

Snake Bites in Mzantsi Afrika: A Summary

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Introduction

There are over 160 snake species in Mzantsi Afrika, of which most are not dangerous to humans. In Mzantsi Afrika, snakes and humans commonly coexist in the same territory, which results in a high number of snake bite incidents. Some snake bites may result in envenomation and require medical intervention.

Species

There are between 160 and 180 snake species in Mzantsi Afrika, and the majority of these species are considered not to be dangerous to humans. Approximately 25 snake species are considered medically important. Table 1 lists snakes found in Mzantsi Afrika that are dangerous to humans.

	Snake	Links to Pictures	Locations in Mzantsi Afrika
1.	Mozambique spitting cobra (<i>Naja mossambica</i>)	Mozambique Spitting Cobra - African Snakebite Institute	Limpopo, Kwa-Zulu Natal, Gauteng, Mpumalanga, North West
2.	Common Night adder (<i>Causus rhombeatus</i>) Rhombic Night Adder	Common Night Adder - African Snakebite Institute	Limpopo, Free State, Kwa-Zulu Natal Eastern Cape, Western Cape
3.	Puff Adder (<i>Bitis arietans</i>) "Irhamba"	Puff Adder - African Snakebite Institute	Throughout Mzantsi Afrika
4.	Rinkhals (<i>Hemachatus haemachatus</i>) "Iphimbi"	Hemachatus haemachatus - Rinkhals (tyroneping.co.za)	Free State, Western Cape, North West, Eastern Cape, Mpumalanga
5.	Black Mamba (<i>Dendroaspis polylepis</i>)	Black mamba - SANBI Black Mamba - African Snakebite Institute	Limpopo, Kwa-Zulu Natal Mpumalanga, Northern Cape North West, Gauteng
6.	Cape Cobra (<i>Naja nivea</i>)	Cape Cobra - African Snakebite Institute	Western Cape Western areas of Eastern Cape Western areas of Free State Western areas of North West
7.	Eastern Green Mamba (<i>Dendroaspis angusticeps</i>)	Eastern Green Mamba - African Snakebite Institute	Coastal Kwa-Zulu Natal Coastal Eastern Cape, north areas
8.	Mountain (Berg) adder (<i>Bitis atropos</i>)	Berg Adder (Bitis atropos) Next Gen Herpetologist Berg Adder - African Snakebite Institute	South -western areas of Eastern Cape Southern areas of Western Cape Lesotho – spilling over into the Free State, KZN and Eastern Cape
9.	Black spitting cobra (<i>Naja nigricincta woodi</i>)	Black Spitting Cobra (Naja nigricincta woodi) from the Cederberg, Western Cape. Dangerously venomous. : r/southafrica (reddit.com) Black Spitting Cobra - African Snakebite Institute	Northern Cape – north western areas Western Cape – north western border
10.	Boomslang (<i>Dispholidus typus</i>)	Juvenile Boomslang Photos and Images (shutterstock.com) Boomslang - African Snakebite Institute	Limpopo, Mpumalanga, Northern Cape Western Cape, Kwa-Zulu Natal, Gauteng, Eastern Cape
11.	Southern Vine Snake (<i>Thelotornis capensis</i>) Twig snake	Southern Vine Snake - African Snakebite Institute	Limpopo, Mpumalanga, Gauteng North West
12.	Forest Cobra (<i>Naja subfulva</i>)	Forest Cobra - African Snakebite Institute Africa's biggest cobra is five species, not one, study finds (mongabay.com)	Kwa-Zulu Natal – northern tip
13.	Gaboon Viper (<i>Bitis gabonica</i>)	Our Hybrid of a hybrid viper. Info in comments : r/snakes (reddit.com)	Kwa-Zulu Natal – northern tip

Table 1: commonly mentioned dangerous snakes of Mzantsi Afrika.

Snake bite prevalence

In Mzantsi Afrika, it is challenging to accurately document the incidence of snake bites. The majority of snake bites in Mzantsi Afrika are reported during the summer season, and the province reporting the most snake bites is the North West province. The incidence of snakebite in Mzantsi Afrika was 2.39 per 100,000. The mortality rate reported from hospitalized snakebite patients in Mzantsi Afrika is below 5%. Snake bites are more common in the rural areas as compared to the urban areas of Mzantsi Afrika.

Clinical presentation of snake bites

The clinical presentation of snake bites is grouped into five syndromes, as listed below:

1. Painful progressive swelling syndrome (**cytotoxic**)
2. Progressive weakness syndrome (**neurotoxic**)
3. Bleeding syndrome (**haemotoxic**)
4. Mixed painful progressive swelling and bleeding syndrome (**cytotoxic and haemotoxic**)
5. Mixed painful progressive swelling and progressive weakness syndrome (**cytotoxic and neurotoxic**)

It is not uncommon to have two envenomation syndromes present at the same time. Swelling is the most common syndrome that is encountered post-snake envenomation.

Painful progressive swelling syndrome (cytotoxic)

The cytotoxic syndrome is the most commonly encountered syndrome among all the snakebite syndromes, and it is mainly due to the toxins found in the snake venom. The toxins found in the venom of the cytotoxic snakes destroy cell membranes, skeletal muscles, and other tissues, which ultimately results in increased vascular endothelial permeability, local swelling, and oedema. These toxins are mainly proteolytic enzymes, phospholipases, and polypeptides. Snakes that commonly present with this clinical syndrome are the puff adder, gaboon adder, night adder, and horned adder.

Progressive weakness syndrome (neurotoxic)

Snakes that commonly cause a neurotoxic syndrome include the black mamba, eastern green mamba, and non-spitting cobras such as the Cape cobra, snouted cobra, and forest cobra. Neurotoxins in the venom of these snakes inhibit the binding of acetylcholine to nicotinic receptors at the neuromuscular junction. Included in the clinical picture are oral paraesthesia, facial paralysis, ptosis, ophthalmoplegia, midriasis, and diplopia. Speech is also affected, resulting in dysarthria and dysphonia. Hypersalivation and dysphagia are also noted. Envenomation later on manifests in descending flaccid paralysis and respiratory failure. The duration it takes for these venoms to cause respiratory failure varies widely between 1 and 8 hours.

Bleeding syndrome (haemotoxic)

This clinical syndrome is mainly caused by gaboon adder, puff adder, boomslang, and vine snake. The venom of these snakes results in abnormally increased production of prothrombin, factor X, and factor IX, leading to a state where these factors are depleted, resulting in consumptive coagulopathy. These factors promote coagulation, and their consumption and depletion result in coagulopathy. Gastrointestinal signs and symptoms include abdominal pain, nausea, and vomiting.

SNAKE ENVENOMATION SYNDROMES

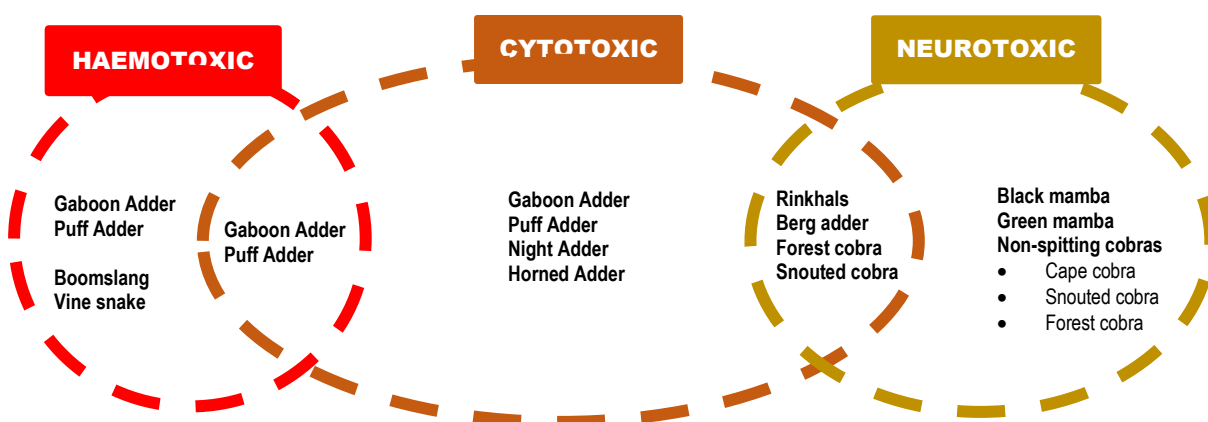


Diagram 1: The snake envenomation syndromes shown are haemotoxic, cytotoxic, and neurotoxic. There is an overlap between cytotoxic and neurotoxic syndromes, as well as cytotoxic and haemotoxic envenomation syndromes.



SYNDROME	CYTOTOXIC	NEUROTOXIC	HAEMOTOXIC	CYTOTOXIC + HAEMOTOXIC	CYTOTOXIC + NEUROTOXIC
CAUSATIVE SNAKES	Adders (Gaboos, Puff, Night, Horned)	Black mamba Eastern Green Mamba Non-spitting cobras	Puff Adder Gaboos Viper Boomslang Vine snake	Gaboos adder Puff adder	Rinkhals Berg adder Forest cobra Snouted cobra
TREATMENT	Supportive Polyvalent antivenom	Supportive Airway protection Polyvalent antivenom Consider cholinesterase inhibitor	Supportive Blood treatment Polyvalent antivenom – adders Monovalent - Boomslang	Supportive Blood treatment Polyvalent antivenom	Supportive Airway protection Polyvalent antivenom

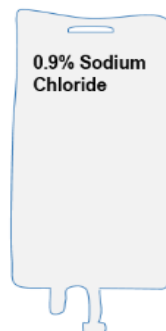
Table 2: Snake bite syndromes and the causative snakes in Mzantsi Afrika.

First aid after a snake bite

The patient must be moved away from the snake. Transport the snake bite victim to the nearest medical facility immediately. The patient should be calmed and immobilized in a sitting or recumbent position in order to minimize the spread of the snake venom. The use of tourniquets on a snake bite victim is contraindicated, as this worsens the snake bite due to the fact that tourniquets concentrate the venom near the snake bite, worsening the effects of the venom. Incising around the wound, using electrotherapy, putting ice on the wound, and sucking the wound are contraindicated. A crepe bandage should be applied approximately and over the snake bite; this is referred to as the Pressure Immobilization Technique (PIT). Application of crepe bandages is particularly important in the bites by cobras and black mambas. Respiratory failure is common in a neurotoxic snake bite, and therefore CPR should be given to the snake bite victim.

Supportive treatment

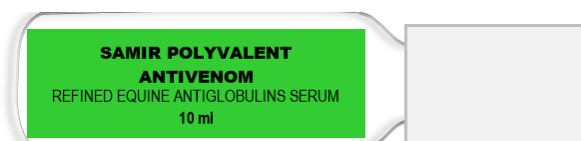
Away protection is very important. Intravenous fluids might be necessary due to fluid losses from cytotoxic snake bites.



Antivenom therapy

The majority of snake bite victims will not require antivenom and will not be given antivenom. There are two types of antivenoms for snake bites: polyvalent and monovalent.

The polyvalent antivenom is only effective against 10 snake bites, which are the Rinkhals, puff adder, gaboon adder, black mama, green mamba, Jameson's mamba, Mozambique spitting cobra, Cape cobra, snouted cobra, and the forest cobra. The polyvalent antivenom is ineffective against the mountain adder, dwarf adder, night adder, boomslang, and vine snakes, and therefore it is contraindicated in these snake bites. The monovalent antivenom is only effective against Boomslang.



Antivenom dosages

Polyvalent antivenom

- 50-100 ml for cytotoxic snake bites
- 80-100 ml for neurotoxic snake bites

Monovalent antivenom

- 20 ml for boomslang envenomation.
- 10 ml follow-up dose may be given in severe cases.

Indications for antivenom therapy include:

- Neurotoxicity signs
- Unidentified snake bites and with evidence of progressive swelling such as:
 - Swelling of the entire foot or hand within 1 hour following the snake bite.
 - Progressive swelling to the knee or elbow joint within 6 hours following the snake bite.
 - Swelling of the entire limb within 12 hours following the snake bite.
 - Progressive swelling at a rate of more than 2 centimetres per hour
 - A compromised away.
- Compartment syndrome

Type of antivenom	Polyvalent	Monovalent
Dosage	80 – 100 ml	20 ml IV
Effective against	1. Rinkhals 2. Puff adder 3. Gaboon adder 4. Black mamba 5. Green mamba 6. Jameson's mamba 7. Mozambique spitting cobra 8. Cape Cobra 9. Snouted Cobra 10. Forest cobra	1. Boomslang

Table 3: polyvalent and monovalent snake anti venoms available in Mzantsi Afrika

Testing antivenom dose

A testing antivenom dose is no longer recommended.

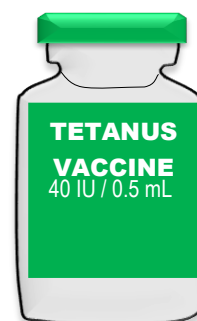
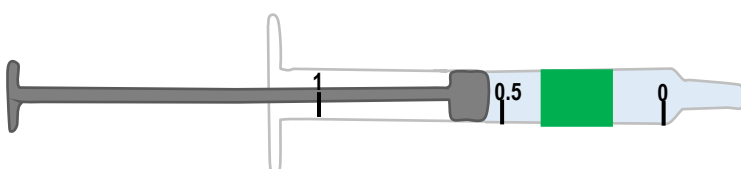
Anaphylaxis prophylaxis

Life-threatening anaphylactic reactions may occur after antivenom administration. Patients who will require antivenom therapy should receive an adrenaline pre-dose of 0.25 mg intramuscularly for anaphylaxis prophylaxis. Prophylactic antihistamines and steroids are not recommended and should only be used when an anaphylactic reaction occurs.



Tetanus vaccination

Tetanus toxoid of 0.5 ml IM must be given to all snake bites patients who have not been immunised in the previous five years.



Antibiotic treatment

Antibiotics are not indicated, especially in the initial 72 hours after the snake bite.

Special investigations

The following special investigations are advised:

- Complete blood count
- Electrolytes
- Urea and creatinine
- Clotting screen
- Calcium
- Magnesium
- Phosphate

References

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