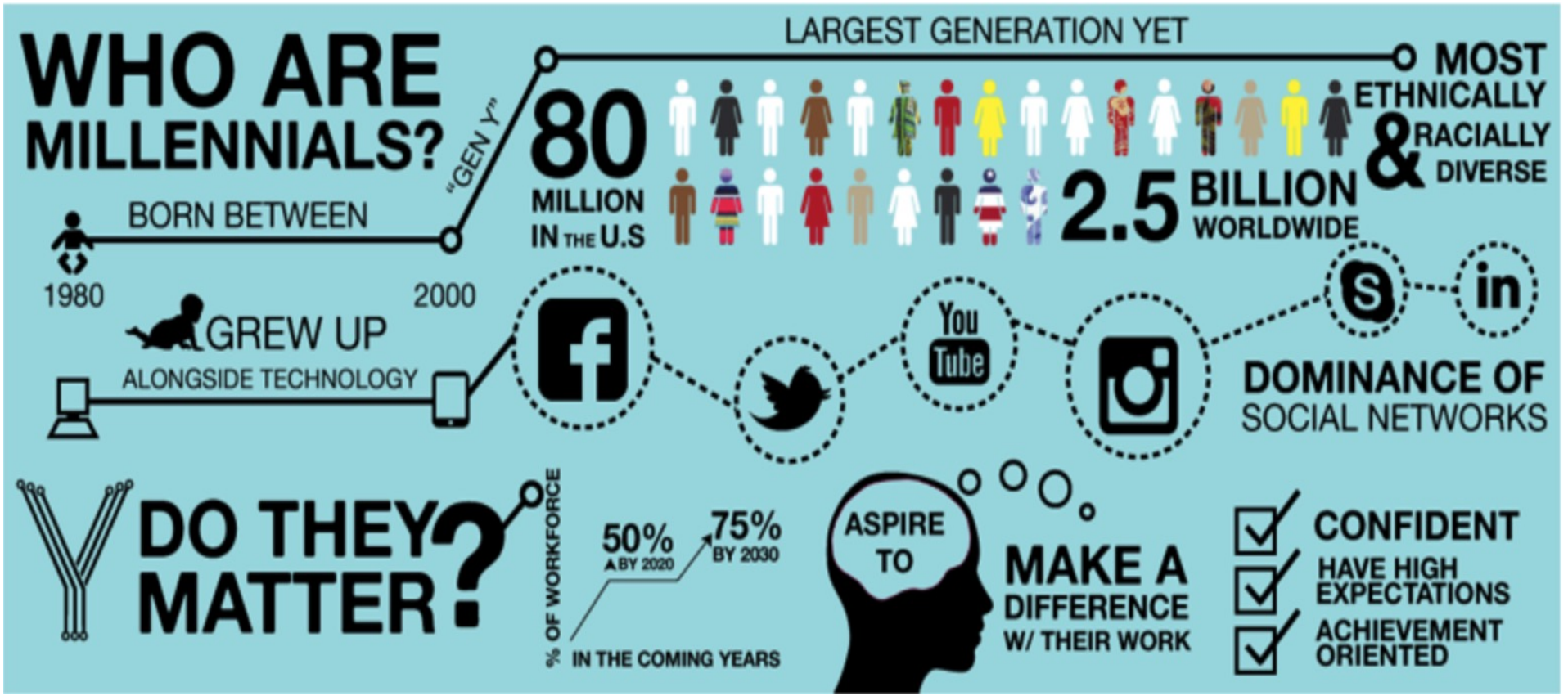
1. Fricke et al. *Ophthalmology*. 2018; 2. American Optometric Association website. Accessed 2019; 3. Zebardast et al. *Am J Ophthalmol*. 2017; 4. U.S. Census Bureau. 2014; 5. Vision Council website. Accessed 2020.

# Patients Are Frustrated by Reading Glasses

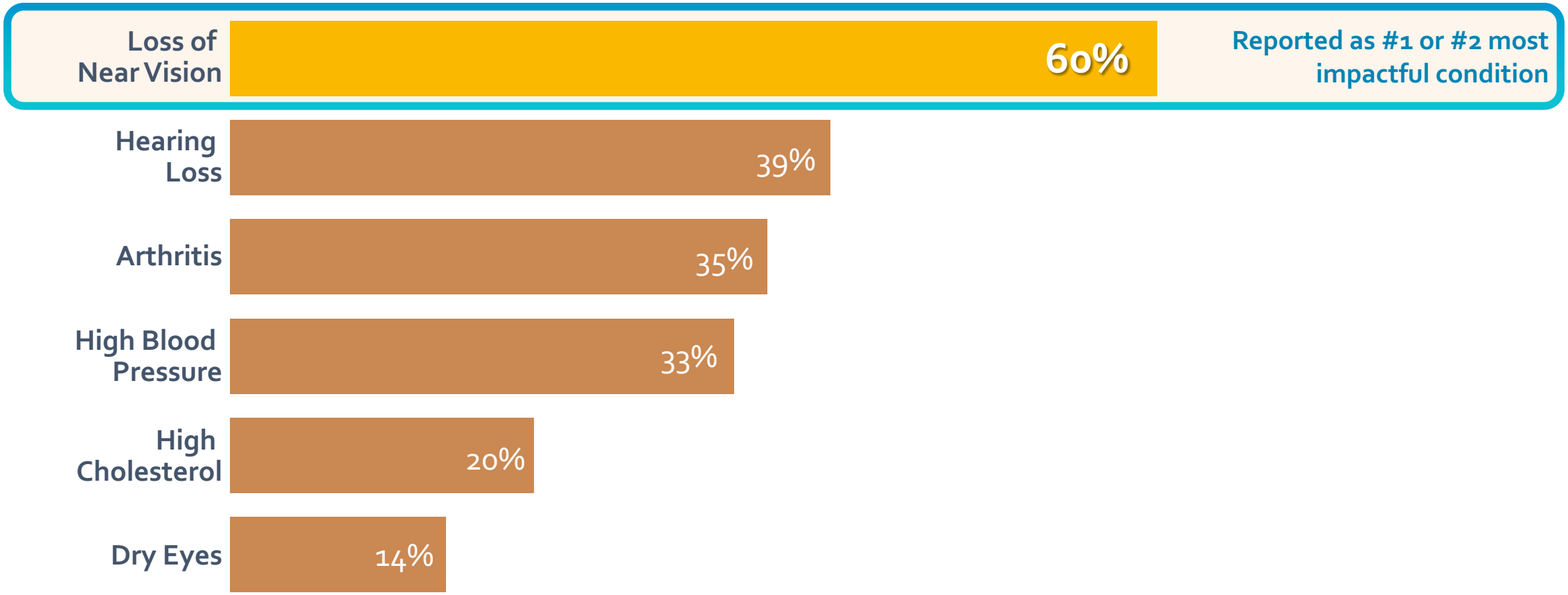



Melissa Barnett, OD, FAAO, FSLS, FBCLA, April Jasper, OD, FAAO. Patient Motivations and Expectations for Presbyopia Correcting Drops. Poster presented at: American Academy of Optometry, November 4, 2021, Boston Massachusetts.

Burke Healthcare Research April 2020, n = 1000 presbyopes ages 40-80 years old. Question A7 (31). Please read the following statements and choose the answer that most closely aligns with your feelings.


WHO ARE MILLENNIALS?
"GEN Y"
BORN BETWEEN
1980
2000
GREW UP
ALONGSIDE TECHNOLOGY
LARGEST GENERATION YET
80 MILLION IN THE U.S
2.5 BILLION WORLDWIDE
MOST ETHNICALLY & RACIALLY DIVERSE
DOMINANCE OF SOCIAL NETWORKS
DO THEY MATTER?
% OF WORKFORCE
50% BY 2020
75% BY 2030
IN THE COMING YEARS
ASPIRE TO MAKE A DIFFERENCE W/ THEIR WORK
CONFIDENT
HAVE HIGH EXPECTATIONS
ACHIEVEMENT ORIENTED

## Consumers Rank the Loss of Near Vision as #1 Impact on Quality of Life in Comparison to Other Age-related Ailments (% ranking conditions as top-2 most impactful on QOL)

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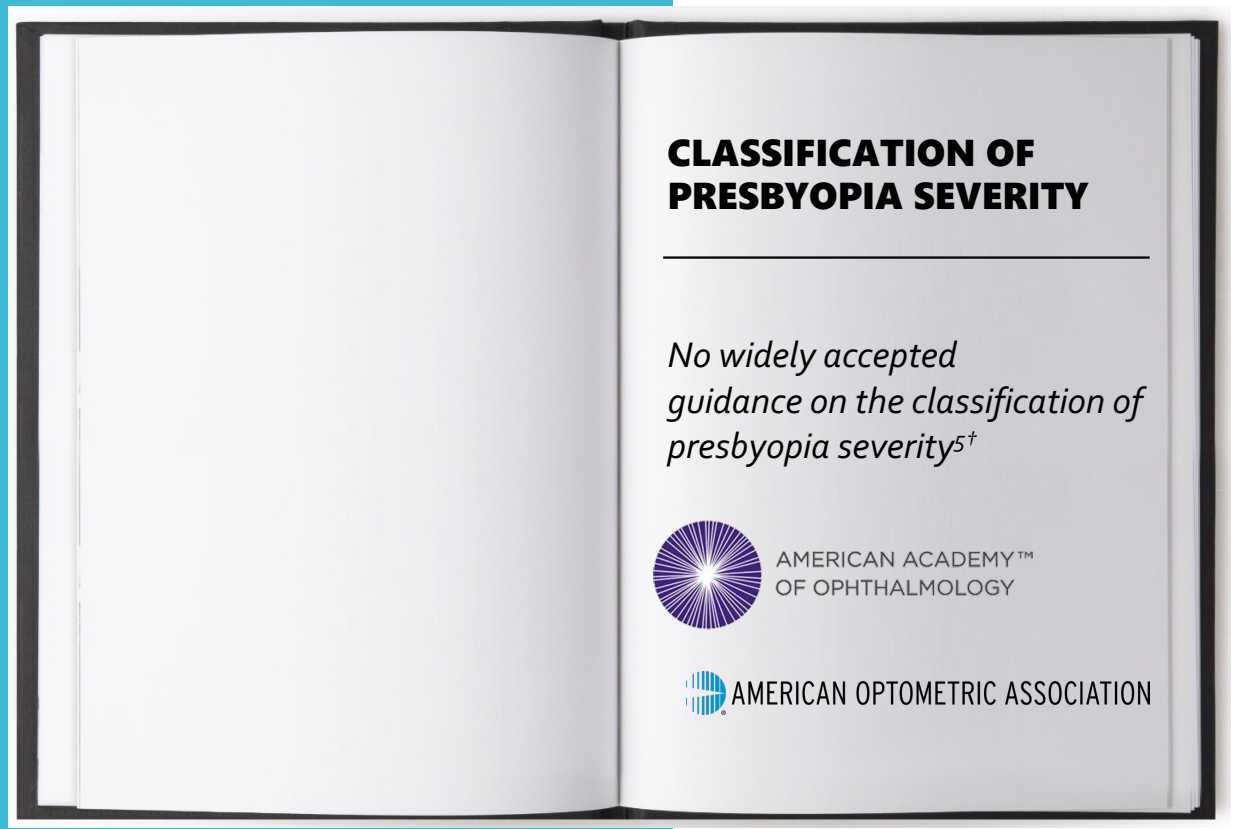
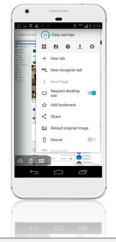
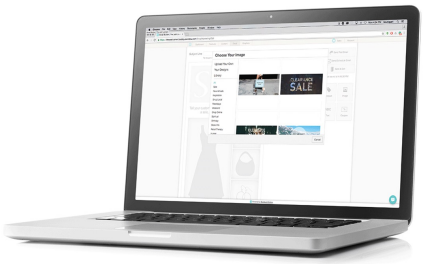



- Premature
- Incipient
- Functional
- Absolute
- Nocturnal

# FUNCTIONAL NEAR VISION




| | **Nutritional label,** legal disclaimers, footnotes | **Smartphone (common text sizes),** Classified ads, Bible, toiletry labels, books, magazines | **Computer (common text sizes),** Children's books, newspaper sub-headlines |
|---|---|---|---|
| Unable to read font size*: | 4 pt – 6 pt | 8 pt – 12 pt | 14 pt – 30 pt |
| PRESBYOPIA CLASSIFICATION | MILD PRESBYOPIA | MODERATE PRESBYOPIA | ADVANCED PRESBYOPIA |
| NEAR VISION CORRECTION† | ≤ +1.25 D | > +1.25 – +2.00 D | > +2.00 D |
| **DCNVA** (photopic) | 20/25 – 20/40 | >20/40 – 20/80 | >20/80 |
| **JAEGER EQUIVALENT** (photopic) | <J4 | J4 – J9 | >J9 |
| **TYPICAL AGE** | 40 – 47 years | >47 – 55 years | >55 years |

DCNVA = distance-corrected near visual acuity.
*Representation of differences in font size (actual size not shown). †Approximation of near vision correction relative to DCNVA.

1. McDonald MB, et al. *Ophthalmol Ther*. 2021. doi:10.1007/s40123-021-00410-w. 2. Sanders DR, Sanders ML. *J Refract Surg*. 2007;23:747-751. 3. Kennedy E. *The Responsive Website Font Size Guidelines.* Accessed April 29, 2021. https://learnui.design/blog/mobile-desktop-website-font-size-guidelines.html. 4. FDA. Accessed June 15, 2021. https://www.fda.gov/media/ 99151/download. 5. Columbia Journalism Review. Accessed June 15, 2021. https://www.cjr.org/language_corner/points-picas-typography-print.php.

# Presbyopic Contact Lens Options

- Multifocal Contact Lenses
- Modified Monovision
- Distance Contacts + Reading Glasses
- Monovision Contact Lenses

# What do the studies say?

**2000**

MV vs Essential GP (Johnson 2000)

- 75% preference for multifocal

**2003**

MV vs Acuvue Bifocal (Situ et al 2003)

- 68% preference for multifocal
- Issues with near vision in low light

**2006**

MV vs Softlens MF (Richdale et al 2006)

- 76% preference for multifocal
- Issues with near vision in low light

**2009**

Woods J et al (2009)

**Objective (exam room)**

- MV "best performer" for high- and low-contrast near vision tests

**Subjective ("real world")**

- MV "lowest performer"
- MF CLs "highest performer" (night driving, television, computer)

**2015**

MV vs Air Optix Aqua MF (Woods et al 2015)

- 51% preference for multifocal
- 37% preference for monovision

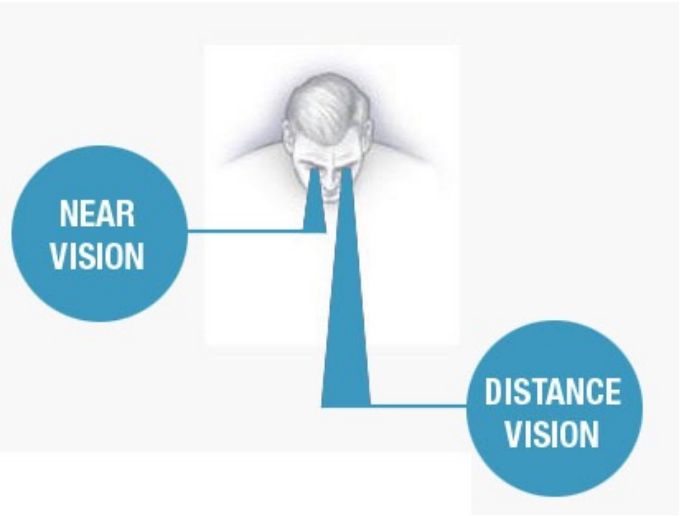
# The Numbers Don't Lie …

- Only 8% of presbyopes have been told about MFs
- 1 in 3 presbyopes want to try MF lenses
- 1 in 3 patients would switch Drs. if not told about MFs
- 91% of CL wearers age 35-55 want to stay in CLs as they age

Studebaker J. "Soft Multifocals: Practice Growth Opportunity" *Contact Lens Spectrum* June, 2009.

# Issues with Monovision

- Many people are not successful
- Halos and glare
- Night driving safety concerns
- Limited intermediate range
- Limited depth perception
- Lack of binocular vision
- Difficult to switch to multifocal lenses



# Why Start Early?

- Easier to deal with a low add than high
- Avoid patient frustration
- Being lazy leads to monovision
  - Push a little plus
  - Push a little more
  - Stall, stall and stall
  - Full blown monovision

# MF Practice Benefits

- Reduce self prescribing of OTC
- Filling a need and a want
- Differentiate your practice & services
- Make patients happy
- Improve patient retention and loyalty
- Increase referrals
- Increase revenue

# MF Practice Benefits

- Reduce self prescribing of OTC
- Filling a need and a want
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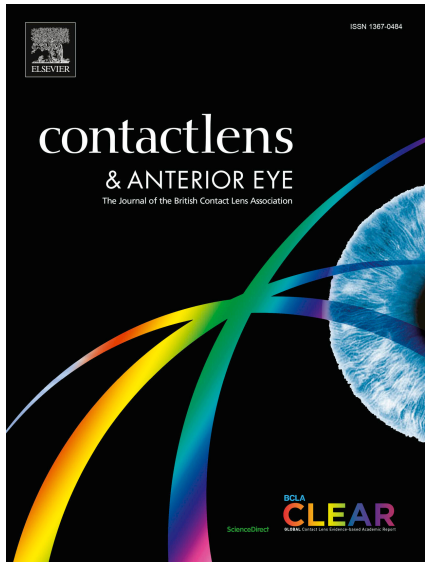
# Keys to Success

- Identify and Recommend
- Understand the science
  - MFs out-perform monovision
- Know the strengths and weaknesses
  - Freedom and functionality
  - Low light, etc.
- Start Early
  - Prepare the pre-presbyopes
- Fitting Process and Fees




Contents lists available at ScienceDirect

Contact Lens and Anterior Eye

journal homepage: www.elsevier.com/locate/clae

# CLEAR – Contact lens optics

Kathryn Richdale [a,*], Ian Cox [b], Pete Kollbaum [c], Mark A. Bullimore [a], Ravi C. Bakaraju [d,e], Paul Gifford [e], Sotiris Plainis [f], Curt McKenney [g], Steve Newman [h], Erin S. Tomiyama [a], Philip B. Morgan [i]

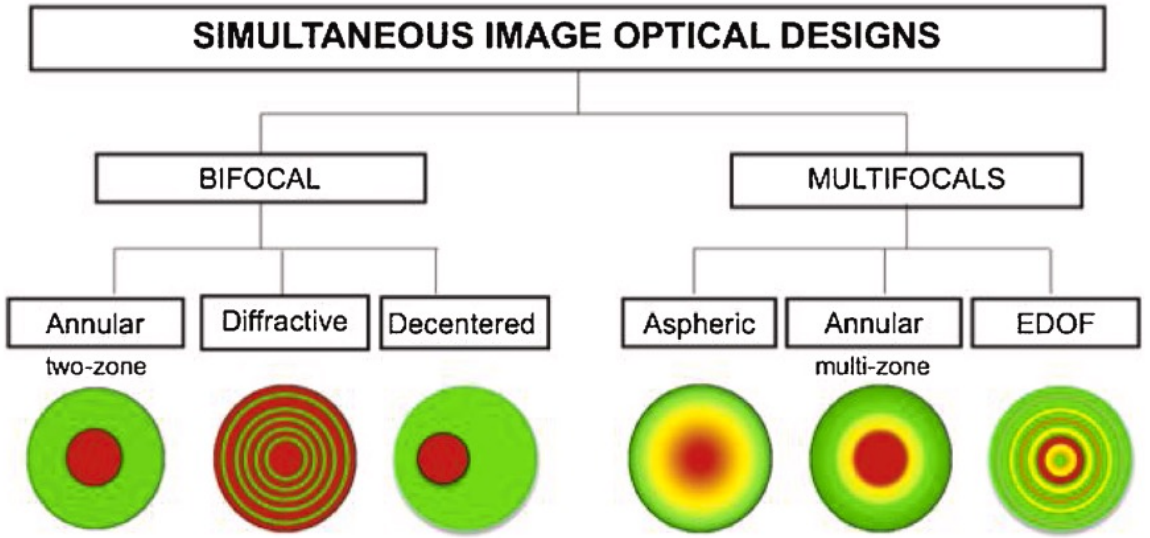
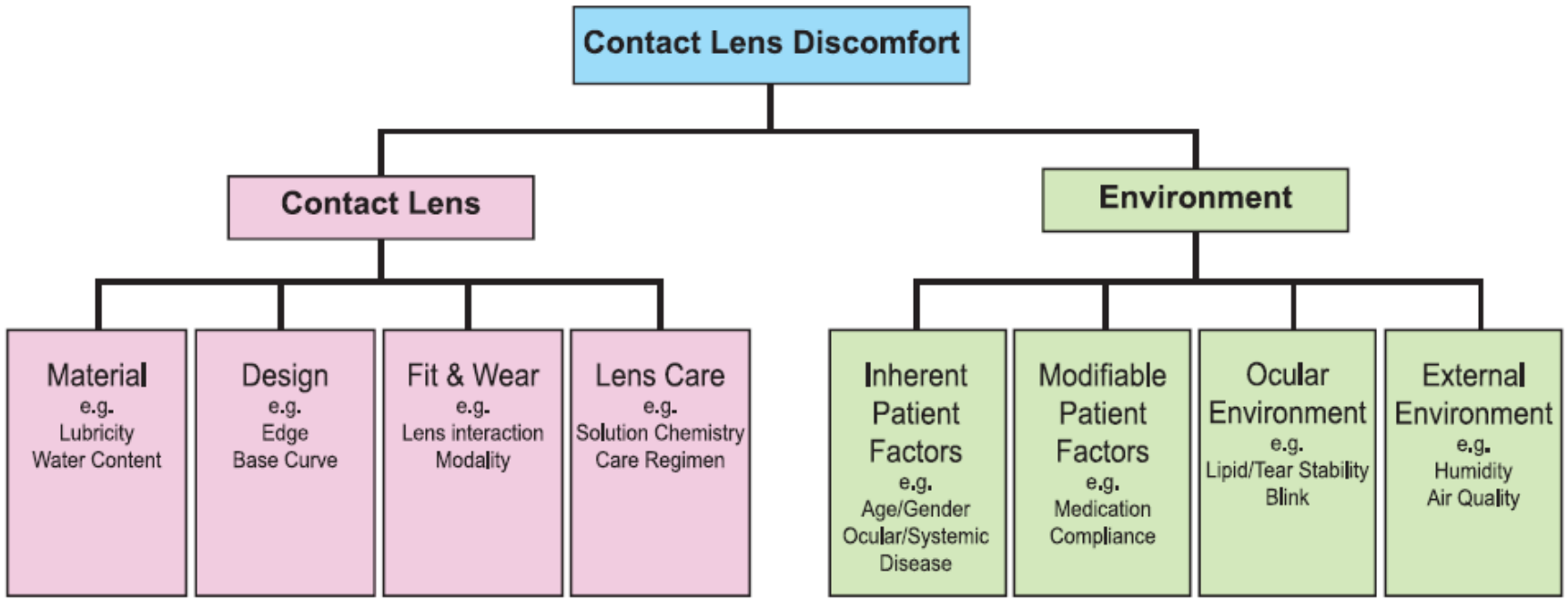



**Fig. 3.** Simultaneous-image optical designs of contact lenses. Red, green and yellow colours represent the areas for distance, near and intermediate vision, respectively. The annular / zonal and aspheric designs illustrated here have a central distance correction: designs with centre near correction are also available. EDOF: extended depth of focus (see 3.4.5).




## Progression of CLD


Slide Credit: TFOS

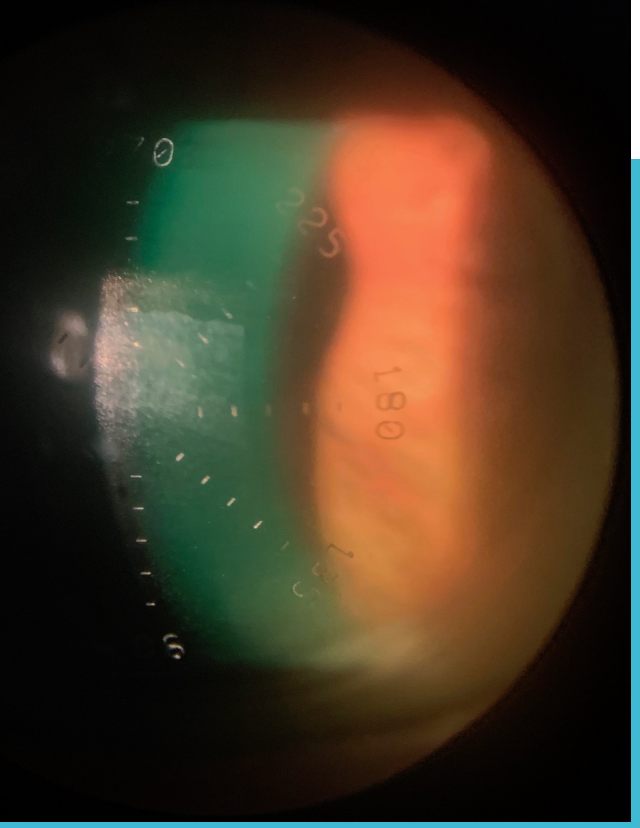
# The Astigmatic Component

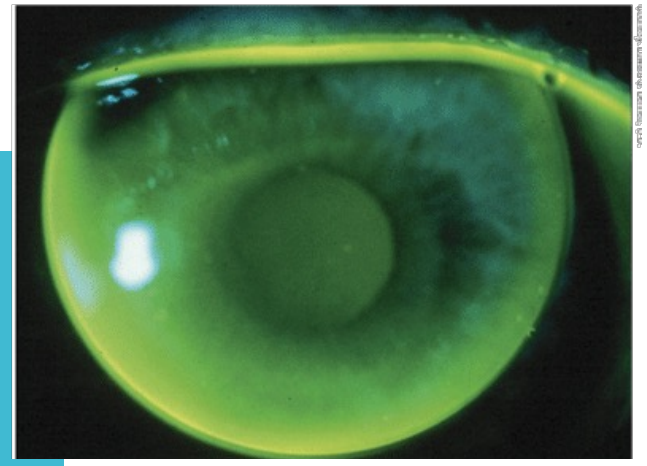
- 0.75 DC or more? 0.75 DC is the “flinch level”
- Is it corneal astigmatism?
- Residual astigmatism more noticeable
- Astigmatism in dominant eye?

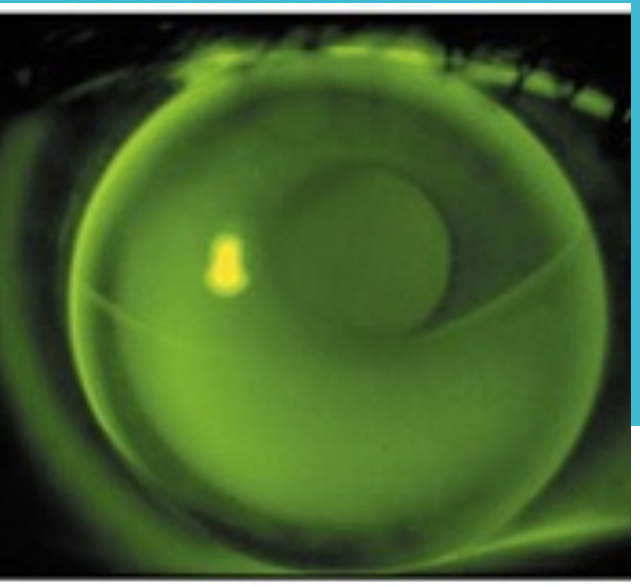
Toric MF fit tip:
Fix astigmatism correction first!

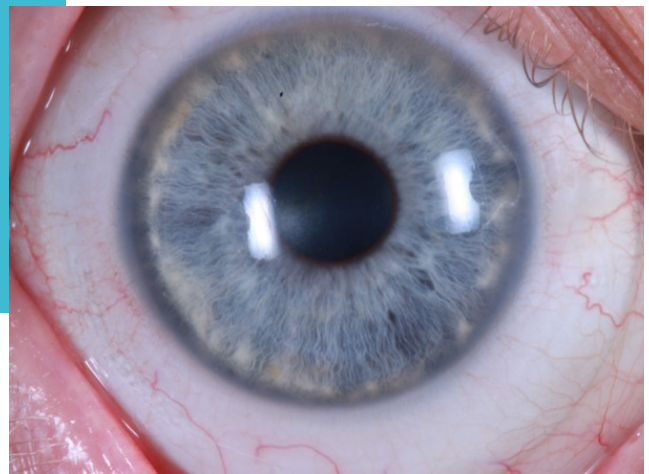
- Corneal Astigmatism ≠ Spectacle Astigmatism

- Soft toric options
- Soft toric multifocal
- Monovision
- SV soft toric OU with readers







# Multifocal Options

Image credits Tom Quinn, OD, Synergeyes, Tom Arnold, OD, Melissa Barnett, OD

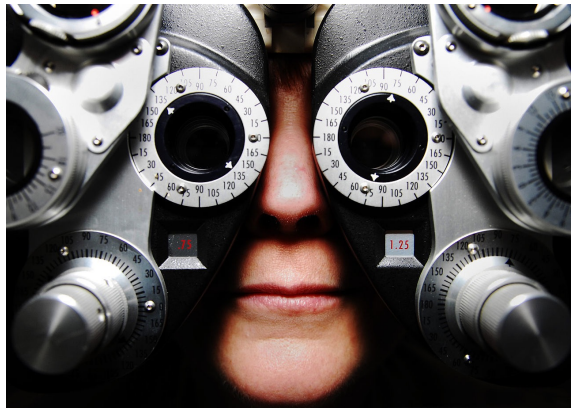
# Multifocal Fitting Steps

# Step 1: Get an Accurate Refraction

***** Most important Step *****

**Never use an old rx or someone else's**

- No More Minus Power than necessary
- No More Add Power than necessary



# Step 2: Determine Eye Dominance

- Sight Dominance
  - This is how we are wired
  - Create a triangle
  - Center a single letter
  - Cover one eye at a time
  - The eye that holds position is dominant
- Sensory Dominance
  - Sensitivity to blur
  - Place +1.50 to +2.00 lens over each eye
  - Check how vision changes
  - The eye that causes the most decrease in vision is the dominant eye

Image credit Shalu Pal, OD

# Step 3: Determine Lens Modality

Choose 1 day, 2 week or 1 month lens design (soft lens) or RGP, hybrid, scleral MF

- Based on Prescription
- Based on History
- Based on Use
- Based on Compliance
- Based on Cost

# Step 4: Choose Initial Lenses

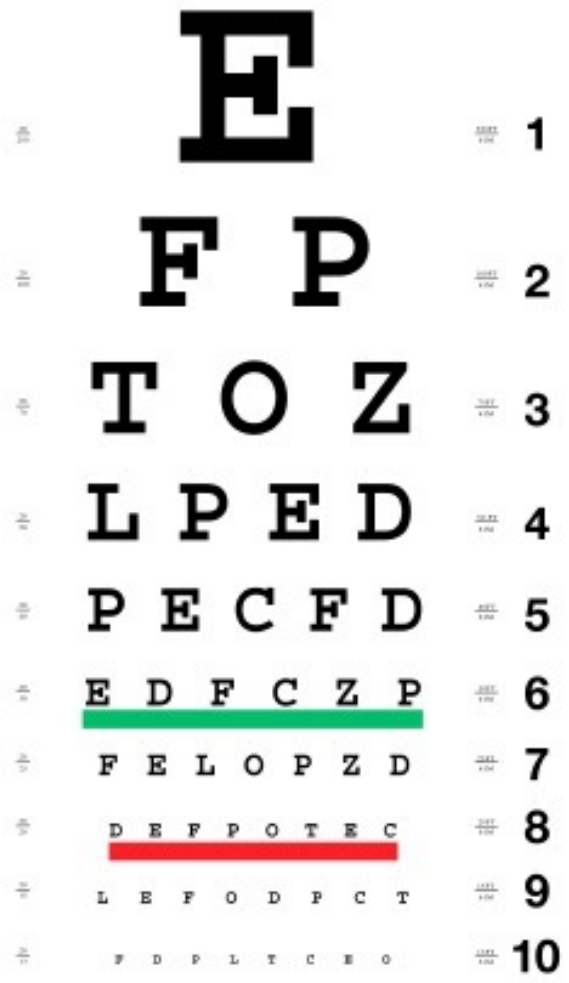
Use the Vertex Spherical Equivalent to choose sphere power
Choose add power based on fitting guide chart

# Step 5: Apply Lenses

- Apply lenses
- Let lens settle for 15 – 30 minutes
- Adaption is very important

# Step 6: Lens Assessment

- Fit
  - Movement
  - Coverage
  - Centration
- Vision – Next
- Comfort
  - Physical lens comfort




- Binocular distance, near & Computer VAs
- Start with 20/40 letters
- Have the lights on
- Use real world tasks – phones / digital device / books
- Check Visual Comfort

# Oh no! We have a problem

- Common complaints
  - Distance, near or intermediate blur
  - Shadows or haze
  - Balance – something off
- Consider more adaptation time!
- What else could it be?
  - Refraction is not accurate
  - The wrong lenses were chosen
  - The lenses are not centered
  - The lenses haven't settled
  - The patient hasn't adapted
  - Expectations were too high!

# Step 8: Troubleshooting

- No matter what the complaint is start with a **Binocular Distance Over Refraction**
- Only change the spherical component of the diagnostic lens
- **Do NOT** change the add power at this step
- Make a single change at a time!

# The Binocular Distance Over Refraction

- Have the patient look at a distance chart with both eyes
- Push Plus over each eye using loose lenses
- Show +0.25 over the right then left eye
- If accepted, then try +0.50 over each eye
- If plus is not accepted, push a little minus
- Show -0.25 over the right then left eye
- If accepted and more help needed, try -0.50

- First, change the sphere component only

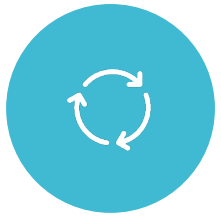
# Step 9: Adaptation Time

Reassure the patient

Give realistic expectations

Give them homework

Remember lighting is important



Things will change (adaptation)

Importance of follow up

# Step 10: The Follow Up

- Ask the patient how they are doing
- If happy, don't change anything
  - Rx and done
- If there is an issue, do a Binocular Distance Over Refraction and adjust the sphere
- If that does not solve the issue, use the fitting guide to attempt to change

# Step 11: Troubleshooting - Follow The Fit Guide

- If there is still an issue with vision after a binocular distance over refraction has been done, then …. Follow the fitting guides for next steps

# Fitting Tips for Success

- Don't make too many changes on the first day
- Make one change at a time
- Use real world tasks to test
- Bright lights
- No phoropters
- Loose lenses
- Know when to stop

# Management – discomfort and dryness

- Contact lens types – material, replacement frequency
  - Daily replacement vs. reusable
  - Hydrogel vs. silicone hydrogel
- Care regimens
  - MPS vs peroxide

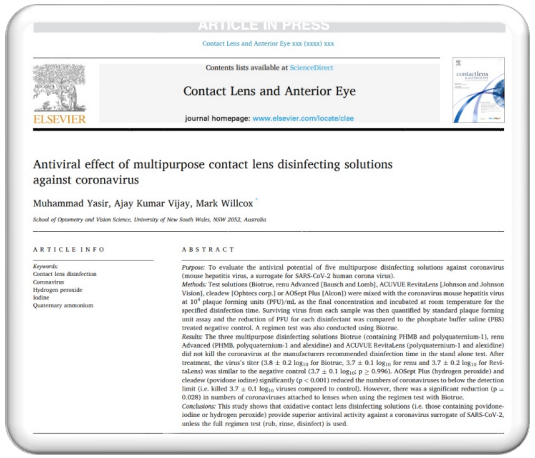
# Hydrogen Peroxide-Based Systems

- $H_2O_2$ - based systems are effective against COVID-19 according to the U.S. Environmental Protection Agency (EPA)[1]
- Within one minute, a 0.5% solution of $H_2O_2$ can cause a > 4 $log_{10}$ reduction in coronavirus contamination (CL disinfecting solutions = 3%)[2,3]
- With a 0.23% concentration of povidone iodine, there was a > 4 $log_{10}$ reduction in coronavirus infectivity within 15 seconds[2]

1. Environmental Protection Agency. About List N: Disinfectants for Coronavirus (COVID-19). Available at https://www.epa.gov/coronavirus/about-list-n-disinfectants-coronavirus-covid-19-0 . 2. Kampf G, Todt D, Pfaender S, Steinmann E. Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. J Hosp Infect. 2020 Mar;104:246-251.3. Kampf G, Todt D, Pfaender S, Steinmann E. Corrigendum to "Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents" [J Hosp Infect. 2020 Mar;104:246-251]. J Hosp Infect. 2020 Jun 17;105:587.

# Antiviral effect of MPS
# CL disinfecting solutions against coronavirus

- Study evaluated the antiviral potential of 5 MPS against coronavirus
- Mouse hepatitis virus, a surrogate for SARS-CoV-2 human coronavirus, was used
- 3 MPS did not eradicate coronavirus at the manufacturers' recommended disinfection time



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Contact Lens and Anterior Eye xxx (xxxx) xxx

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Contact Lens and Anterior Eye

journal homepage: www.elsevier.com/locate/clae

Antiviral effect of multipurpose contact lens disinfecting solutions against coronavirus

Muhammad Yasir, Ajay Kumar Vijay, Mark Willcox *

School of Optometry and Vision Science, University of New South Wales, NSW 2052, Australia

ARTICLE INFO

*Keywords:*
Contact lens disinfection
Coronavirus
Hydrogen peroxide
Iodine
Quaternary ammonium

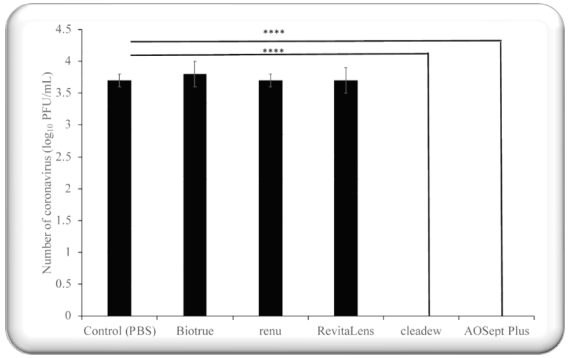
ABSTRACT

*Purpose:* To evaluate the antiviral potential of five multipurpose disinfecting solutions against coronavirus (mouse hepatitis virus, a surrogate for SARS-CoV-2 human corona virus).

*Methods:* Test solutions (Biotrue, renu Advanced [Bausch and Lomb], ACUVUE RevitaLens [Johnson and Johnson Vision], cleadew [Ophtecs corp.] or AOSept Plus [Alcon]) were mixed with the coronavirus mouse hepatitis virus at $10^4$ plaque forming units (PFU)/mL as the final concentration and incubated at room temperature for the specified disinfection time. Surviving virus from each sample was then quantified by standard plaque forming unit assay and the reduction of PFU for each disinfectant was compared to the phosphate buffer saline (PBS) treated negative control. A regimen test was also conducted using Biotrue.

*Results:* The three multipurpose disinfecting solutions Biotrue (containing PHMB and polyquaternium-1), renu Advanced (PHMB, polyquaternium-1 and alexidine) and ACUVUE RevitaLens (polyquaternium-1 and alexidine) did not kill the coronavirus at the manufacturers recommended disinfection time in the stand alone test. After treatment, the virus's titer ($3.8 \pm 0.2$ $\log_{10}$ for Biotrue, $3.7 \pm 0.1$ $\log_{10}$ for renu and $3.7 \pm 0.2$ $\log_{10}$ for RevitaLens) was similar to the negative control ($3.7 \pm 0.1$ $\log_{10}$; $p \geq 0.996$). AOSept Plus (hydrogen peroxide) and cleadew (povidone iodine) significantly ($p < 0.001$) reduced the numbers of coronaviruses to below the detection limit (i.e. killed $3.7 \pm 0.1$ $\log_{10}$ viruses compared to control). However, there was a significant reduction ($p = 0.028$) in numbers of coronaviruses attached to lenses when using the regimen test with Biotrue.

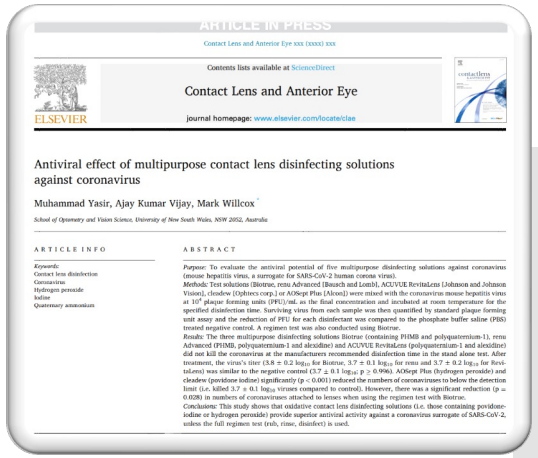
*Conclusion:* This study shows that oxidative contact lens disinfecting solutions (i.e. those containing povidone-iodine or hydrogen peroxide) provide superior antiviral activity against a coronavirus surrogate of SARS-CoV-2, unless the full regimen test (rub, rinse, disinfect) is used.




Yasir M, Kumar Vijay A, Willcox M. Antiviral effect of multipurpose contact lens disinfecting solutions against coronavirus. Cont Lens Anterior Eye. 2021 Aug 27:101513. doi: 10.1016/j.clae.2021.101513. Epub ahead of print. PMID: 34465537; PMCID: PMC8390374.

# Antiviral effect of MPS
# CL disinfecting solutions against coronavirus

- $H_2O_2$ solution and a povidone iodine solution both significantly ($p < 0.001$) reduced the numbers of coronaviruses to less than the detection limit
- Both provide enhanced antiviral activity against a coronavirus surrogate of SARS-CoV-2
- Superior antiviral activity against a coronavirus surrogate of SARS-CoV-2 unless full regimen test (rub, rinse, disinfect) used



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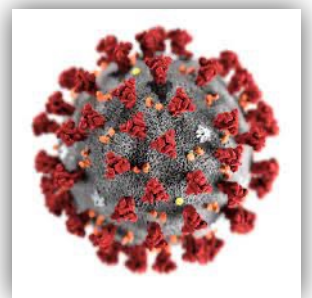

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# Presbyopia and daily disposables

- Many presbyopes are interested in occasional wear
- Convenient
- Great for dry eye
- LESS expense with DD[1]
- Reduced case contamination concerns

1. Efron, N et al, An international survey of daily disposable contact lens prescribing. Clin.Exp. Optom. Jan 2013;96(1):58-64.

# TEMPO Registry

- Rates of adverse events with hydrogel and silicone hydrogel daily disposable lenses in a large post-market surveillance registry over 1 year
- Rates of CIEs with DD lenses
- SiHyDD 0.4% per year
- HyDD 0% per year
- Rates significantly lower than rates with reusable SCLs (3%-4% per year)
- Improved safety outcomes with DD lenses

Chalmers, RL, Hickson-Curran SB, Keay L, et al. Invest Ophthalmol Vis Sci. Jan 2015

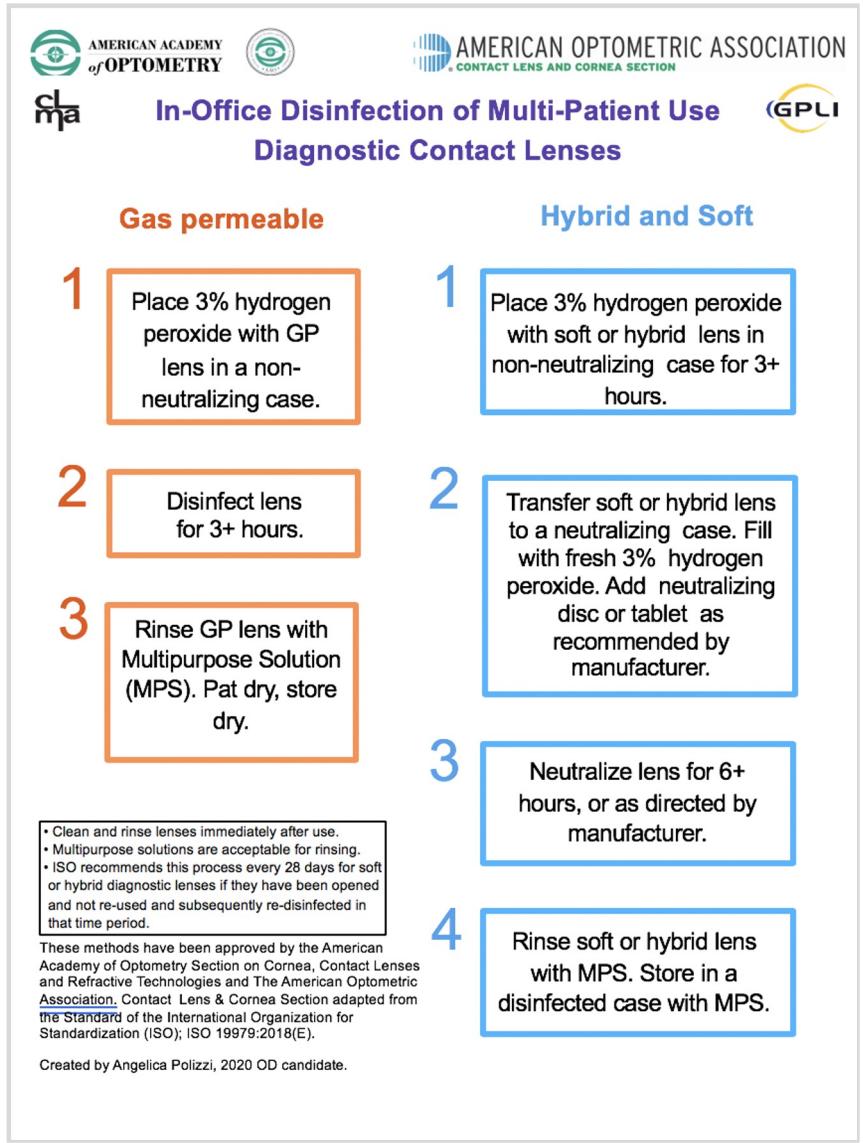
# Daily Replacement Multifocals

# General Guideline Created by AOA/AAO/GPLI /CLMA Joint publication in OVS

TECHNICAL REPORT

**Technical Report: Guidelines for Handling of Multipatient Contact Lenses in the Clinical Setting**

Christine Sindt, OD, FAAO,[1,2] Ed Bennett, OD, MSEd, FAAO, Dipl (AAO CCLRT),[1,2]
Loretta Szczotka-Flynn, OD, PhD, FAAO, Dipl (AAO CCLRT),[1,2] Louise Sclafani, OD, FAAO, Dipl (AAO CCLRT),[1,2]
and Melissa Barnett, OD, FAAO,[1,2]*; for The American Academy of Optometry (AAO) Section on Cornea, Contact Lenses & Refractive Technologies, and The American Optometric Association (AOA) Contact Lens and Cornea Section



AMERICAN ACADEMY of OPTOMETRY

AMERICAN OPTOMETRIC ASSOCIATION
CONTACT LENS AND CORNEA SECTION

clma

GPLI

**In-Office Disinfection of Multi-Patient Use Diagnostic Contact Lenses**

**Gas permeable**

1. Place 3% hydrogen peroxide with GP lens in a non-neutralizing case.
2. Disinfect lens for 3+ hours.
3. Rinse GP lens with Multipurpose Solution (MPS). Pat dry, store dry.

**Hybrid and Soft**

1. Place 3% hydrogen peroxide with soft or hybrid lens in non-neutralizing case for 3+ hours.
2. Transfer soft or hybrid lens to a neutralizing case. Fill with fresh 3% hydrogen peroxide. Add neutralizing disc or tablet as recommended by manufacturer.
3. Neutralize lens for 6+ hours, or as directed by manufacturer.
4. Rinse soft or hybrid lens with MPS. Store in a disinfected case with MPS.

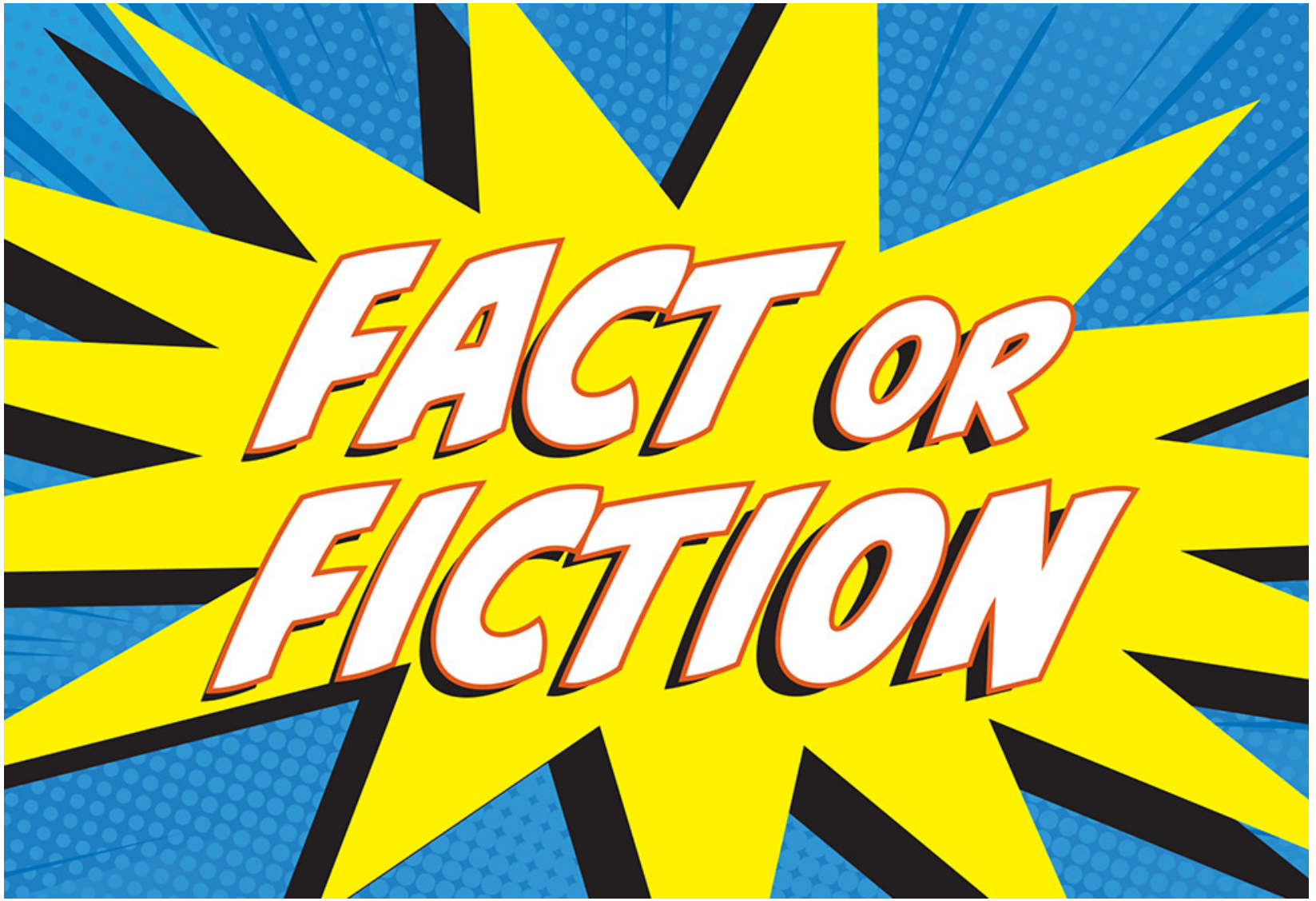
- Clean and rinse lenses immediately after use.
- Multipurpose solutions are acceptable for rinsing.
- ISO recommends this process every 28 days for soft or hybrid diagnostic lenses if they have been opened and not re-used and subsequently re-disinfected in that time period.

These methods have been approved by the American Academy of Optometry Section on Cornea, Contact Lenses and Refractive Technologies and The American Optometric Association. Contact Lens & Cornea Section adapted from the Standard of the International Organization for Standardization (ISO); ISO 19979:2018(E).

Created by Angelica Polizzi, 2020 OD candidate.

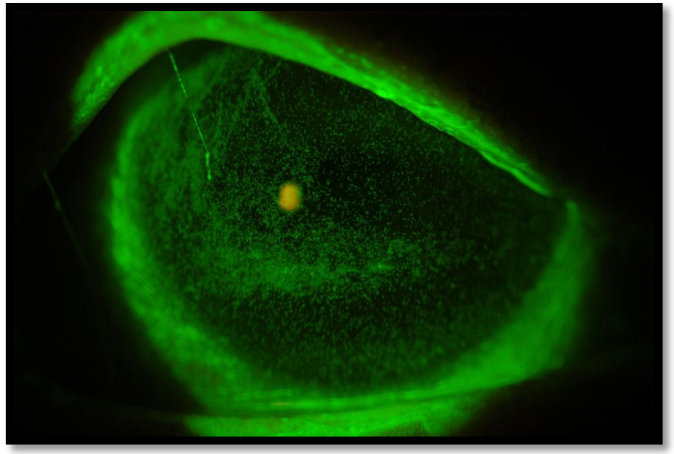
Optom Vis Sci 2020;00:00–00. doi:10.1097/OPX.0000000000001547 

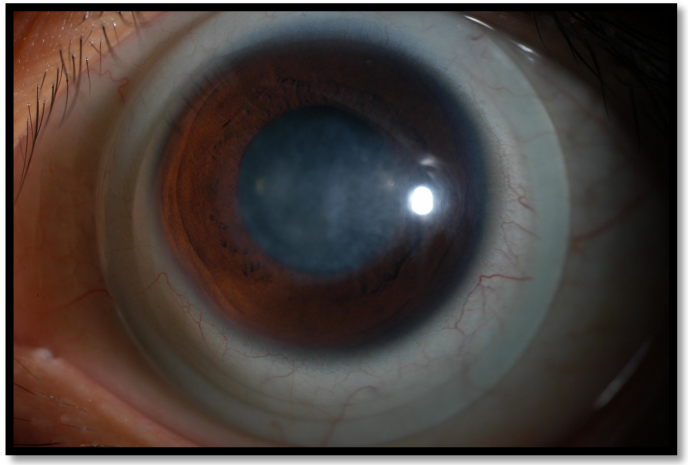
# Scleral Lenses Are Only Used for Irregular Eyes



# Scleral Lenses for Ocular Surface Disease

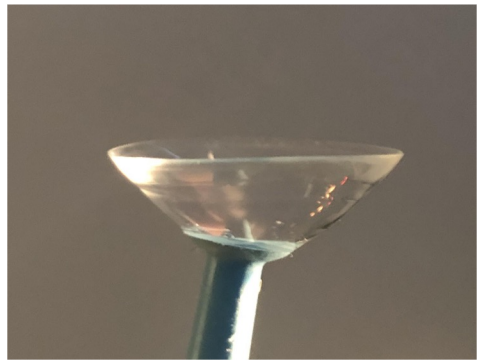
- Rationale
  - Corneal hydration
  - Ocular surface protection
  - General considerations

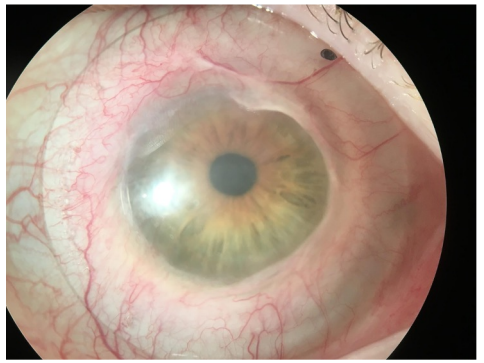


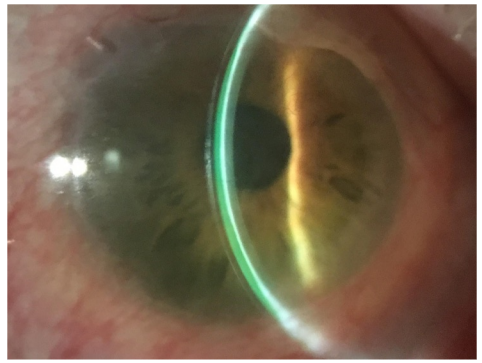


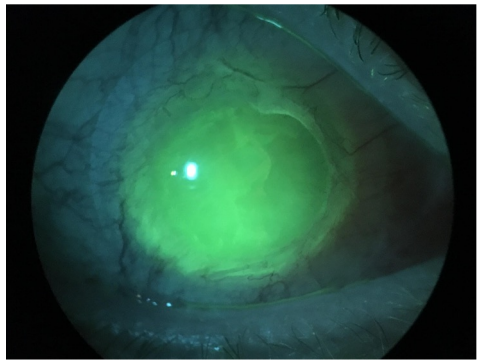
# Scleral Lenses for OSD

- Large diameter, rigid gas permeable
  - 15-22mm in diameter
  - Fluid reservoir created
    - PF saline
- Support the ocular surface
  - Protection from external sources
    - Prevent microtrauma
  - Promote corneal healing
- Improve comfort and QOL
- Adjunct therapy

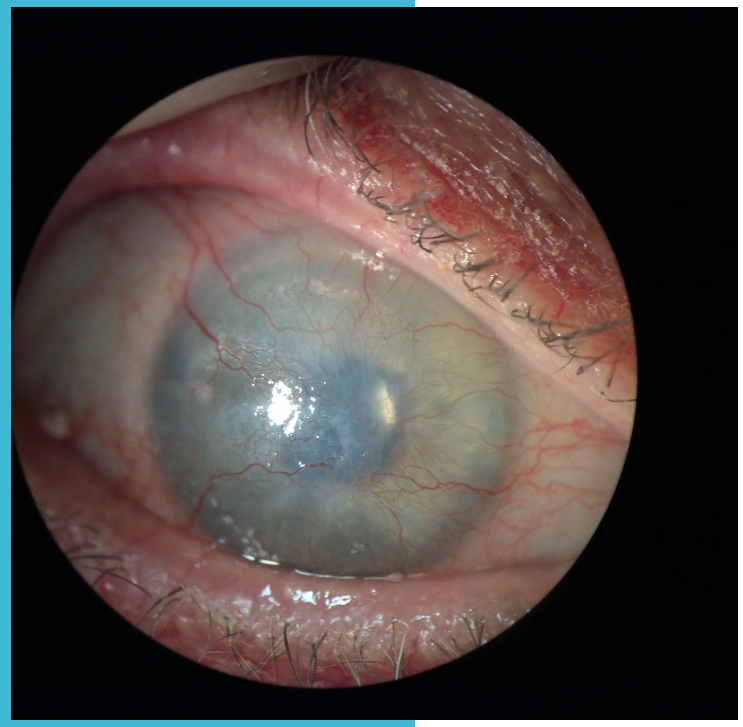


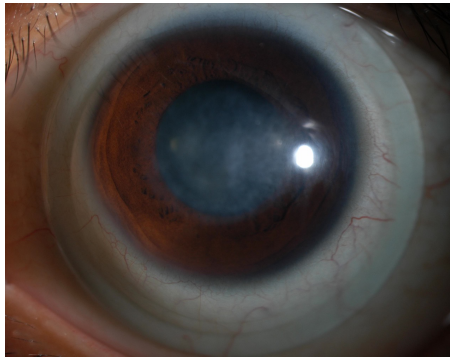


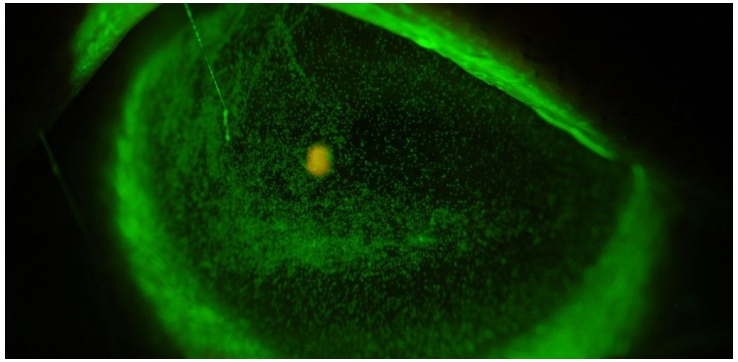




Slide credit John Gelles, OD

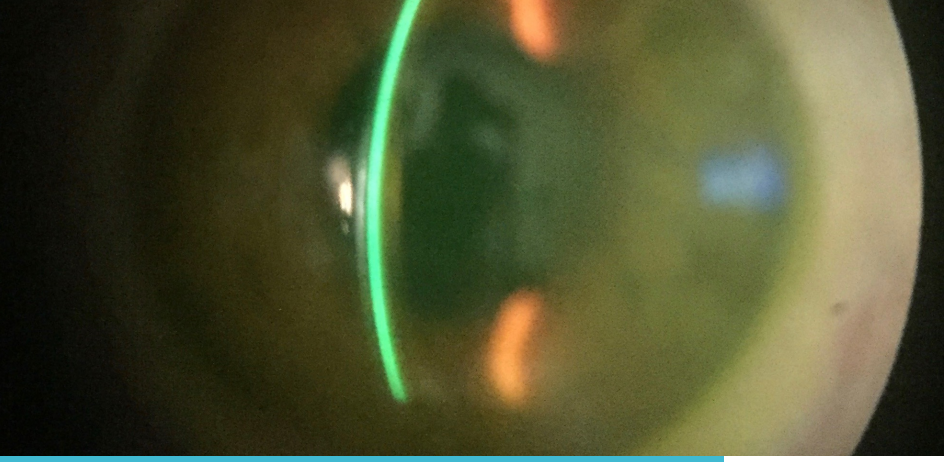






# Therapeutic SL Indications – mild to severe disease

- Neurotrophic Keratitis
- Exposure Keratitis
- Dry Eye Syndrome
- Graft vs Host Disease
- Steven Johnson Syndrome
- Ocular Cicatricial Pemphigoid
- Chemical Burns
- Limbal Stem Cell Failure
- Sjogren's Syndrome
- Persistent Epithelial Defects



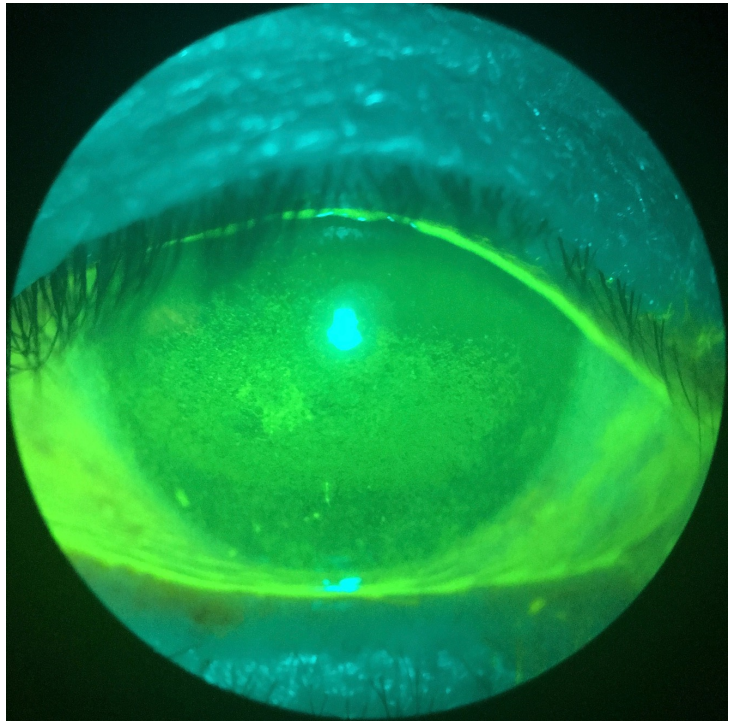

# Newly emerging scleral lens indications

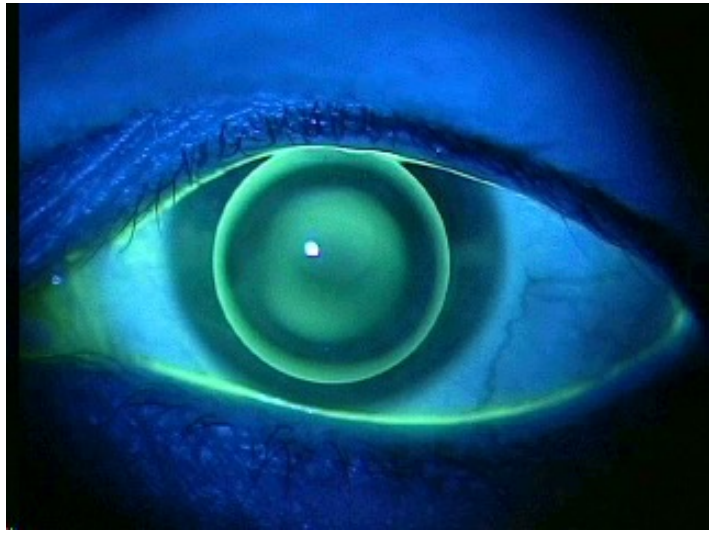
- Soft lens wearers experiencing discomfort / dryness / fluctuating vision
- High refractive errors
- Presbyopia (especially with astigmatism)
- Sports / occupation
- Allergy control

# Fitting Normal Eyes

Indications

- Refractive error
- Astigmatism
- High myopia
- High hyperopia
- Presbyopia
- Aphakia
- Dry eye
- Gas permeable contact lens intolerance
- Piggyback patients
- Athletes





# Fitting Commonalities

Preservative-free solutions

Minimal conjunctival compression / impingement

Optimized materials for oxygen

Daily wear

Nightly disinfection

**Table 16**
Staged management & treatment recommendations for dry eye disease[a,b,c].

**Step 1:**
- Education regarding the condition, its management, treatment and prognosis
- Modification of local environment
- Education regarding potential dietary modifications (including oral essential fatty acid supplementation)
- Identification and potential modification/elimination of offending systemic and topical medications
- Ocular lubricants of various types (if MGD is present, then consider lipid-containing supplements)
- Lid hygiene and warm compresses of various types

**Step 2:**
If above options are inadequate consider:

- Non-preserved ocular lubricants to minimize preservative-induced toxicity
- Tea tree oil treatment for Demodex (if present)
- Tear conservation
  - Punctal occlusion
  - Moisture chamber spectacles/goggles
- Overnight treatments (such as ointment or moisture chamber devices)
- In-office, physical heating and expression of the meibomian glands (including device-assisted therapies, such as LipiFlow)
- In-office intense pulsed light therapy for MGD
- Prescription drugs to manage DED[d]
  - Topical antibiotic or antibiotic/steroid combination applied to the lid margins for anterior blepharitis (if present)
  - Topical corticosteroid (limited-duration)
  - Topical secretagogues
  - Topical non-glucocorticoid immunomodulatory drugs (such as cyclosporine)
  - Topical LFA-1 antagonist drugs (such as lifitegrast)
  - Oral macrolide or tetracycline antibiotics

**Step 3:**
If above options are inadequate consider:

- Oral secretagogues
- Autologous/allogeneic serum eye drops
- Therapeutic contact lens options
  - Soft bandage lenses
  - Rigid scleral lenses

**Step 4:**
If above options are inadequate consider:

- Topical corticosteroid for longer duration
- Amniotic membrane grafts
- Surgical punctal occlusion
- Other surgical approaches (eg tarsorrhaphy, salivary gland transplantation)

Contents lists available at ScienceDirect

The Ocular Surface

journal homepage: www.theocularsurface.com

## TFOS DEWS II Management and Therapy Report

Lyndon Jones, FCOptom, PhD [a, 1, *], Laura E. Downie, BOptom, PhD [b], Donald Korb, OD [c], Jose M. Benitez-del-Castillo, MD, PhD [d], Reza Dana, MD [e], Sophie X. Deng, MD, PhD [f], Pham N. Dong, MD [g], Gerd Geerling, MD, FEBO [h], Richard Yudi Hida, MD [i], Yang Liu, MD [j], Kyoung Yul Seo, MD, PhD [k], Joseph Tauber, MD [l], Tais H. Wakamatsu, MD, PhD [m], Jianjiang Xu, MD, PhD [n], James S. Wolffsohn, FCOptom, PhD [o], Jennifer P. Craig, MCOptom, PhD [p]

# Study of Scleral Lens Wearers with Dry Eye

- Study of scleral lens wearers with dry eye
- Compared lens comfort and dry eye symptoms with polyethylene glycol (PEG)-based surface-treated and untreated scleral lenses
- PEG surface-treated scleral lenses compared to untreated scleral lenses for those with dry eye can provide
  - improved comfort
  - reduced dry eye symptoms
  - reduced ocular surface compromise

ARTICLE

## Assessment of a Novel Lens Surface Treatment for Scleral Lens Wearers With Dry Eye

*Chandra V. Mickles, O.D., M.S., Jennifer S. Harthan, O.D., and Melissa Barnett, O.D.*

**TABLE 2.** *Comparisons of Patient-Reported Symptoms and Clinical Findings Between Baseline, Untreated, and Treated SL Wear*

| Variable (N=19) | Baseline Mean (SD) | Untreated SL Wear Mean (SD) | Treated SL Wear Mean (SD) | P[a] |
|---|---|---|---|---|
| CLDEQ-8 score[b] | 24.7 (6.7) | 17.3 (6.5) | 11.9 (5.3) | 0.003 |
| OSDI score[c] | 48.5 (15.3) | 37.2 (15.1) | 29.8 (11.0) | 0.004 |
| TBUT (seconds) | 3.0 (2.3) | 2.9 (2.1) | 3.8 (2.6) | 0.01 |
| Corneal fluorescein staining score | 1.8 (1.2) | 1.4 (1.1) | 0.92 (0.8) | 0.01 |
| Temporal conjunctival lissamine green staining score | 1.5 (1.0) | 1.2 (1.0) | 1.0 (0.8) | 0.01 |
| Nasal conjunctival lissamine green staining score | 1.3 (1.2) | 1.0 (1.0) | 0.8 (0.7) | 0.06 |
| Lid wiper epitheliopathy score | 1.5 (0.8) | 1.4 (0.6) | 0.9 (0.8) | 0.002 |
| Conjunctival papillae score | 1.4 (0.8) | 1.5 (0.5) | 0.9 (0.7) | 0.003 |
| TBUT over SL (seconds) | N/A | 4.7 (2.9) | 5.9 (5.2) | 0.14 |

Mickles CV, Harthan JS, Barnett M. Assessment of a Novel Lens Surface Treatment for Scleral Lens Wearers With Dry Eye. Eye Contact Lens. 2020 Nov 3. doi: 10.1097/ICL.0000000000000754. Epub ahead of print. PMID: 33156128.

- Tangible Hydra-PEG
- Improves wettability
- Increases surface water retention
- Increases lubricity
- Reduces deposits
- Reduce scleral fogging

Slide credit Tangible Science

# Fitting Steps: Overview

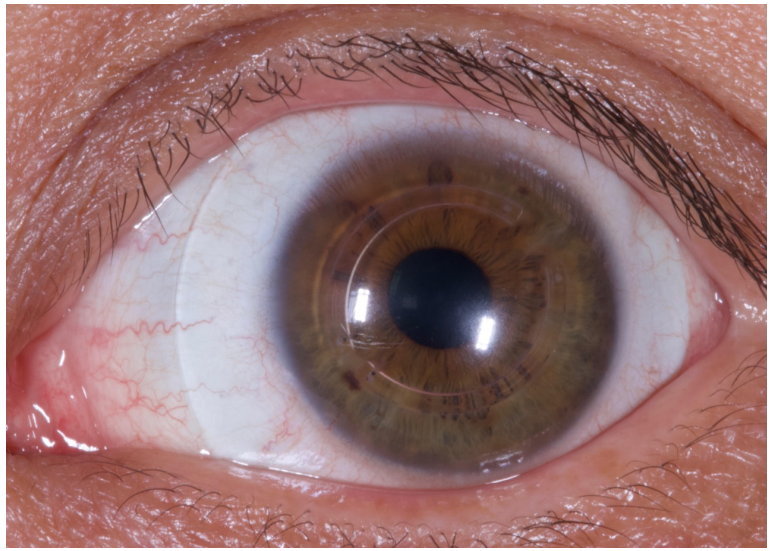
1. Select Lens Diameter & Design of Choice

2. Evaluate Central Clearance

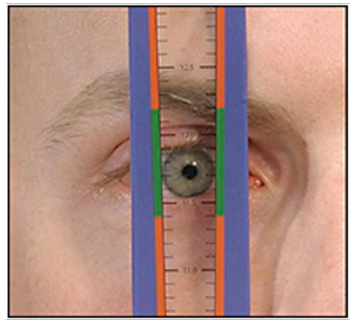
3. Evaluate Limbal Clearance

4. Evaluate Scleral Landing

5. Over-Refraction



# Lens Diameter and Design - Where to Start?



- **Acquire Corneal Topography/Tomography/Keratometry**
- Determine corneal profile – prolate (A) vs. oblate (B)
- Note corneal elevation – the steepest part of the cornea is not always the highest!
- **Scleral Profilometry**
- **Measure HVID / VVID and determine corneal profile**
  - Some topographers provide this feature
  - Can use HVID ruler
  - Generally, choose OAD ~4-5 mm larger than HVID
  - Ex. HVID 12.00 mm, choose OAD 16.00 mm
- **Consider palpebral fissure size**

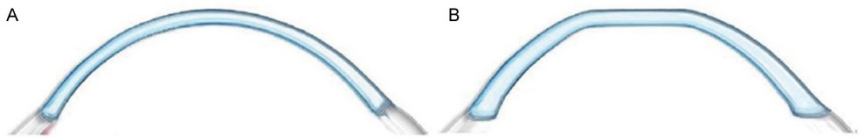
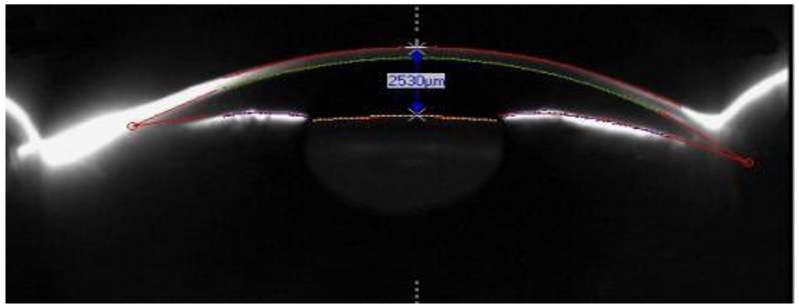




Photo: top ekjo.org
Bottom CL Spectrum

- **Select BC between average and steep K**
  - Follow the manufacturer's fitting guide
  - Note: with more advanced disease, this method is less predictable
- **Use a vault reduction method until desired clearance is achieved**
  - Start in the middle but choose more sagittal depth than less
  - After a little experience will have a favorite starting lenses
  - Make big jumps as you move through the fitting set

Scleral lenses are fit based on sagittal height
Scleral lens fitting does not correspond with keratometry readings




Central K 44.00, HVID – 11.0 mm
Sag= 2530 µm

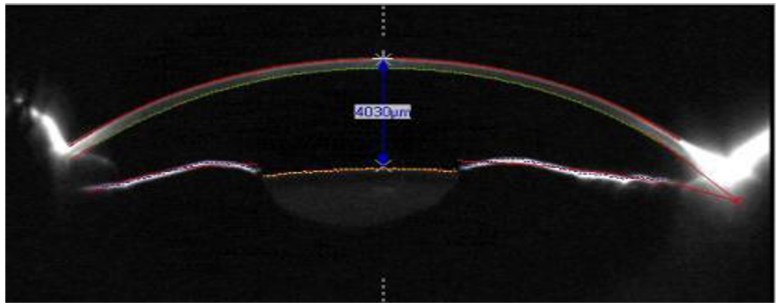
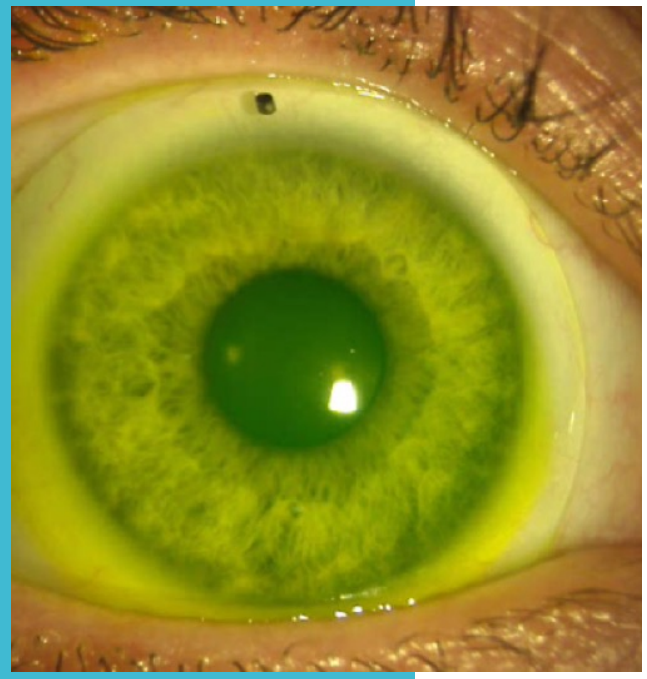
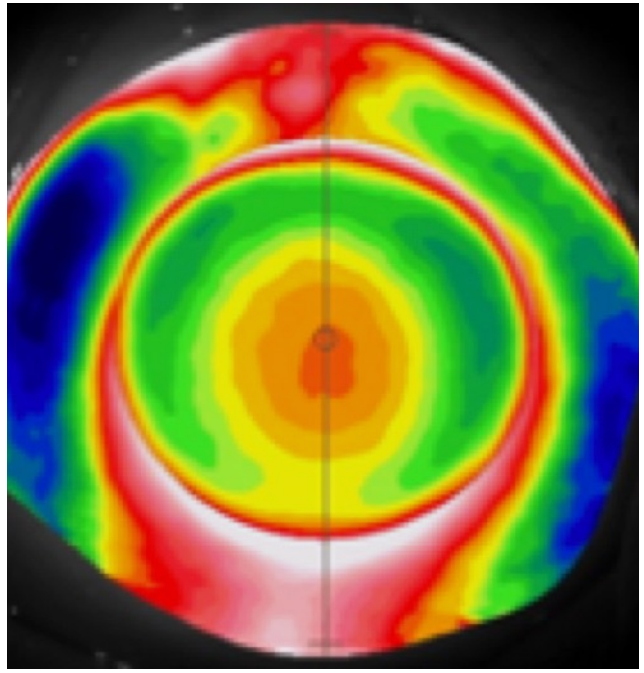
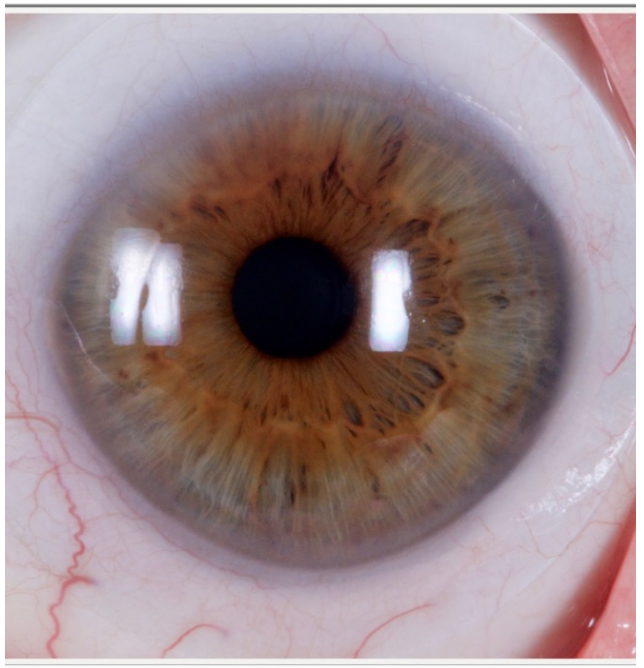



Photo: M. Lipson, OD

Central K 44.00, HVID – 12.6 mm
Sag= 4030 µm

Photo: Pam Satjawatcharaphong, OD

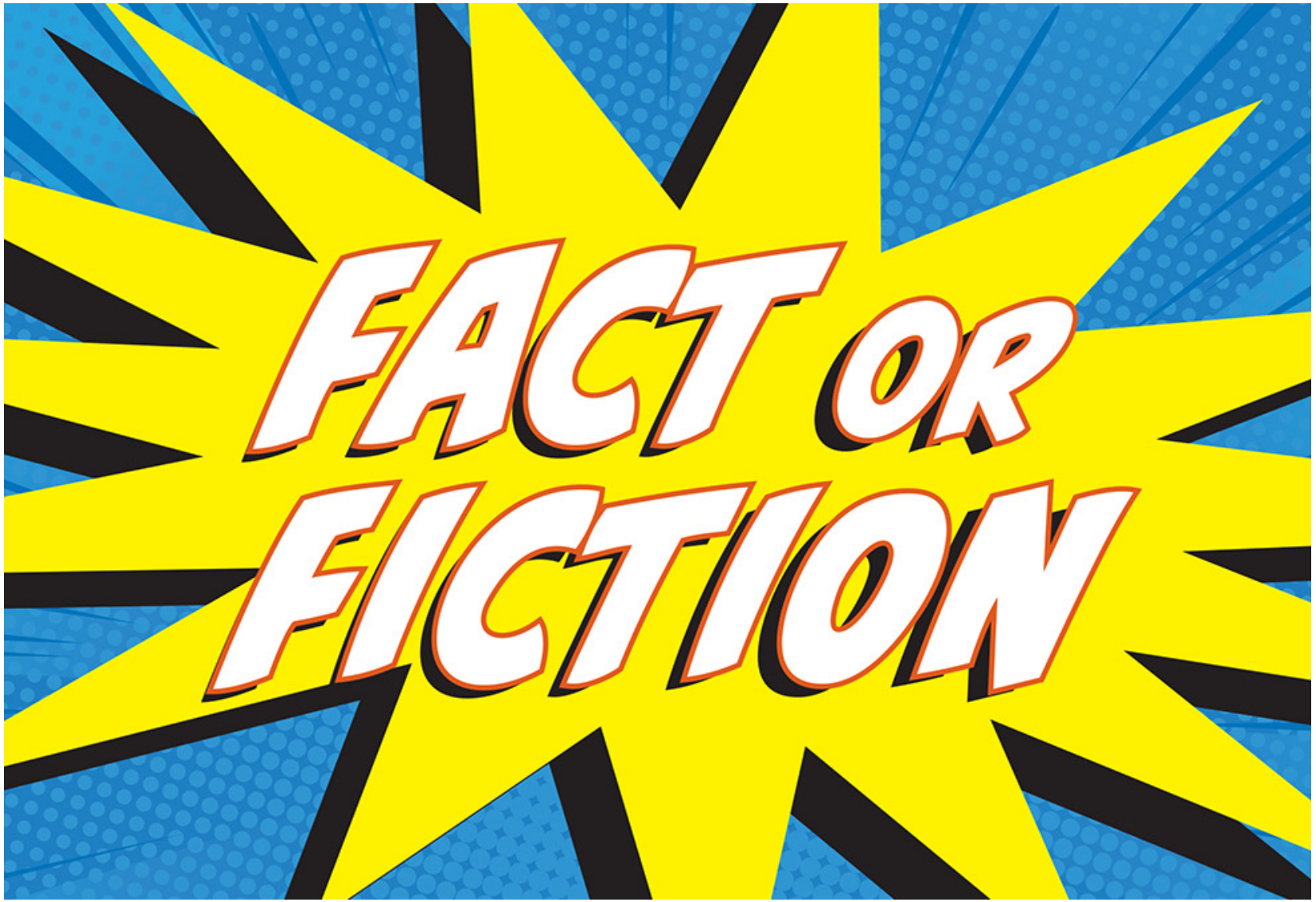




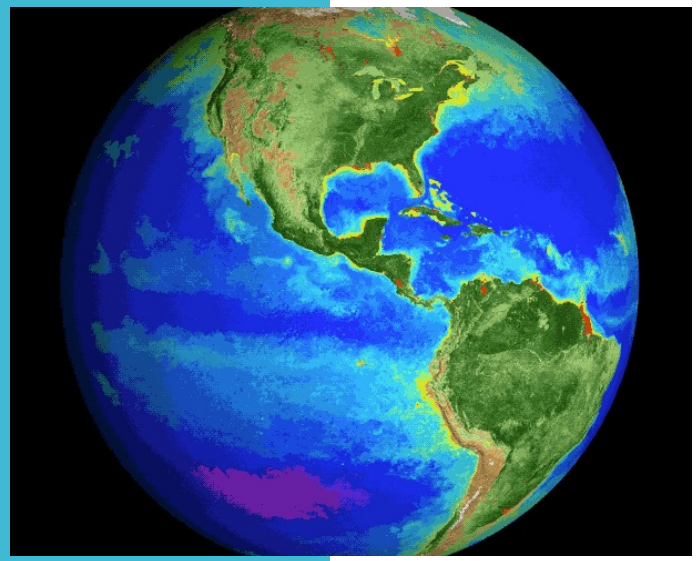
Scleral Alignment

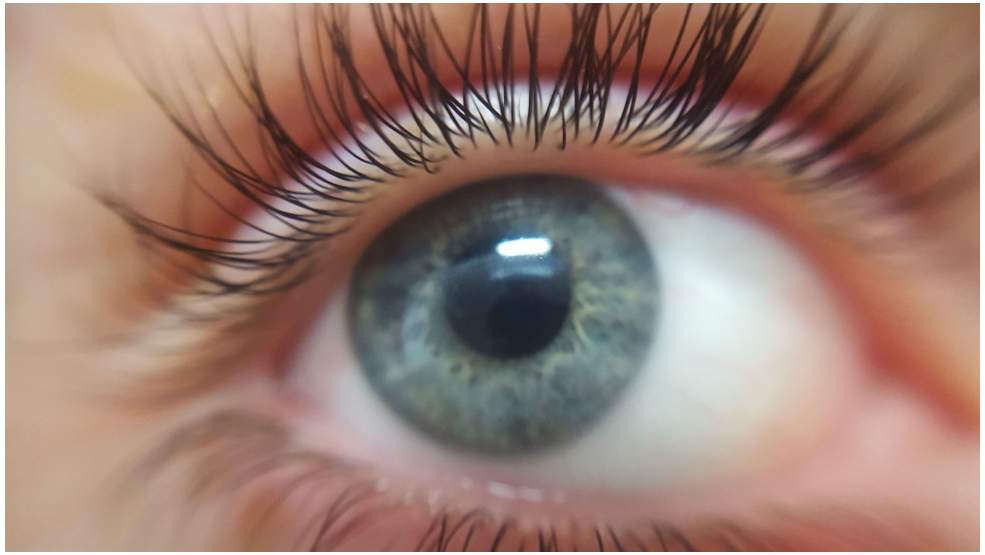
- Evaluate the landing curves for proper scleral alignment
- Peripheral curves should land softly and distribute weight and pressure evenly

Images:T. Arnold, OD

Contact Lenses Should Always be Fit On The Same Day as the Eye Exam







# Dry Eye Evaluation

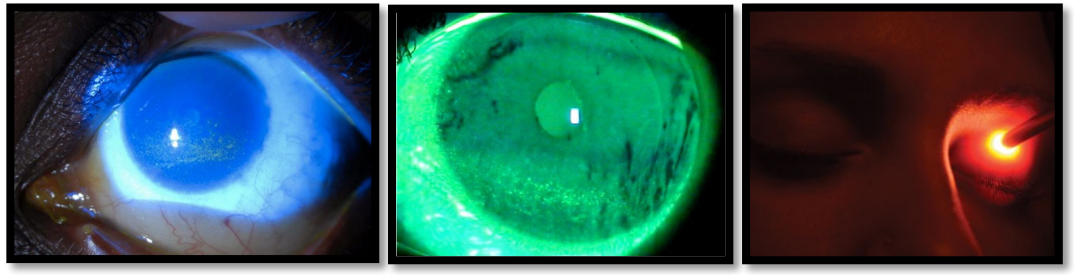
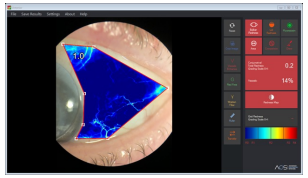


Photo Caroline Blackie, OD

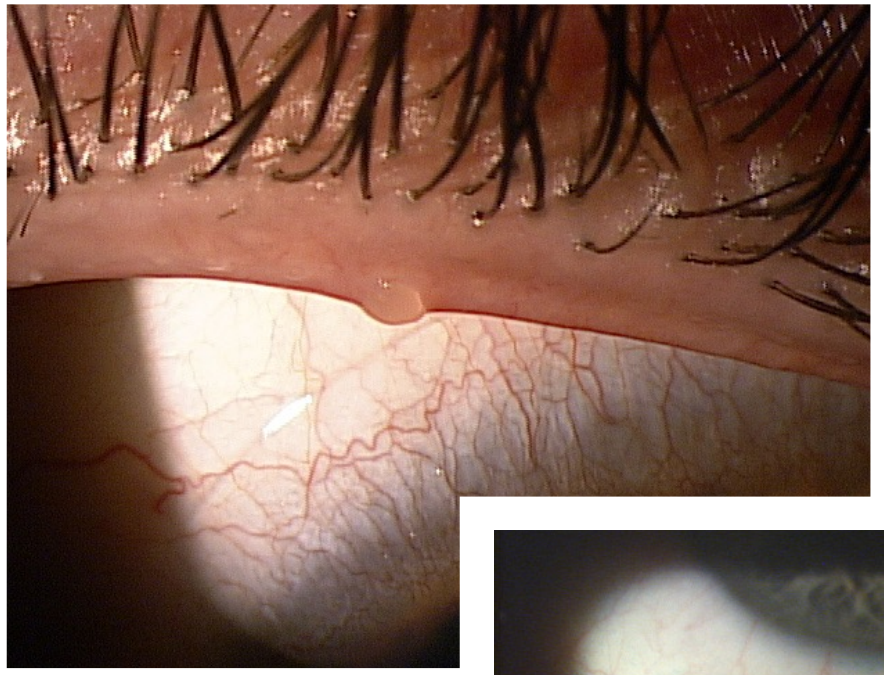
- Eyelid and lashes
  - Meibomitis (expression, debridement, meibography)
  - Blepharitis (slit lamp evaluation)
  - Demodex (slit lamp or microscope evaluation, lash twirl method)
  - Lid Wiper Epitheliopathy (lissamine green)
  - Lagophthalmos (transilluminator)
  - Incomplete eyelid seal
- Cornea
  - Assess for staining (fluorescein)
- Tear film
  - Tear film stability (tear break-up time)
  - Tear film debris (slit lamp evaluation)
  - Tear volume (Schirmer's or Phenol Red Thread)
  - Tear osmolarity/MMP-9
- Conjunctiva
  - Hyperemia (slit lamp evaluation)
  - Assess for staining

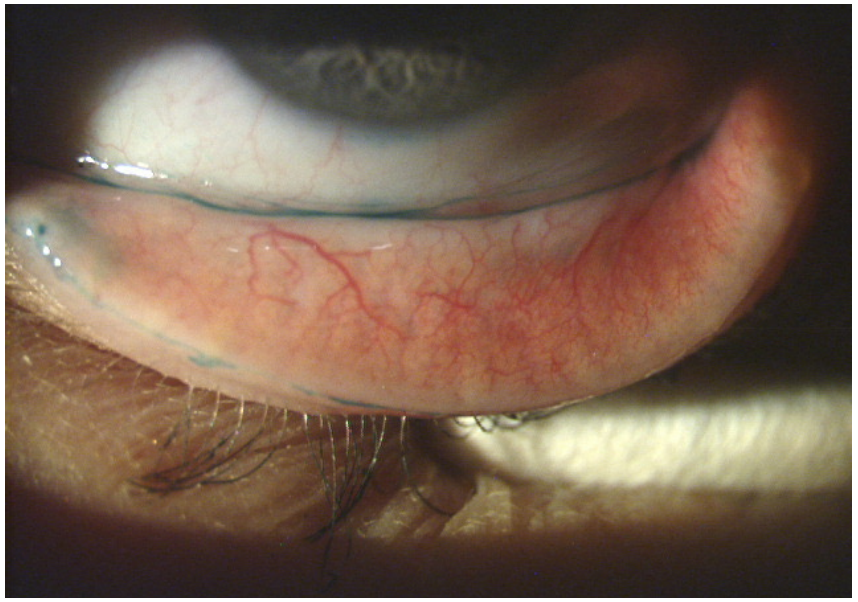
  (lissamine green, Rose Bengal)



# Contact Lens Wear
# An Independent Risk Factor for DED, Especially MGD

- Evaluate
  - Number of glands present
  - Increased lid telangiectasia
  - MG orifice obstruction
  - Decreased quality of meibomian gland secretions
  - Meibomian gland dropout (transillumination or IR photo imaging)



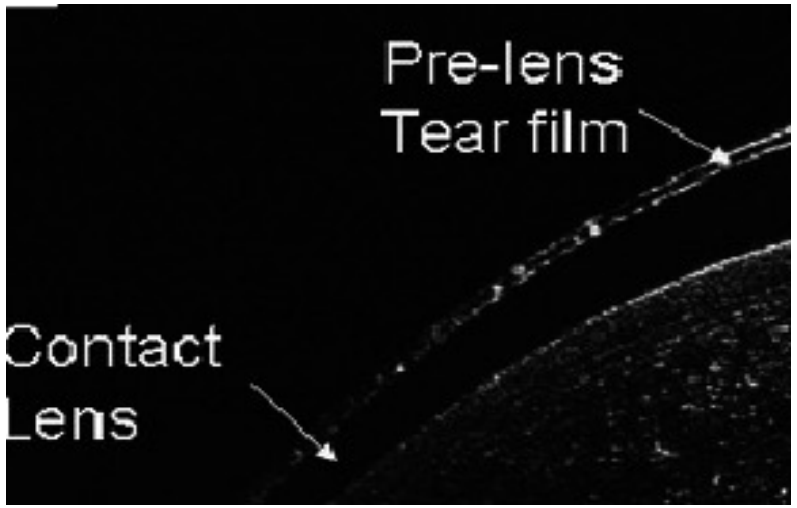


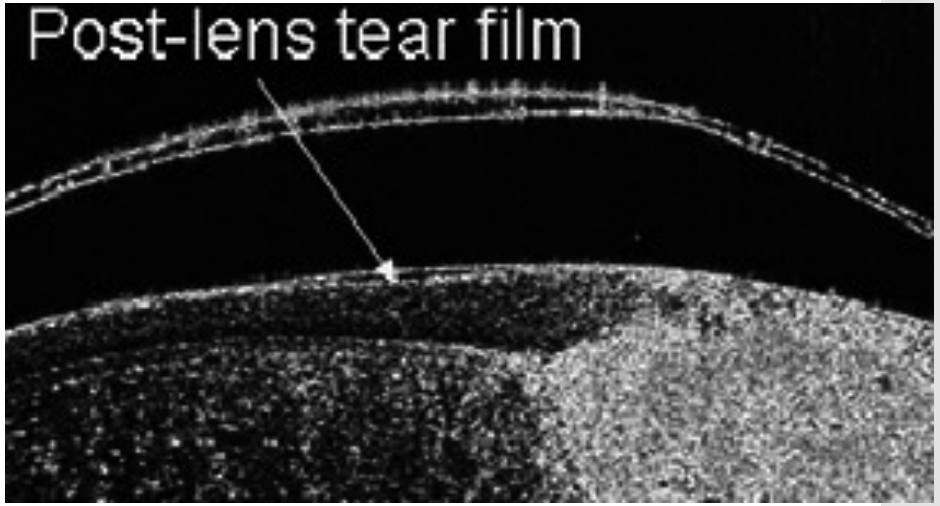
# Contacts Lenses and Dry Eye

- Affect of contact lens on the tear film
  - Divides the tear film into Pre-and post-lens tear film
  - More rapid thinning of tear film
  - Soft lens → faster evaporation of tear film

Craig JP, Nichols KK, Akpek EK, et al. TFOS DEWS II Definition and Classification Report. Ocul Surf. 2017 Jul;15(3):276-283.
Craig, JP, Willcox M, Argüeso P, et al. The TFOS International Workshop on Contact Lens Discomfort: Report of the Contact Lens Interactions With the Tear Film Subcommittee. *Invest. Ophthalmol. Vis. Sci.* 2013;54(11):TFOS123-TFOS156. doi: https://doi.org/10.1167/iovs.13-13235.

# Contact Lens Affect on Tear Film




- Pre- Lens Tear Film
  - Outer lipid coating
    - Aqueous –mucin components
- Post-Lens Tear Film
  - Thin aqueous-mucin layer
    - Oxygen is transmitted to cornea

Slide credit Janelle Davison, OD https://www.researchgate.net/figure/The-edge-of-a-soft-contact-lens-was-imaged-using-the-OCT-immediately-after-instillation_fig2_253933126 [accessed 20 Aug, 2022]

# Preparing the Dry Eye for CL Wear Educate

- Vital when managing chronic complex diseases
- DED – a great extent, self treated
- Patients must do much of the therapy
- Treatment lasts for weeks or months, longer

# Preparing the Dry Eye for CL Wear Encourage

- Chronic condition affecting quality of life, long term therapy, discouraging
  - Review why contact lens wear has been delayed and expected benefits
  - Report the results of the treatment (progress)
  - Expected duration of treatment prior to CL- "light at the end of the tunnel"
  - Once lens wear initiated or resumed, keep the ocular surface healthy- ongoing treatment

# CLINICAL PEARLS FOR SUCCESS


Thank You!