

# STATE TOXINOLOGY SERVICES

Toxinology Dept., Women's & Children's Hospital, North Adelaide SA 5006 AUSTRALIA

## SNAKEBITE MANAGEMENT OVERVIEW DOCUMENT

www.toxinology.com record number SN0200

Family Viperidae Scientific name combined *Bitis arietans arietans* , *somalica*

Common name Puff Adder , Common Puff Adder , African Puff Adder ( *B. a. arietans* ) , Somali Puff Adder ( *B. a. somalica* )

Global region in which snake is found Middle East + North Africa + Sub-Saharan Africa

### CLINICAL OVERVIEW

Puff adder bites have a high probability of significant, even lethal envenoming, with both local and systemic effects. The bitten limb is likely to develop moderate to severe swelling, with marked pain, blistering, bruising, and necrosis is common. Massive fluid shifts into the bitten limb can cause secondary shock and potentially, though uncommonly, renal failure. In addition, there may be significant general systemic symptoms and in some cases, systemic coagulopathy, with bleeding and thrombocytopenia. Bleeding can occur due to venom haemorrhagins, especially into the gut. Arterial thrombosis can occur, principally affecting the bitten limb (especially the popliteal artery).



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### **SNAKEBITE MANAGEMENT OVERVIEW DOCUMENT (continued)**

*Bitis arietans arietans*, *somalica*

#### **First aid**

1. After ensuring the patient and onlookers have moved out of range of further strikes by the snake, the bitten person should be reassured and persuaded to lie down and remain still. Many will be terrified, fearing sudden death and, in this mood, they may behave irrationally or even hysterically. The basis for reassurance is the fact that many venomous bites do not result in envenoming, the relatively slow progression to severe envenoming (hours following elapid bites, days following viper bites) and the effectiveness of modern medical treatment.
2. The bite wound should not be tampered with in any way. Wiping it once with a damp cloth to remove surface venom is unlikely to do much harm (or good) but the wound must not be massaged.
3. All rings or other jewellery on the bitten limb, especially on fingers, should be removed, as they may act as tourniquets if oedema develops.
4. The bitten limb should be immobilised as effectively as possible using an extemporised splint or sling; if available, crepe bandaging of the splinted limb is an effective form of immobilisation.
5. If there is any impairment of vital functions, such as problems with respiration, airway, circulation, heart function, these must be supported as a priority. In particular, for bites causing flaccid paralysis, including respiratory paralysis, both airway and respiration may be impaired, requiring urgent and prolonged treatment, which may include the mouth to mask (mouth to mouth) technique of expired air transfer. Seek urgent medical attention.
6. Do not use Tourniquets, cut, suck or scarify the wound or apply chemicals or electric shock.
7. Avoid peroral intake, absolutely no alcohol. No sedatives outside hospital. If there will be considerable delay before reaching medical aid, measured in several hours to days, then give clear fluids by mouth to prevent dehydration.
8. If the offending snake has been killed it should be brought with the patient for identification (only relevant in areas where there are more than one naturally occurring venomous snake species), but be careful to avoid touching the head, as even a dead snake can envenom. No attempt should be made to pursue the snake into the undergrowth as this will risk further bites.
9. The snakebite victim should be transported as quickly and as passively as possible to the nearest place where they can be seen by a medically-trained person (health station, dispensary, clinic or hospital). The bitten limb must not be exercised as muscular contraction will promote systemic absorption of venom. If no motor vehicle or boat is available, the patient can be carried on a stretcher or hurdle, on the pillion or crossbar of a bicycle or on someone's back.
10. Most traditional, and many of the more recently fashionable, first aid measures are useless and potentially dangerous. These include local cauterization, incision, excision, amputation, suction by mouth, vacuum pump or syringe, combined incision and suction ("venom-ex" apparatus), injection or instillation of compounds such as potassium permanganate, phenol (carbolic soap) and trypsin, application of electric shocks or ice (cryotherapy), use of traditional herbal, folk and other remedies including the ingestion of emetic plant products and parts of the snake, multiple incisions, tattooing and so on.

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#### **Clinical summary**

Puff adder bites are a major cause of snakebite cases within its extensive African range. The actual number of bites each year is unknown, but likely to exceed 1,000, possibly >10,000. The number of fatal cases is also unknown, but it is probably an important cause of African snakebite fatalities, though few fatal cases are recorded in the literature. Possibly more significantly, the severe local effects of envenoming frequently result in long term loss of function in the bitten limb, a sequelae that affects a large number of victims.

A typical puff adder bite causes moderate to severe local pain, moderate to severe swelling, that can extend beyond the bitten limb, extensive local bruising, blistering and often severe necrosis. Compartment syndromes often occur. Necrosis may be more extensive if arterial thrombosis occurs (typically popliteal artery). Fluid shifts into the bitten limb can be massive, causing hypovolaemic shock. It is also possible that the venom is directly cardiotoxic, causing hypotension and sinus bradycardia.

Coagulopathy is not a major feature of envenoming, but thrombocytopenia is well reported and systemic haemorrhaging, due to venom haemorrhagins, is common and may affect many organs, notably the GIT.

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### **SNAKEBITE MANAGEMENT OVERVIEW DOCUMENT (continued)**

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#### **Treatment summary**

Puff adder bites usually cause at least moderate local effects, often severe local effects and sometimes severe, even fatal systemic effects. Therefore all cases require urgent assessment and management and minimum overnight admission.

Insert an IV line and give an initial IV fluid load. Carefully monitor fluid input and output. The likelihood of major fluid shifts into the bitten limb, with consequent secondary hypotensive shock, should guide initial and ongoing fluid replacement IV, in a similar fashion to that used in major burns. Similarly, beware later fluid reabsorption, resulting in potential fluid overload and pulmonary oedema, especially in children. In inserting IV lines and taking blood, be careful in selection of veins etc, because of the likelihood of ongoing ooze in association with coagulopathy. In particular, avoid veins such as the subclavian, femoral and jugular. If possible, insert a long line in the antecubital fossa. A radial arterial line is also useful in this setting, both for repeated blood testing and continuous BP measurement. While a central venous line may be useful in monitoring central pressure in the setting of fluid shifts, consideration must also be given to potential adverse bleeding from insertion, in the setting of haemorrhagic coagulopathy.

Antivenom is the primary therapy, neutralising systemic venom and possibly reducing local venom effects. It should be given IV as soon as it is clear significant envenoming has occurred. This may be determined by rapid development of major local swelling, or rapid extension of swelling, or development of blistering, or systemically detectable coagulopathy, either by lab tests, or by clinical bleeding. The SAVP Polyvalent Antivenom (South Africa) is the most appropriate antivenom. Initial dose should be at least 8-10 vials, but further doses should be given if there is inadequate response 3 hours after the initial dose. There is no clear lab test result to guide the need for further antivenom; the decision should therefore be made on the basis of clinical response or deterioration.

Local wound care is important. The bite area should not be debrided until after any coagulopathy has resolved. Compartment syndrome can develop, but should never be treated with fasciotomy, except when the raised compartment pressure has been confirmed by direct measurement, any coagulopathy has reversed, and more conservative measures have been tried, such as IV mannitol. Fasciotomy will result in long term scars and functional deficit, even when used appropriately, therefore benefit must be weighed against likely long term damage from untreated compartment syndrome.

Antibiotics may be required for local secondary infection, but need not be routinely used, while tetanus prophylaxis should be ensured in all cases.

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#### **Available antivenoms**

SAIMR Polyvalent Antivenom  
South African Vaccine Producers (Pty) Ltd  
Postal -  
P.O. Box 28999  
Sandringham 2131  
Gauteng Province

Physical -  
1 Modderfontein Road, Sandringham  
Johannesburg  
South Africa  
Phone: ++27-11-882-9940  
Fax: ++27-11-882-0812  
Email: [savpunit@global.co.za](mailto:savpunit@global.co.za) / [savpqual@global.co.za](mailto:savpqual@global.co.za)  
Website: [www.savp.co.za](http://www.savp.co.za)

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#### Management Flowchart

