



## CORE Names Its “Top 10 of 2022” Scientific Papers

*Topics Span Drug Delivery, Dry Eye, Microbiology, Myopia Control, MGD and More*

**WATERLOO, Ontario, January 16, 2023**—Ahead of the first global eye care conference of the year, the [Centre for Ocular Research & Education \(CORE\)](#) has announced its “Top 10 of 2022” publications list, designating works of significant value to clinicians, researchers, educators, and manufacturers. The papers were selected from 26 peer-reviewed manuscripts covering clinical studies, laboratory studies, and reviews developed by the organization over the past 12 months.

“The entire CORE team, our collaborators, and sponsors continue to advance multiple dimensions of ocular science at a record pace, helping peers in the optometry and ophthalmology communities provide the best possible patient care,” says CORE Director Lyndon Jones, PhD, DSc, FCOptom, FAAO. “The sheer volume of these high-caliber studies can be overwhelming at times. That’s why we have selected 10 publications that represent essential knowledge for today’s eye care professionals.”

Papers making the “Top 10” for 2022 (in the order in which they were published) include:

1. **Effect of a Novel Omega-3 and Omega-6 Fatty Acid Supplement on Dry Eye Disease: A 3-month Randomized Controlled Trial.** *Optom Vis Sci* 2022; 99;1: 67-75. Ng A, et al.

Fatty acid supplementation has been discussed as a potential means to help patients with a variety of disorders due to their reported anti-inflammatory effects. Supplementation of patients with omega-3 and omega-6 fatty acids has thus been advocated for patients who have dry eye due to recognition of the inflammatory processes involved with that disease, however whether this has an impact on the signs and symptoms of dry eye has not been conclusively demonstrated. In this study, CORE’s expertise in conducting clinical trials was leveraged to be able to demonstrate that supplementation with a novel combination of omega-3 and omega-6 fatty acids is able to significantly improve symptoms in severely symptomatic dry eye patients compared to placebo controls. Importantly, it also demonstrated that it required three months of this supplementation to start to take effect. This information will be useful to clinicians looking for additional means to help their symptomatic dry eye patients. <https://doi.org/10.1097/opx.0000000000001826>

2. **Testing drug release from medicated contact lenses: The missing link to predict in vivo performance.** *J Control Release* 2022; 343 672-702. Pereira-da-Mota A, et al.

The concept of using contact lenses (CL) as drug delivery devices has been proposed for over five decades. CL offer a wide variety of advantages over drop-use for delivering drugs to the eye, as drops rapidly drain from the ocular surface and patient compliance remains poor. However, this concept remains difficult due to numerous scientific, technological, and regulatory challenges. One main difficulty is the setting of release rate specifications for each drug, since at present there are no standardized in vitro release models that can appropriately predict the performance of drug-eluting CL once placed onto the eye. This review looked at methods to predict in eye performance from lab-based models and what

factors are important to develop better models and avoid animal studies.  
<https://doi.org/10.1016/j.jconrel.2022.02.014>

3. **Long-term Effect of Dual-focus Contact Lenses on Myopia Progression in Children: A 6-year Multicenter Clinical Trial. *Optom Vis Sci* 2022; 99;3: 204-212. Chamberlain P, et al.**

CORE was the largest clinical site in this international six-year study evaluating the effect of CooperVision MiSight 1 day lenses on myopia progression. The initial three-years of the study followed a conventional randomized clinical trial model with a control group (wearing Proclear 1 day) matched to a group wearing the lenses under investigation (MiSight 1 day). At the three-year mark all participants were invited to continue in the study for an additional three years, all wearing MiSight 1 day. This paper outlines the results from the six-year data. Participants who initially wore the control lens showed a slowing of their myopia progression after wearing MiSight 1 day for three years (compared to myopia progression in the first three years). For participants who wore MiSight 1 day lenses throughout the six years, the slowing of myopia progression observed in the initial three years continued in the subsequent three years.  
<https://doi.org/10.1097/opx.0000000000001873>

4. **Exploring the factors which impact overall satisfaction with single vision contact lenses. *Cont Lens Anterior Eye* 2022; 45;5: 101579. Guthrie S, et al.**

Subjective ratings of comfort and vision are two of the most impactful measures of contact lens success. However, this work shows that dissatisfaction with ease of handling for application can be enough to lower satisfaction in all areas. In addition, a patient's habitual lens-wearing experience is an important influencer on their perceptions. Consequently, practitioners should not underestimate the effect of a negative lens-handling experience on overall lens-wearing success.  
<https://doi.org/10.1016/j.clae.2022.101579>

5. **The impact of contact lenses on meibomian gland morphology. *Ocul Surf* 2022; 24 148-155. Osae, E.A., et al.**

Despite years of experience with contact lenses, controversy remains as to whether contact lenses adversely impact the meibomian glands (MG). This review summarized the present body of evidence, suggesting that contact lens wear is associated with alterations in MG morphology and qualitative changes in MG secretion. Key factors such as duration of contact lens wear, contact lens type, edge design, and material modulus are discussed in relation to the extent of MG morphological changes, the quality of MG secretion and other ocular surface parameters. <https://doi.org/10.1016/j.jtos.2022.04.001>

6. **Antiviral Activity of Contemporary Contact Lens Care Solutions against Two Human Seasonal Coronavirus Strains. *Pathogens* 2022; 11;4: 472. Lourenco Nogueira C, et al.**

In the early phases of the COVID-19 pandemic, the routes of infection that the virus could take to infect humans was under debate, with a theoretical concern of transmission through the eye. Ocular devices, including contact lenses, thus came under scrutiny as potential vectors for the virus and the effectiveness of virus removal when they were cleaned and disinfected was put into question. This paper investigated the antiviral activity of various contact lens disinfecting solutions against two seasonal coronaviruses in the same family as SARS-CoV-19. It found that oxidative solutions based on hydrogen peroxide or povidone iodine were effective against the viruses, while multipurpose solutions had little to no antiviral activity. A follow up study however demonstrated that inclusion of a rub and rise step effectively removed the vast majority of the viruses,

suggesting that even multipurpose solutions are effective against viral contamination if used as directed. <https://doi.org/10.3390/pathogens11040472>

7. **The impact of a rub and rinse regimen on removal of human coronaviruses from contemporary contact lens materials.** *Cont Lens Anterior Eye* 2022; 45;6: 101719. Lourenco Nogueira C, et al.

This study assessed the impact of a rub and rinse step to remove two coronavirus strains from a wide variety of soft and rigid contact lens (CL) materials using several CL disinfection solutions. The results showed that human coronavirus contamination can be easily removed from CL surfaces. Although CL care products based on oxidative systems (hydrogen peroxide and povidone-iodine) efficiently removed virus contamination from all CL surfaces without the need for a rub and rinse step, a full regimen including rub and rinse steps is crucial when using CL care products based on non-oxidative systems. <https://doi.org/10.1016/j.clae.2022.101719>

8. **Short-term tolerability of commercial eyelid cleansers: A randomised crossover study.** *Cont Lens Anterior Eye* 2022; 45;6: 101733. Craig J, et al.

Growing evidence has shown that lid infestation with the ocular mite *Demodex* is involved in the development of dry eye disease, meibomian gland dysfunction, chalazion and contact lens dropout. This study looked at the short-term tolerability of five commercially available anti-demodectic eyelid cleansers in 30 healthy non-contact lens wearers. The results highlighted varying levels of comfort and satisfaction with the different treatments, with some resulting in tear film instability, conjunctival hyperaemia and ocular surface staining on application. Awareness of these possible adverse effects will help clinicians set realistic patient expectations and encourage better compliance in their use of lid hygiene therapies for the treatment of *Demodex* blepharitis. <https://doi.org/10.1016/j.clae.2022.101733>

9. **Magnitude of astigmatism - A comparison between eyes.** *Cont Lens Anterior Eye* 2022; 45;5: 101510. Luensmann D, et al.

Astigmatism is a refractive error that typically sits more on the sideline of attention even though it is the most common refractive error, being rivaled by myopia only in certain ethnicities. A large cohort of 101,973 clinic patients was included in this retrospective chart review to determine the symmetry of astigmatism between eyes. In this cohort 87.2% of patients exhibited some level of astigmatism in at least one eye. Taking the astigmatic patients alone, it became apparent that one in four exhibited astigmatism of at least  $-0.75\text{DC}$  in one eye only, while the other eye required a lower correction. The power symmetry was high between eyes for low astigmatic corrections; for patients who had  $-1.00\text{DC}$  in the right eye, 80.8% of them had a similar prescription ( $\pm 0.50\text{DC}$ ) in the left eye. However, symmetry was reduced with higher astigmatism; for patients with astigmatism of  $-4.00\text{DC}$  in the right eye, only 40.6% exhibited a similar level ( $\pm 0.50\text{DC}$ ) of astigmatism in the other eye. <https://doi.org/10.1016/j.clae.2021.101510>

10. **Temporal Change in Pro-Inflammatory Cytokine Expression from Immortalized Human Corneal Epithelial Cells Exposed to Hyperosmotic Stress.** *Curr Eye Res* 2022; 47;11: 1488-1495. Nagaarudkumaran N, et al.

Hyperosmolarity, or an increase in concentrations of salts and other dissolved particles in a solution, has been identified as a key contributor to the development of dry eye disease. The mechanisms through which an increase in osmolarity affects cells on the ocular surface is however still under investigation. Leveraging CORE's expertise in cell culture, this study investigated the impact of hyperosmolar stress on corneal epithelial cells to produce biomarkers indicate inflammation as well as their metabolic activity. It

found that exposure to hyperosmolar environments caused decreased cell metabolism within six hours, and provided insight into the types of changes in the measured inflammatory biomarkers at this point as well. This will provide valuable insight into the timing of when cells should be assessed for effects of hyperosmolarity as well as what inflammatory biomarkers to target for new therapies.  
<https://doi.org/10.1080/02713683.2022.2125531>

CORE offers a searchable database of its more than 2,600 peer-reviewed papers, professional articles, continuing education presentations, and scientific presentations dating back to the early 1980s. That resource is available at <https://core.uwaterloo.ca/publications/>.

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### **About the Centre for Ocular Research & Education (CORE)**

The [Centre for Ocular Research & Education \(CORE\)](#) – formerly known as the Centre for Contact Lens Research – was established in 1988 at the University of Waterloo’s [School of Optometry & Vision Science](#). Over the next three decades, the organization evolved from a three-person operation into a thriving hub of basic and applied research, collaborating with sponsors, agencies and academia on advanced biosciences, clinical research and education. Its uncompromising independence and results of the highest quality have been at the heart of many of the most prominent advances in eye health. Today, its approximately [50-person team](#) serves a range of ophthalmic sectors, including medical devices, ocular pharmaceuticals, digital technology and others, with a focus on the anterior segment. For more information, please visit [core.uwaterloo.ca](http://core.uwaterloo.ca).



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