


SNAKES & SPIDER BITES

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Objectives

1. Identify the clinical presentation of pit viper envenomation and describe the appropriate use of antivenin.
2. List the most common venomous spider bites, describe associated symptoms, and identify the appropriate treatment.



The Missouri Poison Center

- Cost effective "center of excellence" of specialized personnel and data systems.
- Multiple access routes make Poison Center services available to virtually everyone in MO 24/7/365. (toll-free phone; **800-222-1222**, text, web chat, TTY)
- Public, 911 Dispatchers, Police, EMS, Nurses, Physicians, Pharmacists, Veterinarians, and more. (**888-268-4195**; 314-268-4195)



Population Served

- The Missouri Poison Center served all 114 Counties in 2015
- Total population ~5 million
- 2.7 million cases handled since 1974

CALLS BY COUNTY

- 6,000 to 10,000
- 1,000 to 5,999
- 300 to 999
- 100 to 299
- 30 to 99
- 1 to 29

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Who is Serving Missouri?

Registered Pharmacists & Nurses who are certified as Specialists in Poison Information, clinically supervised by a board certified physician toxicologist

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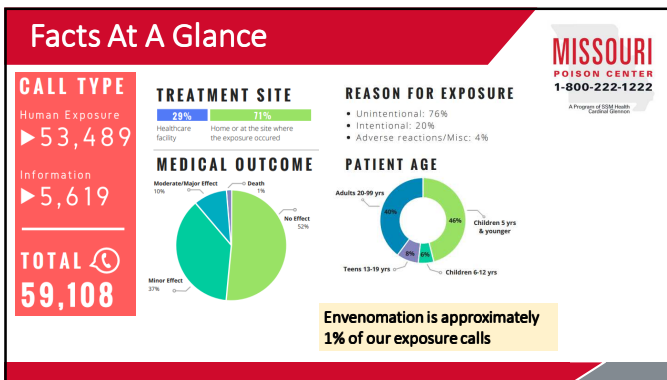
Poison Center Patient Care Paths

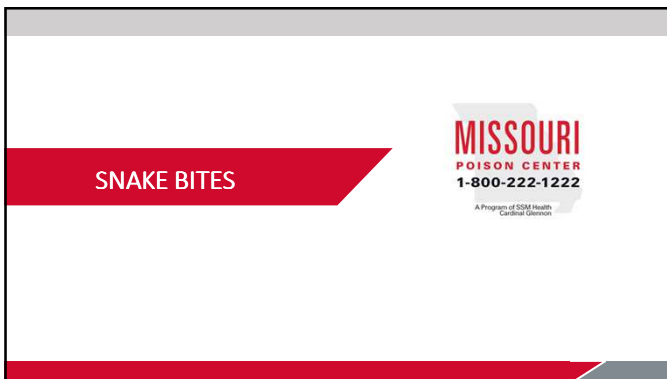
- Reassure
- Provide home care and follow-up
- Provide detailed consultation to doctors on hospitalized cases

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QUESTION

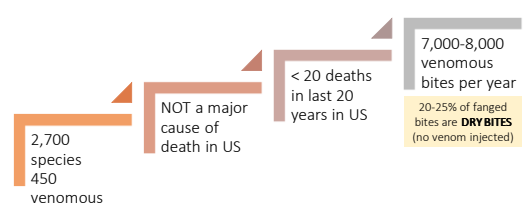
HOW MANY EXPOSURES DOES MPC HANDLE PER YEAR?





Snake Bite General Facts

OPHIDIOPHOBIA THE FEAR OF SNAKES



2,700 species
450 venomous

NOT a major cause of death in US

< 20 deaths in last 20 years in US

7,000-8,000 venomous bites per year

20-25% of fanged bites are **DRY BITES** (no venom injected)

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Venomous or Non-Venomous?



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Non-Venomous Snakes

- Examples:
 - *Colubridae*: king, black rat, garter
- NO fangs
- Upper and lower row of tiny teeth
- Painful but not serious
- Looks similar to a human bite

Disposition

Wound care

Tetanus update



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Crotaline Pit Viper Family

RATTLESNAKES

- Massasauga Rattlesnake "Swamp rattler"
- Timber Rattlesnake
- Western Pygmy Rattlesnake "Ground rattler"



COTTONMOUTH

- Water Moccasin

COPPERHEAD

- Osage
- Southern
- Northern
- Broadbanded

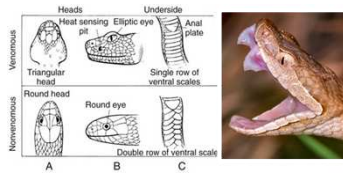


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Pit Viper Characteristics

- Copper-colored **triangular-shaped** heads
- Elliptical **slit-like pupils**
- Heat sensing "**pit**" proximal to nostril
- A **single** row of subcaudal scales distal to the anal plate



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Pit Viper (Crotalid) Venom

- Aqueous solution of high molecular weight **enzymes** that spread slowly via the lymphatic system
- **Cytotoxic** and **hemotoxic** components
 - **Cytotoxic:** damage tissue
 - **Hemotoxic:** harms blood clotting system
- No **neurotoxic** snakes in Missouri



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Clinical Presentation

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Local effects:

- Fang punctures (1-4 usually)
- Typically in 5 minutes: sharp, burning pain at site
- 30 min to 6-8 hours: edema, erythema & possible ecchymosis
- Proximal edema may progress for 24-48 hours



QUESTION

T/F: Putting ice on a snake bite reduces swelling and improves outcomes.

Initial Management

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- Anticipate swelling
- Immobilize and elevate slightly above the heart
- Mark and measure swelling every 15 to 30 minutes



Medical Management


- 1 Determine the severity on presentation**
 - History, location of bite, pre-hospital treatment
 - Current symptoms
- 2 Baseline labs**
 - CBC, PT/PTT, INR, Fibrinogen
 - Electrolytes, BUN, Scr
- 3 Restricted mobilization**
 - Elevate slightly above heart
 - Activity enhances venom spread
- 4 Pain control**
 - Parenteral opiates such as morphine or fentanyl
 - NSAIDs only if low risk of bleeding
- 5 Anxiety**
 - Benzodiazepines
 - Calming environment
- 6 Other**
 - Tetanus booster as needed
 - IV fluids

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Labs & Monitoring

- Baseline CBC, PT/PTT, INR, fibrinogen, electrolytes, BUN and creatinine
- Repeat in 6 hours; if within normal limits, no further labs indicated




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Conservative Use of Antivenin

- **Crotalidae polyvalent immune fab fragments (CroFab)**



CroFab does not reverse tissue damage; it halts or slows its progression.

- Antivenin is recommended if bite is classified as *moderate-severe* based on any of the **3 domains** or may become so in next **6-12 hours**

1	2	3
Local	Systemic	Hematologic

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Proper Dosing of CroFab

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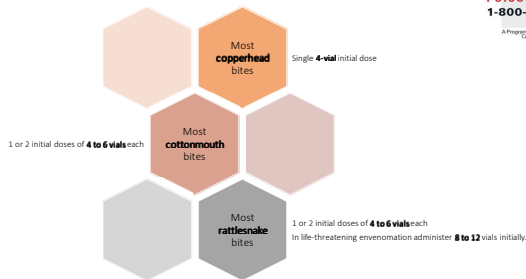
- Pediatric and adult dosing is **identical** because it is based on severity of envenomation, not on size or age.
 - Reduce infusion volume of reconstituted antivenin in small children.
- Establish **initial control** of envenomation with **4 to 6 vials** of CroFab.
- In adults, start the 250 mL infusion at a rate of 25 to 50 mL/hour for the first 10 minutes and observe for hypersensitivity reaction.
- If no reaction occurs, complete the infusion over the next 50 to 60 minutes. Faster infusion may be indicated in critically ill patients with hemorrhage or shock.

Incidence of acute hypersensitivity	• 5%, consider risk vs benefit before giving again
Most cases are mild	• Resolve spontaneously or with steroids and antihistamines

How many vials?

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How to assess "control"

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- Assess control of the envenomation by repeat clinical exam and laboratory coagulation tests at any time within an hour of completion of the initial CroFab dose.

Control is defined as...	If control is not achieved...
<ul style="list-style-type: none"> • No or limited progression of local tissue effects, improved systemic symptoms, and all coagulation studies and platelet counts are clearly trending toward normal. 	<ul style="list-style-type: none"> • A second 4 to 6 vial dose may be beneficial. • Consultation with the poison center is recommended before giving any repeat doses.

- **Recurrence of venom effects** or delayed onset of venom effects occurs in 50% of those treated with CroFab. **Scheduled maintenance dosing is controversial.** For this reason, additional 2-vial CroFab doses should be considered only on an "as needed" basis.
- **Consultation with the poison center is recommended before giving any "maintenance" dose.**

Surgical Intervention

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Compartment syndrome =
RARE in pit viper bites

Venom deposited in the
dermal or SQ tissue

Edema is usually
subcutaneous NOT sub-fascial

- **AVOID** cutting, suctioning, excising the bite area, or exploration of the wound
- **CONTRAINDICATED: Prophylactic Fasciotomy**
 - Compartment syndrome is rare following **pit viper** bites because subfascial injection of venom is rare.
- **FASCIOTOMY IS VERY RARELY INDICATED** and can be avoided with early and adequate administration of *CroFab* which prevents progression of tissue injury and swelling.

Disposition

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Asymptomatic patients
with a **dry bite**
OR **nonvenomous**
snakebite:

- Discharge after wound care and anti-tetanus update
- Return if signs of envenomation develop over the next 8 to 12 hours.

Envenomated
snakebite:

- Observe for a minimum of 8 to 12 hours after the bite, until stable.
- Admit if necessary for management of pain, systemic symptoms, or to administer CroFab.

Educate about good
wound care, monitoring,
and management at
home after discharge

Wound Care & Other Treatments

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Cleanse, cover wound with sterile dressing. Apply antibiotic ointment.

Surgical wound debridement at 3-10 days, if necessary.

Resume activity at 3-4 days post bite.

Electric shock therapy of the wound should be avoided.

Steroids should be avoided except for true allergic phenomena or serum sickness related to CroFab.

Prophylactic antibiotics should be avoided. Snake bites have a very low incidence of infection.

Elevate the limb as often as possible. Recurrent edema may occur for several MONTHS.

Do not wear anything constricting until healed.

SPIDER BITES

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Spider Bites...In General

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- 20,000 species of native spiders!
- **Local Effects**
 - Effects vary from unnoticed to mild-moderate symptoms
 - A blister may develop
 - Risk for secondary infection
- Most fangs are **too small** to penetrate skin and envenomate

COMMON SYMPTOMS




- Stinging
- Burning
- Painful
- Swollen
- Itching
- Redness
- Blanching

General Spider Bite Management

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- **Therapeutic Intervention**
 - Wash area thoroughly with soap and water
 - Keep clean and dry
 - Do NOT apply ice
 - Apply a topical antibiotic or hydrocortisone 1%
 - Monitor for symptoms of a venomous bite

QUESTION

WHAT ARE THE VENOMOUS SPIDERS IN MISSOURI?

Venomous Spiders

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 **BROWN RECLUSE**
loxoseles



 **BLACK WIDOW**
latrodectus




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BROWN RECLUSE

Is it always a brown recluse?

ALL OF THESE MUST BE PRESENT TO IDENTIFY IT AS A BROWN RECLUSE:

1. Six eyes arranged in pairs.
2. A dark **violin** shape on the cephalothorax
3. Uniformly **light-colored legs**: no stripes, no bands.
4. Uniformly colored **abdomen** (cream to dark brown)
5. Only **fine hairs** on the legs – NO spines.
6. Body length is about **3/8 inch**. If > 1/2 inch, it is NOT a recluse.
7. Web is **hidden** from sight; never out where it can be seen.



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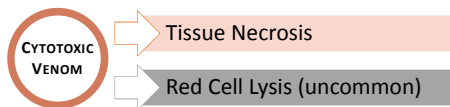
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Brown Recluse Venom

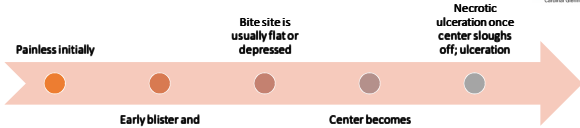
- **Cytotoxic venom**
 - *L. reclusa*: Most prevalent species in the US (found in Missouri, among other states); the Chilean recluse (*L. laeta*) is more potent (found in LA, Florida, and Massachusetts)

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Local Effects



Necrosis is worse if bite was in a fatty area Ulcer can take weeks to heal Secondary infection can occur

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Systemic Effects

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**SYSTEMIC EFFECTS
 ARE RARE**

Develop within 24-72 hours	Head-to-toe pruritic rash	General inflammatory symptoms	Hemolysis; dark urine	Rarely DIC
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Treatment

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Recommended Medical Management	General wound care Tetanus prophylaxis Antibiotics if needed
NOT Recommended	Dapsone is NOT a routine recommendation NO benefit: injected steroids, vasodilators, electric shock Early excision of wound is NOT recommended and may prolong healing

Delay surgical intervention for 8 weeks

BLACK WIDOW

Overview - Black Widow

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- Most bites are in the Southwest US during warm months
- **Habitat:** woodpiles, garages, rock piles
- Characteristic **hourglass**
 - May or may **NOT** be visible
 - Juvenile and male black widows are smaller and brown

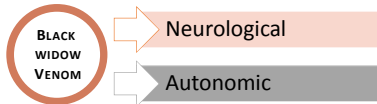


Black Widow Venom

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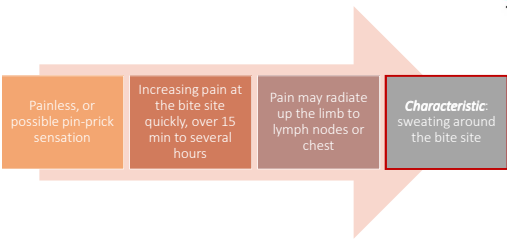
- **Neurotoxic venom**
 - *Latrodectus* species (latro-toxin)
 - Stimulates neurotransmitter release (acetylcholine)
 - Increased frequency and force of muscle contractions
 - NOT dermato-necrotic



Local Effects

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Systemic Effects

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- **"Latrodectism"**
 - Develop within 30 minutes – 2 hours
 - Remote or generalized pain
 - Headache, anxiety, "Pavor mortis"
 - Muscle cramping and fasciculations; writhes in pain
 - Board-like rigidity of the abdomen, shoulders, and back
 - Nausea, vomiting, increased oral secretions, tachycardia, hypertension
 - Irritability, agitation
 - Malaise, lethargy, fever

Treatment

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- Spontaneous recover expected in 24-48 hours
- Death is very rare
- Administer benzodiazepines to relax muscles and reduce blood pressure; opiates for intense pain
- **ANTIVENOM:**
 - IgG horse-serum by Merck = expired but extensions have been granted by the FDA
 - Administer only if patient has failed standard care
 - Premedicate with antihistamines
- **DO NOT GIVE:** Calcium gluconate, dantrolene, muscle relaxers
- Antibiotics are not usually needed

Resources from MPC

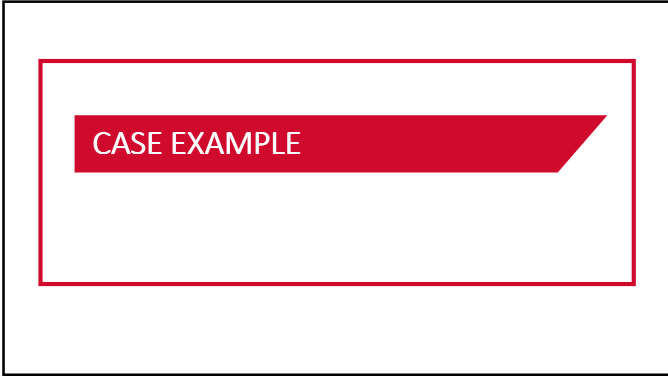
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Bites, Snakes, & Plants – Oh My!
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Snakebite Prevention Made Simple
Phone + Car Keys = Your SNAKE BITE KIT


STINGING INSECTS, SPIDERS & SNAKES



Case Example – Snake Bite

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- An 8 yo patient presented to the emergency department 40 minutes after being bitten on the left ankle by a **copperhead** while walking barefoot to the car after spending the day at the river. **Two puncture wounds** are noted. There is redness but minimal **swelling**.
- Vital signs: Temp: 97.8°F BP: 95/65 mmHg HR: 100 RR: 20
- HEENT: unremarkable
- Lungs: clear to auscultation
- CV: normal sinus rhythm
- Abd: normal bowel sounds
- Neuro: alert and oriented



Case Example – Snake Bite

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1. **Based on the patient’s presentation what would be the best initial management?**
 - A. Apply ice to reduce the swelling.
 - B. Allow the patient to ambulate and monitor the progression of symptoms.
 - C. Obtain a baseline CBC, PT/PTT, INR, fibrinogen, electrolytes, BUN and creatinine.
 - D. Begin a 4 vial regimen of *Crofab*.
2. **When should labs be repeated?**
3. **When would we recommend *Crofab*?**

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