

Scorpion stings and venoms

The term scorpionism is the medical term used to describe the syndrome of scorpion stings. We focus here on the thick-tailed scorpions in the family [Buthidae](#), which are the most dangerous scorpions in South Africa (See [Dangerous scorpions: how to identify them](#)). Find out here about [how to prevent being stung](#), the [signs and symptoms of scorpionism](#), and [scorpionism management](#).

Introduction

In South Africa we are fortunate to have a fascinating and diverse scorpion fauna and yet a low incidence of scorpionism, unlike areas in the south-western U.S.A., Mexico, east-central South America, north Africa, the Middle East and India where the incidence of serious scorpion envenomation is high. Worldwide, there are about 100,000 cases of scorpion envenomation resulting in approximately 800 deaths per year. Locally more than 95% of cases of scorpionism results in no more than local pain lasting from several minutes to about 4 hours with most of the Ischnurid stings resulting in no more than a pin prick. In South Africa there are only 1 to 4 deaths a year resulting from *Parabuthus* envenomation (nothing in comparison to car, crime, sport or health related deaths).



[Parabuthus capensis](#). [image [N. Larsen](#) ©]



[Parabuthus transvaalicus](#). [image [L. Prendini](#) ©]

A case study of 42 serious scorpion envenomations, occurring in western Cape over 5 summers (1986/7 to 1991/2), recorded 4 fatalities of children. *Parabuthus granulatus* was found to be the main culprit, responsible for 3 deaths. *Parabuthus capensis* was the alleged culprit of the fourth death but as the specimen was lost it cannot be verified. *Parabuthus transvaalicus* is the major cause of serious scorpion envenomation in Zimbabwe with recorded cases of death. *Parabuthus mossambicensis* has also been implicated in cases of serious envenomation. All *Parabuthus* and especially *P. kalaharicus*, *P. schlechteri* and *P. villosus* must be regarded as potentially lethal.

The reason for the high number of envenomations by *Parabuthus granulatus* is probably due to its habit of actively foraging unlike most scorpions' sedentary ambush strategy. October to March is the period when most stings occur, with a peak in January / February, with about 75% of stings occurring at night. The victims are usually stung on the foot due to open footwear or no footwear. Scorpions are a greater problem in the north-western Cape than snakes.

All scorpions possess a neurotoxic venom that affects the central nervous system but there are some exotic species with cytotoxic venom. Less than 5% of stings result in signs and symptoms requiring medical attention. The non-Buthidae families normally result in no more than a mild to intense pain at the sting site with possible mild local inflammation (swelling and redness). The family *Ischnuridae* with its thin tail and small stinger can hardly penetrate the skin although some of the larger species can execute a mild to painful sting.

Scorpions, as with spiders and snakes, voluntarily deliver venom that is expelled by 2 muscles surrounding the venom gland in the vesicle. Sometimes, the animal can deliver a dry sting and the victim, due to sheer hysteria, can show false signs and symptoms. The depth of the sting will also determine the severity of the envenomation as will the health and size of the victim. The effects of a sting can be reduced if delivered into a bony area or thick clothing can prevent venom entering soft tissue below the skin. A deep sting into a fleshy area will result in more severe symptoms.

Scorpions, like spiders and snakes, do not make good pets and invariably succumb to neglect. The scorpion becomes stressed with continual handling and prodding and may end up stinging its keeper when he picks it up to impress his friends. If they are to be kept, only those who know and understand them should keep them.

How to prevent being stung by a scorpion

1. Wear protective footwear especially at night.
2. Exercise caution when lifting rocks, logs and when collecting firewood.
3. Do not handle scorpions with bare hands.
4. When camping try not to sleep directly on the ground.
5. Shake out footwear, clothing and bedding to expel unwanted creepy crawlies.
6. Learn how to distinguish a highly venomous scorpion from a harmless one and the area they occur in.

Signs and symptoms of scorpionism

The severity of envenomation depends on various factors such as the health and age of the victim, the sting site and species, size and degree of agitation of the scorpion. A person with heart or respiratory problems will be at greater risk. Some or all of the following signs and symptoms may result.

1. Immediate and intense, burning pain at the sting site that lasts about 30 minutes. Mild inflammation may be present, with the sting mark not always visible.
2. Signs and symptoms only develop after 30 minutes and sometimes only after 4 to 12 hours, increasing in severity over the following 24 hours. The pain can be local as well as distal with abdominal cramps.
3. Paraesthesia, an abnormal sensitivity, includes a burning sensation and pins and needles usually in the hands, feet, face and scalp.
4. Hyperaesthesia, an excessive sensitivity of the skin to clothing and bedding with the patient even sensitive to noise.
5. Ataxia, a lack of muscle coordination with a stiff legged or drunken walking action. Involuntary movements, tremors and muscle weakness.
6. Tachycardia, an increased pulse rate of 100 to 150 bpm for *Parabuthus granulatus* and below 55 bpm for *Parabuthus transvaalicus*.
7. Raised blood pressure in *Parabuthus granulatus*. Normal in children but raised in some adults in *Parabuthus transvaalicus* cases.
8. Dysphagia, a difficulty in swallowing especially with *Parabuthus transvaalicus* and excessive salivation.
9. Dysarthria, a speech difficulty.
10. Excessive perspiration in *Parabuthus transvaalicus* cases.
11. Headaches, nausea, vomiting and diarrhea.
12. Ptosis, patient has droopy eyelids.
13. Restlessness and anxiety is a prominent feature seen in children with *Parabuthus granulatus*. Hyperactivity and infants crying for unexplained reason.
14. Urine retention.
15. Respiratory distress is a major complication and can result in death.

Differential diagnosis

The following possibilities must be considered when making a diagnosis: Alcohol withdrawal, Botulism, Diphtheria, Drug overdose, Encephalitis, Guillain-Barré syndrome, Hysteria, Meningitis, Myasthenia gravis, Myocardial infarction, Organophosphate poisoning, Poliomyelitis, Subdural haematoma, Tetanus.

Scorpionism management

Do's.

1. First aid treatment is the application of a cold compress, if the hyperaesthesia will allow and an analgesic (Asprin, Paracetamol) to relieve pain and transport to a hospital.
2. Monitor cardiac and respiratory functions and treat as required.
3. Patient with systemic symptoms, especially children and the elderly must be hospitalized for 24 to 48 hours.
4. Immobilize and clean wound.
5. Antivenom must **only** be administered in the case of severe systemic envenomation.
6. Antihistamine and steroids only to be administered in cases of allergic reaction to antivenom. In the event of anaphylactic reaction, which must always be anticipated, administer adrenaline.
7. Atropine may be administered in cases of confirmed *Parabuthus transvaalicus* envenomation to control excessive secretions.
8. Intravenous administration of 10 ml of 10% calcium gluconate IV over 10 to 20 minutes may provide relief from pain and cramp, but is only effective for 20 to 30 minutes.
9. Administer a tetanus toxoid to prevent infection.
10. Envenomation of the eyes must be flushed with water or any bland fluid (milk, urine). In severe cases antivenom can be diluted 1 to 5 or 1 to 10 with water.

Don'ts

1. Do not use traditional remedies such as incisions, suction, tournique or the application of ointments.
2. Do not use alcohol as it will only mask any symptoms.
3. Do not administer antivenom if no signs or symptoms of severe envenomation presents itself.
4. Do not administer spider or snake antivenom.
5. Do not administer atropine to reduce salivation in the case of *Parabuthus granulatus* stings as it may lead to unopposed adrenergic reaction.
6. Do not administer barbiturates, opiates, morphine or morphine derivatives as this could greatly increase convulsions and cause respiratory distress.

Research on local venomous species

Research in the Western Cape was done to improve the treatment for victims stung by Buthidae scorpions as it was felt that the treatment previously administered was not very effective. Eventually the scorpions responsible for the stings were obtained when patients were stung and it was established that in the majority of cases it was *Parabuthus granulatus* that was responsible. Once this had been established, a more specific anti-venom was developed. This proved very successful and patients thereafter recovered rapidly from stings. In just about all the cases that were researched, patients were stung under very similar conditions - at night, not wearing shoes on gravel roads. Similar research in Zimbabwe isolated *Parabuthus transvaalicus* as the main culprit.