



Access

Professional Development

PRE-HOSPITAL MANAGEMENT

EMS

BEFORE WE KICK OFF...

- **National Snakebite Advisory Group**
 - Useful tool for clinical consultation on snakebites. Medical Professionals who deals with snakebites in the clinical setting can ask Mande Toubkin (082 820 7914) or Prof Tim Hardcastle (082 468 1615) to be added to the group. EMS guys please don't spam you are more than welcome to contact me at any time for snakebite advice in the prehospital setting.
 - Please log all snakebites that you encounter on the National Snakebite Database (www.nsbdb.co.za).
- **Useful Resources**
 - Prehospital Snakebite Protocols
 - In-hospital Snakebite Management
 - Snakebite Management in Special Patient Groups and Surgical Aspects
 - Snakebite Flipper Cards Layman, EMS, & In-hospital
 - Download all of these at www.nsbdb.co.za

BEFORE WE KICK OFF...

SNAKEBITE CONSULTATIONS:

- Prof Tim Hardcastle 082 468 1615
- Prof Dries Engelbrecht 084 789 7364
- Prof Vidya Laloo 082 700 2732
- Dr Christoff Bell 073 174 0199
- Mande Toubkin 082 820 7914
- Arno Naude 062 463 8370
- Nick van der Walt 072 680 1681
- Jonathan Leeming (Scorpions & Spiders) 082 338 4381



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SECTION I INTRODUCTION

The problem and solutions to Prehospital Snakebite Management by Paramedics.

INTRODUCTION

Common Challenges in Prehospital Snakebite Management:

- **Limited Formal Training:** Snakebite management is not extensively covered in tertiary emergency medical education.
- **Outdated Practices & Misinformation:** Many training institutions continue to teach outdated protocols from decades ago, and misinformation from unverified sources, such as social media, can further contribute to incorrect treatment approaches.
- **Fear & Lack of Interest:** Personal fear of snakes often leads to a lack of motivation to seek further knowledge on proper snakebite management.
- **Infrequent Exposure:** Since snakebites are not common emergencies, paramedics may forget essential skills over time without regular training and reinforcement.
- **Underestimation of Envenomation Severity:** The severity of envenomation is sometimes misjudged, resulting in delays in transport and definitive medical care.

WHAT IS THE SOLUTION?

Significant progress has been made in improving prehospital snakebite management through:

- **Standardized National Eswatini Guidelines** that provide clear and evidence-based protocols for emergency responders.
- **Prehospital Snakebite Management Flipper Cards**, offering quick-reference guidance for paramedics in the field.
- **The adoption of Snakebite Syndromic Management**, which prioritizes symptom-based treatment over species identification to ensure timely and effective emergency care.

HOW BIG IS THE PROBLEM?

Snakes pose a significant risk to the health and well-being of many people especially those that live in poverty and are far from adequate medical intervention. When these individuals get bitten the impact of the snakebite goes a lot further than just the effects of the venom and very often these individuals are the breadwinners in the family. Without them, the family can suffer from significant financial burdens which could plunder them deeper into poverty. Even though children do not contribute to the well-being of their family's finances, they are at a much higher risk of permanent disabilities and death from snakebite which can threaten the future of the entire family financially!

In many parts of the world, snakebite is a neglected public health problem with over 7000 people being bitten and up to 380 deaths per day worldwide! This has been brought to the attention of The World Health Organisation (WHO) which has listed it as a Neglected Tropical Disease and has put strategies in place to prevent and control snake envenomations.



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SECTION 2

SNAKE IDENTIFICATION

Identifying venomous species.



ADDERS/VIPERS (VIPERIDAE)

South Africa has 13 species of Adders and except for the Puff Adder and the Gaboon Adder these adders don't grow very big. All of them have triangular heads that's distinct from the neck's with keeled scales. They all have hinged fangs that fold back onto the roof of the mouth when not in use. Except for the Night Adder all the adders in South Africa gives birth to live babies.



PUFF ADDER



PUFF ADDER

- **Distribution:** Throughout South Africa
- **Colour:** Specimens from Western and Eastern Cape as well as KZN are predominantly black and yellow, with animals from other areas of the country ranging between brown, grey and cream.
- **Patterning:** Distinctive V-shaped markings or chevrons pointing towards the tailing all the way down the back. There is also a thin line connecting the eyes over the head.
- **Other properties:** Vertical pupils with keeled scales. Hisses loudly when disturbed. Fangs can be up to 25mm long.
- **Size:** Averages between 90-120cm, but specimens up to 1.8m have been documented.
- **Venom:** Predominantly cytotoxic with a haemotoxic component, with a venom yield of up to 350mg. Only 100mg may prove fatal to an adult (Branch, 1998).

GABOON ADDER



GABOON ADDER

- **Distribution:** Northern KZN
- **Colour:** Various shades of pastel colours including pink, purple, black, brown, and fawn.
- **Patterning:** Blocks along the spine, interconnected with black hourglass markings, and triangular shapes on the sides
- **Other properties:** Vertical pupils with keeled scales. Hisses loudly when disturbed. Fangs can be up to 75mm long.
- **Size:** Averages at around 120cm, but larger specimens have been documented.
- **Venom:** Predominantly cytotoxic with a cardiotoxic component, with a venom yield of up to 600mg. Only 100mg may prove fatal to an adult (Branch, 1998).

COBRAS & MAMBAS (ELAPIDAE)

There are several species in South Africa that falls into this family of snakes however only 7 species are potentially fatal. Elapidae snakes have small, fixed fangs in the front of their mouths through which they inject their venom.



MOZAMBIQUE SPITTING COBRA



MOZAMBIQUE SPITTING COBRA

- **Distribution:** KZN, Limpopo, Mpumalanga, Gauteng, Northwest, parts of the Northern and Eastern Cape and Free State.
- **Colour:** Brown (grey as hatchling) with a pink or orange belly.
- **Patterning:** No patterning on the body however it has broken black bands on the underside of the neck.
- **Other properties:** Round pupils with smooth scales. Spreads a hood when cornered and can spit its venom up to 3m.
- **Size:** Averages at around 120cm, bigger specimens up to 1.5m are often found.
- **Venom:** Predominantly cytotoxic with a yield of around 200 – 300mg of venom however 40mg can be lethal to an adult. This venom causes skipping necrosis (Branch, 1998).

CAPE COBRA



CAPE COBRA

- **Distribution:** Western Cape, parts of the Eastern Cape, Northern Cape, Northwest and Free State.
- **Colour:** Vary variable in colour including yellow, brown, black, cream, orange as well as a speckled phase which could include any of these colours.
- **Patterning:** No patterning on the body however hatchlings have a thick black band across the neck which disappears into adulthood.
- **Other properties:** Round pupils with smooth scales. Spreads a hood when cornered.
- **Size:** Averages at around 140cm, bigger specimens up to 160cm are often found.
- **Venom:** Predominantly neurotoxic with a yield of around 250mg of venom with 15mg being potentially fatal (Branch, 1998).

SNOUTED COBRA



SNOUTED COBRA

- **Distribution:** KZN, Limpopo, Northwest, Gauteng, and Mpumalanga.
- **Colour:** Above yellowish to greyish brown with a yellow belly. A black and cream banded phase is also found.
- **Patterning:** Either no patterning, slight blotching, or black and cream bands.
- **Other properties:** Round pupils, smooth scales., and a broad hood with a dark band.
- **Size:** Averages at around 180-250cm in length.
- **Venom:** Predominantly neurotoxic venom with a yield of up to 300mg of which only 25mg may be fatal in an adult (Branch, 1998).

FOREST COBRA



FOREST COBRA

- **Distribution:** Northern KZN
- **Colour:** Front part yellowish-brown fading into black.
- **Patterning:** Black flecking on the front end of the body.
- **Other properties:** Round pupils with highly polished smooth scales. Spreads a broad hood when cornered.
- **Size:** Predominantly neurotoxic venom, their venom yield is around 100-300mg (African Reptiles and Venom, 2017).

BLACK SPITTING COBRA



BLACK SPITTING COBRA

- **Distribution:** Northern Cape down into the Cedarberg Mountain range in the Western Cape.
- **Colour:** Pitch black.
- **Patterning:** None.
- **Other properties:** Round pupils smooth scales. Spreads a broad hood when cornered. Can accurately spit its venom up to 3m.
- **Size:** Averages at around 120-150cm, bigger specimens up to 200cm are found.
- **Venom:** Predominantly cytotoxic venom, their venom yield is around 350mg and 40mg could prove fatal (African Reptiles and Venom, 2017).

RINKHALS



RINKHALS

- **Distribution:** Parts of the Western, Northern and Eastern Cape, Free State, KZN, Gauteng, Mpumalanga, and Limpopo.
- **Colour:** Depending on the population they can be pitch black, grey, brown, or olive. Populations in KZN and the Eastern Cape have orange/yellow and black bands down the back.
- **Patterning:** Some are blotched. Animals have white bands in the neck.
- **Other properties:** Round pupils with keeled scales. Spreads a hood when cornered. Can accurately spit its venom up to 3m. Gives birth to live babies.
- **Size:** Averages at around 100cm, bigger specimens up to 150cm are found.
- **Venom:** Predominantly neurotoxic with a strong cytotoxic component. Its venom is diluted for a spitting snake; however it still produces around 100mg of venom on average of which 50-60mg may lead to serious neurological symptoms (African Reptiles and Venom, 2017).

BLACK MAMBA



BLACK MAMBA

- **Distribution:** Parts of KZN, Limpopo, Gauteng, Northwest, Mpumalanga, and parts of the Eastern and Northern Cape.
- **Colour:** Dark olive, greyish brown, or gunmetal grey.
- **Patterning:** Some individuals have slight darker banding towards the back end of the body.
- **Other properties:** Round pupils with smooth scales. Can spread a narrow hood when cornered.
- **Size:** Averages at around 300cm, bigger specimens up to 450cm are found.
- **Venom:** Predominantly potent neurotoxic. Venom yields range from 250mg but may be as much as 400mg with only 10mg necessary to kill an adult (Branch, 1998)!

GREEN MAMBA



GREEN MAMBA

- **Distribution:** KZN along the coastal forests and the very tip of the Eastern Cape.
- **Colour:** Uniform green head, back, and belly.
- **Patterning:** Individuals may have individual yellow scales scattered along the body.
- **Other properties:** Round pupils with smooth scales.
- **Size:** Averages at around 180cm, bigger specimens up to 250cm are found.
- **Venom:** Predominantly neurotoxic. Their venom yields are around 60-100mg and deaths have been reported within 30 minutes (Branch, 1998).

BOOMSLANG



BOOMSLANG



BOOMSLANG

- **Distribution:** Found throughout South Africa apart from the drier parts of the Western and Northern Cape as well as around Lesotho.
- **Colour:** Hatchlings are usually grey and turn into their adult colouration as they grow. Females are generally brown, and males are either green, green, and black bars, blue, red, and brown.
- **Patterning:** Some are uniform colours and others have black bars.
- **Other properties:** Round pupils with rough scales. Inflates their necks when they feel threatened.
- **Size:** Averages at around 150cm, bigger specimens up to 200cm are found.
- **Venom:** Predominantly potent haemotoxic. They yield around 1-15mg of venom of which only 1mg is toxic to an adult (Branch. 1998).

VINE SNAKE



VINE SNAKE

- **Distribution:** Parts of KZN, Limpopo, Gauteng, Northwest, and Mpumalanga
- **Colour:** Cryptically coloured resembling branches or twigs.
- **Patterning:** Head has green and orange colouration.
- **Other properties:** Keyhole shaped pupil. Can inflate its neck when it feels threatened.
- **Size:** Averages at around 120cm, bigger specimens up to 150cm are found.
- **Venom:** Predominantly haemotoxic. Bites are extremely rare.



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SECTION 2

ASSESSMENT

Assessing the snakebite before deciding on a treatment pathway.

SCENE SIZE UP

- **Scene safety** – Prevent a second snakebite from happening
- **C-A-B** – If these are stable move on. If not, stop and manage.
- **Vital Signs** – Heart rate, Blood Pressure, Respiratory Rate, SpO2, EtCO2, LOC/GCS, ECG Monitoring, Temperature, Skin Condition, Pupil Reaction.
- **Physical Examination** – Fangs marks (absence of fang marks does not rule out snakebite), Signs & Symptoms (swelling, bleeding, paralysis, difficulty in breathing, etc), Signs of Shock (tachycardia/bradycardia, hypotension, excessive sweating, decreased LOC, pale in colour, delayed cap refill).
- **SAMPLE history** – Signs & Symptoms, Allergies (previous allergies to snakebites, antivenom, or other medication), Medication
- Irrespective of species, if a tourniquet is in place, DO NOT remove it as it can quickly escalate to venom rush and cardiac arrest!
- An identification of the snake can be useful but is not required for successful treatment. DO NOT try and catch or kill the snake to take with to hospital! Time = Life/Muscle

VENOM TYPES

In South Africa we have 3 main types of venoms although quite a few species have a mixed composition of the following venoms:

- *Cytotoxic venom* – Cytotoxic venom causes cell membrane and tissue destruction leading to local swelling, blistering oedema. The tissue destruction leads to kidney damage and death with the body trying to repair itself and the dead tissue overwhelms functioning of the kidneys. It is characterized by painful and progressive swelling, with blood-stained tissue fluid leaking from the bite site, decreasing blood pressure, blistering and bruising. There will be severe pain at the bite site moving up the affected limb. There will also be enlarged and painful lymph nodes nearest to the bite site. Tissue death may occur. Cytotoxin is a slow acting venom but with severe pain. Patients therefore have sufficient time to make their way to an appropriate hospital facility. Time is muscle and the earlier antivenom can be administered the less damage would be suffered.

VENOM TYPES

In South Africa we have 3 main types of venoms although quite a few species have a mixed composition of the following venoms:

- *Neurotoxic* – Neurotoxic venom affects the nerve endings leading to paralysis. Paralysis of the respiratory system would lead to respiratory arrest which is quickly followed by cardiac arrest and death. Imagine being alive but unable to breathe! Neurotoxin is a quick-acting venom that can produce serious life-threatening symptoms within 15-30 minutes, but 2-6 hours is more realistic. Quick actions are required to ensure that a victim survives.
- *Haemotoxin* – Haemotoxin venom affects the clotting ability of blood and damages the walls of the blood vessels, which results in massive continuous bleeding. By leading to micro clotting the remains of the fluid then leaves the circulatory system. Serious symptoms usually occur between 24-48 hours after a bite.

SYMPTOMS OF CYTOTOXICITY

Cytotoxicity presents with pain and swelling with or without bruising, bleeding, or blistering. When dealing with cytotoxic swelling the following is crucial:

- Immediately and clearly draw a ring around the bite site with a permanent marker and record the time. Remove any constricting clothing or jewellery.
- Monitor the patient every 30 minutes until the swelling stops. Record the symptoms as well as the progress of swelling and the time.

SYMPTOMS OF NEUROTOXICITY

Snakebite neurotoxicity presents as a descending paralysis. Respiratory paralysis with imminent respiratory failure is suggested by dyspnoea, distress, restlessness, sweating, exaggerated accessory muscle use for breathing (e.g. abdominal muscles), and cyanosis. Coma is usually the result of respiratory failure, and these victims will die unless artificially ventilated.

Early signs and symptoms:

- Pain at the bite site can be absent, minimal, or mild.
- Swelling will be absent to mild in most cases.
- Bitter taste in the mouth.
- Paraesthesia of the tongue, lips, and mouth.
- Increased thirst & dry mouth. If salivation occurs, it will often be very thick and stringy.
- Nausea and vomiting.
- Chest tightness.

SYMPTOMS OF NEUROTOXICITY

Intermediate signs and symptoms:

- General weakness, ptosis, slurred speech.
- Dysphagia.
- Inability to open or clench the jaw.
- Inability to protrude the tongue.
- Difficulty to cough.
- Fasciculations.
- Broken neck syndrome, flaccid paralysis (limbs hang limp).
- Respiratory distress/weakness.

SYMPTOMS OF NEUROTOXICITY

Late signs and symptoms:

- Vertigo, warm/cold skin, shock, pupillary abnormalities.
- Paradoxical respirations.
- Hypotension, tachycardia, or bradycardia.
- Conscious but unable to respond.
- Hallucinations or confusion.
- Paralysis of sphincters leads to incontinence.
- A quiet period with a fixed stare before a coma sets in.

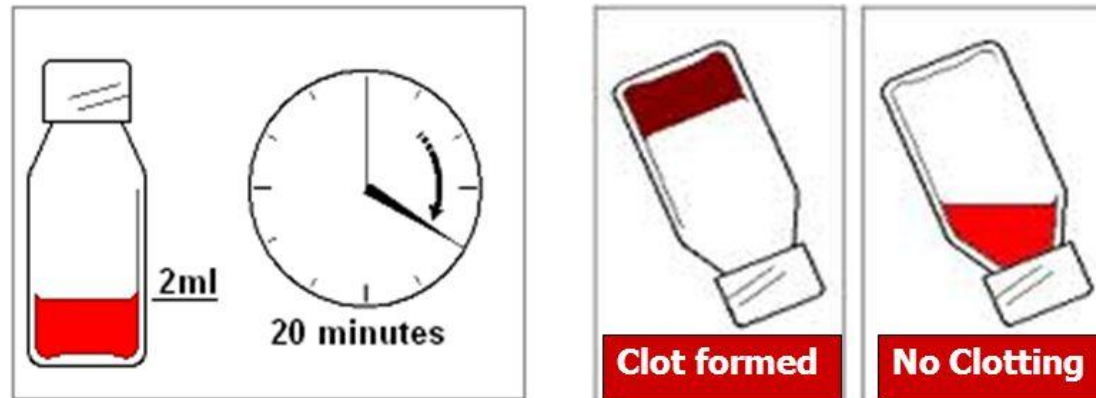
SYMPTOMS OF HAEMOTOXICITY

These envenomations may have a delayed onset of symptoms of more than 15 hours making it crucial to admit all patients with suspected snakebites from unknown snakes with no symptoms for at least 24 hours. Symptoms include:

- Most often negligible local swelling can be found.
- The main symptom is persistent bleeding from the fang marks, recent wounds, and IV sites. The gums should be thoroughly examined as it is usually the first site from where bleeding occurs. Perform the 20-minute blood clot test.
- Other symptoms include nausea and vomiting, abdominal pain, headache, hot and cold fever, increased sweating, epistaxis, haematemesis, melaena, subarachnoid or intracerebral haemorrhage, and haematuria.
- Late signs will include discolouration of the skin due to bleeding, mental confusion, yellow vision due to blood in the eyes, hypotension, multiple organ failure, convulsions, decreased level of consciousness, and coma.

SYMPTOMS OF HAEMOTOXICITY

Clotting Time using Test Tube Method



SNAKEBITE SYNDROMES

A precise snake species identification is not necessary, as symptoms can be categorized into one of five syndromes, simplifying the treatment process.

Snakebite Syndrome 1 – Painful Progressive Swelling

- **Swelling** due to cytotoxic venom starting at the bite site and progressing up the limb.
- **Immense pain** with the affected area being warm and hard.
- Complications include: blistering, discoloration, bleeding under the skin, necrosis, pseudo compartment syndrome, nerve and vessel entrapment, deep vein thrombosis, hypotension, and hypovolaemic shock.
- **Species responsible:** Mozambique Spitting Cobra, Stiletto Snake, Night Adder.

True compartment syndrome is rare in snakebite.

SNAKEBITE SYNDROMES

Snakebite Syndrome 2 – Progressive Weakness

- **Progressive weakness** due to neurotoxic venom – Impairment of striated muscles which is responsible to generate force and contract to support functions such as breathing, blood circulation, body movement, and body posture.
- This syndrome can lead to complete **paralysis, respiratory failure, and cardiac arrest.**
- Complications include: Muscly spasms, drooling, incontinence, salivation, lacrimation, diaphoresis, dilated pupils, dyspnoea, respiratory failure, and death.
- **Species responsible:** Black Mamba

Due to the different mechanisms in which the neurotoxins work they produce different signs and symptoms. Black Mamba envenomations may have non-painful swelling.

SNAKEBITE SYNDROMES

Snakebite Syndrome 3 – Bleeding

- History may include the **need to “pull” the snake from the bite site.**
- **Bleeding tendencies** are caused by haemotoxic venom.
- Bite site and other fresh wounds will start to bleed early on.
- Later complications include: Haematuria, haemoptysis, melena, epistaxis, cerebral haemorrhage, hypotension, and hypovolaemic shock (slow onset 12-36 hours after bite).

- **Species responsible:** Boomslang & Vine Snake

SNAKEBITE SYNDROMES

Snakebite Syndrome 4 – Mixed Painful Progressive Swelling & Bleeding

- Mix of complications from the Painful Progressive Swelling as well as Bleeding Syndromes.
- **Species responsible:** Puff Adder

SNAKEBITE SYNDROMES

Snakebite Syndrome 5 – Mixed Painful Progressive Swelling & Progressive Weakness

- Mix of complications from the Painful Progressive Swelling as well as Progressive Weakness Syndromes.
- **Species responsible:** Snouted Cobra and Rinkhals.



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SECTION 3 MANAGEMENT

Prehospital Emergency Medical Care



AIRWAY CONTROL

Neurotoxicity should be identified as an extreme emergency in airway control. Do not intubate early as a preventative measure as you do with airway burns but do not wait until all airway control collapses before implementing airway control and artificial ventilation.

Monitor the patient's respiratory drive by keeping an eye on the SpO₂ and ETCO₂ readings. Should the SpO₂ drop below 94% administer supplemental Oxygen using a nasal cannula and a non-rebreather mask. If the patient develops a bradypnea or apnoea initiate immediate artificial respiration support with a BVM while you prepare for intubation.

AIRWAY CONTROL

Induction drugs:

- 1-2mg/kg of Ketamine or
- 0.1-0.3mg/kg of Etomidate.

Neuromuscularblocker

- **AVOID** Suxamethonium – Worsens paralysis, prolonged respiratory failure, risk of hyperkalaemia.
- Only if Needed – 1-1.2mg/kg of Rocuronium.

Post RSI Maintenance

- 1-2mg/kg/hr Ketamine – Titrate to effect
- **AVOID** Morphine and Midazolam infusions for sedation purposes.

AIRWAY CONTROL

Baseline Ventilator Settings:

- Mode: SIMV
- Tidal Volume: start at 6ml/kg and adjust as per vitals parameters
- PIP: 12-14cm H₂O
- PEEP: 5
- I:E: 1:2
- Rate: 12bpm (adults), 20bpm (paediatrics), 25bpm (neonates)

HYPOTENSION

Adrenaline Infusion Chart – Syringe Driver (0.01-1µg/kg/min)				
Prepare	Weight	Range (ml/hr)		
		Lowest	Mid	Highest
3x1mg/ml (1:1000) Adrenaline + 47ml 0.9% Normal Saline	2	0.2ml/hr	1ml/hr	2ml/hr
	4	0.4ml/hr	2ml/hr	4ml/hr
	6	0.6ml/hr	3ml/hr	6ml/hr
	8	0.8ml/hr	4ml/hr	8ml/hr
	10	1ml/hr	5ml/hr	10ml/hr
	20	2ml/hr	10ml/hr	20ml/hr
	25	2.5ml/hr	12.5ml/hr	25ml/hr
	30	3ml/hr	15ml/hr	30ml/hr
	35	3.5ml/hr	17.5ml/hr	35ml/hr
	40	4ml/hr	20ml/hr	40ml/hr
	45	4.5ml/hr	22.5ml/hr	45ml/hr
	50	5ml/hr	25ml/hr	50ml/hr
	55	5.5ml/hr	27.5ml/hr	55ml/hr
	60	6ml/hr	30ml/hr	60ml/hr
	65	6.5ml/hr	32.5ml/hr	65ml/hr
	70	7ml/hr	35ml/hr	70ml/hr
	75	7.5ml/hr	37.5ml/hr	75ml/hr
	80	8ml/hr	40ml/hr	80ml/hr
	85	8.5ml/hr	42.5ml/hr	85ml/hr
	90	9ml/hr	45ml/hr	90ml/hr
95	9.5ml/hr	47.5ml/hr	95ml/hr	
100	10ml/hr	50ml/hr	100ml/hr	
110	11ml/hr	55ml/hr	110ml/hr	
120	12ml/hr	60ml/hr	120ml/hr	

HYPOTENSION

Adult Adrenaline Infusion Chart – No Syringe Driver

Prepare	Mix 2x 1mg (1:1000) Adrenaline + 198ml 0.9% Normal Saline in a 200ml drip with a 60 Dropper administration set. Titrate to effect		
Dosage (2-10ug/min)	2ug/min = 1drop every 5 seconds	5ug/min = 1 drop every 2 seconds	10ug/min = 1 drop every second

CYOTOXIN SPECIFIC MANAGEMENT

When swelling is observed around the bite area use a pen to circle the site of the bite if visible as well as the time of the bite on the skin. Mark the progression of swelling every 30 minutes. Elevate the affected area and transport the victim rapidly to an appropriate hospital. Analgesia is indicated for all cytotoxic envenomations (mild to severe) and the options are as follows:

- Paracetamol (PO/IV) should be first line analgesia.
- Opioids (e.g. Tramadol, Codeine, etc) can be added. Keep in mind that opioids may cause side-effect presentation of a neurotoxic bite.
- NSAIDS (e.g. Diclofenac, Ibuprofen, Indomethacin, etc.) **SHOULD NOT** be used as it worsens bleeding and increases the risk of renal failure with cytotoxin involvement.

TRANEXAMIC ACID IN HAEMOTOXIC ENVENOMATIONS

Please note that Tranexamic Acid (TXA) is contra-indicated in Bleeding Syndromes (Boomslang & Vine Snakes) because TXA is an antifibrinolytic agent that prevents the breakdown of fibrin clots. In Boomslang bites, the problem is not excessive fibrinolysis but the complete depletion of clotting factors, meaning there is no fibrin to stabilise.

The use of TXA therefore does not stop the bleeding because there is no functional clotting system left to preserve.

VENOM OPHTHALMIA

Spitting Cobras can cause intense conjunctivitis and corneal erosion complicated by secondary infection, anterior uveitis, corneal opacities, and permanent blindness. The treatment for snake venom in the eyes includes:

- Irrigate the eye as soon as possible using large volumes of a bland liquid (0,9% Normal Saline preferred) for at least 10 minutes.
- If a local anaesthetic is available, mix 1ml of 2% Lignocaine into a 1000ml 0.9% Normal Saline. Connect an administration set and run it into the medial canthus of the eye.
- Unless a corneal abrasion can be excluded, the patient should be treated for a corneal injury with a topical antimicrobial eye ointment.
- Cover the eye with a bandage to prevent light sensitivity.



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SECTION 4 MISCELLANEOUS

Other points to remember...

TOURNIQUET REMOVAL

- TOURNIQUETS IN PLACE MUST NOT BE REMOVED PREHOSPITALLY!

Depending on the duration of the tourniquet application, a victim may suffer from quick cardiac arrest on rapid removal of the tourniquet due to venom rush. Before a tourniquet is removed, prepare for intubation, ventilation, and CPR as a worst-case scenario. To prevent venom rush, apply a manual blood pressure cuff high up on the limb (above the tourniquet) and inflate to 180mmHg (or higher than the systolic BP of the patient if they have hypertension above 180mmHg). Remove the tourniquet with the BP cuff still inflated. Administer antivenom as indicated while the BP cuff remains inflated. 15 minutes after antivenom administration, slowly deflate the BP cuff by 5mmHG/minute while closely monitoring the patient for new symptoms of neurotoxicity and deterioration. If the patient's condition worsens, re-inflate the tourniquet, and wait 10 minutes before continuing the procedure. Be aware of compartment syndrome and reperfusion injury to the kidneys.

“ANTIVENOM CRISIS”

- SAVP is closed for renovations and by latest communications have run out of most antivenom.
- Pannaf Premium and Echi-Tab antivenoms are being imported as an alternative.
- Please be aware of both venom anaphylaxis which is more common in snake handlers, and antivenom anaphylaxis in snakebites.
- Antivenom administration is safe in pregnancy.
- There is no such thing as a paediatric dose when it comes to antivenom.
- Where no IV access is possible, antivenom can be administered via an IO route.

INDICATIONS FOR ANTIVENOM

Antivenom is indicated for bites of the following African snakes:

- Systemic envenomation:
 - Neurotoxicity.
 - Spontaneous systemic bleeding.
 - Incoagulable blood (20MWBCT).
 - Cardiovascular abnormality (hypotension, shock, arrhythmia, dysrhythmias).

INDICATIONS FOR ANTIVENOM

Local envenomation:

- Bites on fingers or toes (with swelling).
- Bites on limbs of small children and babies (with swelling).
- Extensive swelling (more than half the limb).
- Rapidly progressive swelling.
 - Swelling progresses more than 5cm per hour.
 - Swelling of the whole hand or foot in 1 hour after envenomation.
 - Swelling extends to the elbow or knee in 3-4 hours after envenomation.
 - Swelling of the entire limb in 8 hours after envenomation.
- Discolouration, bruising, or blistering of the skin.
- Threatened airway due to swelling.
- Complications e.g. pseudo or actual compartment syndrome (antivenom administration is indicated before surgery).

Administer antivenom immediately for positive Boomslang envenomation do not wait for symptoms to develop first.

PREPARATION OF ANTIVENOM ADMINISTRATION

In preparation for antivenom administration ensure that the following has been prepared:

- All required monitors and equipment have been prepared and resuscitation equipment is ready.
- All medication should be ready for the treatment of anaphylaxis with a dose of 0.5ml of 1:1000 solution of adrenaline drawn up for immediate intramuscular injection should anaphylaxis occur.

Premedication with 0.25mg of adrenaline SC or IMI for the prevention of anaphylaxis is the only evidence-based prophylaxis against reactions available. Corticosteroids and antihistamines have no prophylactic role. Avoid adrenaline premedication in patients with a history of ischaemic heart disease, stroke, hypertension, and tachyarrhythmias.

ANTIVENOM ADMINISTRATION

Administration of SAVP Antivenom

The dosage of antivenom varies depending on the snake or snakebite presented with. If you are unsure, administer 10x vials of Polyvalent Antivenom (PAV) or 1x vial of Monovalent Antivenom (MAV). It may be repeated in increments of 2x vials (20ml) of PAV or 1x vial (10ml) of MAV every subsequent 2 hours over 10 minutes, as required should there be continued signs and symptoms of envenomation. This may be necessary in the case of multiple bites or bites from large snakes.

ANTIVENOM ADMINISTRATION

If you can identify the snake or the snakebite symptom the following dosages are advised:

- The loading dose for painful progressive swelling syndrome is 6-8 vials (60-80ml) of PAV.
- The loading dose for progressive weakness syndrome is 8-12 vials (80-120ml) of PAV.
- If the snake is identified as a Gaboon Adder, a loading dose of 20 vials (200ml) of PAV is recommended.
- The loading dose for bleeding syndrome is 1 vial (10ml) of MAV.

Due to the risk of anaphylaxis, it is advised to dilute the antivenom instead of a bolus dose to ensure closer monitoring. Dilute the contents of the PAV in normal saline to a volume of 200ml and administer intravenously over 30-60 minutes at a rate of 200-400ml/hr. For MAV, dilute to 50ml with normal saline and administer over 15 minutes.

ANTIVENOM ADMINISTRATION

Administration of PANAF Antivenom

The PANAF antivenom would be administered in the same way as the SAVP products, the only difference would be the loading dosages:

- Puff Adder and Gaboon Adder 3-6 vials (30-60ml).
- Black Mamba and Green Mamba 10-25 vials (100-250ml).
- Cobra species 20-40 vials (200-400ml).



Access

Professional Development

**THANK
YOU**

NICK VAN DER WALT

+2772 680 1681

WWW.ACCESSPD.CO.ZA