

# Sun and sea in summer

**Victor Grech** MD, PhD, FRCPCH, MRCP(UK), DCH, CLJ

Consultant Paediatrician (Cardiol), Department of Paediatrics, Mater Dei Hospital, Malta  
Associate Professor of Paediatrics, Faculty of Medicine and Surgery, University of Malta,  
Msida, Malta

**Email:** victor.e.grech@gov.mt

## Educational aims

- To highlight prevention strategies and management of over exposure to the sun
- To provide an overview of eye and ear infections frequently encountered in the summer months
- To provide an insight into jellyfish stings and their management

## Key words

otitis media, otitis externa, conjunctivitis, bacterial, sunstroke, sunburn

**Summer is upon us soon, and we will encounter patients with various ailments which tend to be specific to this time of the year. OTC (over the counter) treatment may or may not be appropriate and this article will give some reasonable guidelines.**

## Introduction

Being outdoors in summer exposes individuals to a variety of environments that the body is normally unaccustomed to for most of the year. These are namely intense sunlight and swimming (sea water or pools). This article will highlight some common problems that may be encountered in these settings.

## Solar exposure

The sun produces visible light and heat, but these comprise only a part of the solar radiation spectrum. The portion of the solar spectrum that leaks through the atmosphere and produces skin damage is the ultraviolet portion and this radiation produces both short term and long term damage.

Short term damage is comprised literally

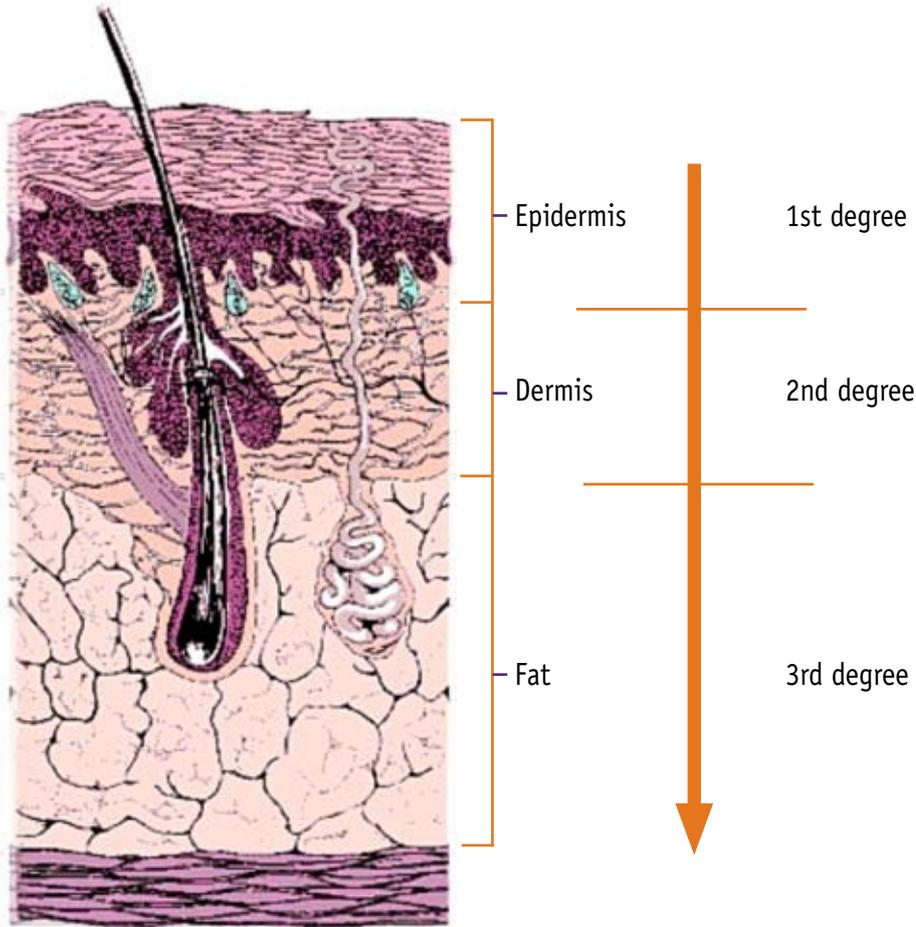
of skin burns. These may be of varying degrees depending on the strength and duration of exposure. These burns may therefore be of 1st or 2nd or even 3rd degree. 1st degree burns causes redness and pain within a few hours after the exposure, with worsening of the symptoms over the next twenty-four hours. 2nd degree burns are more severe and serious, and can also cause blistering of the skin (Figure 1).

Treatment of sunburns involves control of pain and includes the use of paracetamol or stronger pain relief, such as ibuprofen, for a few days. One may also use moisturizers and a 1 percent hydrocortisone cream three times a day, cool baths and wet compresses. Drinking lots of fluids is also important. If peeling occurs, one may continue to apply moisturizers until the skin heals.

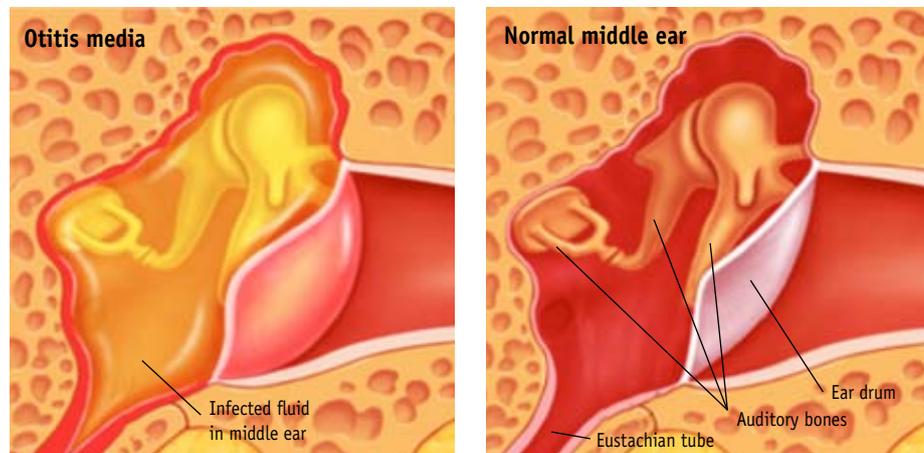
With regard to long term effects, unfortunately, we receive most of the solar damage to our skin as children, and this damage is permanent and cumulative. Reducing this solar exposure decreases the chances of premature aging and also reduces the risk of skin cancer in the long term.<sup>1</sup>

## Prevention is always better than cure and some important reminders include:

- Ultraviolet radiation is also reflected from relatively bright surfaces such as sand and sea, so staying in the shade is not, by itself, sufficient.
- Protective clothing is crucial, including a hat and long sleeve shirt and long pants. Keep in mind that most clothing only has a protection factor of 5 to 9, so one can still get sun damage with clothing on.<sup>2</sup>
- Limit exposure to the sun when it is at its strongest, between 10am and 4pm.<sup>3</sup>
- It is also important to protect eyes with sunglasses.<sup>4</sup>
- Sunblocks should be used daily, even under cloudy conditions, since most of the sun's radiation penetrates clouds and can still cause sunburn.<sup>5</sup>
- Sunblocks are the most important and effective anti-aging creams.
- A sunscreen should contain ingredients that physically block the sun's radiation, especially for sensitive skin. Such compounds include zinc oxide and titanium dioxide.
- Deet is found in insect repellents and reduces the effectiveness of sunblocks, so use a higher factor of sunblock if using a combination product that has both a sunscreen and an insect repellent.



**Figure 1.** Layers of skin affected by increasing severity of burns



**Figure 4.** Normal ear on the right and otitis media on the left showing the middle ear cavity inundated with pus, causing the eardrum to bulge into the external auditory

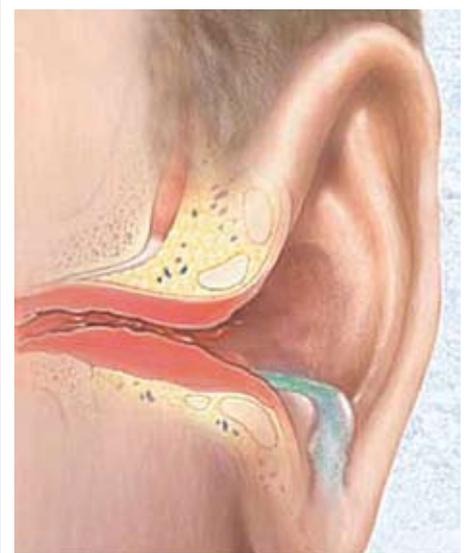
### Sunstroke

Sunstroke or heatstroke are an advanced form of hyperthermia, a progression from heat exhaustion or heat prostration. Hyperthermia comes from the Greek hyper, meaning 'over, above, or excessive' and the Greek therme, meaning 'heat'. It is an acute condition and a medical emergency wherein the body is overheated because it produces or absorbs more heat than it can get rid of. This condition is most commonly caused by prolonged exposure to excessively high

temperatures and results in the body's heat-dissipating becoming literally overwhelmed and unable to effectively lose heat, and the body's core temperature spirals upward uncontrollably. Hyperthermia may also be caused deliberately in the treatment of certain forms of cancer, or inadvertently as a rare reaction to certain drugs during general anesthesia. Hyperthermia differs from fever in that fever is a natural body reaction and is, to some extent, controlled by the body itself. Temperature is set (normal or fever)



**Figure 2.** Conjunctivitis with a red eye and purulent discharge



**Figure 3.** Otitis externa with inflammation and swelling of the lining of the external auditory canal and a discharge leading out of the ear

by the action of the pre-optic region of the anterior hypothalamus, deep within the brain, and this is usually a normal immune response to a bacterial or viral infection, allowing the immune system to work more effectively and to degrade and weaken the condition of the invading organisms. In contrast, hyperthermia occurs when the body temperature is raised without the consent of the heat control center. Hence, hyperthermia may be defined as a temperature rise above and beyond that required by and regulated

by the body's thermoregulatory mechanisms.

One of the body's most important temperature regulation systems is the process of sweating. The skin engorges with blood and the appearance is that of flushing. This process draws heat from inside as the skin acts as a radiator, allowing heat to be carried off by radiation or convection. Evaporation of sweat further cools the skin. However, when the body becomes dehydrated, the production of sweat ceases and in an attempt to maintain blood pressure, blood may be diverted from the skin back to the central vascular system, and at this point, when heat cannot be lost, the core temperature rises literally uncontrollably.

Affected individuals may become confused and hostile and appear intoxicated since brain function becomes impaired. They may also complain of headaches and may feel faint due to a drop in blood pressure. The heart rate and respiratory rate rise and as the victim also goes into shock, the appearance of a flushed skin changes to that of a pale, cold and clammy skin. Chills and trembling may also occur along with nausea and vomiting, and convulsions may ensue. As the internal organs begin to fail (kidneys, liver etc) unconsciousness and coma will result, followed by death.

If we were to quantify some temperature figures, the normal human body temperature is up to 37.5°C (98°F). Temperatures above 40°C (104 °F) are life-threatening and at 41°C (106 °F), brain death ensues. Death is almost certain at 45°C (113°F).

Heat stroke is a medical emergency requiring hospitalization. First aid requires the immediate lowering of the body temperature, by moving indoors or into the shade, the removal of clothing, and cooling the skin by wetting with cool water or by the application of cold and or wet compresses. Alcohol rubs should not be used. A fan will help to evaporate the water on the skin and further aid cooling. Rehydration is also crucial by drinking water or commercial isotonic solutions. Once admitted to hospital, these measures will be continued along with an infusion of intravenous fluids to correct dehydration. Needless to say, avoidance is crucial. In the setting of hot environments, one should drink lots of fluids, wear light, loose-fitting clothing and wide brimmed hats, avoid direct sunlight, use sunscreens and avoid unnecessary exertion in conditions of relatively high heat. Use fans and other methods of active cooling. Alcohol

and caffeinated drinks should be avoided as these promote the production of excessive urine, worsening water loss.<sup>6</sup>

### Otitis and conjunctivitis

In summer, pools and contaminated seawater may predispose to eye or ear infections.<sup>7,8</sup>

Conjunctivitis is characterised by painful red eyes with a purulent discharge(Figure 2).

These may sometimes be treatable with just saline washes and simple analgesia with paracetamol. However, these measures may not suffice and it is not unreasonable to administer antibiotic eye drops (three times daily for a week) along with saline cleaning. Persistent pain/redness/discharge should prompt medical referral. Never use a steroid containing eye preparation as if the infection is viral, severe damage may be incurred. Moreover, persistent usage of steroid eye drops may lead to serious complications, such as high intraocular pressure.

### Ear infections

Ear infections may be of two types:

- Otitis externa is an infection of the external auditory canal, and leads to pain in the ear canal along with a discharge that mixes with ear wax and therefore appears brownish-yellow (fig 3). Again, in such cases, it would not be unreasonable to administer a topical antibiotic preparation along with simple analgesia such as with paracetamol. Naturally, persistent pain/discharge should prompt medical referral.
- Otitis media is more likely to occur in winter and causes a very painful infection of the ear middle ear cavity, often associated with an intercurrent cold. However, such infections may also occur when contaminated sea or pool water reaches the ear through the nose – through the communication called the Eustachian Tube that connects the middle ear cavity with the back of the mouth, and it is this communication that allows us to equalise the pressure within the ear when we fly, and also allows infections to reach the ear from the mouth in the setting of a cold or when diving into contaminated water (Figure 4). Analgesia should be prescribed for the severe pain until a medical review is available. These infections occur behind the ear drum and therefore cannot be reached by ear drops as these are stopped by the ear drum, which is both air- and water-tight.

Untreated otitis media may cause the build-up of pressure by pus within the ear to actually rupture the ear drum, liberating pus into the ear canal where it mixes with ear wax and appears as a brownish-yellow discharge. This relieves the pressure and therefore the pain, and in this setting, ear drops will actually reach the middle ear cavity through the perforation. Such perforations are usually self sealing.

### Jellyfish

Jellyfish blooms seem to be becoming an annual event, not only in Malta, but throughout the Mediterranean, and therefore, as in previous years, it is likely that the Maltese islands will see their customary share of jellyfish this summer, particularly on days when sea currents and winds waft large offshore blooms toward our shores.

There are several theories why the local jellyfish, the *Pelagia noctiluca* is becoming a frequent visitor to our coasts. The main reason is probably that fishing is removing the jellyfishes' main competitor for food, thus leaving more food for the jellyfish to feed on. Moreover, global warming, by heating up the seas, speeds up the production of the microscopic organisms on which jellyfish feed. Overfishing also leads to a decrease in natural jellyfish predators, such as marine turtles, which are also often victims of vessel propellers.

Jellyfish are stinging aquatic invertebrates. Most jellyfish are harmless to humans but a few can cause serious problems. Jellyfish have stinging organelles (nematocysts) which may penetrate the upper dermis and discharge venom which causes a local reaction and may also diffuse into the systemic circulation. The venoms are typically polypeptides and enzyme compounds which may be both toxic and antigenic to humans.<sup>9</sup> The most common adverse reactions are mild local dermatitis. Rarely serious or fatal systemic reactions may occur.

The *Pelagia noctiluca* is an oceanic species widely dispersed in warm waters, and can grow up to 10 centimetres in diameter with mauve or pink mushroom-shaped body. The tentacles total eight in all, and are pale brown and usually between 10cm and 30cm in length. When the jellyfish comes into contact with its prey, or with a potential predator, it fires its stings from poison sacks and the stinging cells latch onto the skin to leave a burn. The sting is painful and

can be dangerous to the few individuals who are particularly sensitive to them. In this species, even the body stings.<sup>10</sup> Caught jellyfish should be discarded in refuse bins as detached tentacles left on the beach remain capable of stinging for several weeks.

The effects of *Pelagia noctiluca* stings are usually limited to the skin causing erythematous, edematous, and vesicular topical lesions with local pain which persists for 1–2 weeks, and systemic complications or cutaneous superinfections.

Rarely, dramatic immediate reactions have been observed after *Pelagia noctiluca* stings and these include severe generalized allergy with bronchospasm, pruritus and postinflammatory hyperpigmentation. Immediate pain, distress and the occurrence of urticarial lesions and dyspnoea after massive stings have been reported. Stings may also leave scars and hyperpigmentation that may last for years.<sup>11</sup>

### Practice points

- Avoid the sun whenever and wherever possible.
- Drink lots of water and use protective clothing and sunblock.
- Alcohol and caffeinated drink exacerbate dehydration.
- Skin damage from solar exposure is cumulative.
- Only doctors should (cautiously) prescribe steroid containing eye drops.

There are no deterrents to jellyfish stings. Tentacles and wounds should also be rinsed with saline/sea water and not fresh water. Adherent tentacles should be gently lifted off with a towel or stick in order to prevent progressive envenomation. Heat worsens the burn so they should not be rubbed with sand. The most effective first aid treatment for the skin pain of jellyfish wounds is the use of cold packs. Cold packs should be applied to the stung area for fifteen minutes and then re-applied, if necessary.

In summary, while summer is fun, the potential for risky behaviour and for accidents and injury is higher, as individuals have more time for recreation and for leisure activities that they would otherwise not be able to perform. Care should be taken in order to avoid not only short term problems, such as jellyfish bites and painful sunburn, but also long term complications due, for example, to solar exposure, such as skin cancers.

### References

1. Buchanan N, Leisenring W, Mitby PA, Meadows AT, Robison LL, Hudson MM, Mertens AC. Behaviors associated with ultraviolet radiation exposure in a cohort of adult survivors of childhood and adolescent cancer: a report from the Childhood Cancer Survivor Study. *Cancer*. 2009 Sep 15;115(18 Suppl):4374-84
2. Dixon HG, Lagerlund M, Spittal MJ, Hill DJ, Dobbins SJ, Wakefield MA. Use of sun-protective clothing at outdoor leisure settings from 1992 to 2002: serial cross-sectional observation survey. *Cancer Epidemiol Biomarkers Prev*. 2008;17(2):428-34
3. Emmett A, Uchida T, Wagner RF Jr. Sunburn risk factors for beachgoing children. *Dermatol Online J*. 2008;15;14(1):28
4. Maddock JE, O'Riordan DL, Lee T, Mayer JA, McKenzie TL. Use of sunglasses in public outdoor recreation settings in Honolulu, Hawaii. *Optom Vis Sci*. 2009;86(2):165-6
5. O'Riordan DL, Steffen AD, Lunde KB, Gies P. A day at the beach while on tropical vacation: sun protection practices in a high-risk setting for UV radiation exposure. *Arch Dermatol*. 2008;144(11):1449-55
6. Bouchama A, Dehbi M, Mohamed G, Matthies F, Shoukri M, Menne B. Prognostic factors in heat wave related deaths: a meta-analysis. *Arch Intern Med*. 2007; 12;167(20):2170-6. Epub 2007 Aug 13.
7. Artieda J, Pineiro L, Gonzalez M, Munoz M, Basterrechea M, Iturzaeta A, Cilla G. A swimming pool-related outbreak of pharyngoconjunctival fever in children due to adenovirus type 4, Gipuzkoa, Spain, 2008. *Euro Surveill*. 2009 Feb 26;14(8). pii: 19125. Erratum in: *Euro Surveill*. 2009;14(9). pii: 19139
8. Centers for Disease Control and Prevention (CDC). *Pseudomonas* dermatitis/folliculitis associated with pools and hot tubs--Colorado and Maine, 1999-2000. *MMWR Morb Mortal Wkly Rep*. 2000 Dec 8;49(48):1087-91
9. Burnett JW, Calton GJ, Burnett HW, Mandojana RM. Local and systemic reactions from jellyfish stings. *Clin Dermatol* 1987;5:14-28.
10. Mariottini GL, Giacco E, Pane L. The mauve stinger *Pelagia noctiluca* (Forsskål, 1775). Distribution, ecology, toxicity and epidemiology of stings. A review. *Mar Drugs*. 2008;6(3):496-513. Epub 2008 Sep 4
11. Auerbach PS. Envenomations from jellyfish and related species. *J Emerg Nurs*. 1997;23:555-568