



RANZCO

The Royal Australian
and New Zealand
College of Ophthalmologists

RANZCO Position Statement: For the General Public - Solar Retinopathy

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We acknowledge the Aboriginal and Torres Strait Islander Peoples, the Traditional Owners of Country throughout Australia and recognise their continuing connection to land, waters and community. We pay our respects to them and their cultures; and to their Elders past, present and emerging. In recognition that we are a bi-national College, we also acknowledge the Rangatiratanga of Māori as Tangata Whenua and Treaty of Waitangi partners in Aotearoa New Zealand.

1. Purpose and scope

The purpose of this position statement is to provide guidance to the general public on solar retinopathy.

2. Take Home Points

- The sun or an eclipse should never be viewed with the naked eye. Children are especially at risk and must always be supervised during a solar eclipse.
- Looking at the sun for as little as a few seconds can cause solar retinopathy.
- Solar retinopathy happens quickly with no pain or warning and can cause permanent loss of central vision.
- It results in mild to moderate loss of central vision, which can be permanent.
- There is no proven treatment for solar retinopathy, therefore it is important to prevent its occurrence through patient education.
- The Royal Australian and New Zealand College of Ophthalmologists (RANZCO) advises that the only way to guarantee the prevention of solar retinopathy is to avoid all forms of direct sun viewing.
- The use of solar eclipse glasses carries certain risks. Individuals who use them must be counselled regarding safety and precautions, including the use of filters complying with the AS ISO 12312-2 standard.
- If you or a family member are worried you have solar retinopathy, urgent referral to an ophthalmologist is needed for diagnosis, and to explore other possible causes of this visual condition.

3. Background

3.1 What is Solar Retinopathy?

Solar retinopathy (also known as eclipse retinopathy) occurs when intense light energy damages the inner lining of the back part of the eye (the central retina). Solar retinopathy is caused by prolonged or high intensity exposure of the fovea centralis (the part of the eye which is responsible for high-definition colour vision) to light energy.

It is typically associated with sungazing or eclipse viewing, but may be caused by laser pointers, welding, endo-illumination during ophthalmic surgery and photographic illumination mechanisms. Risk factors include young age, with children and teenagers most at risk, photosensitising drugs, drugs known to cause macular toxicity, psychiatric disease, illicit drug use, and pre-existing macular disease, for example, age-related macular degeneration. There are slightly more men than women who have solar retinopathy.

3.2 How does looking at the sun damage your eyes?

Light damage to the eye is thought to be caused by ultraviolet energy. The duration of exposure can be as short as a few seconds and is not caused by cell damage from heat. Sensitivity to sunlight leads to disruption of the retinal pigment epithelium (RPE; layer of cells underlying and supporting the retina), as well as damage to the choroid (blood vessels underlying the RPE) and blistering and fragmentation of photoreceptors (cells that convert light into signals to the brain).

4. Diagnosis, Treatment and Management

It is important to recognise the signs and symptoms of solar retinopathy, which can occur within hours to 1-2 days of exposure.

Blurred vision in one or both eyes, a blind spot that is slightly off centre or directly in your line of sight, altered colour vision, straight lines appearing curved or kinked, objects appearing smaller than normal, eye discomfort when confronted with bright light and mild to severe pain in your forehead or temples are all symptoms of solar retinopathy.

Fundoscopy examination of both eyes can result in findings ranging from no issues in mild cases, to a yellow-white spot in the central macula, progressing to a reddish spot over days.

Ophthalmologists may refer individuals to undergo diagnostic imaging – optical coherence tomography, fundus autofluorescence and fluorescein angiography – in some cases.

There is **no** proven treatment for solar retinopathy. Rather, individuals should abstain from further sun-gazing or eclipse viewing.

Welders should wear appropriate (industrial grade) protective helmets or goggles.

It is important to note that caution should be exercised when taking anti-inflammatory medicine (corticosteroids) as systemic steroids are a risk factor for other macular disease, as well as cataract formation and raised intraocular pressure.

Additionally, while studies have shown benefits from taking oral antioxidant supplements (available over the counter) to slow the progression of age-related macular degeneration (ARMD), there is **no** proven benefit from taking antioxidants for solar retinopathy.

Individuals with vision loss should exercise caution with driving, even if their eyesight meets the requirements for a private driver's license.

Individuals operating heavy machinery or holding a commercial driver's license and have any symptoms should abstain from work until they have been assessed by an eye specialist.

5. Prevention and Education

The safest way of observing the sun (as used by astronomers) is to project the image onto a screen or to watch it online. RANZCO advises that the only way to guarantee the prevention of solar retinopathy is to avoid exposure through direct sun-gazing of any kind. As children and teenagers are most at risk parents and carers should educate them about the dangers and supervise them closely during the eclipse.

However, it should be noted that direct viewing of a solar eclipse may safely be performed through the correct use of approved filters, also known as 'eclipse glasses' and 'eclipse filters'.

Further advice is as follows:

- Some commercially available solar shades have shown good absorption of visible light, as well as ultraviolet and infrared light, making them potentially safe for eclipse viewing. Only glasses that meet the AS ISO 12312-2 standard will provide adequate

- eye protection when viewing the sun or an eclipse.
- It is strongly recommended that when purchasing eclipse glasses and similar products, the buyer checks:
 - they are from a reputable supplier;
 - they show the standard certification;
 - legitimacy by visiting the manufacturer's website; and
 - they are not scratched, punctured, torn or otherwise damaged.
 - Even if filters state that they meet the standard, it is recommended that people see if the manufacturer is listed (see References no 9 and 14 below) to confirm that there are no changes or updates to the certification of the product.
 - Eclipse filters should be used to look at a lamp or light bulb to ensure that it can't be seen. Only the sun should be visible through genuine eclipse filters.
 - Certified filters that meet the Australian Standards for welding shields and goggles with a lens category higher than 12 may also be used.
 - Children should always be supervised when using approved eclipse glasses.
 - These protectors should provide adequate coverage to ensure that no direct radiation from the sun can reach around the frame to their eye other than through the appropriate filter. During an eclipse of the sun, eye protectors must be worn whenever a part of the sun is not covered by the moon.
 - Eclipse glasses may be placed over the top of normal distance glasses.
 - There are risks associated with all forms of direct viewing of the sun, even through solar shades due to: possible manufacturing faults; the availability of filters that may not meet the AS ISO 12312-2 standard; incorrect usage of filters such as putting them on too late or removing them too early during an eclipse; the risk of 'copycat' sungazing through filters that do not meet the AS ISO 12312-2 standard; the risk of 'sneaking a peek' without shades especially by children.
 - Regular sunglasses, polaroid filters, dark glasses, welding glasses, X-ray film, photographic neutral density filters, red glass filters and homemade sun filters are not safe for observing the sun.
 - The sun should never be observed through an unfiltered camera, telescope or binoculars of any kind, and nor should it be viewed through these devices whilst wearing eclipse glasses or another form of handheld solar viewer as concentrated solar rays could damage the solar shades and cause solar retinopathy.
 - A total solar eclipse may safely be watched without eye protection, but only during the brief period while the moon completely covers the sun. Local authorities should be consulted regarding the precise timing of this event. Solar filters may only be removed when the moon completely covers the sun and it suddenly gets dark. Just prior to the sun reappearing, to keep observing the remaining partial eclipse solar shades must be worn again.
 - It is never safe to look at a partial eclipse, or the partial phases of a total eclipse, without approved eye protection.

5.1 What to do if you are worried about your eyes after the eclipse

If you have blurry vision, loss of central vision or are worried about your eyes after the eclipse, **make an appointment as soon as possible with your ophthalmologist, optometrist or a doctor**. Individuals with suspected solar retinopathy should be urgently referred to ophthalmology, to be seen as soon as possible (within days). In rural locations, it may be more practical to refer to a local optometrist, who may be able perform telehealth (over Zoom) with ophthalmology. Where referral to optometry is not possible, travel to major urban centres, through patient-assisted-travel schemes, may be arranged. Royal Flying Doctors Services (RFDS) transfer is not necessary for solar retinopathy. Solar

retinopathy is not a contraindication to flying.

Improvement in sight may occur between one and six months after injury. Good sight (6/9 or better) at the time of presentation indicates better visual recovery. Other deficits such as blurriness and blind spots may become permanent despite an improvement in overall sight.

6. Record of amendments to this document

Page	Details of Amendment	Date amended
Entire document	Created	March 2023

7. References

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