



Treating the Local Effects of Snake Bite

Lecture 13: Snake Bite Management Course

Introduction

- Several of the dangerous Cambodian Snake species cause mild to serious local toxicity
- Kraits, however, cause serious illness without any sign of local toxicity - this helps differentiate their bites
- Local toxicity can lead to numerous complications
- Wound care must include all possible efforts to reduce the risk of soft tissue infection
- Cutaneous necrosis can be difficult to identify
- Identification of Compartment Syndrome & deep tissue necrosis can be difficult & requires careful examination - it **cannot** be diagnosed by appearance
- Local toxicity sometimes leads to referral of a patient to a surgeon, often inappropriately, leading to permanent & significant disability for the patient, or death

Unknown Snakebite at Night



Local Swelling



Local Bruising & Swelling



A M. 46"
2311 BÌNH PHƯỚC
RẮN CHÂM QUẠP CẦN
25 (C. rhodostomum)

Local Bruising...or Necrosis?



Cobra Bites



Haemorrhagic Bullae



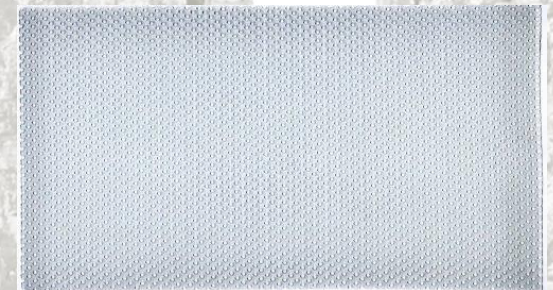
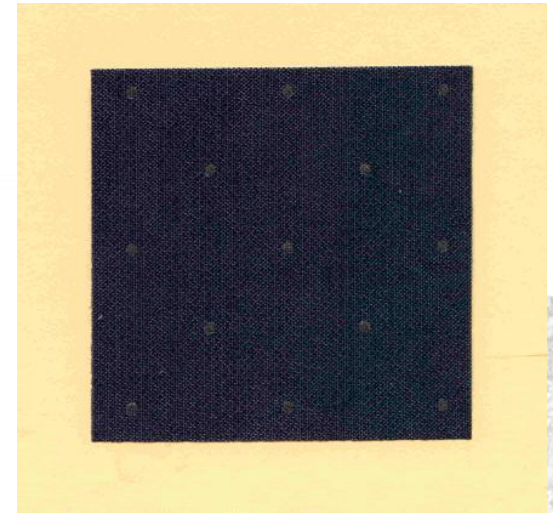
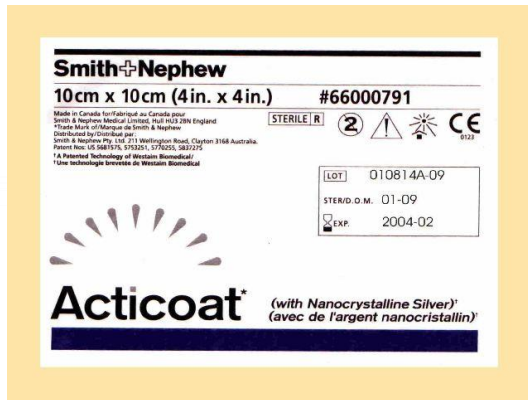
Poorly Managed Haemorrhagic Local Toxicity



Local Treatment & Dressings

- Daily careful, gentle cleansing with soap & water or a gentle antiseptic
- Avoid bursting bullae at all costs
- Gently aspirate large bullae by sterile technique, at the base, using iodine, a large syringe & a fine needle
- Any dressings applied should be non-stick & ideally antibacterial, eg. (in order of preference)
 - “Acticoat” (polyethylene mesh impregnated with nano-silver, enclosing a layer of rayon & polyester; S&N)
 - “Mepitel” (flexible polyamide net coated in silicone gel; Molnlycke Health Care)
 - “Bactigras” (paraffin soaked cotton gauze + 0.5% chlorhexidine; S&N)
 - “Adaptic” (petroleum emulsion-coated gauze: J &J)
 - All are usually overlain with an absorbent, non-stick dressing such as “Melonin” or “Cutilin”

Modern Non-adherent Dressings (1)



Modern non-Adherent Dressings (2)



Simple Alternative Dressing



- Clingfilm, or an equivalent, is cheap & readily available. It is sterile & suitable as a temporary dressing, having the advantages of
 - Allowing visibility of the local tissue injury
 - Providing a barrier to bacteria
 - Maintaining hydration of the wound

Treatment of Infections (1)

- Local soft tissue infection:
 - Will complicate local tissue injury covered with non-sterile dressings & poultices, and incisions, as well as at IV sites
 - Remove any contaminating material, such as cow dung!
 - Thoroughly clean wounds with saline
 - Only close wounds which are less than 6 hours old, in clean skin, that were never been contaminated - else leave open for 5 days
 - Early IV antibiotics (at least 5 days course - **not** a stat dose)
 - gram positive (penicillin or flucloxacillin)
 - +/- gram negative antibiotic cover
 - + metronidazole if cow dung has been used

Treatment of Infections (2)

- Tetanus vaccination
 - tetanus immunisation for snake bite patients (3 doses over 6 months, if no previous vaccination, or a single dose if previous vaccination) once coagulopathy has resolved
 - Tetanus vaccination essential - once coagulopathy has resolved ($<3/7$), or with a fine needle; ensure completion of full course as an outpatient - further doses at 6/52, 6/12
 - Tetanus toxoid should also be given if the patient has a cow dung poultice on broken skin, or other tetanus-prone wounds, with no previous tetanus vaccination, **ALONG WITH** tetanus immunoglobulin
 - Give a tetanus booster if the patient has had a full vaccination course with the last dose more than 10 years ago

Monitoring Local Tissue injury

- This can be monitored in the following ways:
 - Mark the area of swelling, blistering, bruising once a day (maybe more often in the first 2 days)
 - Measure the circumference of the limb at:
 - The ankle, mid-calf, knee
 - The wrist, upper forearm, elbow
 - Photographs can be taken (many people now have mobile phones) at regular intervals:
 - Print these & place them in the patient's medical record, or
 - Keep them on the hospital computer in a folder labeled with the patient's details

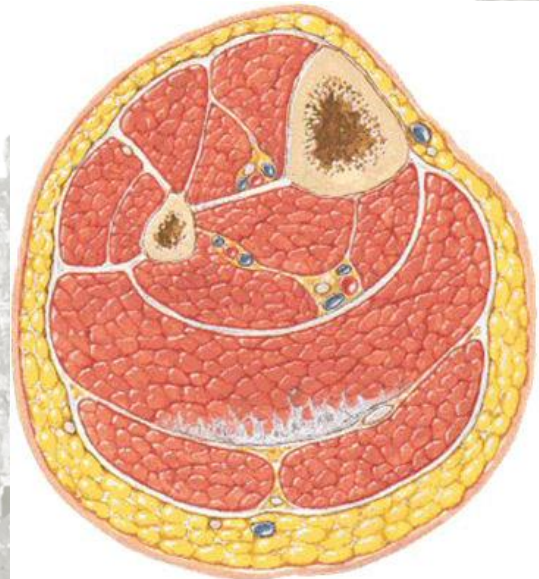
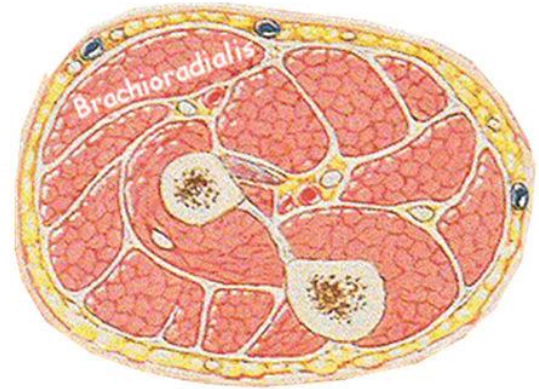
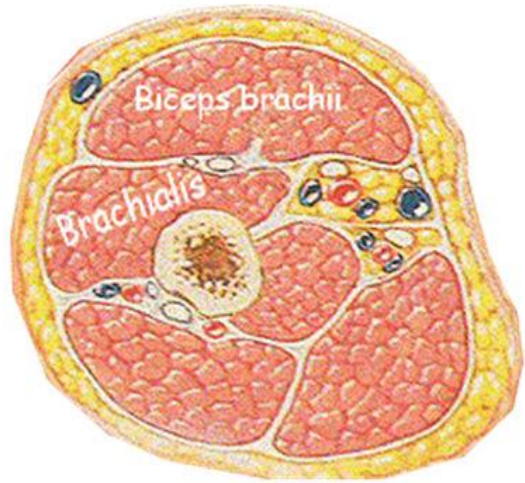
Compartment Syndrome

- Similar effects can be seen from different mechanisms:
 - Constriction from outside the muscle:
 - A tight plaster cast around a swelling limb
 - Tight bandages around a swelling limb
 - The formation of rigid eschar/full thickness (or deep partial thickness) burns
 - Massive swelling of the superficial soft tissues, exceeding their capacity to stretch
 - Increase in muscle size:
 - A crush injury to muscle, a closed fracture or intramuscular haematoma
 - A vascular injury/occlusion of the arteries supplying a limb, leading to a period of ischaemia & hence swelling
 - Generalised toxin-mediated muscle injury - rarely
 - Not due to deep vein thrombosis

Criteria for making the Diagnosis of Compartment Syndrome

- It is not possible to diagnose CS from appearance alone
- Tense, painful limb not responding to normal doses of opiates
- **5 P's:**
 - Pain at rest & on passive extension of muscles
 - Pale, cool (or cyanosed) peripheries
 - Parasthesiae
 - Poor capillary return
 - Pulseless (a late sign!!!!)

Limb Muscle Compartments



Measurement of Muscle Compartment Pressures (1)

- Direct measurement:
 - Using a needle (ideally ultrasound-guided, to find compartment & avoid vessels) inserted aseptically into the muscle compartment of concern
 - Pressure is transduced with either a manometer or an arterial or CVL transducer
 - A bit difficult to set up, no kit available commercially
 - Complications:
 - painful, invasive
 - can cause bleeding & infection
 - awkward to do continuous monitoring
- Indirect measurement may be available in the future with the use of high-resolution Doppler ultrasound (S.Jensen - work in progress)

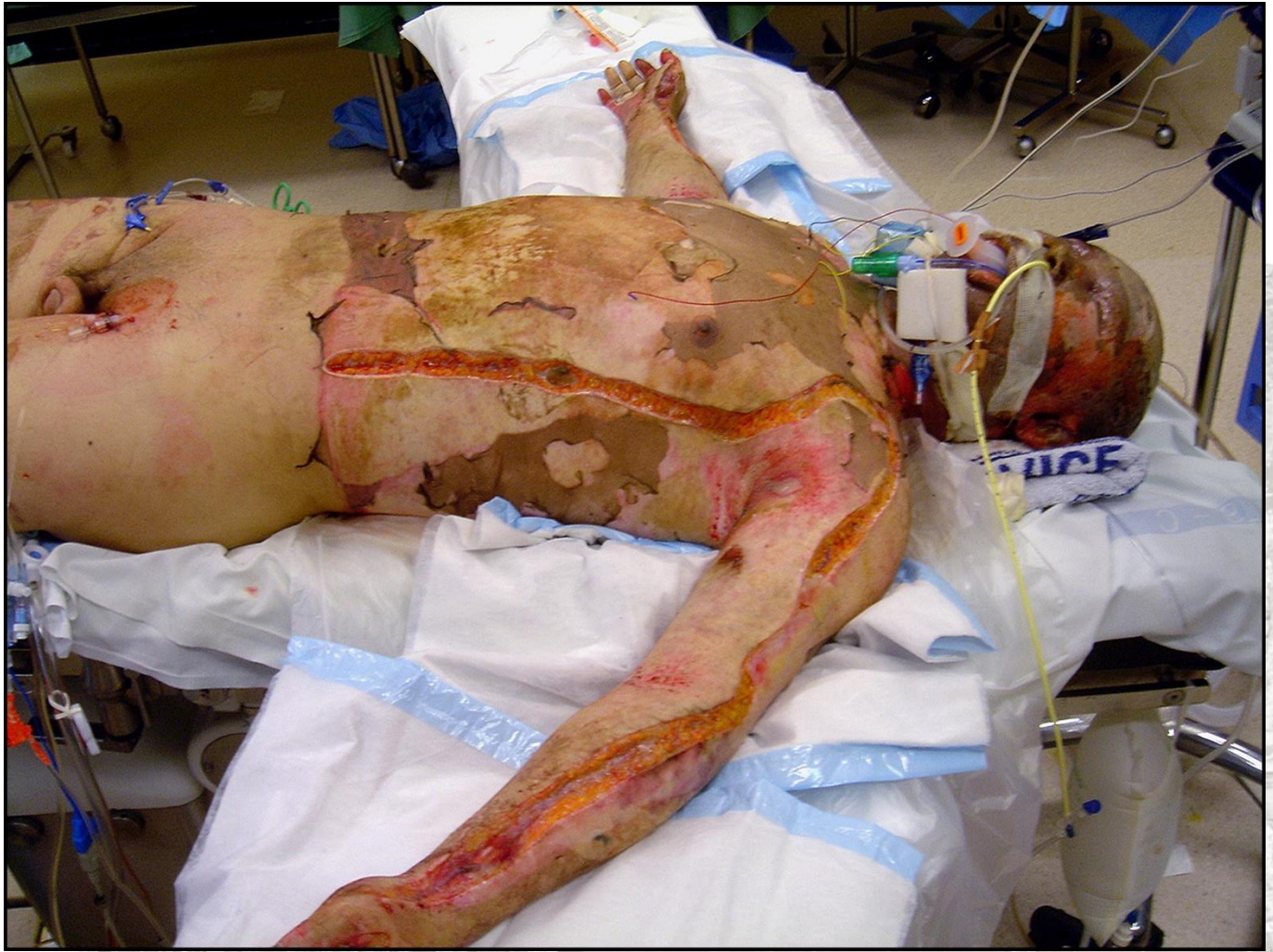
Measurement of Muscle Compartment Pressures (2)

- Basic auditory Doppler probes, for detecting peripheral pulses are of very limited use
- Measured pressures:
 - Normal <10mmHg
 - Equivocal 10-20mmHg
 - Mildly-Moderately raised 20-30mmHg
 - Significantly raised >30mmHg
- Keep DBP (measured at the same level in the opposite limb) at least 10-20mmHg above the compartment pressure

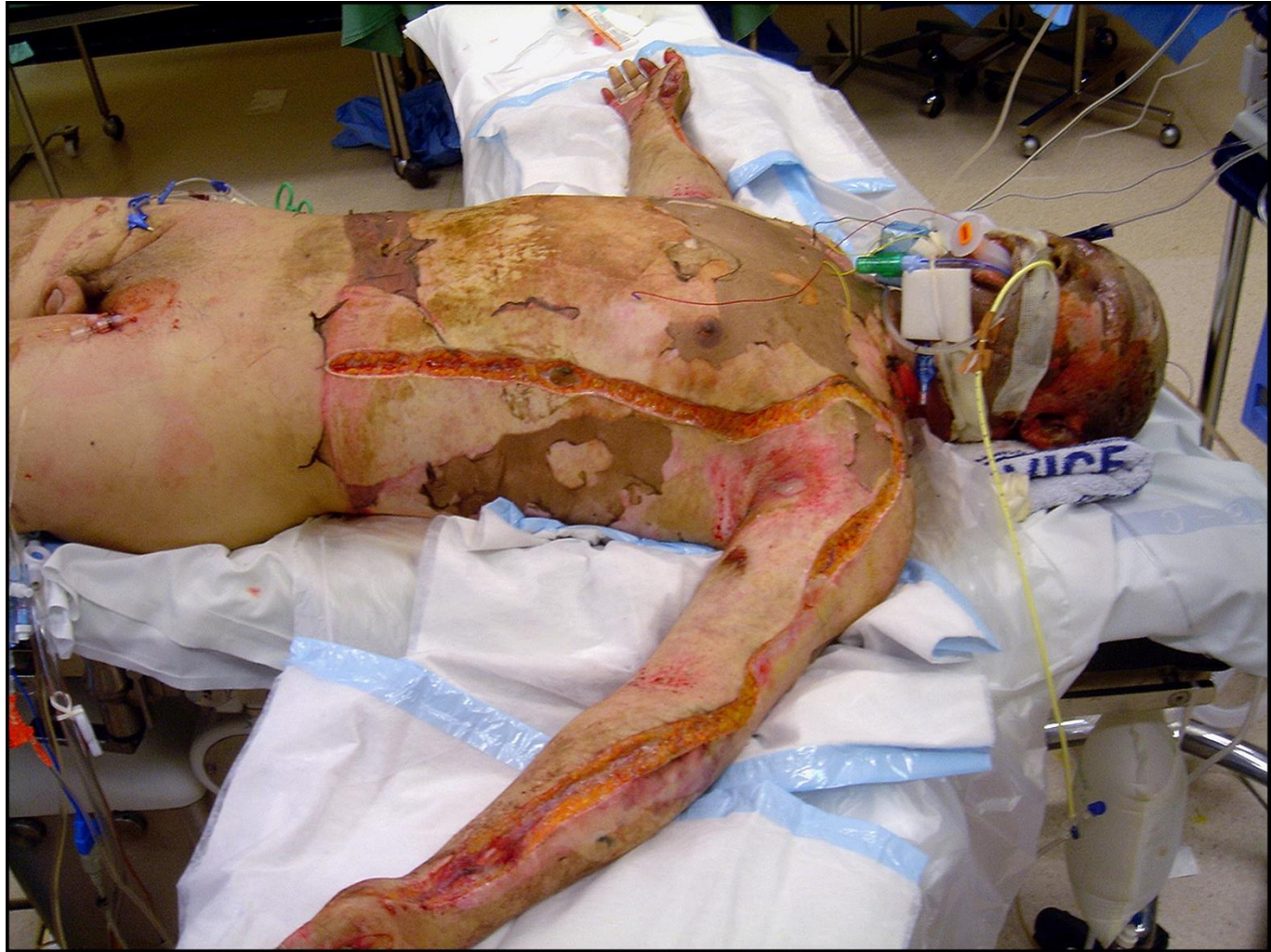
Fasciotomy & the Dangers of Surgery

- Fasciotomy is the incision of the full length of the muscle fascia (ideally via a keyhole in the skin)
- Escarotomy is the incision through scar tissue, usually reserved to full thickness burns
- **Any surgical procedure is contraindicated in the presence of coagulopathy**
- Bleeding, pain, infection, contractures, disfigurement are all complications of surgery in these patients
- Local tissue injury is best managed by **early, appropriate antivenom, in effective doses**
- Patients with extensive local injury usually recover fully without requiring surgery

Escharotomy (1)



A photograph of a patient lying on a hospital bed, showing extensive escharotomy incisions. The patient's torso and arms are covered in large, irregular, and deep incisions made through the eschar (dead skin) to relieve pressure and improve circulation. The patient is lying on their back, and the incisions are visible on the chest, abdomen, and both arms. The patient is wearing a white hospital gown, and various medical tubes and wires are attached to their chest and head. The background shows a typical hospital room setting with a bed, a chair, and some medical equipment.



Escarotomy (2)



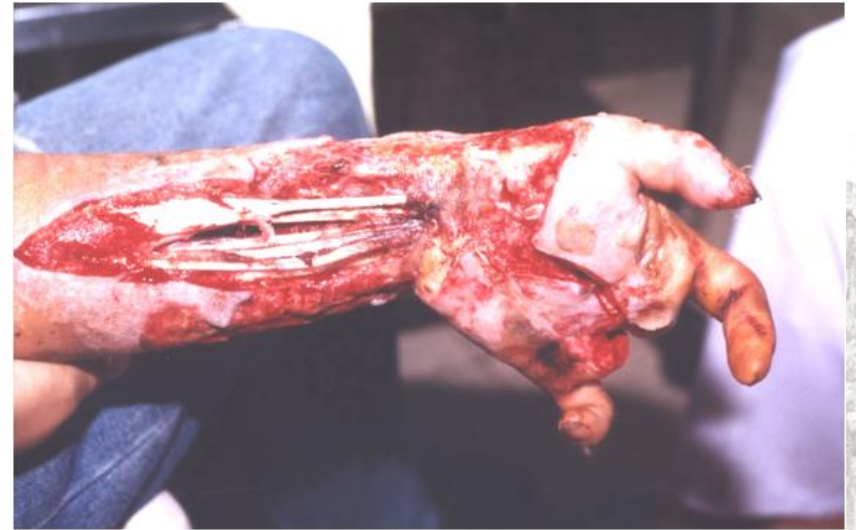
Unnecessary, Ineffective Surgery: Green Pit Viper Bite



Limited Surgery - Malayan Pit Viper Bite



Surgical Results



Devastating Amputations



Suspected Malayan Pit Viper Bite: Recovery Without Surgery



Malayan Pit Viper - No Surgery



Recovery from Malayan Pit Viper Bite



Treatment of Pain

- Pain, swelling, bruising
- Simple analgesics (**not aspirin**, or NSAIDs!) PR or by the OGT (not IM)
- Regular paracetamol (1g Q6H adult, 15mg/kg Q6H child)
- PRN low-dose IV morphine (2.0-2.5mg boluses up to every 15 mins until comfortable in adult, 0.5-2.0mg in child)
- Giving morphine should be given more cautiously to a patient with neurotoxicity who is not intubated

Ocular Injury by Spitting Cobras (1)

- Symptoms:
 - Immediate & persistent intense burning/stinging
 - Blurring/clouding, then possibly loss, of vision
 - Profuse watering & whitish discharge
 - Photophobia
- Signs:
 - Watering (epiphora)
 - Conjunctivitis/conjunctival injection
 - Spasm & swelling of the eyelids
 - Conjunctivitis
 - African (not Asian) spitting cobra: corneal ulceration, permanent scarring, endophthalmitis
 - Signs of systemic envenomation have not been reported

Ocular Injury by Spitting Cobras (2)

- Treatment:
 - Immediate copious irrigation of the eyes & surrounding skin with water or saline
 - Strongly encourage the patient not to rub their eye(s)
 - 0.5% adrenaline drops relieves pain & inflammation, but will need to be repeated frequently
 - Suitable alternatives are any local anaesthetic eye solution or 1% lignocaine + adrenaline
 - The instillation of antivenom can cause local irritation & is of no clear value, hence is not recommended
 - Since corneal ulceration can occur (& abrasions from rubbing), fluorescein staining & slit lamp examination are essential

Ocular Injury by Spitting Cobras (3)

- For prevention of:
 - corneal infection, infective conjunctivitis, endophthalmitis & corneal scarring/opacities
 - antibiotic ointment (preferred over drops), chloramphenicol or tetracycline
 - use until pain is completely resolved & repeat slit lamp examination has revealed healing of the cornea
- Steroid or anti-inflammatory eye drops may be of value in reducing pain & inflammation
- Photophobia associated with pupillary (ciliary) spasm may be relieved with mydriatic (dilating) drops
- Some ophthalmologists suggest the use of eye pads, which at least relieves photophobia & reduces injury from rubbing
- Oral analgesia should be used to supplement topical agents, such as codeine/paracetamol & an anti-inflammatory analgesic
- Closely monitor the progress of any ulceration



Summary - Key Points

- Local tissue injury occurs commonly after snake bite:
 - some are minor & NEVER require surgery (Green pit vipers)
 - some rarely require surgery (cobra bites)
 - some occasionally require surgery (other viper bites)
- Surgery is associated with many adverse effects, especially heavy bleeding, infection & potentially increasing necrosis; **it should be avoided**
- Compartment syndrome cannot be diagnosed by visual inspection & has specific criteria for diagnosis
- Monitor the progress of local injury
- Good results can be obtained in most patients with:
 - early appropriate antivenom
 - good wound care, including aspiration of haemorrhagic blisters
 - IV antibiotics for established infection (prophylactic use may select resistant organisms)