

Poster number PO15.02

Myths and facts from

The Chamber of Horrors

of Travel Medicine

Gunnar Hasle, MD, Reiseklinikken - Oslo Travel Clinic, St Olavs plass 3, 0165 Oslo
For reprint: <http://www.reiseklinikken.no/horror.html>

Quicksand, sharks and pirates have a significantly greater appeal to the public than mundane statements about the dangers of alcohol, motor vehicle accidents and HIV. I often get questions that are undoubtedly inspired by Tarzan books or movies like Indiana Jones and James Bond. Tropical medicine has provided novelists with unlimited ideas of what you might encounter in tropical regions.

Quicksand



Scene from David Lean's movie "Lawrence of Arabia" (Horizon/Columbia pictures).

Quicksand and quick clay are a tixotropic gel made up of water, salt and sand or clay, which becomes liquid when you tread on it. You will not be sucked down. The mixture is heavier than water and your natural buoyancy will ensure that you are able to stay afloat and paddle forwards. However, extracting yourself may take time, and come high tide, you may well drown. Quicksand and quick clay are more common in temperate than in tropical zones. They do not represent a significant risk for travellers!

Dry quicksand, as seen in the film "Lawrence of Arabia", is sand that is so loosely packed that you sink in it. A research team let sand settle in an upward airflow, resulting in a packing fraction of 41%. Comparatively light objects could be made to sink in this sand (Lohse et al. Nature 432, 689 - 690 09 December 2004). The authors could not rule out the possibility that this phenomenon might occur in nature, and represent a danger to humans.

Shark attacks



Typical shark-bite. The shark has taken a large piece of the thigh. Photo: Dr. Kenneth W. Kizer

More people die as a result of being swept out to sea by waves while fishing on the seashore than from shark attacks. However, shark attacks are far more spectacular, and the problem is increasing. Sharks don't normally attack humans. Like other animals, they eat what they are used to. If a shark attacks a human being every effort will be made to hunt it down and kill it. The shark species known to attack humans are the White, Tiger and Zambesi sharks. The latter is usually found in estuaries, and is known to swim several kilometres up-river. Sharks will normally initially inflict a serious bite, and then wait nearby. As a result, many people survive shark attacks. The shark may bite out of a sense of curiosity (as when you drop a small piece of plastic into an aquarium), or the attack may express territoriality. It may attack simply to eat. The diet of species of shark dangerous to man includes seals, which in terms of size are similar to humans. When a shark has bitten a seal, it will often wait until the victim is dead. Generally, even the man-eating shark species will not attack if you are swimming together with them. However, there are accounts of situations in which sharks have become accustomed to a diet that included humans: At *Isle de Diabole*, the French prison settlement off the coast of French Guyana, funerals were performed by throwing the dead prisoners into the sea. And the sharks were there. This, of course, made escape from the island difficult. When Denmark/Norway traded slaves in West Africa (in what is now known as Ghana), slaves frequently jumped into the sea in a bid to escape. The Danish priest Monrad described the activity of the sharks as being "like carp in a carp-pond".

It is argued that sharks are not evil creatures, which of course they are not. For a shark, eating a man is not an evil act. In South Africa snorkelling and diving is organised among Tiger sharks and Zambesi sharks, without protective cages. The sharks are attracted with the aid of food. The fact that no accidents have occurred so far does not make this a safe

pastime. Some divers say that if you stay calm and look into the sharks' eyes, they will not attack. There is no scientific basis for this myth. It is highly unlikely that the outcome of a shark encounter will depend on your behaviour rather than on the shark's temper, previous experiences and hunger. Snorkelling among Orcas, as they do in Tysfjorden in Norway comes under the same category. These animals are not related to sharks, but are fully capable of tearing a human being apart within a few seconds.

Crocodiles



I photographed this picture in the aquarium in Hartbeespoort, South Africa. Unknown photographer.

In Africa, Nile crocodiles kill about 1000 people every year. Crocodiles rarely kill white people; usually the victims are local people taken on the shores of rivers.

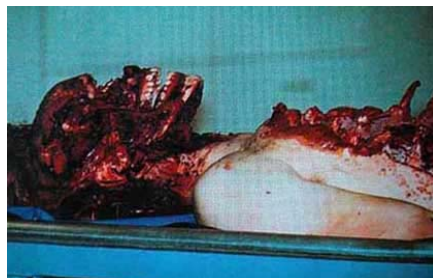
The Australian saltwater crocodile is a close relative of the Nile crocodiles, and just as dangerous. However, they don't live that close to humans, and are therefore less likely to kill people. Dangerous crocodiles are also found in India (Mugger crocodiles) and in the Caribbean. Black caimans in the Amazon are also dangerous. Nile crocodiles are the only crocodiles that cause significant numbers of deaths among humans.

The largest Nile crocodiles can weigh up to 1200 kg and are capable of speeds of up to 30 km/h under water. They can also move very quickly over short distances on land. It can be fatal to underestimate the speed of a crocodile on land. They can turn rapidly, and knock a man off balance with swipe of the tail.

They are capable of leaping half their body length out of the water and snatching prey standing on the shore, or on a branch. They can remain submerged for two hours without breathing, and then burst out of the water. They can also drift under water on the current for the last few meters before they attack. To the untrained eye they are invisible at depths of 20-30 cm. The crocodile is able to detect very small movements on the surface, such as when an animal comes to drink, and an attack follows. Even in small streams, alertness is essential in crocodile areas, since they may conceal surprisingly large crocodiles. When a crocodile has taken hold it will pull the victim under water and roll around, thereby drowning and tearing apart its victim.

It is fascinating that an animal order can remain almost unchanged for 200 million years. Crocodiles emerged as long ago as in the Triassic period, and ate dinosaurs. The combination of their ability to live for a year without food, an unbelievable camouflage and a speed that exceeds our wildest imaginings has proved efficient. Incidentally, many people don't know that crocodiles are very watchful parents. The eggs are buried and the parents guard them until they hatch. When a baby crocodile needs to be moved, an adult will carry it gently in its jaws.

Big cats



Cougar victim. The big cats eat soft tissue, not the skeleton. Photo: Dr. Ben Galloway

Jaguars and cougars very rarely kill humans, although they are fully capable of doing so. Tigers kill 600-800 people every year, lions and leopards about 400 each. The big cats almost never kill tourists. Their victims are local people who live close to their habitats. Outside the national parks wild animals are usually very afraid of humans. When a wild animal starts to kill people it

will be hunted and eliminated as soon as possible. In the parks, the animals are far less afraid of man, and the safest option is to stay in the car, in securely fenced areas or together with an armed ranger. The rangers will often know where the lions are, and will demonstrate how to avoid direct confrontation. It is not unusual for people who enter for example the Kruger National Park without protection to be killed. Some people go looking for this kind of risk: the annual Kruger marathon is a good example of this. A good tip if you choose to take part in this insanity is to stay in the middle of the field. Lions will concentrate on stragglers!

Would Tarzan have had any chance in a fight with a lion or a leopard, armed only with a knife? Unlikely. You would at least need a spear to keep the animal at bay. An interesting question is: what is the best option if a large carnivore attacks? If an animal attacks to protect its cubs, then fleeing could be sufficient, or you could throw yourself to the ground with your face down, and try to protect your neck with your hands. However, if the animal is attacking for food, then playing dead is not an option, it might well be prepared to eat a carcass. The only option in this case is to fight back: beat it with any tool that comes to hand, throw stones, try to poke the animal in the eye with a finger. In many cases lions have retreated when several people have joined in the attack. In the case of a lion attack one should definitely try to help the victim of the attack. Unfortunately, when it comes to leopards they will try to injure as many people as possible in this type of situation.

Why are we so fascinated by lions, crocodiles and Tyrannosaurus rex? We model toys for small children on the most dangerous animals, and Walt Disney make movies and cartoons about them. Certainly lions are beautiful, but not more so than, say, antelopes. It is the fact that lions are dangerous that so fascinates children and adults alike.

There are many things that are hard to understand. For instance, there is a temple in Thailand where tigers, humans and other animals live together peacefully. Nobody should be surprised, however, if one day one of these tigers kills one of the monks, or a tourist.

Candirú



Dr Anuar Samad removed a Candirú from a man with a forceps in 1997. Photo: Anuar Samad.

This is a catfish, *Vandellia cirrhosa*, which is found in the Amazon. It can enter the urinary tract of human beings and suck blood. This is said to be immensely painful. If you swim naked and urinate in the water the candirú can find its way in.

The fish is transparent, and virtually invisible in the water. It is not rare, although attacks on humans are. There is only one recent report of a man being invaded by a candirú, published in Portuguese: Anuar Samad: *Incrível causa de Uretrorragia!* Arquivos Ellis 2004 1:2; 13. Normally these fish survive by sucking blood from the gills of larger fish. Their fame can be attributed to the fact that they are what the media call "sexy news".

Snakebites

Snakes kill 30-50000 people every year. We have an instinctive fear of snakes, partly wrapped up in religious concepts. As a result, countless harmless and endangered snakes are killed all over the world.



Cobra bite to a leg. The soft tissue is digested by enzymes in the snake venom. Photo: H.A. Reid. From Peters and Gilles: A colour atlas of tropical medicine. Wolfe medical publications ltd. 1977

Snake venoms contain a cocktail of components, to kill and digest the prey. The venoms of different snake families have different modes of action. Elapids, such as cobras, have venoms that act as neurotoxins locally (see photo), while viper venom causes vasculitis (inflammation of the blood vessels). The venoms of Australian snakes and sea snakes contain a myotoxin, which causes paralysis and lysis of the muscles. A

good first aid tip in Australia, or after being bitten by a viper would be the application of a pressure bandage and immobilisation of the affected limb. This is not necessarily good first aid after a cobra bite, as the local affect of the venom might be more severe if it is isolated locally. On the other hand, cobra venom has components that cause neurological paralysis, and this might be delayed by immobilisation.

Filariasis/Elephantiasis

When Thor Heyerdahl and his young bride Liv travelled to the Fatu Hiva in the Marquesas Islands they found a paradise of jungle, beaches and coral reefs. They ate fish, pork, mussels, coconuts and various fruits brought there by the Polynesians. In short, everything an adventurous young couple could desire. But Heyerdahl noticed that the local people had elephantiasis.

Different types of filariasis attack humans. Lymphatic filariasis causes elephantiasis. The adult worms live in the lymph nodes, especially in the groin, and block the drainage of the lymphatic fluid. The result is lymph oedema. In extreme cases, as in the picture, enlarged limbs and thickened, cracked skin results. The disease is transmitted by mosquitoes (*Aedes* sp.). The condition is diagnosed by finding microfilariae in the blood. These are the larvae the mosquitoes ingest, and they develop further in the mosquitoes before they being transmitted to a new host. We have medicines that can kill the microfilariae, but not the adult worm. The worm lives for many years, and the lymph oedema does not recede.



Elephantiasis:
Lymphoedema in
lymphatic
filariaisis.
Courtesy
www.lepra.org

Other types of filariasis are loa-loa and river blindness. The adult loa-loa doesn't settle in a lymph node, but migrates around the body, causing local symptoms where it passes. It is most dramatic when passing the eyes, and may be seen as a 3-4 cm long worm creeping under the conjunctiva.

Loa-loa is transmitted by *Chrysops* sp., a type of fly that bites and licks blood. It has been speculated that these insects may also transmit hepatitis B and HIV, by direct transmission of blood, but this has not been proven, and the recognized paths of transmission can fully explain the distribution and dispersal of hepatitis B and HIV.

It is important to protect oneself against insect bites when staying in the tropics. As regards river blindness, loa-loa and lymphatic filariasis, it seems that long and extensive exposure is needed in order to contract the diseases, although in principle one single worm is enough to contract filariasis. This indicates that the efficacy of the transmission is low, and the risk for an ordinary tourist is remote. But we understand Heyerdahl's fear, and it was probably partly because of this that they gave up their project of returning to nature.

To what extent is leprosy contagious?

When Armauer Hansen found the leprosy bacillus by microscoping tissue from a skin biopsy taken from a leprosy patient, he was the first person in the world to point out a micro organism that could cause a disease. The director of the leprosy hospital, and Hansen's father-in-law, Daniel Cornelius Danielsen, was of the view that these things were too small to have any significance. Danielsen claimed, until his death, that leprosy was an inheritable and not a contagious disease. Armauer Hansen later lost his licence after trying to transfer the disease by inoculating leprosy bacilli into the eye of a healthy person (fortunately without success!).

I worked for three months at Armauer Hansen Research Institute in Addis Ababa as a student in 1980-81, and I also had teaching practice at the leprosy hospital there. It was proved by lymphocyte transformations test that I had immunity against the disease, indicating that I had been exposed to the bacillus, without contracting the disease. The same has probably happened with thousands of volunteers working with leprosy patients. Leprosy has a clinical spectrum ranging from what are known as lepromatous patients, who don't have any traceable specific immunity against the leprosy bacteria, and lots of bacilli in the skin, to the so-called tuberculoid leprosy, where there are strong immune reactions, and no visible microbes. It is the immune reactions that damage the nerves; this leads to loss of feeling in the skin, resulting in increased risk of wounds and wound infections. Chronic osteomyelitis may lead to amputations.

A lepromatous patient can probably spread the bacilli by droplets in the air, and is therefore highly contagious. Burned-out leprosy patients, often severely handicapped, as you meet them as beggars on the street are probably not contagious at all. Even if you are heavily exposed to leprosy bacilli the risk of contracting the disease is almost zero. Armauer Hansen made

one of the most important discoveries in the history of medicine. But Danielsen was also right: inheritable factors and general constitution determine whether you will contract leprosy or not.



Sequelae of leprosy. A nurse cares for a foot with chronic osteomyelitis at the Green Pastures hospital in Pokhara, Nepal. Photo: Gunnar Hasle

When in the movie "Ben Hur", we see the hero enter the valley of the lepers to visit his mother and sister we can still admire his courage: he *thought* he could contract the disease. But there was really no danger.

Diagnostics were undeveloped in biblical time, and it is by no means certain that the people said in the Bible to be leprosy really suffered from the disease we today call leprosy. Historians concluded this after the microorganism *Mycobacterium leprae* was discovered.

Pandemics



Japanese tourists in Turkey, spring 2006, in fear of sunlight and airborne contagions. Photo: Gunnar Hasle

It is far from certain that the Black Death was caused by *Yersinia pestis*, as the textbooks tell us. *Y. pestis* is a microbe that was discovered by Alexandre Yersin during an epidemic of bubonic plague in China 1894-1897. But we have no microbiological samples from Europe from the years 1347-1350. Susan Scott and Christopher Duncan have written a thrilling book, "The return of the Black Death", in which they claim that the Black Death was probably a viral haemorrhagic fever with a long incubation time, a disease that no longer exists. Their arguments seem convincing: The symptoms described by eyewitnesses from 1347-1350 do not match the symptoms of plague, as we know it today. Based on church records, which are thought to be reliable, they found that the incubation time must have been about three weeks, while it is just a few days for plague. Rats and rat fleas are absolutely necessary for plague to spread, and according to the authors rats did not exist in England in the 14th Century. The defenders of established knowledge maintain that the symptoms and mortality rates associated with plague may have changed since then; that it is impossible to calculate the incubation time when a disease is transmitted through rats; and that there undoubtedly were rats in England at that time. The discussion was apparently settled when Didier Raoult found *Y. pestis*-DNA in teeth from people who died during a plague epidemic in Marseille in the 16th Century, but when the material was retested in England they found nothing. Furthermore, this was from an epidemic two hundred years after the Black Death, and may well have been another disease. Maybe the agent of infection exists somewhere. The big question is: If the Black Death emerged again, would we be worse or better off than our forebears were in the 14th Century? The answer is by no means simple. We have technology to enable us to sequence the genome of a new pathogen within a few days, we could make antiviral drugs, and later even vaccines. But at the outset of a pandemic none of this would help us. And while the Black Death was spread by ship, by foot and on horseback over a three-year period, a modern pandemic could be spread by airplanes all over the world before we even knew it existed.

Anyway, humans have to live with the threat of new epidemics. We had a serious reminder of this during the SARS epidemic, which was stopped by means of careful measures implemented by health authorities all over the world, and a portion of good luck. The threat of avian flu is far from over. From a travel medicine point of view there is not much we can do before an epidemic has begun, but in periods with extensive media coverage of this issue we receive numerous questions from people seeking advice on whether they should travel to an endemic country or not. My answer would be that what a single person does or does not do matters very little: If a pandemic emerges and bird flu is transmitted from person to person, you

would be no safer in Europe or in the USA than in Vietnam or Indonesia. However, travellers may be included in drastic quarantine measures. Airports may be closed, and the passengers may be isolated for several days.

Pirates

We think of pirates from the past with horror and fascination. The romantic aura surrounding piracy in Captain Kidd's time emerged from the desire for freedom. Discipline on British ships was hard. The captain could sentence people to death. Nobody talked about human rights, neither on ships nor ashore. On a pirate ship democracy prevailed. The crew could "legally" dismiss the captain at any time. Life as a pirate was dangerous, but free. Pirate captains did put on fancy, nice clothes (probably robbed from their victims), like Captain Hook and Jack Sparrow do in the movies.

There is nothing romantic about today's pirates. The problem is at its greatest in Indonesia, especially in the Straits of Malacca, but also in Africa and South America. The economic losses attributable to piracy are between 13 and 16 billion US\$ per year. The number of pirate attacks increased threefold in the period 1993-2003, according to Wikipedia. Pirates generally attack commercial ships, but yachts are also exposed.

What is the best option if pirates attack your yacht? Probably nothing other than to give the pirates what they want, and hope that they will spare your life. If you carry firearms on a yacht they have to be registered in every harbour, and they often have to be deposited until you leave the country. If you don't manage to scare away the pirates with a warning shot, they are likely to shoot to kill you. You would need to be extremely tough, and an expert shot, to improve your chances of survival by using a firearm.

Compared to the number of yachts in the world pirates kill very few yachtsmen, but this is an increasing, and possibly under-reported, problem.

Cannibalism

This is the ultimate horror vision of travel medicine, well known from novels: Is cannibalism a threat? We have to make a distinction between: 1. Cannibalism as a part of a culture. 2. Cannibalism under extreme hunger conditions. 3. Cannibalism committed by mentally disturbed persons. Although 2. and 3. occur, but they will not be discussed here.

Stories of tribes that eat humans are a result of the need of colonisers to legitimate their conquests of other cultures. In fact, there are very few (if any) descriptions of reliable eyewitness reports of people that under normal circumstances eat other humans. The famous Carib people were reputed to be cannibals, but doubt has later been cast on this theory. The Disney Corporation has been criticised for scenes in "Pirates of the Caribbean", in which the Carib are portrayed as cannibals. Remnants of this people reportedly still live uncontacted on the border between Venezuela and Guyana. In any event, there are sound reasons for not visiting them, they have nothing to gain from contact with our civilisation.

It is very probable that in the past cannibalism was a culturally accepted act among some peoples on Papua New Guinea. Kuru is a human variant of "Mad cow disease" and was common among some New Guinean tribes. It was because of the link between cannibalism and kuru that the cause of prion diseases was discovered. The Korowai of Papua New Guinea is the only known tribe that today possibly practise cannibalism, although there is some doubt about this.



This drawing by the Swedish artist Robert Högfeldt (1894-1984) reminds us that when you buy sex you are entering the arena of organized crime, and that humans are the most dangerous of all animals, two of the most important take-home messages in travel medicine.

It also shows the western world's concept of foreign cultures.