UIAA Mountain Medical Centre
Information Sheet 6

SUNSCREENS AND ALTITUDE

Introduction
There is no better way to prevent sunburn at high altitude than to cover up exposed parts with clothing. There is no suggestion from clinical experience that malignant melanomas are seen commonly in high altitude climbers than in the general population. Obviously, the more benign skin cancers are seen in more commonly in those who spend much time outdoors, and are probably more common in (for example) mountain guides than their office-based peers. Despite the recent publicity on sunscreens and melanomas, there is presently no definite evidence to suggest avoiding the use of sunscreens; there may however be further data about this.

Ultraviolet light
Sunlight is composed of various wavelengths ranging from ultraviolet light through infrared to visible light - ultraviolet light is the most harmful to the skin and causes sunburn, ageing of the skin and, over the long term, skin cancer. Ultraviolet light is made up of UVC, UVB and UVA, UVC being the shorter wavelength that is filtered out by the earth's ozone layer. UVB and UVA penetrate the ozone layer and reach the earth's surface but the atmosphere filters more UVA than UVB. Fortunately, UVA is not quite so powerful in its effects as UVB as it has an additive (cumulative) effect with UVB on the skin. UVB and UVA are the only wavelengths that need to be screened out as we still have an ozone layer over most of the earth!

Ultraviolet light (especially UVA) is harmful to the eye in excessive quantity, acutely causing snow blindness (conjunctivitis) and in the long-term cataract formation. The higher the altitude the more UV light there will be and as snow is a powerful reflector of ultraviolet light, one must take extra caution whilst climbing on snow and ice, especially at altitude (see practical issues). UVB and UVA penetrate clouds thus explaining why sunburn and snow blindness can occur on cloudy days.

Sunscreens
There are a variety of substances that can protect against UVB - these work by absorption, whereas UVA screens mainly work by reflection. Zinc or titanium dioxide cream will reflect UVA and UVB but leaves a white film on the skin, so a proprietary sunscreen is often preferable.

Sun Protection Factor (SPF)
This number only applies to the UVB (screening) action of the sunscreen. For example, when using a product with a SPF15 one can spend fifteen times longer in the sun before becoming sunburnt. Remember, the ***SPF does not apply to UVA sunscreens*** so even a product with a SPF25 but with no UVA screen will less effective than a product with a lower SPF but with a UVA screen. When buying, look for a cream that has a high SPF factor, and both a ***UVA+B block*** to ensure maximum protection. The other factor that has to be taken into account when choosing a sunscreen is cosmetic acceptability - some people like greasy preparations while others prefer alcohol based lotion preparations that are much easier to apply.

Side effects
Some sunscreens contain PABA (p-amino benzoic acid); these (usually lotions) do sting already burnt skin and will stain clothing yellow. Very rarely an acute dermatitis can occur when using sunscreens but this is fairly obvious as the face swells up and the skin weeps – washing and discontinued use should solve the problem. People taking antibiotics, especially of the tetracycline type can sometimes become photosensitive at high altitudes because the increase in UV light has an effect with tetracycline in the skin.

Effective use of sunscreens
A high SPF sunscreen with UVA blocking properties should be applied ***several times a day***, remembering that sweat and rubbing the face will reduce the effectiveness of the screen. Remember to wear a pair of good quality sunglasses or goggles on snow and at altitude ***even in cloudy conditions***. ***Always carry a spare pair of sunglasses***, or if you have lost them, make something, e.g. a piece of card with eye slits cut through it, or clothing to cover the eyes.

Some Recommended Products (available in the UK)
RoC Creme Ecran Total SPF 25 (with lipsalve Stick Ecran SPF15)
Uvistat Cream 20
Soltan 20
Piz Buin Total Sunblock Lotion*
Coppertone Ultrashade
Spectraban 15 Lotion
Delph sunscreens and lotions – recommended by GP's for sunlight-hypersensitivity
* Also available as lipsalve with sunscreen

There are many other reputable products available.

Practical Issues
Covering the skin (especially the face & arms) is very important at extreme altitude. Facemasks (silk is best) or balaclavas - even when unnecessary for protection against cold - have an important place in the prevention of sunburn. The lips, underside of the nose and the ears also need to be protected and lipsalve with a sunscreen should be used.

The treatment of acute sunburn is to cover the inflamed area and use soothing creams such as calamine lotion. When there is severe skin inflammation over a wide area, e.g. very painful thighs after marching in shorts, a ***single*** application of a steroid cream - Betnovate 0.1% - is helpful.

Snow blindness is the intensely painful gritty sensation in the eyes, in which UV radiation has induced inflammation of the cornea and conjunctiva. It is best treated with a combination of a steroid eye drops, e.g. betamethasone 0.1% and an antibiotic, e.g. chloramphenicol eye ointment, three times daily. The inflammation usually settles within 24 hours.

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