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# Major upper limb amputation after Snake Bite Gangrene

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## Summary

Major lower limb amputations following snake bite gangrene have been reported from the savannah belt of Nigeria. In bites delivered to the upper limb, amputations are often of the digits (minor amputations). We report the case of a male farmer who had an above elbow amputation after a snake bite to the hand. Explanation for the amputation is proposed and need for prevention highlighted.

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## Introduction

In the developing world, snake bites are an occupational disease, occurring most commonly among rural male agricultural workers (1, 2). The extremities (3), especially the hand and foot (4-6), are usually bitten. Reports of major amputations proximal to the ankle are more common (4, 7, 8). In the upper limb, however, it is often the digits that are amputated (4, 5). We report the case of a male farmer from Northern Nigeria who had above elbow amputation after a bite in the hand by an unidentified snake.

## Case Report

A 50-year old right-handed, non-diabetic and normotensive male farmer presented to Federal Medical Centre, Birnin Kudu in Northern Nigeria, with a dark, blistered, swollen left upper limb (Figure 1) exuding offensive discharge. There was also history of nausea, vomiting and passage of dark urine. Two weeks before presentation he had felt a sudden sting on his left thumb while packing a heap of grass in his farm. Within a few minutes he started having abnormal sensations in his hand. Fang marks were noted and a fang was removed. Subsequently, there was a gradual onset of swelling which progressed from the left hand to mid-arm. He sought initial treatment from a herbalist and a tourniquet was not used. At presentation at our centre, he was febrile (temperature=38°C), pale (PCV=24%), jaundiced and had dark urine. His pulse was regular, of good volume, with a rate of 92 beats per minute. His supine blood

pressure was 80/50mmHg. There was wet gangrene of the left upper limb up to the mid-arm level. A clinical diagnosis of limb gangrene with septicaemia was entertained.

He was optimized (fluid resuscitation, blood transfusion, tetanus toxoid administration, ceftriaxone and metronidazole commenced) for an emergency above knee guillotine amputation (figure 2). Shoulder abduction exercises were started as soon as pain subsided. The wound, however, continued to discharge and needed further nibbling of distal end of the left humerus, daily dressing, wound cultures and antibiotic changes. The discharge and all signs of sepsis settled in his fourth month of care. He underwent split thickness skin grafting of the wound with a 98% take.

He was discharged 4 months after presentation with a healed stump and 70° range of shoulder abduction.

## Discussion

About 1 million snake bites of which there are 500,000 cases of envenoming probably occur annually in Africa (9). An incidence of 600/100,000 population per year has been reported for the Benue valley of Nigeria (10). As in the patient in this case, majority of them occur in male farmers who live in rural areas.

The reports by Abubakar et al (4) and Abbas et al (8) are also from the savannah belt of Nigeria. Of 16 amputations in the Abubakar et al report, all 10 amputations in the upper limb were minor while 2 of the 6 in the lower limb were major. Abbas et al reported 2 major lower



Figure 1. Gangrene of the left upper limb up to mid-arm after snake bite to the thumb



Figure 2. Above elbow guillotine amputation for snake bite gangrene

limb amputations in paediatric victims of snake bite. In contrast, ours is a report of major upper limb amputation following snake bite. We are not aware of such a report from the savannah belt of Nigeria.

Why are major amputations more likely after bites to the lower limbs than the upper limbs? The higher documented incidence in Nigeria (3, 11) of lower limb snake bites is a possible explanation. Reviewing the series by

Abubakar et al (4) would however suggest that some 'protective' factor(s) for the upper limb seem plausible. We postulate that closer proximity of the upper limb to the heart and the relatively smaller muscle bulk would, respectively, promote more rapid dispersal of snake venom (assuming a tourniquet is not used, as in our patient) and provide smaller amount of tissue necrosis for bacterial proliferation with consequent reduction of the

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likelihood of major amputation in the upper limb. Tissue necrosis is caused by the various enzymes in snake venom. Compartment syndrome, the unhygienic prehospital intervention often sought by victims in developing countries (4, 8), delay in presentation (4) and bacterial infection may combine with tissue necrosis to make major amputation inevitable. All these factors were in operation in our patient and those of others (4,8). We believe that local envenoming must have been more severe in our patient, overwhelming the 'protective' factors. In support of severe envenoming in our patient were local features of envenoming and possible myoglobinuria or haemoglobinuria occasioning the dark urine. Disability from amputation in a farming environment, poverty and inaccessibility to prostheses has consequences. Prevention is imperative. Farmers should wear protective shoes, long trousers and protective gloves while working on the farm. Health education should focus on enjoining victims to report to hospital immediately. Efforts should be made to provide facilities in rural areas (12) and train rural workers in first aid.

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