



EYE OPENERS

Mason Eye Institute • University of Missouri
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Dry Eye Syndrome: A Complex Problem

According to the National Eye Institute, an estimated 5 million Americans 50 years of age and older have dry eye syndrome. Millions more people are bothered by dry eyes but their symptoms are less severe than dry eye syndrome.

“Dry eyes are a complex but treatable problem,” said Don Liu, MD, an oculoplastic surgeon at Mason Eye Institute. “Various factors can contribute to the development of dry eyes. The environment and allergies may play a role, and older age and some diseases and medications can be factors. The body may not be producing enough tears to keep the eyes moist. Or the quality of the tears may not be good. The tears may not have enough oil or mucus in them. In some patients, a problem with the eyelids may be a cause of dry eyes.”

Tears: Nature's Lotion for the Eyes

About ¼ teaspoon of tears is produced daily by each eye. Tears bathe and protect the eyes, washing out dust and debris, keeping the eyes moist and helping the eyes fight infection. “Tears help protect the eyes and keep our vision clear,” Dr. Liu said. “In addition to water, tears contain proteins, vitamins, salts, antibodies, oxygen, lipids and other substances, all in proper proportions.”

“Tear production can be influenced by various things, including age, the environment, hormones, some diseases and drugs,” Dr. Liu said. “Often tear production decreases as people get older. But patients shouldn't think that dry eyes are part of growing old and something they have to live with.

Symptoms of dry eyes shouldn't be ignored, for they can lead to more serious problems. It's important to see an eye doctor to get proper diagnosis and treatment.”



Sagging of the lower eyelid can cause dry eyes. In this photo, the lower lid is turning away from the eye, preventing the eyelids from blinking properly and spreading tears over the eye's surface. Such an eyelid change can occur with aging.

Tears: A Mix of Fats, Water and Mucus

Tears have three distinct layers. The outer layer is made of lipids (also referred to as fats or oils). The middle layer contains water and a little bit of salt. The inner layer is made of mucus, the most slippery substance in our bodies.

The lipids, or fats, in the oily outer layer prevent water in the tears from evaporating too quickly. Lipids in the tears are secreted by tiny glands, called meibomian glands, which are located on the edges of the upper and lower eyelids. Sometimes the meibomian glands become plugged with aging, preventing the release of lipids into the tear film. The water in the middle layer is secreted by tear glands in the upper eyelids. The largest tear gland is the almond-sized lacrimal gland, located in the outer part of each upper eyelid.

The inner mucus layer allows the tear film to be evenly spread over the eye with blinking. The mucus is produced by thousands of cells on the inner surface of the eyelids and in the conjunctiva.

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Symptoms of Dry Eye Syndrome

Symptoms of dry eye syndrome include a burning or scratchy sensation of the eyes, light sensitivity and excessive tearing. If dry eye syndrome is severe, it can cause intense eye pain. Patients with dry eyes often notice stringy mucus in their eyes. It is a sign that tear film does not contain enough water. Blurred vision can also occur in dry eye syndrome. The blurred vision often is worse at the end of the day or after close work, such as reading, knitting and sewing. The eyes may feel tired after only a short period of close work. Dry eye syndrome can also cause watery eyes.

"As odd as it seems, many patients with dry eyes have watery eyes. These are patients who don't produce enough lipids or mucus," Dr. Liu said. "When tears do not have the proper amount of oil, water and mucus, they have a poor quality. Poor quality tears stay in the eye for only a short time. They break up quickly and run down the cheek. This results in a vicious cycle. When eyes feel dry, the lacrimal glands produce more water. But the watery tears do not do their job because they have too much water and not enough oil and mucus. The eyes feel dry, which signals the lacrimal glands to produce even more water."

Not Enough Tears or Poor Quality of Tears

Dry eye syndrome occurs when tear production is decreased, tear evaporation is too fast or tear content lacks enough mucus or oil. Tear production can decrease with aging or with hormonal changes from menopause. Dry eyes may be a side effect of some medications. Autoimmune diseases such as rheumatoid arthritis, lupus and Sjögren's syndrome can be associated with poor tear production and dry eyes.

An eyelid problem can also cause dry eye syndrome. The glands that secrete lipids into the tear film may be blocked. Without the lipid layer covering water layer, the tears evaporate too quickly. The lacrimal glands in the eyelids can be blocked, preventing the normal secretion of water into the tear film.

Infrequent blinking or impaired blinking can result in dry eye. "The eyelids must function properly and must be in a normal position to distribute the tear film evenly over the eye's surface," Dr. Liu said. "During normal blinking,

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Eye on Faculty Don Liu, MD

Don Liu, MD, is an oculoplastic surgeon and professor of ophthalmology at Mason Eye Institute. He joined the faculty in 2001. A graduate of the State University of New York School of Medicine, Dr. Liu completed a fellowship in ophthalmic plastic and reconstructive surgery at Albany (N.Y.) Medical Center. He is a member of a most prestigious professional society, the American Ophthalmological Society.



Q&A Spotlight

What types of surgery do you perform as an oculoplastic surgeon?

I perform a variety of procedures, including removing a tumor or scar in the eyelids or face, repairing eyelid or face lacerations, repairing fractures, fixing droopy eyelids, re-animating paralyzed eyelids, correcting excessive tearing, and fixing the bulging eyes of patients with thyroid dysfunction.

What are the most gratifying aspects of performing oculoplastic surgery?

The best part about being an oculoplastic surgeon is being able to save a patient's life and vision, restore function, relieve discomfort and pain, and achieve the best cosmetic result so patients aren't self-conscious about their appearance.

What is your philosophy about patient care?

The patient always comes first. I do my very best to achieve the very best results.

What activities do you enjoy in your leisure time?

I love to read, anything from archeology, history, politics, to arts, religion and war stories. Traveling and interacting with people is always an educational opportunity for me. I love to learn from everyone, from people of different ages and of different backgrounds.

For more information regarding dry eye, Dr. Liu or the Mason Eye Institute, please telephone or visit our new website at <http://som.missouri.edu/Ophthalmology>

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the eyelids hug the eyeball, and the upper eyelid touches the lower eyelid for a split second. The eyelids must be able to spread the tears over the surface of the eye.”

“Many elderly people have sagging lower eyelids that turn away from the eyeball. Often people don't know that outward turning of the lower lid can be corrected with surgery,” Dr. Liu said. “I've seen patients who have lived with a tearing problem and eye irritation for years, not realizing that the sagging lower eyelid can be corrected with surgery.”

When to See Your Eye Doctor for Dry Eyes

Eye pain, excessive tearing, burning or itching, redness, blurred vision and light sensitivity each signal the need to see an ophthalmologist.

“Dry eyes can sometimes be difficult to treat. Over-the-counter artificial tears are helpful in some patients, but they aren't a cure all,” Dr. Liu said. “A prescription eye drop is available that works by stimulating the lacrimal glands to produce more tears. It is useful in some patients. But it may not provide relief if there isn't enough mucus or lipids in the tears. If eye drops don't help, plugging the tear drainage ducts may be tried as a way to keep tears in the eyes for a longer time. If an eyelid is the problem, surgery can be performed to correct the eyelid so the lids work together as they should.”

“It's important to not ignore symptoms of dry eyes,” Dr. Liu said. “An eye exam should be done to determine the cause of dry eyes. A proper diagnosis is the first step to treatment.” ♦

The Mission of the Mason Eye Institute

The Mason Eye Institute is dedicated to providing the highest quality of patient care, education and research in ophthalmology. The Mason Eye Institute provides leadership that sets standards for excellence in ophthalmology by developing well-trained, competent, compassionate ophthalmologists; by expanding knowledge through basic science research and clinical investigations, and by providing thorough, compassionate care to our patients, which includes the latest advances in medical eye care. Thank you to those who have contributed to the furtherance of our mission through your generous gifts.

John W. Cowden, MD

Chairman and Roy E. Mason Distinguished Professor of Ophthalmology

GIVING SIGHT

Thank you for your support of the Mason Eye Institute. Gifts from grateful patients and other friends like you help to support important areas, such as providing care for patients who cannot afford to pay for the cost of their health care, enabling Mason Eye Institute to conduct important research on diseases such as glaucoma, macular degeneration, cataract and diabetic retinopathy, and funding facilities and programs to train future ophthalmologists.

How You Can Help

There are many ways you can make a difference in the lives of people with vision-related illnesses or injuries. Please consider one of the following special needs.

Patient Care Fund

Mason Eye Institute provides eye care to mid-Missouri residents without regard to health insurance status or ability to pay. But many of our less fortunate patients lack the resources to purchase appropriate glasses or low-vision aids. A gift to our Patient Care Fund helps purchase these and other items for patients who otherwise would not be able to have them.

Resident Education Fund

The future of ophthalmology lies in the hands of young physicians who train in ophthalmology. Each year we have the pleasure of meeting three new doctors who have chosen ophthalmology as their specialty and will train with our faculty physicians for the next three years. At all times, Mason Eye Institute has nine resident physicians on the staff. We must ensure that we pass on to these physicians the most up-to-date medical information and provide them with state-of-the-art equipment with which to hone their skills as ophthalmologists. Your gift to our Resident Education Fund helps purchase learning materials, equipment and seminar opportunities for budding ophthalmologists who may some day care for your eyes.



Mason Eye Institute

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Mason Eye Institute Faculty

John W. Cowden, MD

is chairman of the Department of Ophthalmology. He specializes in cornea and external diseases of the eye and performs cataract surgery, refractive surgery and corneal transplant surgery.

Christopher DeRose, OD

is an optometrist with a special interest in contact lens fitting. He joined Mason Eye Institute in May 2008.

Jeffrey M. Gamble, OD

is an optometrist who specializes in contact lens fitting and keratoconus.

Joseph Giangiacomo, MD

specializes in pediatric ophthalmology and pediatric and adult strabismus.

Dean P. Hainsworth, MD

specializes in retina and vitreous diseases. His current research includes macular degeneration and diabetic retinopathy.

Lenworth N. Johnson, MD

is a neuro-ophthalmologist (diseases of the eye and brain) and ophthalmology residency program director.

Martin L. Katz, PhD

is conducting research on neuronal ceroid lipofuscinosis (NCL), an inherited metabolic disease that affects nerve cells and causes blindness.

Bo Lei, MD, PhD

is studying electrophysiologic changes of the retina in retinal degenerative diseases. He has a joint appointment with the College of Veterinary Medicine.

Don Liu, MD

specializes in oculoplastic surgery and orbital trauma. His clinical interests include orbital and periorbital tumors, lacrimal disorders, eyelid reanimation and eye socket reconstruction.

Timothy D. McGarity, MD

specializes in general ophthalmology and performs refractive surgery and cataract surgery.

Rajiv R. Mohan, PhD

is conducting research on corneal gene therapy and corneal wound healing. He has a joint appointment with the College of Veterinary Medicine.

Kristina Narfström, DVM, PhD

is studying in cats and dogs hereditary retinal blinding diseases that have their counterparts in humans.

Beryl J. Ortwerth, PhD

has a distinguished 30-year career conducting research on cataract formation, funded through grants from the National Institutes of Health.

Lixing W. Reneker, PhD

is studying the molecular mechanisms that control lens and corneal development. She is using transgenic mouse models to understand the pathogenesis of human ocular diseases.

Frank G. Rieger III, MD

is a cornea and external diseases specialist. He also performs cataract surgery. He serves patients in Columbia and at the outreach clinic at Cooper County Memorial Hospital, Boonville, Mo.

Dan B. Schoenleber, MD

is a glaucoma specialist and also performs cataract surgery. He is director of the outpatient clinic at Mason Eye Institute.

K. Krishna Sharma, MSc, PhD

is director of research and is studying the molecular basis for lens transparency and cataract formation.

Morton Smith, MD

is an adjunct professor and an ophthalmic pathologist. He is professor emeritus at Washington University, St. Louis.

Theodore E. Wills, MD

is a specialist in general ophthalmology.

Victoria Wolak, OD

is an optometrist specializing in contact lens fitting. She joined Mason Eye Institute in January 2008.