



Major review

Diagnosis, pathophysiology, and treatment of photophobia



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ABSTRACT

Photophobia, an abnormal intolerance to light, is associated with a number of ophthalmic and neurologic conditions. In the presence of normal neurologic and ophthalmologic examinations, the most common conditions associated with photophobia are migraine, blepharospasm, and traumatic brain injury. Recent evidence indicates that the intrinsically photosensitive retinal ganglion cells play a key role in the pathophysiology of photophobia. Although pharmacologic manipulation of intrinsically photosensitive retinal ganglion cells and the neural pathways that mediate photophobia may be possible in the future, current therapies are directed at the underlying cause of the photophobia and optical modulation of these cells and pathways.

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1. Introduction

In the presence of a normal ocular exam, ophthalmologists are often at a loss trying to help patients with a chief complaint of photophobia. We describe what is currently known about the pathophysiology of this condition, what treatments are available, and what future treatments may look like.

2. Clinical presentation

Photophobia is an abnormal intolerance to light,⁵⁴ but it would be unusual for a patient to present with this chief complaint. Instead, patients may report that they are light sensitive in situations where most other people are not. Some patients will recognize that they are especially sensitive to artificial

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indoor lighting. The perspicacious patient will recognize that they're specifically sensitive to nonincandescent artificial indoor light.⁸⁴ Computer monitors are another common source of discomfort for the photophobic patient. Anecdotally, patients tend to have less trouble with natural light from the sun unless they are faced with glare from snow or other highly reflective surfaces.

Many patients with a chief complaint of photophobia will have a normal eye exam, but there are still a few signs to observe. It's not uncommon for photophobic patients to be wearing sunglasses in the waiting room. If you walk into an exam lane and the patient has turned off all of the lights, this is likely an indication that he or she is photophobic.

3. Conditions associated with photophobia

A number of ophthalmic and neurologic conditions are associated with photophobia (Table 1). The most common conditions encountered in a comprehensive ophthalmology practice are dry eye and corneal neuropathy, migraine, benign essential blepharospasm (BEB), and traumatic brain injury (TBI).^A An approach to the diagnosis of photophobia is provided in Figure 1.

3.1. Dry eye and corneal neuropathy

Dry eye, one of the most commonly encountered conditions in an ophthalmic practice, is the most common ocular cause of photophobia.^{A,70} Most dry eye patients complain of itchy, dry, scratchy, burny eyes; however, dry eye may be more challenging to diagnose when patients present with atypical symptoms such as photophobia. Useful examination tools include a careful evaluation of the tear film, tear film breakup time, corneal staining with fluorescein or rose bengal, and Schirmer test. Some patients will have normal testing for dry eye yet may have dry eye symptoms. In some neurologic conditions such as progressive supranuclear palsy and Parkinson disease, severe dry eye syndrome is seen in nearly all affected patients. A subset of these patients may also complain of photophobia.^{C,19}

Chronic dry eyes can lead to corneal neuropathy, a condition also frequently associated with photophobia. Resolution of the pain after instillation of topical anesthetic drops in a patient with an otherwise unrevealing anterior segment evaluation should raise the suspicion for corneal neuropathy and "dry eye-like pain."⁷³ Corneal neuropathy associated with dry eye can also be diagnosed with confocal corneal microscopy.⁹ Other causes of corneal neuropathy include zoster keratitis,⁴¹ diabetic neuropathy,²⁰ and chemotherapy.³² We recently reported that chronic migraine is also associated with reduced corneal nerve fiber density and symptoms of dry eye.⁵¹

3.2. Migraine

Migraine affects approximately 6% of men and 18% of women, making it the most common neurologic condition.⁷⁷ Nearly all migraineurs report light sensitivity during a headache,⁵⁰ but

Table 1 – Conditions associated with photophobia

Ocular
Anterior segment
Dry eye syndrome
Uveitis
Conjunctivitis
Corneal disease
Corneal abrasion
LASIK surgery
Corneal neuropathy
Interstitial keratitis
Pterygia
Aniridia
Cataract surgery
Posterior segment
Vitritis
Achromatopsia
Bradyopsia
Cone dystrophy
Retinitis pigmentosa
Alstrom syndrome
Sjorgen-Larsson syndrome
Papilledema
Optic neuritis
Chiasm
Pituitary tumor
Pituitary apoplexy
Retro-chiasmal pathways:
Demyelination
Cortical visual impairment
Strabismus
Exotropia
Neurologic
Migraine
Blepharospasm
Progressive supranuclear palsy
Traumatic brain injury
Meningitis
Subarachnoid hemorrhage
Lesions of the thalamus
Medications
Barbiturates
Benzodiazepines
Chloroquine
Haloperidol
Lithium
Methylphenidate
Zoledronate
Miscellaneous
Posterior fossa tumors (in association with epiphora and torticollis)
Preeclampsia
Neurasthenia (chronic fatigue syndrome)
Fibromyalgia
Measles
Rabies
Inflammatory bowel disease
IFAP syndrome (ichthyosis follicularis with alopecia and photophobia)
PPK (psoriasiform lesions and plantopalmar keratoderma)
Trisomy 18
Zinc deficiency with exocrine insufficiency
Hutchinson-Gilford progeria syndrome

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