

**FROSTBITE AND OTHER
LOCALIZED COLD-RELATED
INJURIES (Nonfreezing Cold
Injuries)**

Chilblains

- Chilblains, or **pernio**, is characterized by usually mild but uncomfortable inflammatory lesions of the skin of bared body areas caused by chronic intermittent exposure to cold weather
- Localized edema, erythema, cyanosis, plaques, nodules, and in rare cases, ulcerations, vesicles, and bullae. (**appear up to 12 hours after acute exposure**)





Trench foot

- *Immersion foot*
- Early symptoms progress from tingling to numbness of the affected tissues.
- On initial examination, the foot is pale, mottled, anesthetic, pulseless, and immobile, which initially does not change after rewarming.
- A hyperemic phase begins within hours after rewarming
- As perfusion returns to the foot over 2 to 3 days, **edema and bullae** form, and the hyperemia may worsen.





Panniculitis

- Mild degrees of necrosis of the subcutaneous fat tissue that develops during prolonged exposure to temperatures just above freezing.
- children and on the thighs and buttocks of young women involved in equestrian activities.
- There is no effective treatment for the injury.

Cold Urticaria

- Antihistamines are recommended for acute cases, but **ketotifen**, **doxantrazole**, and **zafirlukast** may be tried if cold urticaria is persistent.
- In rare cases may lead to fatal anaphylaxis.

Treatment (Chilblains)

- The affected skin should be rewarmed, gently bandaged, and elevated.
- Oral **nifedipine** 20 mg three times daily
- Limaprost, 20 micrograms PO three times daily as both a prophylactic and therapeutic treatment for local cold injury.
- Topical **corticosteroids** (0,025% fluocinolone cream) and even a brief burst of oral corticosteroids, such as prednisone, have been shown to be useful.

Effective prophylaxis (Trench foot)

- Keeping warm, ensuring good boot fit, changing out of wet socks several times a day never sleeping in wet socks and boots, and once early symptoms are identified, maximizing efforts to warm, dry, and elevate the feet .

Frostbite

- Frostbite can occur on any skin surface but generally is limited to the nose, ears, face, hands, feet and penis



First-degree injury

- Characterized by partial skin freezing, erythema, mild edema, lack of blisters, and occasional skin desquamation
- The patient may complain of transient stinging and burning, followed by throbbing. Prognosis is excellent.

Second-degree injury

- Characterized by full-thickness skin freezing , formation of substantial edema over 3 to 4 h, erythema, and formation of clear blisters . The blisters form within 6 to 24 h
- Numbness, followed later by aching and throbbing. Prognosis is good.



(c) University Erlangen,
Department of Dermatology
Phone: (+49) 9131-85-2727

Third-degree injury

- Characterized by damage that extends into the subdermal plexus. Hemorrhagic blisters form and are associated with skin necrosis and a blue-gray discoloration of the skin
- The patient may complain that the involved extremity feels like a "block of wood," followed later by burning, throbbing, and shooting pains.
- Prognosis is often poor.

Fourth-degree injury

- Characterized by extension into subcutaneous tissues, muscle, bone, and tendon.
- There is little edema. The skin is mottled, with nonblanching cyanosis, and eventually forms deep, dry, black, mummified eschar.
- Vesicles often present late (do not extend to the digit tips).
- The patient may complain of a deep pain.
- Prognosis is extremely poor



(c) Copyright Emedicine.com 1999, 2000

Treatment

FIELD MANAGEMENT

- The hypothermia and dehydration associated with frostbite should be addressed.
- Wet and constrictive clothing should be removed.
- The involved extremities should be elevated and wrapped carefully in dry sterile gauze, with affected fingers and toes separated.
- Further cold injury should be avoided.

- **Rapid rewarming** is the single most effective therapy for frostbite.
- Rewarming in the field is often impractical and sometimes is dangerous.
- If the victim has frozen feet and the only avenue to evacuation is prolonged ambulation, rewarming can complicate matters significantly.
- It can be excessively **painful**

- If rewarming is attempted in the field, only clean water warmed to 37 to 39°C for approximately 20 to 30 minutes, until the distal extremity is pliable and erythematous.
- The use of hot, untested tap water should be **avoided**
- Attempts to directly warm with dry air, such as campfires and heaters, should be **avoided**
- Rubbing snow on frostbitten tissue to stimulate circulation is ineffective, destructive, and absolutely **contraindicated**.

EMERGENCY DEPARTMENT MANAGEMENT

- Rehydration and general warming
- *Rapid rewarming* is the core of frostbite therapy and should be initiated as soon as possible.
- The injured extremity should be placed in gently circulating water at a temperature of *37 to 39°C* for approximately 20 to 30 min, until the distal extremity is pliable and erythematous.
- Frostbitten faces can be thawed using moistened compresses soaked in warm water

- Anticipate severe pain during rewarming, and treat with *parenteral opiates*.
- Clear blisters should be debrided or at least aspirated.
- Hemorrhagic blisters should not be debrided
- Therapy with **penicillin G** 500,000 U IV every 6 h for 48 to 72 h is recommended in prophylaxis
- Topical bacitracin
- Silver sulfadiazine has **no** benefit
- Tetanus immunization
- Ibuprofen 12mg/kg per d PO



© Rolf Hefner

DIAPER DERMATITIS

two forms of diaper rash

- * contact (irritant) dermatitis
- * candidal dermatitis



Treatment of contact diaper dermatitis includes good hygiene, air drying, and the use of barrier creams or ointments such as zinc oxide.

Treatment of candida dermatitis is with topical application of antifungal agents, most commonly nystatin cream (100,000 units/gram as a cream, powder, or ointment applied three times a day for 10 to 14 days) which may be applied in combination with barrier ointments (zinc oxide applied after nystatin) and topical steroids (1% to 2% hydrocortisone cream or ointment applied after nystatin, but before zinc oxide if used) for severely inflamed lesions. Infants with candidal diaper dermatitis should be carefully examined for concomitant oral thrush. If oral disease is present, it should be treated with oral nystatin in mixtures of 100,000 units/mL. Use 2 mL four times a day in infants and 4 to 6 mL four times a day in children. Administer for up to 48 hours after resolution of oral lesions.

Abusive Head Trauma or Shaken Baby Syndrome

Abusive head trauma is the most common cause of traumatic death and disability in infancy and early childhood. Although a number of terms have appeared in the medical literature over the years to describe the spectrum of cranial and ocular injuries that occur due to inflicted head injury in children, the American Academy of Pediatrics currently recommends the term *abusive head trauma* as the appropriate medical diagnostic terminology.

Abusive head trauma demonstrates a distinct pattern of injuries characterized by intracranial injury (hemorrhage, edema, or infarction) and ocular injury (retinal hemorrhage or retinoschisis). Skull, rib, or long bone fractures may be present; however, remarkably, there may also be no external evidence of trauma at all. Retinal hemorrhages occur in up to 80% of patients with abusive head trauma and typically are extensive.

Infants and children with abusive head trauma are brought to the ED with a broad spectrum of clinical concerns and findings. Children may present in extremis, with obvious signs of physical trauma. Alternately, they may present with only very subtle suggestions of irritability or feeding problems and no history of trauma at all. Apnea and seizures both have a significantly higher association with abusive head trauma than with accidental trauma. Unfortunately, a substantial number of cases of abusive head trauma go unrecognized due to the mild, nonspecific nature of the presenting symptoms and signs.

Differential diagnosis of abusive head trauma

birth-related

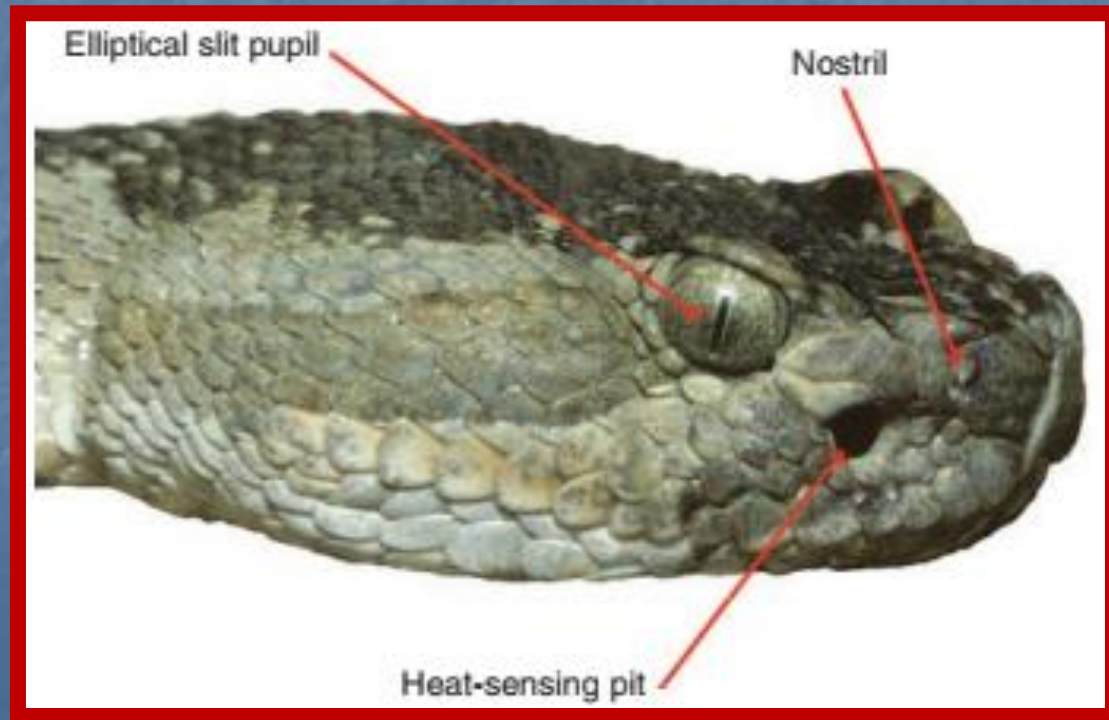
accidental trauma

-Subdural and retinal hemorrhages secondary to birth are typically asymptomatic, resolving well within the first month of life.

-Accidental falls are extremely unlikely to result in severe intracranial injury and typically result in focal damage with clear evidence of blunt impact to the head.

Snakebite

The crotaline snakes are called pit vipers because of bilateral depressions or pits located midway between and below the level of the eye and the nostril . The pit is a heat receptor that guides strikes at warm-blooded prey or predators. Within the pit viper group, the rattle distinguishes the rattlesnake from other crotaline snakes. The mistaken belief that rattlesnakes always rattle before striking has persisted for centuries. In truth, many strikes occur without a warning rattle.



PATHOPHYSIOLOGY

Crotaline venom is a complex enzyme mixture that causes local tissue injury, systemic vascular damage, hemolysis, fibrinolysis, and neuromuscular dysfunction, resulting in a mixture of local and systemic effects. Crotaline venom quickly alters blood vessel permeability; this leads to loss of plasma and blood into the surrounding tissue, which causes hypovolemia. Crotaline venom activates and consumes fibrinogen and platelets, causing a coagulopathy. In some species, specific venom fractions block neuromuscular transmission, which leads to cranial nerve weakness (e.g., ptosis), respiratory failure, and altered sensorium.

CLINICAL FEATURES

one or more fang marks,
localized pain,
progressive edema extending from the bite site
nausea and vomiting,
weakness,
numbness or tingling of the tongue and mouth
dizziness,
fasciculation.

effects include

tachypnea, tachycardia, hypotension, and altered level of consciousness.

In general, local swelling at the bite site becomes apparent within 15 to 30 minutes, but in some cases, swelling may not start for several hours.

In severe cases, edema can involve an entire limb within an hour. In less severe cases, edema may progress over 1 to 2 days.

Progressive ecchymosis may also develop because of leakage of blood into subcutaneous tissue.

oral

muscle

Systemic

DIAGNOSIS

The diagnosis of snakebite is based on the presence of fang marks and a history consistent with exposure to a snake (e.g., walking through a field). Snake envenomation involves the presence of a snakebite plus evidence of tissue injury. Clinically, the injury may be manifest in three ways: *local injury* (swelling, pain, ecchymosis), *hematologic abnormality* (thrombocytopenia, elevated prothrombin time, hypofibrinogenemia), or *systemic effects* (e.g., oral swelling or paresthesias, metallic or rubbery taste in the mouth, hypotension, tachycardia). Abnormalities in any one of these areas indicate that venom effect is developing. The absence of any of these manifestations for a period of 8 to 12 hours following the bite indicates a dry bite

TREATMENT

Do not :

- * suction and incision
- * Electric shock
- * Use tourniquets because they obstruct arterial flow and cause ischemia.

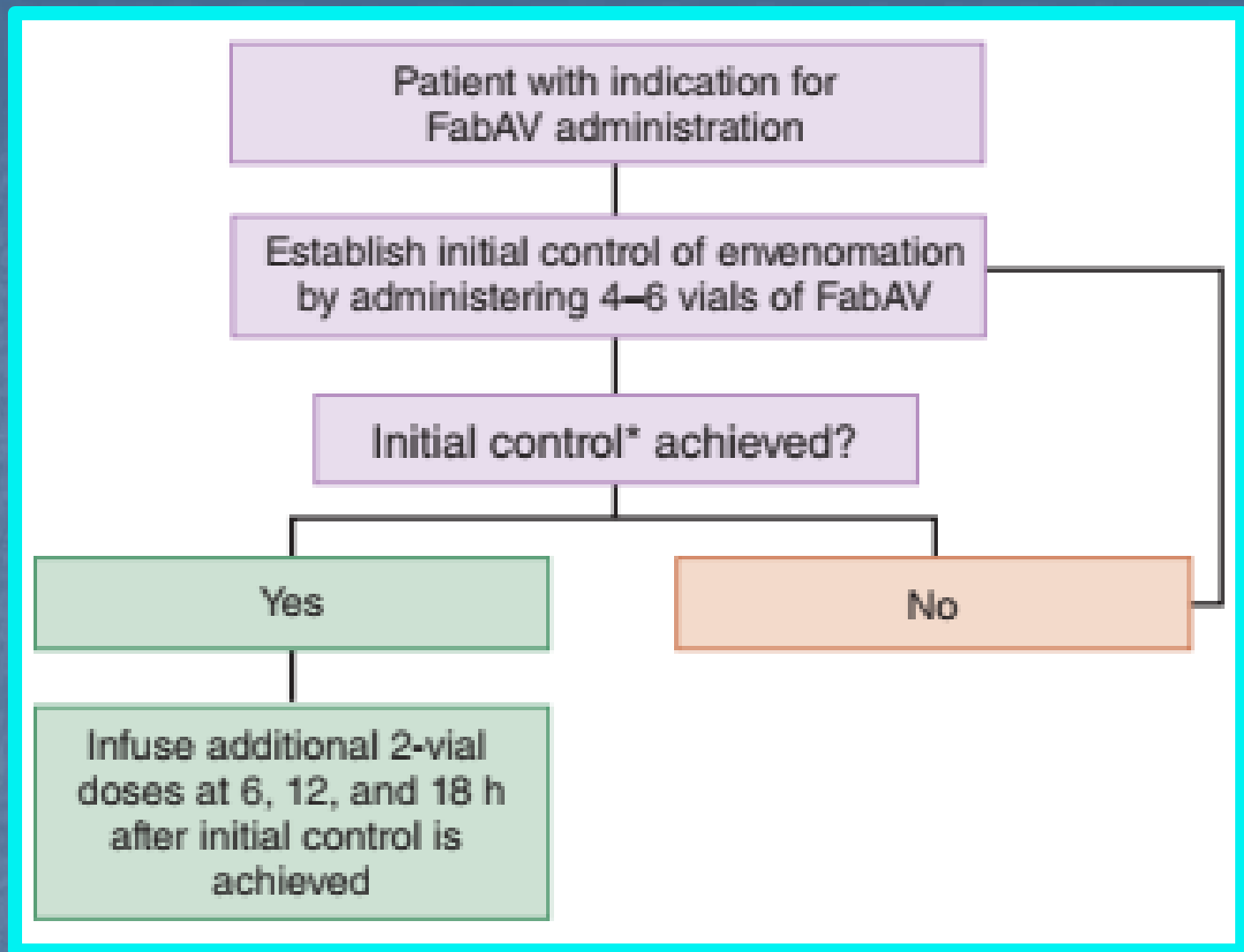
TABLE 212-1

Recommended First Aid Measures for Snakebite

- Retreat well beyond striking range. Many victims are bitten again while trying to capture the snake.
- Remain calm. Movement will increase venom absorption.
- Immobilize the extremity in a neutral position below the level of the heart.
- Ensure prompt transport to a medical facility whether or not there are signs of envenomation.
- Constriction bands (see text) can be applied if there is no nearby medical facility.

TABLE 212-3**Laboratory Evaluation in Crotaline or Elapid Snakebite**

- CBC^a
- INR or prothrombin time^a
- PTT^a
- Fibrinogen level^a
- Fibrin degradation product levels
- Serum electrolyte levels
- Glucose level
- BUN level
- Platelet count
- Creatine kinase level
- ECG^f
- Arterial blood gas analysis^g



Initial control is cessation of progression of all components of envenomation: local effects, systemic effects, and coagulopathy.

TABLE 212-4**Management of Compartment Syndrome Caused by Crotalinae Snake Envenomation^{a†}**

- Determine intracompartmental pressure.
- If pressure is not elevated, continue standard management.
- If signs of compartment syndrome are present and compartment pressure is >30 mm Hg:
 - Elevate limb.
 - Administer mannitol, 1–2 grams/kg IV over 30 min.
 - Simultaneously administer *additional* antivenom over 60 min.
- If elevated compartment pressure persists another 60 min, consider fasciotomy.

*thank
you*