


Wardale Williams

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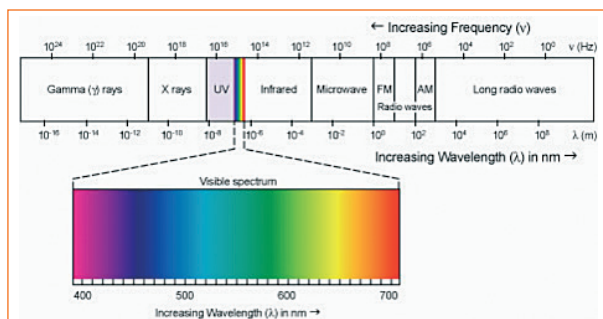
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Effects of Ultraviolet (UV) Light on the Eye

Global atmospheric changes such as depletion of ozone are thought to lead to increased levels of UV radiation on earth. This can have adverse effects on human health, and long-term effects of ultraviolet light on the eye are of increasing concern.

What is UV light?

UV light is electromagnetic radiation with a wavelength shorter than that of visible light, but longer than X-rays. It is so named because the spectrum consists of electromagnetic waves with frequencies higher than those that humans identify as the colour violet. Although ultraviolet is invisible to the human eye, most people are aware of the effects of UV through the painful condition of sunburn, but the UV spectrum has many other effects, both beneficial and damaging, to human health.



What effects does UV have on the eye?

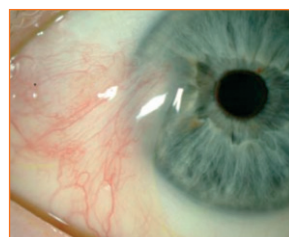
Photokeratitis and photoconjunctivitis

Photokeratitis is an inflammation of the cornea, while photoconjunctivitis refers to an inflammation of the conjunctiva, the membrane that lines the inside of the eyelids and eye socket. These inflammatory reactions may be compared to a sunburn of the very sensitive skin-like tissues of the eyeball and eyelids and usually appears within a few hours of exposure. Photokeratitis and photoconjunctivitis can be very painful, however, they are reversible and do not seem to result in any long-term damage to the eye or vision.

An extreme form of photokeratitis is snow blindness. It sometimes occurs in skiers and climbers who experience extreme UV levels due to high altitude conditions and very strong ground reflection – fresh snow can reflect up to 80 per cent of incident UV radiation. These extreme UV levels kill the outer cells of the eyeball leading to blindness. Snow blindness is very painful when the dead cells are being shed. In the majority of cases new cells grow quickly and vision is restored within a few days. Very severe snow blindness may involve complications such as chronic irritations or tearing.

Pterygium and Pinguecula

These are both growths that form on the whites of the eye, they are common cosmetic blemishes and are probably linked to prolonged UV exposure. Both pterygia and pingueculae have a tendency to become inflamed but this can be treated with topical steroids. Pterygia may extend over the centre of the cornea and thereby reduce vision. This can be removed by surgery although the outgrowth sometimes recurs.



Pterygium



Pinguecula

Cataracts

Most people develop cataracts as they get older. It is thought however that exposure to small amounts of UV over many years may be partly to blame. There is

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evidence to suggest that people with greater exposure may well develop cataracts at a younger age.

Cancer of the eye

Current scientific evidence suggests that different forms of eye cancer may be associated with life-long exposure to the sun. Melanoma is the most frequent malignant cancer of the eyeball and sometimes requires surgical removal. A common location for basal cell carcinoma is on the eyelids.

Age-related macular degeneration

The cells of the macula are very sensitive to UV light and may become damaged with time leading to deterioration of the central vision.

What can I do to protect my eyes?

- Wear good quality sunglasses with lenses that offer 99-100% UVA and UVB protection. If you spend a lot of time in bright sunlight then wrap-around frames can offer additional protection.
- Even on a cloudy day there is still plenty of UV around, so having a UV block on your day to day spectacles is advisable. High index lens materials naturally offer this protection as do **Transitions™** changeable tint lenses, which are designed to be worn all the time and to replace ordinary clear lenses.
- Some soft contact lenses are available with a UV blocker. Sunglasses are still advised in bright sunlight

though, to protect the tissues of the eye not covered by the lens.

- Wear a wide brimmed hat, this is especially advisable when the sun is high in the sky.
- Carotenoids such as lutein, a yellow pigment found in high concentrations at the macula, can help enhance the eyes natural defence against UV. Lutein is naturally found in dark green leafy vegetables such as spinach and kale, but is also found in vitamin supplements such as I-Caps.

Protecting your children

Vision experts agree that children are especially vulnerable to eye damage from UV radiation and have long recommended the use of protective lenses for all children whenever they are exposed to the sun. Several factors contribute to this increased ocular vulnerability in children. Firstly, under normal circumstances, children spend more time outdoors than adults, particularly during the summer. As a result, the average child receives approximately three times the annual UV dose of the average adult and up to 80% of lifetime UV exposure before the age of 20. Secondly, over 75% of UV radiation will be transmitted through to the retina in a child's eye as the lens and cornea are so clear, compared with 10% in those older than 25 years.