

In the blink of an eye:

A case of mucin ball formation with daily lens wear

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Introduction

Mucin ball (MB) formation is classically associated with extended wear (EW) contact lenses (CLs) and found in up to 65% of EW cases.¹ It has been shown that rapid formation of MBs is associated with an increased risk of corneal infiltrative events (CIEs), while a delayed formation of MBs (i.e. after several days/weeks of EW) has a small protective effect against CIEs.¹ MBs are more prevalent with silicone hydrogel (SiHy) lenses versus conventional hydrogel, and there is a positive relationship between MB formation and lens wettability, back surface deposits, and steep corneal curvature.² They have also been associated with higher modulus lenses and irregular corneal surfaces, as in the case of recurrent epithelial erosion.³ In this case, MBs formed within hours of wearing a daily lens in a patient who is not thought to be a CL abuser.

Case History

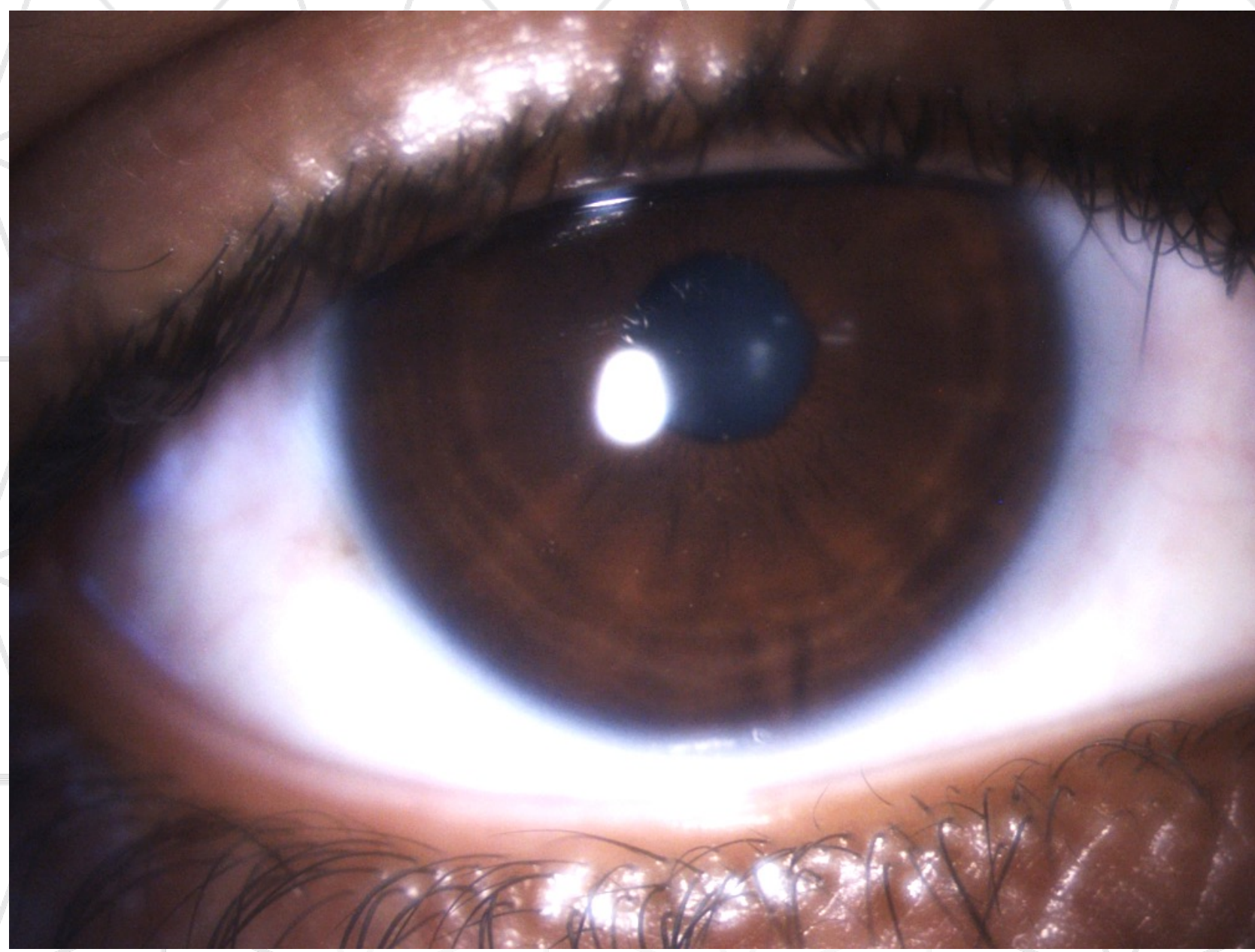
- Patient:** 22 year old Asian male
- No contributory medical or ocular history
 - Interested in wearing soft CLs for the first time

- Glasses Rx:**
- OD -4.50 -2.25 x 169, visual acuity: 20/20
 - OS -3.75 -2.00 x 180, visual acuity: 20/20

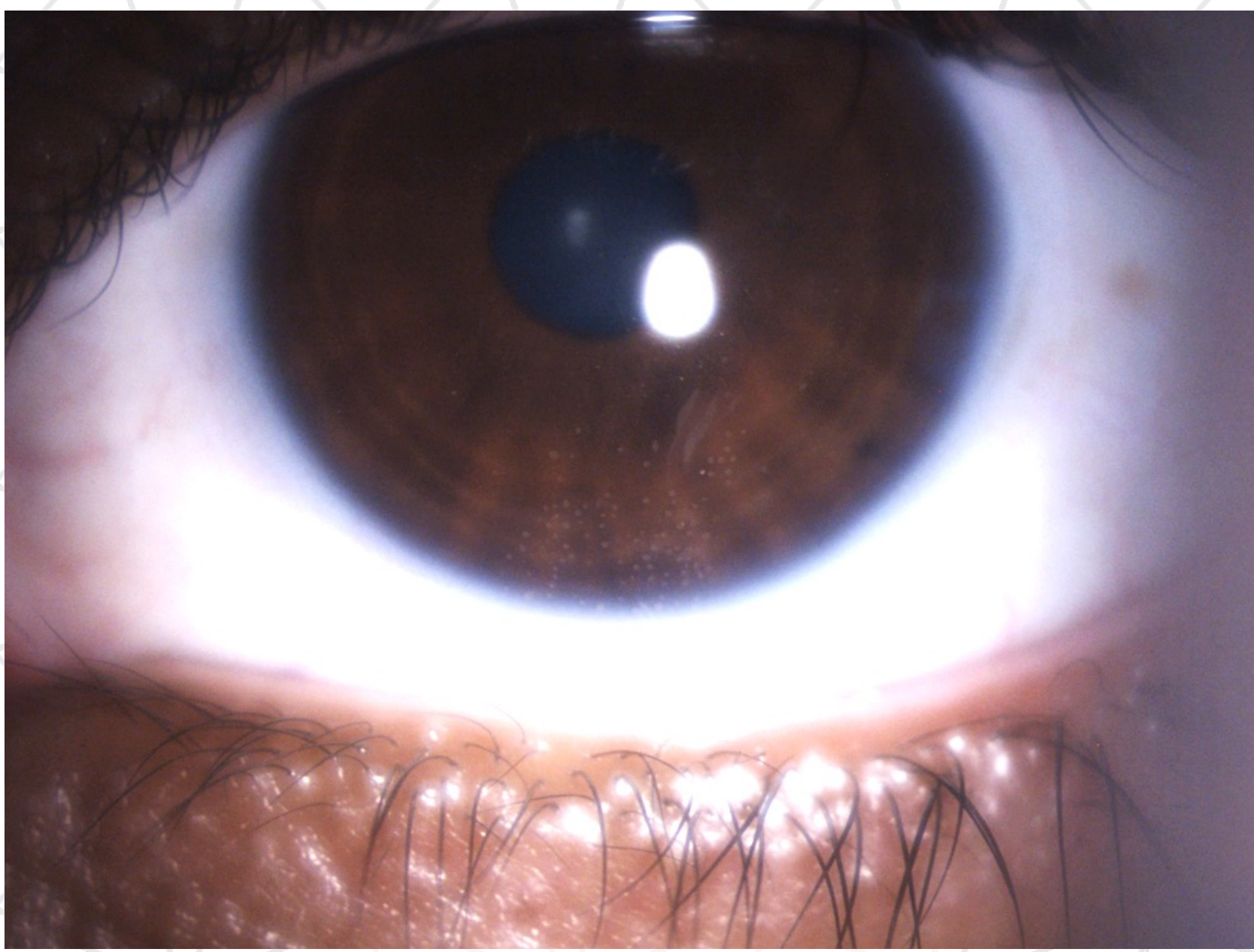
- Contact Lens Rx:**
- OD -4.50 -1.75 x 160, visual acuity 20/20 (15R rotation)
 - OS -4.00 -1.75 x 180, visual acuity 20/20

- Keratometry (manual):**
- OD 41.12 @ 169 / 43.25 @ 079 (Δ 2.12D)
 - OS 41.12 @ 175 / 43.25 @ 085 (Δ 2.12D)

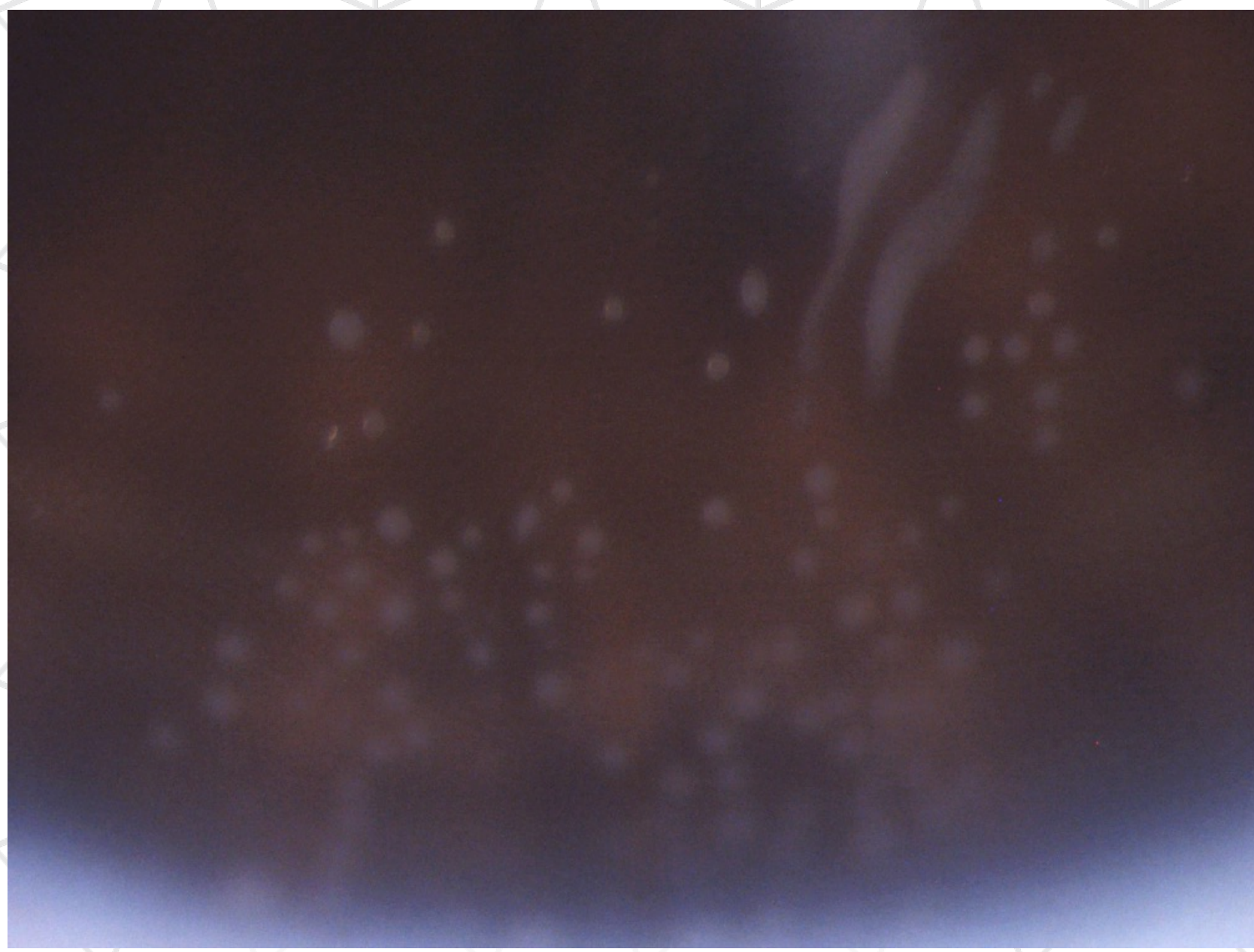
Clinical Findings



Img 1. OD lens #1, >15 MBs



Img 2. OS lens #1, >70 MBs



Img 3. High mag lens #1 OS MBs

Initial CL:

- MBs noted (>15 OD, >70 OS) at 1 and 3 week f/u with corresponding corneal epithelial depressions
- Wear time prior to appt: 2 hrs
- Pt denies sleeping in CLs and/or reusing pairs

Second/Finalized CL:

- No MBs noted OU after 1 week of daily lens wear
- Wear time prior to appt: 2 hrs

Lens Comparison

CL	Material	Water Content	Dk/t	BC	Diam.	Wetting Agent	Modulus	MB?
1	verofilcon A	51%	90	8.5	14.5	Polyamido-amine + poly (acrylamide-acrylic) acid	0.6 MPa	Yes
2	stenfilcon A	54%	80	8.6	14.5	None	0.4 MPa	No

Table 1. Soft contact lens parameter comparison between initial and final lens (both SiHy).

Take-home Points

- Mucin balls can form with daily lens wear and are *not* exclusive to EW lenses
- A **flatter** CL may have better aligned with patient's corneal curvature and prevented MB formation
- A **lower modulus** CL **without a wetting agent** may have also prevented MB formation
- Different SiHy lenses may or may not cause MBs, suggesting a **switch to hydrogel in not always necessary** to prevent MBs

Discussion

There are many factors that contribute to MB formation, extended wear time and SiHy lens material being the most commonly thought of factors. Rapid MB formation can take place, though, in a matter of hours as demonstrated here. Research demonstrates that this rapid formation (in contrast to a delayed formation) can increase the chance of CIEs¹ rather than creating a protective effect, so understanding how to change a lens to reduce MBs is important. Consider better matching the CL base curve with the patient's keratometry, choosing a lens without a wetting agent, and/or moving to a more flexible lens. In this case we chose to prioritize keeping the patient in a SiHy lens for its oxygen permeability benefits rather than switching to a hydrogel, which is less likely to cause MBs.

References

1. Szczotka-Flynn, et al. (2017). MBs Influence CIEs. *Optom Vis Sci*. Vol 94, Issue 4, 448-457.
2. Tan J, et al. (2003). MBs with Wear of Conventional and Silicone Hydrogel CLs. *Optom Vis Sci*, 80 (4), 291-297.
3. Christina N. Grupcheva, et al. (2017). Microstructural evaluation of the MBs and their relations to the corneal surface—Insights by in vivo confocal microscopy. *CL & Ant Eye*. Vol 40, Issue 5, 340-345.