

Insect Bite Avoidance

Introduction

Several tropical diseases are transmitted by insects, such as malaria, yellow fever, and Japanese encephalitis. In some instances bite avoidance is the only means of protection, for example dengue.

Although both genders of some insects bite humans, it is the female who generally requires a blood meal in order for her larvae to develop.

Mosquitoes are primarily attracted by carbon dioxide, and then by heat and movement. They can detect carbon dioxide using their antennae.

Ticks usually live in long grassy areas and attach themselves to the clothing of a human as they brush past. From there they crawl up the clothing until they find an area of exposed skin.

Sand flies are found in many areas of the world and are most active between dusk and dawn. They will, however, bite during daylight hours if disturbed.

Tsetse flies inhabit the dense vegetation and savannah areas in sub-Saharan Africa, between 14°N and 29°S. They are attracted to dark, contrasting colours, particularly the colour blue.

Avoidance of Insect Bites

There are several methods of avoiding insect bites, both inside and outdoors.

Behaviour

- Insect bites can be reduced by avoiding highly infested areas. Many species of mosquitoes bite between dusk and dawn, so being indoors during these hours can reduce the number of bites. Tsetse flies are unaffected by repellents and can bite through tight fitting or loose knit clothing, therefore wearing loose or thicker clothing and avoiding infested areas are the best methods of protection.

Insect repellent

- There are many brands of repellent on the market, but evidence suggests that N, N-diethylmetatoluamide (DEET) based products are the most effective. DEET is available in a variety of concentrations for use on skin or clothing. A lower percentage concentration is recommended for use on the skin, whilst the higher percentage concentrations are best reserved for use on clothing. Concentrations of 20% have been shown to offer protection for 1-3 hours; higher concentrations provide longer-lasting protection, with concentrations of 30% found to persist for 6 hours.¹ This duration of protection appears to plateau at concentrations higher than 50%,² and therefore there is no need to use repellents with concentrations greater than 50%.

- A solution of no more than 20% should be used on infants and children, and avoided altogether in babies of less than 2 months of age. Manufacturers in the UK have applied their own age restrictions on use of DEET, and these should be followed. Particular care should be taken with children to ensure they are not able to ingest repellent.
- Repellents should be reapplied at regular intervals, especially in hot, humid conditions when they may be removed by perspiration, and after swimming.
- One small study found that the efficacy of DEET was reduced by the simultaneous use of sunscreen.³
- There have been some safety concerns regarding the use of DEET, but research suggests that it is very safe when used according to the manufacturer's instructions.
 1. Use only on exposed areas of skin
 2. Remove with soap and water when the repellent is no longer required.
 3. Do not spray directly on the face and wash hands after application to avoid contact with lips and eyes.
 4. Do not apply to cuts, abrasions or irritated skin.
 5. Sunscreen that contains repellent should be avoided as it may encourage excessive use of DEET.
- Natural repellents are available for those who prefer not to use chemical- based products, but only offer a short duration of protection against mosquitoes. The manufacturer's instructions should be followed when applying these products to babies and infants.

Clothing

- When travelling in malarial areas it is advisable to wear long trousers and long sleeves in the evenings as malarial mosquitoes are most active at this time.
- When in tick infested areas, trousers should be tucked into socks to prevent them from crawling up the legs.
- Some studies suggest that mosquitoes may be attracted to darker colours and recommend the wearing of light coloured clothing. Mosquitoes are able to bite through tight clothing, so travellers should wear loose fitting garments.
- Clothing can be treated with insect repellent or a specially designed insecticide such as permethrin; this can be particularly useful in avoiding tick bites.

Screening and mosquito nets

- Travellers who will be staying in basic accommodation should consider sleeping under a mosquito net to avoid being bitten at night.
- Nets should be impregnated with permethrin, which most are prior to purchase.
- Permethrin is a contact insecticide, which will kill insects landing on the net and therefore increase the effectiveness.
- Travellers should consider carrying a small sewing kit so that minor repairs can be made if the net develops a hole.

Knock down sprays

- These can be used before retiring for the night to rid sleeping areas of insects.
- Plug-in devices are also available which release an insecticide vapour, as do insecticide coils which are burned.
- Coils should only be used in well-ventilated areas and can be useful for campers. A small piece of the coil lit under the table can be a useful deterrent when dining at outdoor restaurants.

Vitamin B and garlic

- There have been recent suggestions that taking vitamin B complexes and garlic can make a person less attractive to mosquitoes. There is no scientific evidence that this is the case.

Buzzers

- Devices that emit a sonic tone inaudible to humans have been proven to be ineffective and should not be used.

Treatment of Insect Bites

Insect bites generally appear as small, red, raised areas that are very itchy. Any local swelling can be reduced by the topical application of a mild steroid cream. Antihistamine tablets can be taken to relieve itching. Mosquito bites should not be scratched and should be kept clean and dry to avoid the risk of infection.

Ticks need to be removed from the skin very carefully. This can be done using a pair of tweezers or specially designed tick removers. Grasp the tick near to the skin and pull whilst twisting it slightly. It is important that the whole tick is removed without leaving any mouth parts embedded in the skin.

Availability of Repellents and Nets

Many travel clinics and pharmacies stock a range of insect repellents and mosquito nets, or they can be purchased from camping and outdoor shops.

References

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3. Montemarano AD et al. Insect repellents and efficacy of sunscreens. The Lancet 1997;349:1670-1 cited in Mark S, Fradin MD Mosquitoes and mosquito repellents: a clinician's guide. Annals of Internal Medicine 1998;128:931-40

Reading List

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