



CLINICAL PRACTICE

# Ear-invading arthropods: A South African survey

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Insects and other small arthropods may enter people's ears quite easily. Usually this causes minor annoyance, but the arthropod's movements within the ear canal and against the sensitive tympanic membrane can be both distressing and painful. The offending creature may cause ear canal lacerations, otitis externa or tympanic membrane perforations itself, or clumsy injudicious attempts at its removal may cause additional injury.<sup>1</sup> It may be necessary to refer such patients to an otorhinolaryngologist, who will usually remove the insect using a microscope, often under general anaesthetic in the case of young children.

To our knowledge there has been no study to identify a series of insect and arachnid foreign bodies scientifically, and there certainly has been no series from Africa. We therefore decided to assemble a collection of arthropods for more detailed analysis. The results were first published in an entomological journal,<sup>2</sup> but are repeated here in modified form for a medical readership.

A study comparing the efficacy of previously recommended chemical substances to kill insects in the ear before removal found that microscope oil killed American cockroaches most quickly – average time 27.2 seconds.<sup>1</sup> Another study showed that ethanol killed American and German cockroaches most quickly, in 32.6 and 29.6 seconds, respectively.<sup>3</sup> Two per cent lidocaine has also been recommended, but does not kill the insect as quickly and may cause vertigo if there is a tympanic membrane perforation.<sup>4,6</sup>



## What we did

During a 2-year period (July 2001 - June 2003) Tygerberg Hospital staff were asked to place all invertebrates removed from the ears of patients into vials, labelled with as much information as possible. The usual techniques adopted for the extraction of arthropods were removal with the aid of a microscope, using crocodile forceps, suction or syringing.

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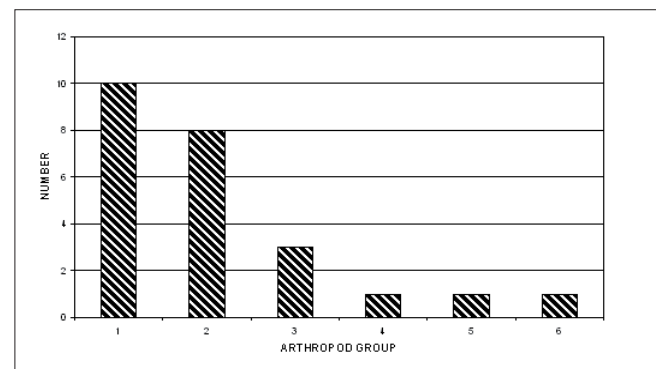


Fig. 1. Histogram showing the number of different kinds of arthropods removed from the ears of patients presenting at the Outpatients Department at Tygerberg Hospital between July 2001 and June 2003. 1 = Blattodea (cockroaches); 2 = Diptera (flies); 3 = Coleoptera (beetles); 4 = Hemiptera (bugs); 5 = Lepidoptera (moths); 6 = Acarina (ticks).



**Table I. Arthropoda recovered from the ears of patients at Tygerberg Hospital, arranged alphabetically according to Order**

Sample	Order	Family	Genus/species	Supporting information (comments)
1	Acarina	Ixodidae	<i>Rhipicephalus sp.</i>	
2	Blattodea	Blattellidae	<i>Blatella germanica</i>	
3	Blattodea	Blattellidae	<i>B. germanica</i>	
4	Blattodea	Blattellidae	<i>B. germanica</i>	
5	Blattodea	Blattellidae	<i>B. germanica</i>	
6	Blattodea	Blattellidae	<i>B. germanica</i>	'A year old boy. Insect crept into ear while sleeping ca. 09:00'
7	Blattodea	Blattellidae	<i>B. germanica</i>	'At night while sleeping Jan 03'
8	Blattodea	Blattellidae	<i>B. germanica</i>	'2 year old boy – crawled in at night 1 week before removed'
9	Blattodea	Blattellidae	<i>B. germanica</i>	'Crawled in @ night 2 a.m. Jan 03'
10	Blattodea	Blattellidae	<i>B. germanica</i>	'Crawled in at night while asleep 06/12/02'
11	Blattodea	Blattellidae	<i>B. germanica</i>	'11/02/03 crawled into ear in early hours of morning'
12	Coleoptera	Anobiidae	?	
13	Coleoptera	Elateridae	?	
14	Coleoptera	Scarabaeidae?	?	(Badly damaged specimen)
15	Diptera	Muscidae	?	
16	Diptera	Muscidae	?	
17	Diptera	Muscidae	?	
18	Diptera	Muscidae?	?	(Only fragments preserved)
19	Diptera	Muscidae?	?	(Only fragments preserved)
20	Diptera	Muscidae	?	'4 year old boy'
21	Diptera	Muscidae	?	'28 year old prisoner with mastoid cavity'
22	Diptera	Sarcophagidae	?	'10 year old 14/04/03'
23	Hemiptera	Reduviidae	<i>Pirates sp.</i>	
24	Lepidoptera	Tineidae?	?	(Badly damaged specimen)

## What we found

Twenty-four arthropods were collected (Fig. 1). All useful data relating to the samples are presented in Table I. Unfortunately the general condition of recovered specimens made their identification beyond family level difficult. Specimens were often crushed, and in some instances only a few fragments were preserved.

## Discussion

Of the 24 specimens collected, 10 (42%) were German cockroaches (*Blatella germanica* (Linnaeus, 1767)), 8 (33%) flies (mostly Muscidae), and 3 (13%) beetles (three different families). Single specimens (each representing about 4% of the total sample) of three other groups of arthropods were found (Acarina, Hemiptera and Lepidoptera). A possible confounding factor is that it is not known whether other species may be easier to remove in peripheral clinics or by GPs, or indeed may extricate themselves.

**Blattodea.** All 10 cockroaches encountered in the present study were *B. germanica*, a small cockroach and the most common household pest species in South Africa.<sup>7</sup> It is known to enter human ears.<sup>8</sup> Although our study is apparently the first to be conducted in Africa, the results confirm the findings of previous investigations conducted elsewhere in the world. Baker<sup>3</sup> reported that 21 of 27 insects (78%) in the ears of

children were cockroaches, while a review by Antonelli *et al.*<sup>4</sup> records 18 cockroaches (49% of records), 3 beetles, 1 bee, 1 spider, and 14 unspecified. Cockroaches usually enter the ears of people (mostly children) at night while they are asleep. The service area of Tygerberg Hospital includes a relatively economically impoverished community where control of household pests may be inadequate, and many people live in overcrowded conditions, adding to the likelihood of an insect crawling into an ear.

**Diptera.** Seven of the 8 dipterans (flies) recovered from ears were Muscidae, while the 8th was a small sarcophagid (flesh fly). Although species identifications were not attempted, it is highly probable that the muscids were common household species like the ubiquitous *Musca domestica* (Linnaeus, 1758). The flies were found mostly in infected ears or infected mastoid cavities.

**Coleoptera.** Specimens representing three different families were recovered from ears. Adult elaterids (click beetles) and scarabaeids (chafer beetles) are commonly attracted to lights and are therefore encountered in dwellings at night. It is probable that these insects, like the cockroaches, also entered the ears of sleeping individuals at night. Anobiidae (death watch beetles) are small wood-boring insects that may be very common in buildings, especially where untreated wood has been used for building or where wood is used as fuel for cooking or heating purposes.



**Hemiptera.** The single hemipteran encountered in this study was a species of *Pirates* (Reduviidae). These assassin bugs are also attracted to light and are therefore commonly found in houses at night.

**Lepidoptera.** The single lepidopteran encountered in this study was a badly damaged adult clothes moth (Tineidae). These are common household pests.

**Acarina.** The only non-insect arthropod recovered during this study was an adult hard tick (Ixodidae) of the genus *Rhipicephalus*. One of the most commonly encountered species is the cosmopolitan kennel tick, *R. sanguineus* (Latreille, 1806). These ticks normally live in dwellings where domestic dogs are found<sup>9</sup> and emerge at night. They are known to crawl into dark places at dawn, which may explain why the tick was found in an ear. Ear-invading ticks are more problematic than many other arthropods as they are resistant to being killed by the agents tested for this purpose.<sup>4</sup>

Insects in the ear canal should be removed with care, after initially killing them with oil, using appropriate instruments

and good lighting, lest injudicious attempts at removal cause additional injury. Should removal prove difficult, referral to an otorhinolaryngologist is advised.

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An eHealth Education Centre is to be launched at Mdantsane this year. It will be located at Cecilia Makhiwane Hospital, which is part of the East London Hospital Complex. Once implemented, it will be the first of its kind in Africa.

Information and communication technologies will be harnessed for the benefit of the people of the Eastern Cape, putting scarce specialised medical care within reach of even the poorest and most rural communities.

## Eastern Cape - breaking new ground in Telehealth

News of the development was heralded with much fanfare at the eHealth Conference hosted by the Walter Sisulu University of Science and Technology (WSU) and the Eastern Cape Department of Health, from 21 – 24 February 2006.

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