

Carry this Flipper Chart in your Medical Kit.

# SNAKEBITE

## FLIPPER CARD



**EMERGENCY  
CARE  
PROVIDER**



Gift of the Givers  
FOUNDATION



- V** - Vision of
- E** - Empowering the
- N** - Network
- O** - Of
- M** - Medical Professionals
- S** - Saving lives and limbs



Trauma Society of South Africa



Emergency Medicine  
Society of South Africa

This Flipper Chart gives you all the information needed to treat a snakebite as an Emergency Medical Care (Prehospital) Provider

SASS® 2022

# ASSESSING THE SNAKEBITE

## SCENE SIZE UP

- **SCENE SAFETY** - Ensure everyone is safe from a second snakebite.
- **C-A-B**
- **CYTOTOXIC BITES:**

Remove constricting rings / jewellery and clothing

**MARK SWELLING** - Circle the site of the bite with a pen if visible. Write the time of bite on the skin. Document progression of swelling from the first circle to the rest of the limb or affected area. The affected area should be **ELEVATED. RAPID** transfer to a hospital is imperative.

- **NEUROTOXIC BITES:**

**PRESSURE BANDAGES** - are **ONLY USED IN NEUROTOXIC BITES**. Ensure adequate circulation is present in the distal point of the limb if a pressure bandage is applied.

**TOURNIQUETS** should **ONLY** be used when **A PRESSURE BANDAGE IS NOT** available in a **CONFIRMED BLACK MAMBA OR CAPE COBRA BITE** and if you are more than **90 MINUTES AWAY** from definitive care at a hospital. **DO NOT REMOVE** a tourniquet if it is in place **UNLESS** progressive swelling syndrome presents as per CPGs.

If an improvised tourniquet is in place, replace it with a commercial tourniquet **ABOVE** the improvised one.

## VITALS

- Heart Rate
- Temperature
- Blood Pressure
- HGT
- ETCO2
- Respiratory Rate
- Skin condition
- SpO2
- GCS
- ECG monitoring

## PHYSICAL EXAMINATION

- Fang marks - absence of fang marks does not rule out snakebite
- Signs and Symptoms - Swelling, Paralysis, Bleeding, etc.
- Signs of Shock?

## HISTORY

- **SAMPLE**
- Where on the body was the patient bit?
- How long has it been since the snakebite?
- Is there an identification/description of the snake?
- What activity was performed at the time of the bite?
- Has the patient sustained a snakebite before?

## SNAKEBITE EMERGENCY CONTACT NUMBERS

<b>Tygerberg Poison Control Centre</b>	<b>086 155 5777</b>	<b>Mande Toubkin</b>	<b>082 820 7914</b>
<b>Prof A Engelbrecht</b>	<b>084 789 7364</b>	<b>Jason Seale</b>	<b>082 781 8498</b>
<b>Prof T Hardcastle</b>	<b>082 468 1615</b>	<b>Arno Naude</b>	<b>083 739 9303</b>
<b>Dr S Garach</b>	<b>082 495 0135</b>	<b>Mike Perry</b>	<b>083 448 8854</b>
<b>Dr C Bell</b>	<b>073 174 0199</b>	<b>Chris Hobkirk</b>	<b>082 372 3350</b>
<b>Dr V Lalloo</b>	<b>082 700 2732</b>	<b>Johan Marais</b>	<b>082 494 2039</b>

# Snakebite Syndromes

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## 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, bleeding under the skin, necrosis, pseudocompartment syndrome, nerve and vessel entrapment, deep vein thrombosis, hypotension, and hypovolaemic shock.
- Species responsible: Puff Adder, Gaboon Adder, some of the dwarf Adder species, Spitting Cobras (Mozambique Spitting Cobra & Black Spitting Cobra), Stiletto Snakes, and Night Adders.

## Progressive Weakness

- Progressive weakness and paralysis due to neurotoxic venom.
- This syndrome can lead to complete paralysis, respiratory failure and cardiac arrest.
- Complications include: muscle spasms, drooling, incontinence, salivation, lacrimation, diaphoresis, dilated pupils, dyspnoea, respiratory failure and death.
- Species responsible: Black Mamba, Green Mamba, Non-spitting Cobras (Cape Cobra, Snouted Cobra & Forest Cobra), Berg Adder and the Desert Mountain Adder

## Bleeding

- History may include need for the snake to be “pulled off” the bite site (back-fanged)
- Bleeding tendencies are caused by haemotoxic venom.
- This syndrome eventually leads to widespread internal bleeding. Bite site bleeding early on
- Later complications include: Haematuria, haemoptysis, melena, epistaxis, cerebral haemorrhage, hypotension, and hypovolaemic shock. (12-36 hours).
- Species responsible: Boomslang and Vine Snakes

## Mixed Painful Progressive Swelling & Bleeding

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

## Mixed Painful Progressive Swelling & Progressive Weakness

- Mix of complications from the Painful Progressive Swelling as well as Progressive Weakness Syndromes
- Species responsible: Rinkhals, Snouted Cobra, Berg Adder and Forest Cobra

# HYPOTENSION

Systolic BP <90mmHg with a bradycardia (<60bpm)

Fix underlying causes. Administer Oxygen if hypoxic and consider airway control if airway is unprotected

Autonomic dysfunction is common with neurotoxic bites

If pulse remain <60 bpm consider 0.5mg Atropine repeated every 5 minutes up to 3mg (adults dose). Consider adrenaline infusion if hypotension persists and patient non-responsive

Systolic BP <90mmHg with a normal pulse rate (60-100bpm)

Fluid Resuscitation 1000-2000ml fluid boluses (maximum 30ml/kg) as per SEPSIS-3 guideline (snakebite is not trauma)

Should the BP remain <90mmHg initiate adrenaline infusion. Titrate to effect

## Adult Adrenaline Infusion Chart – No Syringe Driver

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	

## 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) 2	2ug/min = 1drop every 5 seconds	5ug/min = 1 drop every 2 seconds	10ug/min = 1 drop every second

# AIRWAY CONTROL

If simple airway manoeuvres and supplemental O<sub>2</sub> has been administered and imminent respiratory compromise is confirmed by assessing the respiratory rate, SpO<sub>2</sub>, ETCO<sub>2</sub>, heart rate and other signs of shock

## Options for airway control

**Manual Control**  
BVM

**Alternative Airway**  
LMA, LTA, iGel

**RSI**  
Laryngoscopy  
(2-3 attempts)

**Surgical Airway**  
Last resort should other options fail

### RSI MEDICATION

mg/kg	INDUCTION
1-2	Ketamine
0.1-0.3	Etomidate
mg/kg	NEUROMUSCULAR BLOCKER
1-2	Suxamethonium - <b>AVOID</b>
1-1.2	Rocuronium - <b>only if needed</b>

### BASELINE VENTILATOR SETTINGS

<b>Mode</b>	SIMV
<b>Tidal Volume</b>	7ml/kg
<b>PIP</b>	12-14cm H <sub>2</sub> O
<b>PEEP</b>	5
<b>I:E</b>	1:2
<b>Rate</b>	12bpm (adults), 20bpm (paediatrics), 25bpm (neonates)

### POST RSI MAINTENANCE

mg/kg	MAINTENANCE
1-2mg/kg/hr	Ketamine 500mg/50ml
Titrate to effect	
<b>Avoid Morphine and Midazolam</b>	

### POST INTUBATION CHECKLIST

- ETT secured at correct depth
- ETCO<sub>2</sub> Monitor attached
- Ventilator set & attached
- Analgesia administered
- Sedation administered
- Vital signs rechecked
- ETT cuff pressure checked
- Analgosedation infusion prep:  
(Ketamine 500mg./50ml Titrate to effect at around 1-2/kg/hr  
**AVOID** Morphine and Midazolam)
- Functional IV line for resuscitation

### EYE CARE

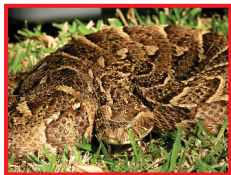
- Flush affected eye/eyes with a bland liquid, 0.9% Sodium Chloride solution preferred
- If a local anaesthetic is available, mix 1ml of 2% Lignocaine into a 1000ml 0.9% Sodium Chloride. Connect an administration set and run it into the medial canthus of the eye.
- Cover the eye with a bandage to prevent light sensitivity.
- Transport to a hospital for assessment.

# POLYVALENT ANTIVENOM SPECIES



## RINKHALS (*HEMACHATUS haemachatus*)

- **Distribution:** Parts of the Cape Provinces, KZN, Mpumalanga, Limpopo and Gauteng
- **Colour:** Black, brown or olive with white throat bands or black and yellow/orange body bands with yellow throat bands
- **Length:** 1.0-1.5m
- **Venom:** **Cytotoxic & Neurotoxic**
- **Venom Effects:** Progressive Weakness and Paralysis along with Painful Progressive Swelling



## PUFF ADDER (*BITIS arietans*)

- **Distribution:** Throughout SA
- **Colour:** Colour varies but has V-shaped markings down the back pointing towards the tail
- **Length:** 0.9-1.2m but up to 1.4m
- **Venom:** **Cytotoxic**
- **Venom Effects:** Mixed Painful Progressive Swelling & Bleeding



## GABOON ADDER (*BITIS gabonica*)

- **Distribution:** Coastal Northern KZN
- **Colour:** Various shades of pastel colours with blocks along the back and triangles down the sides
- **Length:** 1.2m can get bigger
- **Venom:** **Cytotoxic**
- **Venom Effects:** Mixed Painful Progressive Swelling & Bleeding



## BLACK MAMBA (*DENDROASPIS polylepis*)

- **Distribution:** Parts of KZN, Limpopo and Mpumalanga
- **Colour:** Dark Olive, greyish brown or gunmetal grey
- **Length:** 2.8-3.2m but up to 4.5m
- **Venom:** **Neurotoxic**
- **Venom Effects:** Progressive Weakness and Paralysis with or without minor swelling



## GREEN MAMBA (*DENDROASPIS angusticeps*)

- **Distribution:** KZN along the coastal forests
- **Colour:** Uniform green with irregular yellow scales
- **Length:** 1.8-2.5m
- **Venom:** **Neurotoxic**
- **Venom Effects:** Progressive Weakness and Paralysis with or without minor swelling



### MOZAMBIQUE SPITTING COBRA (NAJA mossambica)

- **Distribution:** KZN, Limpopo
- **Colour:** Brown with an orange/salmon belly and black bands on the neck
- **Length:** 1.2-1.6m
- **Venom:** **Cytotoxic**
- **Venom Effects:** Painful Progressive Swelling



### CAPE COBRA (NAJA nivea)

- **Distribution:** Western, Northern and parts of the Eastern Cape as well as parts of the Free State
- **Colour:** Varied between yellow, brown, black, cream and a speckled phase
- **Length:** 1.4-1.6m
- **Venom:** **Neurotoxic**
- **Venom Effects:** Progressive Weakness and Paralysis



### SNOUTED COBRA (NAJA annulifera)

- **Distribution:** KZN, Limpopo and Mpumalanga
- **Colour:** Yellowish brown with a yellow belly, or black and cream bands
- **Length:** 1.8-2.5m
- **Venom:** **Neurotoxic & Cytotoxic**
- **Venom Effects:** Progressive Weakness and Paralysis along with Painful Progressive Swelling



### FOREST COBRA (NAJA subfulva)

- **Distribution:** Coastal Northern KZN
- **Colour:** Black back half with a yellowish-brown front half
- **Length:** 2-2.7m
- **Venom:** **Neurotoxic & Cytotoxic**
- **Venom Effects:** Progressive Weakness and Paralysis along with Painful Progressive Swelling

## MONOVALENT ANTIVENOM SPECIES —



### BOOMSLANG (DISPHOLIDUS typus)

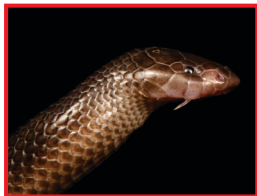
- **Distribution:** Found throughout South Africa apart from the driest parts and Lesotho
- **Colour:** Grey, Brown, Green, Red, Blue, Green with Black "bands", black backs with yellow bellies
- **Length:** 1.5-2.0m
- **Venom:** **Haemotoxic**
- **Venom Effects:** Bleeding

## OTHER SPECIES



### VINE SNAKE (*THELOTORNIS capensis*)

- **Distribution:** Parts of KZN, Limpopo and Mpumalanga
- **Colour:** Cryptically coloured resembling a stick
- **Length:** 1.2-1.5m
- **Venom:** **Haemotoxic**
- **Venom Effects:** Bleeding



### STILETTO SNAKE (*ATRACTASPIS bibronii*)

- **Distribution:** KZN, Gauteng, Free State, North West, Limpopo, Mpumalanga and Northern Cape.
- **Colour:** Body brown to blackish, Belly may be white
- **Length:** 40-60cm, max 98cm.
- **Venom:** **Cytotoxic**
- **Venom effects:** Moderate swelling with potential of causing local tissue necrosis.



### NIGHT ADDER (*CAUSUS rhombeatus*)

- **Distribution:** SA's east coast down to Swellendam, including Gauteng, Limpopo, Mpumalanga and small part of Free State.
- **Colour:** Dark brown Rhombic markings on the back. Body colour varies from light grey to brown. Characteristic "V" shape marking on the head.
- **Length:** 40-60cm. Max 1m
- **Venom:** **Cytotoxic**
- **Venom effects:** Moderate local swelling and pain.

**Photo Credit:** Neville's Snake and Reptile Rescue, Eastern Cape.

Even though localized symptoms could seem extreme, there is no antivenom for the treatment of stiletto and night adder bites.

#### DISCLAIMER

The authors and editor have exerted every effort to ensure that the clinical procedures and recommendations described herein are based on current knowledge and state of the art information obtained from acknowledged authorities, texts and journals. However, they cannot be considered absolute and universal recommendations. Each patient situation must be considered individually. The reader is urged to check the package inserts of drugs and equipment and the manufacturers recommendations for indications, contraindications, proper usage, warnings and precautions before use. The authors and editor disclaim responsibility for any adverse effects resulting directly or indirectly from information presented in this booklet, undetected errors or misunderstandings by the readers.