Key insights
This special issue reviews the biochemical, cellular and clinical responses of ocular tissues to UV radiation, and methods of protecting the eye against the harmful effects of UV. Although there is little doubt about the cause and effect relationship of acute sunlight exposure and tissue damage, the link between chronic exposure (particularly to solar UV) and age-related conditions such as cataract and macular degeneration is less clear. A new study has shown that UV radiation may be a hazard to eyes throughout the day and year, and suggests that advice for eye protection differs from that for skin protection.
Sunglasses can actually increase UV exposure of the crystalline lens and corneal limbus by disabling the eyes' natural protective mechanisms. UV-blocking contact lenses are effective in protecting the lens and limbus. A combination of sunglasses, a wide-brimmed hat and UV-blocking contact lenses offers the most complete measure of UV protection.

Public health aspects of UV exposure

- To our current knowledge, exposure to UV radiation has only adverse effects on the eyes
- UV-related eye diseases are common, disabling, and cause a considerable disease burden worldwide
- Acute high-dose UV exposure causes photokeratitis and photoconjunctivitis
- Low-dose chronic exposure is a risk factor for cataract, pterygium, and squamous cell carcinoma of the cornea and conjunctiva
- There is some evidence in relation to other conditions, including ocular melanoma and age-related macular degeneration (AMD)
- Proposed health benefits of vitamin D through appropriate skin exposure to UV or vitamin D supplementation are as yet unclear

CLICK HERE FOR THE ABSTRACT

USE THIS IN YOUR PRACTICE TO:
- Gain an overview of the public health issues involved in skin and eye exposure to UV
Ocular effects of ozone depletion


- Although the ozone layer is projected to recover slowly in the coming decades, continuing vigilance is needed regarding sun exposure
- Longer life expectancy increases susceptibility to age-related eye diseases in which UV radiation plays a part
- Young people also need to be vigilant about sun exposure since some UV-related conditions are determined by early-life exposures
- Advocating eye protection for those living in areas with high ambient levels of solar UVB is an important public health message
- The need for ocular UV protection will continue even when the ozone layer fully recovers in approximately 2100

 USE THIS IN YOUR PRACTICE TO:

- Appreciate the relevance of ozone depletion and how it influences sunlight-related eye diseases

Eye protection throughout the day and year


- Ocular UV exposure was measured throughout the day, in September and November, using dummies with UV-B sensors
- UV exposure in September when the face was directed toward the sun differed dramatically from measurements taken on the top of the head and those for the eye taken later in the year
- Although the overall level is lower, higher solar altitude is associated with higher levels of UV when facing away from the sun
- Using UV Index as an indicator of need for eye protection can be misleading. Eye protection may be warranted throughout the year

 USE THIS IN YOUR PRACTICE TO:

- Inform patients that UV radiation is a year-round hazard to eyes and that advice for eye protection differs from that for skin protection

©Johnson & Johnson Medical Ltd  Eye & Contact Lens Special Issue, July 2011
UV and the anterior eye


- Ophthalmohelioses (a range of eye diseases in which sunlight is implicated) impact on patients’ quality of life and on health care costs
- Peripheral light focusing (PLF) plays a role in the pathogenesis of pterygium and cataract
- Understanding PLF has resulted in improved sunglass designs and developments in UV-blocking contact lenses
- PLF is greatly attenuated by the use of UV-blocking contact lenses
- Ocular UV fluorescence photography has demonstrated early (preclinical) ocular surface evidence of solar damage
- Diet may also play a role in ophthalmohelioses and in skin cancer
- Personalised advice on UV protection may be possible in future

CLICK HERE FOR THE ABSTRACT

USE THIS IN YOUR PRACTICE TO:

- Learn more about PLF and educate patients about the role of sunglasses and contact lenses in protecting eye health

Phototoxicity and the retina

Glickman RD. Ultraviolet phototoxicity to the retina. Eye & Contact Lens 2011; 37: 196-205.

- Depending on the wavelength and exposure duration, light interacts with tissue by thermal, mechanical or photochemical mechanisms
- The anterior structures of the eye absorb much of the UV component of the optical radiation spectrum but a portion of the UVA band (315-400 nm) penetrates into the retina
- Lifetime blue-light damage may contribute to the onset of degenerative diseases of the retina and retinal pigment epithelium (RPE)
- Some drugs may act as photosensitizers, promoting retinal UV damage
- Phototoxicity may be reduced by dietary intake of antioxidants

CLICK HERE FOR THE ABSTRACT

USE THIS IN YOUR PRACTICE TO:

- Understand mechanisms of UV-induced damage underlying some of the leading causes of visual loss in the ageing population
The role of UV in AMD


- The cornea and the lens block a major portion of UV radiation from reaching the retina (<295nm)
- The relationship between UV and AMD is unclear although short wavelength radiation and blue light induce oxidative stress to RPE
- Epidemiologic evidence suggests a trend towards an association between excessive light exposure and AMD
- Antioxidant enzymes and macular pigments protect the retina
- Factors involved in UV exposure levels include geographical area, rural/urban dwelling, ethnicity (melanin) and age

CLICK HERE FOR THE ABSTRACT

USE THIS IN YOUR PRACTICE TO:

- Review the evidence for a link between UV and AMD and advise your patients accordingly

The ‘ideal’ eye protection against UV

Sliney DH. Intraocular and crystalline lens protection from ultraviolet damage. Eye & Contact Lens 2011;37:4 250-258.

- UV-absorbing contact lenses offer the best UV eye protection provided they cover the limbus
- Sunglasses may disable the eyes' natural protective mechanisms of pupil constriction and lid lowering
- Ground reflectance (off snow and water) is a key factor in photokeratitis
- Sunglass frame design is critically important in reducing UV ocular exposure
- UV-absorbing contact lenses offer the best method for filtering needless exposure of UV radiation of the lens and limbus

CLICK HERE FOR THE ABSTRACT

USE THIS IN YOUR PRACTICE TO:

- Advise your patients on the most effective methods of eye protection and explain the limitations of sunglasses alone
The need for UV protection

Chandler H. UV absorption by contact lenses and the significance on the ocular anterior segment. Eye & Contact Lens 2011;37:4 259-266.

- Use of UV-blocking contact lenses prevents detrimental cellular changes to the cornea and maintains corneal clarity after UV exposure
- Shielding the aqueous humour and crystalline lens with UV-blocking contact lenses may help protect against precataractous changes
- Brands with Class I (90% of UV-A, 316-400nm and 99% of UV-B, 280-315nm) or Class II (70% of UV-A and 95% of UV-B,) protection include ACUVUE® OASYS® and ADVANCE®, and 1-DAY ACUVUE®
- UV-blocking contact lenses are especially pertinent for patients who have pterygia or pre-existing UV-induced lenticular damage, or who are exposed to high levels of UV in occupational/recreational activities
- Aphakic and pseudoaphakic patients may also benefit
- Wearing UV-blocking contact lenses does not negate the need for other strategies □ a combination of sunglasses, a wide-brimmed hat and UV-blocking contact lenses offers the most complete protection

Benefits of UV-blocking contact lenses

Walsh JE and Bergmanson JRG. Does the eye benefit from wearing UV-blocking contact lenses? Eye & Contact Lens 2011;37:4 267-272.

- UV-blocking contact lenses that cover the limbus provide protection from all sources of ocularly incident UV
- Although directly relating solar UV dose to ocular damage is epidemiologically challenging, irradiation of ocular cell cultures can estimate the toxic effects of UV exposure
- Using UV-blocking contact lenses greatly increase the time the wearer can be exposed to solar UV before a toxic ocular dose is reached
- A scientifically rigorous, clinically applicable ocular protection factor metric is needed for eyewear, similar to that used for skin suncreams