Punctal occlusion may improve visual acuity for contact lens patients

Reduced wearing time? Plug them!

By Marc R. Bloomenstein, OD, FAAO

A healthy ocular surface is critical for the visual acuity and comfort of soft contact lenses. Despite this, treating dry eye is often an afterthought. Instead, contact lens practitioners may make multiple changes to the lens material, lens modality, and/or cleaning solution in an attempt to improve comfortable wear time and avoid dropout.

By the time patients reach their 50s and 60s, I’ve found that very few want to continue wearing contact lenses. I’m convinced that dropoff in the contact lens correction curve has more to do with increasing ocular surface concerns than with the onset of presbyopia.

Subjective questionnaires, combined with new diagnostic tests, such as tear osmolarity, offer a real opportunity for identifying patients who are struggling with dryness before they complain of symptoms or drop out of lens wear altogether. Then, we can proactively inform our patients of the signs of dry eye and devise a plan for addressing the problem.

Anecdotally, I have seen improvements from treating dry eye in contact lens wearers with punctal occlusion, but I recently undertook a prospective study to test the impact of this relatively simple, low-cost intervention.

**Study design**
Fifty patients were recruited from my contact lens-wearing population. The patients were established soft contact lens wearers without any formal diagnosis of dry eye. None of them was using any topical eye drop, other than artificial tears or re-wetting drops.

The lower punctum in one eye of each patient was occluded with a medium-size Parasol® silicone punctal plug (Beaver-Visitec International, formerly Odyssey Medical), with the fellow eye serving as a control. This plug was chosen because it is easy to insert, fits almost every eye, and has a 92 percent retention rate. The eye to be occluded was randomly selected.

Osmolarity testing, tear break-up time (TBUT), visual acuity, and corneal and conjunctival staining were performed at baseline and 30 days after punctal occlusion. Subjective analysis of the patients was evaluated by a pre- and post-occlusion questionnaire regarding the comfort of the lens throughout the day, as well as the perceived visual acuity. The Ocular Surface Disease Index (OSDI) was also utilized for further subjective analysis.

Subjects continued wearing their habitual lenses and were instructed to continue cleaning their lenses with the same care solutions and using re-wetting drops as needed, just as they had before insertion of the plugs.

**Results**
Nearly one-quarter of the unoccluded, control eyes lost one or more lines of vision during the study, and only nine percent gained a line. In the punctal occlusion group, however, 43 percent of the eyes gained at least one line and none of the eyes lost any visual acuity (Figure 1).
Osmolarity was reduced by an average of 17.2 mOsms/L in the occluded eyes, compared to only 0.21 mOsms/L in the control eyes (Figure 2). TBUT in the occluded eyes increased by two seconds, from 7.2 to 9.2 seconds, while the control eyes had a reduction in TBUT of 0.2 seconds (8.35 to 8.15 seconds). We saw a 68.8 percent reduction in corneal staining and a 37.5 percent reduction in conjunctival staining in the occluded eyes, compared to increases of 13 percent and 25 percent, respectively, in the control group.

Subjects were asked to rate their perceived comfort and visual acuity at different times of the day using a one to 10 scale, both at baseline and at the 30-day visit. Reported afternoon comfort improved by 26 percent and evening comfort improved by 38.4 percent after one month of punctal occlusion. There was no change in morning comfort. Subjective visual acuity improved by 13.9 percent, 22 percent, and 22.3 percent respectively, for the morning, afternoon, and evening.

The average OSDI score at baseline was 27.6, which is in the moderate range for dry eye. At the one-month mark, OSDI scores had dropped considerably, down 41.8 percent to an average of 16.04, which falls in the mild dry eye range (Figure 3).

At the conclusion of the study, when patients were given the option of a plug in the fellow eye, 90 percent chose to undergo additional punctal occlusion.

**Discussion**

These patients weren’t tremendously dry prior to the study, but they had significant symptoms, per the moderate OSDI scores. Punctal occlusion is an underutilized opportunity to improve comfort in our contact lens wearers. A plug helps to keep the ocular surface well lubricated, which reduces the potential for inflammatory mediators to depress tear production and cause injection and chemosis.

In this study, one month of punctal occlusion improved all subjective and objective measures in a typical contact lens population, without regard for etiology of the dryness symptoms. Particularly notable is the 43 percent of eyes that gained lines of visual acuity. To me, this is important validation of something we don’t focus on enough—the degree to which contact lens-related dryness affects vision in addition to comfort.

This study demonstrates that punctal occlusion with high-quality, reliable punctal plugs can improve comfort and visual performance in contact lens wearers. This should extend patients’ comfortable wearing time, increase satisfaction with contact lens wear, and help prevent contact lens dropout.

**Reference**


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