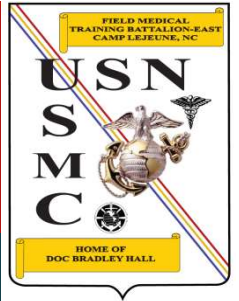


# Envenomation Injuries

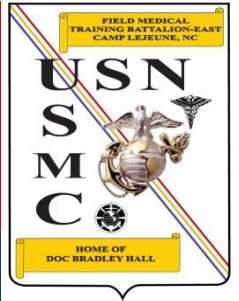


# Overview

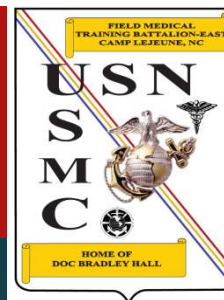


- ▶ Definitions
- ▶ Types of Venomous Snakes
- ▶ Treatment of Snake Bites
- ▶ Management of Arthropod Envenomation
- ▶ Anaphylactic Shock

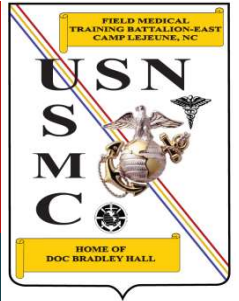
# Learning Objectives



Please Read Your  
Terminal Learning Objectives  
And  
Enabling Learning Objectives

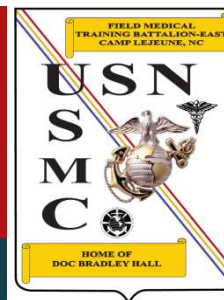


# Definitions

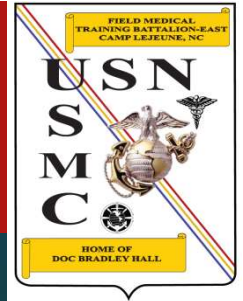


## Envenomation

- ▶ An injury or illness caused by the poisonous secretion of an animal, usually transmitted by a bite or sting.



# Classifications Of Venomous Snakes

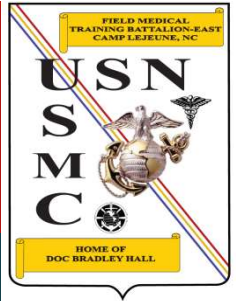


## Snake Venom:

- ▶ Affects the body in a number of ways depending on:
- ▶ Type and quantity of venom
- ▶ Different snake species produce different types of venom.



# Actions Of Snake Venom



## Hemotoxin:

- ▶ Destroys red blood cells, disrupts blood clotting, and cause organ degeneration and tissue damage

## Neurotoxin:

- ▶ Acts on nerve cells and tissue, and disrupts brain function.

## Cytotoxin:

- ▶ Typically attacks only a specific type of cell, muscle group, or organ.



# Pit Vipers (*Crotalinae*)

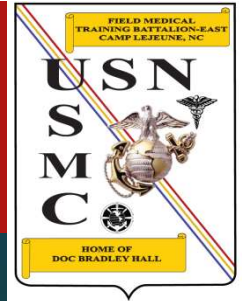


Cottonmouth  
(Water Moccasin)



Saw Scaled Viper

# Pit Vipers (*Crotalinae*)



## Venom: **Hemotoxin**

### Characteristics:

- ▶ Retractable fangs
- ▶ Heat sensing pit
- ▶ Large triangular head
- ▶ Slit-like pupils





# Pit Vipers (*Crotalinae*)

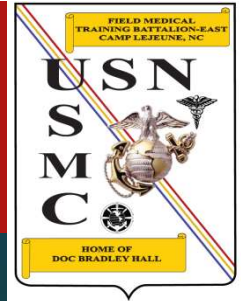


Eastern Diamondback Rattlesnake

## Examples:

- ▶ Rattlesnakes
- ▶ Moccasins
- ▶ Copperheads
- ▶ Saw-Scaled viper
- ▶ Habu

# Pit Vipers (*Crotalinae*)

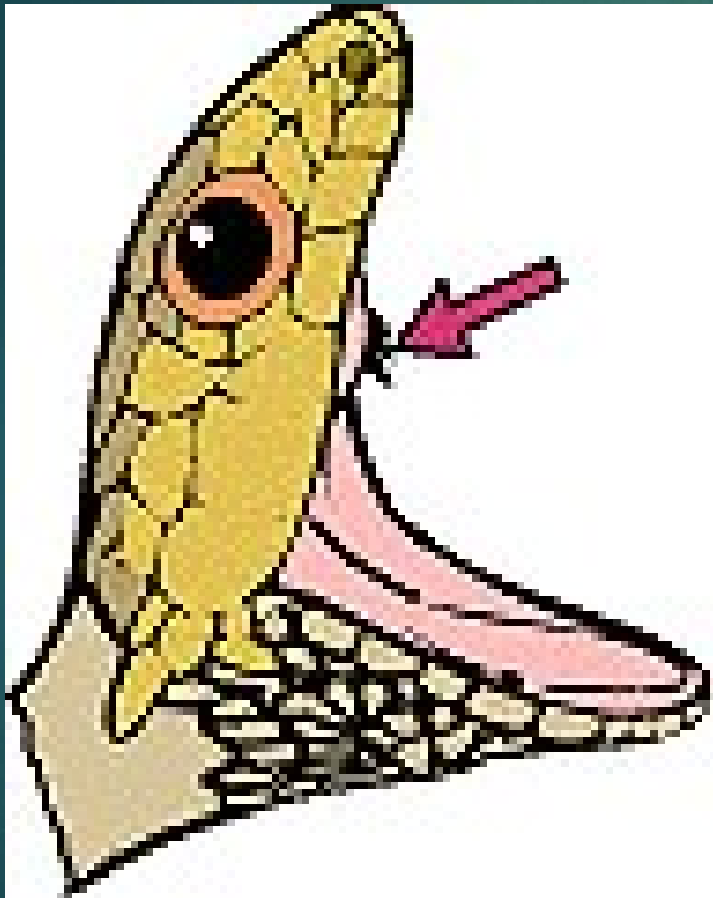


## Signs and Symptoms:

- ▶ Excruciating pain at bite site
- ▶ Tissue swelling at bite site
- ▶ Bleeding from major organs (hematuria)
- ▶ Tingling or numbness
- ▶ Headache
- ▶ Nausea / vomiting
- ▶ Death may occur within 6-48 hours



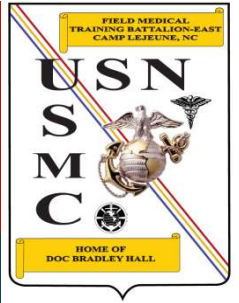
# Colubrinae



## Characteristics:

- ▶ Venom is hemotoxic
- ▶ Fixed fangs in rear of mouth
- ▶ Egg shaped head
- ▶ Large eyes

# Colubrinae



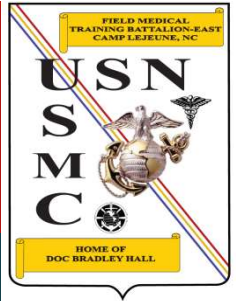
## Signs and Symptoms:

- ▶ Symptoms may not manifest until hours after bite.
- ▶ Hemorrhage to gums, nose and other orifices
- ▶ Headache / nausea
- ▶ Blood in stool, urine, or saliva
- ▶ Death due to internal bleeding





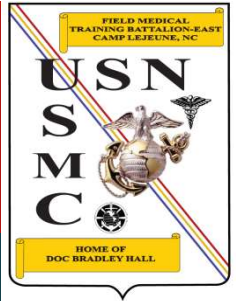
# Colubrinae



Boomslang



# Elapinae



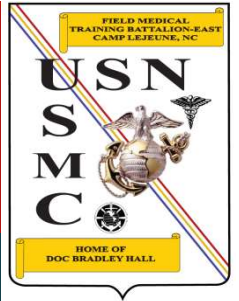
## Characteristics:

- ▶ Venom is neurotoxic
- ▶ Front fixed hollow fangs
- ▶ Round pupils
- ▶ Head shape is in proportion to the width of body



Krait

# Elapinae

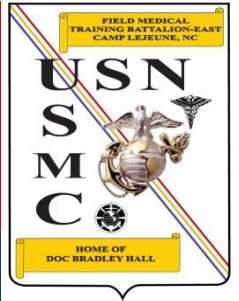


Cobra

## Signs and Symptoms:

- ▶ Stiffness, muscle aches, spasms
- ▶ Severe headache, blurred vision, and drowsiness
- ▶ Pain at bite site
- ▶ Nausea, vomiting, and diarrhea
- ▶ Chills with rapid onset of fever
- ▶ Respiratory paralysis and death

# Coral Snakes (*Elapinae*)



**Examples:** Coral Snakes, Krait, Cobra  
(red on black, red on yellow, and other patterns)



Tropical Coral Snake



Eastern Coral Snake



# Sea Snakes (*Hydrophiinae*)

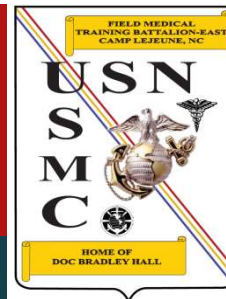


## Characteristics:

- ▶ Neurotoxic venom
- ▶ Fixed fangs
- ▶ Flat tail
- ▶ Brightly colored



# Sea Snakes (*Hydrophiinae*)



## Early Signs and Symptoms:

- ▶ Bites are usually painless
- ▶ Little or no swelling

Most important early symptoms are of rhabdomyolysis:

- ▶ Headache
- ▶ Thick-feeling tongue
- ▶ Thirst
- ▶ Sweating
- ▶ Vomiting

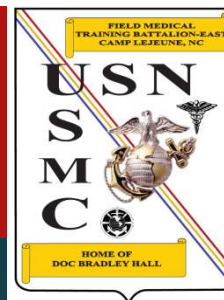
# Sea Snakes (*Hydrophiinae*)



## Signs and Symptoms:

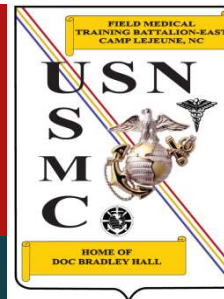
Symptoms that appear 30 minutes to several hours post-bite include:

- ▶ Generalized aching
- ▶ Stiffness and tenderness of muscles all over the body
- ▶ Paralysis of voluntary muscles
  - ▶ Paralysis of muscles involved in swallowing and respiration can be fatal
- ▶ After 6 to 12 hours the result of muscle breakdown can lead to cardiac arrest.





# Prevention of Snake Bites



- ▶ **LEAVE THE SNAKE ALONE**
- ▶ Keep your hands and feet out of areas you can't see.

## Slide 23

---

**HPJJ2**

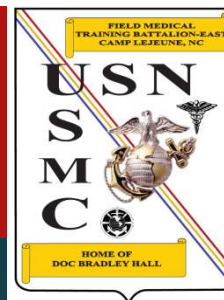
Moved this slide before treatment

Hometchko PO1 Jamesdavid J, 12/9/2020

# Common Do Not's



- ▶ **DO NOT** cut or incise the bite site
- ▶ **DO NOT** apply ice or heat
- ▶ **DO NOT** apply oral suction
- ▶ **DO NOT** remove any dressings/bandages
- ▶ **DO NOT** try to kill the snake for identification
- ▶ **DO NOT** have the victim eat or drink anything



# Treatment of Snake Bites

## Diagnosing a snake bite:

- ▶ Fang marks
- ▶ Bleeding, small lacerations
- ▶ Presence of fang marks does not always indicate envenomation
- ▶ Manifestation of signs and symptoms of envenomation are necessary to confirm diagnosis of a snake venom poisoning.

Snake bite



## Slide 26

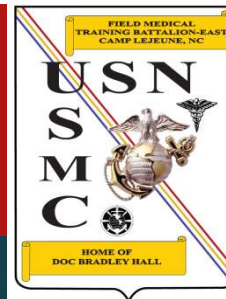
---

**HPJJ3**

Added Pictures from the "old" next slide. Combined 2 slides

Hometchko PO1 Jamesdavid J, 12/9/2020

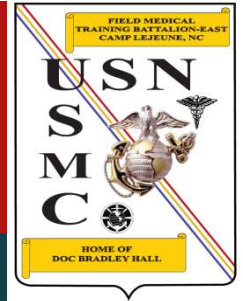
# Treatment of Snake Bites



Most definitive  
care is  
**ANTIVENOM**



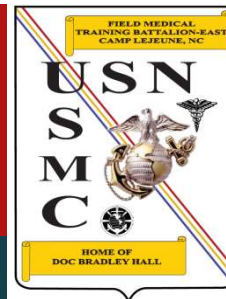
# Treatment of Snake Bites



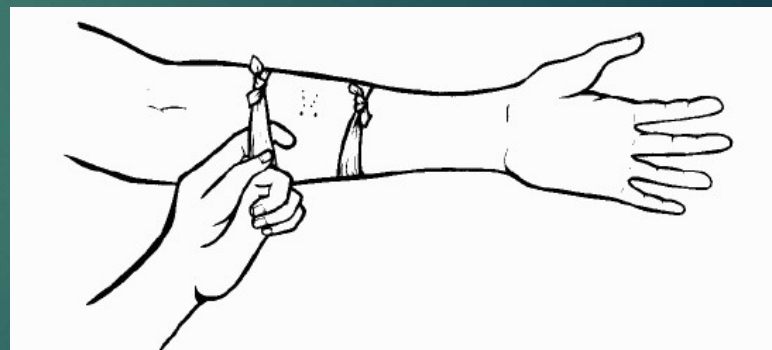
- ▶ Keep victim calm and reassured
- ▶ Allow limb to rest at a neutral position in relation to heart
- ▶ Locate bite site, removing any rings or constricting items from extremity

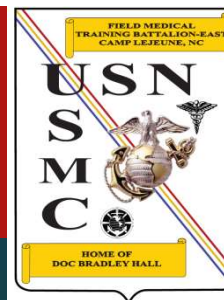


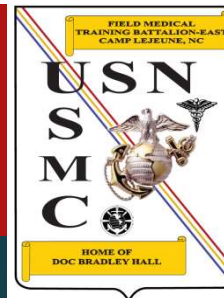
# Treatment of Snake Bites



- ▶ If on extremity, place constricting band above and below the bite
- ▶ On hand or foot, single band above wrist or ankle
- ▶ Apply splint
- ▶ Check distal pulses
- ▶ Monitor and TACEVAC

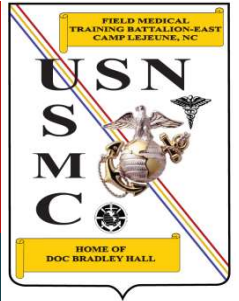






# Arthropod Envenomation

# Bees and Wasps



- ▶ Reaction to sting from histamine response
- ▶ Honey bees sting once and leave stingers in skin
- ▶ Wasps, bumble bees, and hornets can sting multiple times



Honey bee



Bumble bee



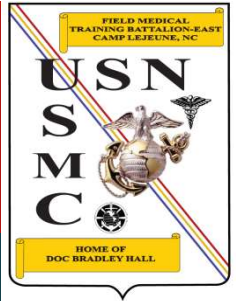
Wasp



Hornet



# Bees and Wasps

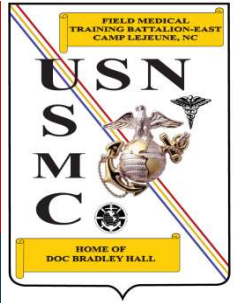


## Signs and Symptoms:

- ▶ Pain
- ▶ Itching/burning sensation
- ▶ Wheal
- ▶ Be aware for anaphylactic shock



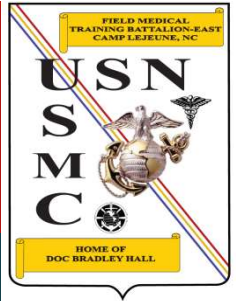
# Insect Sting Treatment



- ▶ Immediately remove stinger
  - ▶ **DO NOT** USE TWEEZERS
  - ▶ Scrape across skin with card or knife blade
- ▶ Apply ice
- ▶ Hydrocortisone 1% BID
- ▶ Monitor for Anaphalaxis



# Ants



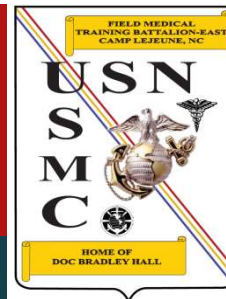
Some species of ants can bite repeatedly, while some have stingers at the tip of their abdomen.

## Signs and Symptoms:

- ▶ Pain
- ▶ Itching/burning
- ▶ Vesicles
- ▶ Monitor for anaphylactic reaction



# Ants



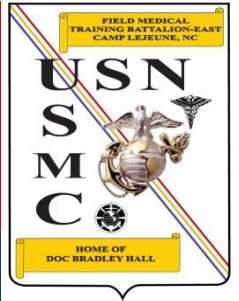
## Multiple bites can cause more severe reactions:

- ▶ Vomiting
- ▶ Diarrhea
- ▶ Edema
- ▶ Hypotension due to vasodilatation

## Treatment:

- ▶ Apply ice
- ▶ Apply Hydrocortisone 1% BID
- ▶ Monitor for Anaphylaxis

# Millipedes



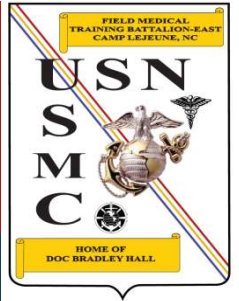
Secretes toxin as a defense mechanism

## Signs and Symptoms:

- ▶ Dermatitis that begins with a brown stain on skin
- ▶ Secretions in the eye can cause lacrimation and blurry vision



# Millipedes



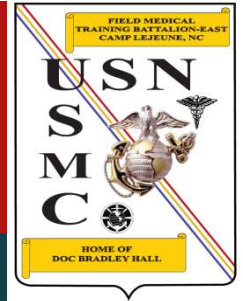
## Treatment:



- ▶ Wash skin with soap and water
- ▶ If toxin is secreted in the eyes, irrigate with water or saline; an ophthalmologic evaluation is mandatory
- ▶ Monitor for anaphylaxis



# Centipedes

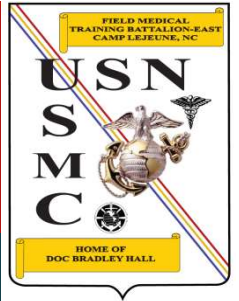


## Signs and Symptoms:

- ▶ Burning pain, tenderness
- ▶ Erythema (redness)
- ▶ Local swelling
- ▶ Superficial necrosis and ulceration may sometimes occur



# Centipedes

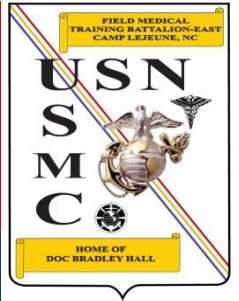


## Treatment:

- ▶ NSAIDS
- ▶ Lidocaine or other anesthetic
- ▶ Look for anaphylactic reaction



# Caterpillars



Venomous caterpillars have venom in hollow hairs all over their bodies

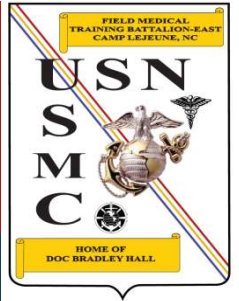
## Signs and Symptoms:

- ▶ Dermatitis
- ▶ Erythema and edema
- ▶ Conjunctivitis
- ▶ Necrosis



Saddle back caterpillar

# Caterpillars



## Treatment:

- ▶ Use scotch tape to remove hairs from skin
- ▶ Do not rub area
- ▶ Monitor for anaphylaxis





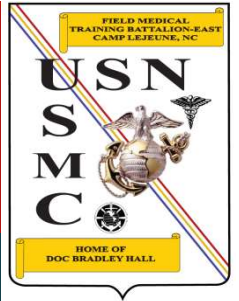
# Black Widow Spider



**Venom is  
Neurotoxic**

Red "Hourglass" shape on  
abdomen

# Black Widow Spider



## Signs and Symptoms:

- ▶ Initial pain is not severe, but severe local pain rapidly develops
- ▶ Pain gradually spreads over the entire body and settles in the abdomen and legs
- ▶ Weakness
- ▶ Sweating
- ▶ Excessive salivation
- ▶ Rash may occur



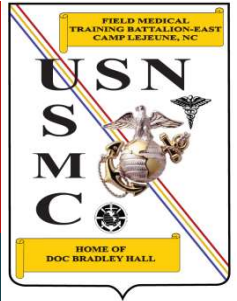
# Black Widow Spider



## Signs and Symptoms:

- ▶ Tremors
- ▶ Nausea/vomiting
- ▶ Respiratory muscle weakness combined with pain may lead to respiratory arrest
- ▶ Anaphylactic reactions can occur but are rare
- ▶ Symptoms usually regress after several hours and are usually gone in a few days

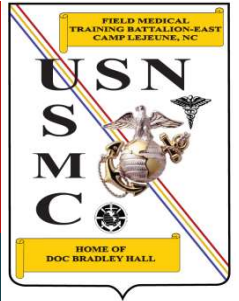
# Black Widow Spider



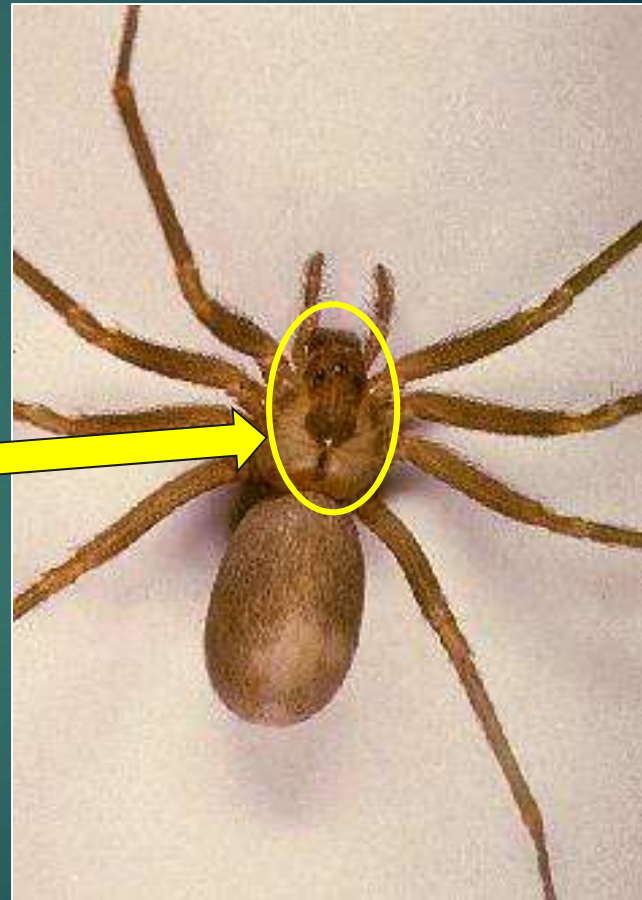
## Treatment:

- ▶ Clean with soap and water
- ▶ Intermittent ice for 30 minutes each hour
- ▶ Antibiotics if infection occurs

# Brown Recluse

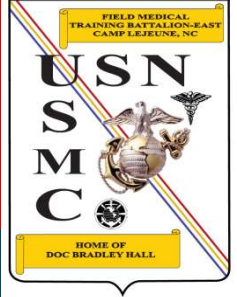


- ▶ Small body
- ▶ Light brown
- ▶ Dark brown violin shape on posterior thorax
- ▶ Venom is hemotoxic / cytotoxic





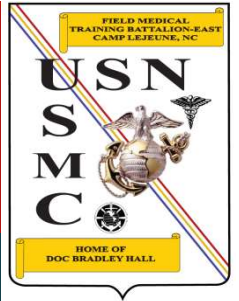
# Brown Recluse



## Signs & Symptoms:

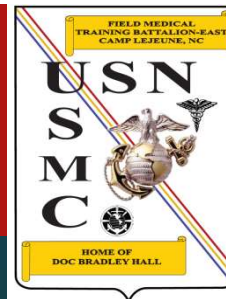
- ▶ Painless bite
- ▶ Painful red area with cyanotic center develops within few hours
- ▶ Tissue damage is possible

# Brown Recluse



Area of discoloration that does not blanch after several days.

# Brown Recluse



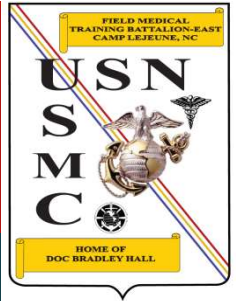
## Signs & Symptoms:

- ▶ After 1-2 weeks
  - ▶ Area turns **DARK** and scab falls off leaving ulcer
- ▶ Ulcer may persist for weeks to months
- ▶ Systemic reaction may occur that could lead to death





# Brown Recluse



## Treatment:



- ▶ Cold compresses
- ▶ Provide supportive care
- ▶ Refer to Medical Officer
- ▶ Tetanus prophylaxis and antibiotics
- ▶ Monitor for anaphylaxis

# Scorpions

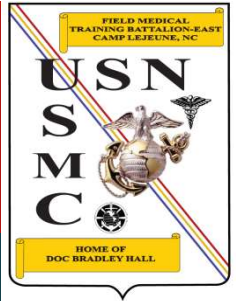


- ▶ Predatory arthropods that have eight legs, a pair of grasping claws and a narrow segmented tail ending with a venomous stinger.
- ▶ Scorpions range in size and are found widely distributed over all continents.
- ▶ Scorpion venom has a fearsome reputation and about 25 species are known to have venom capable of killing a human being.
- ▶ Venom is neurotoxic





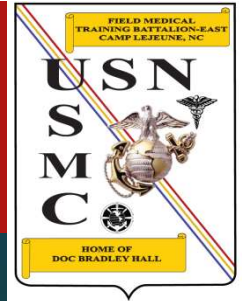
# Scorpion Sting



## Signs and Symptoms:

- ▶ Erythema and edema
- ▶ Pain and/or paresthesia
- ▶ Cranial nerve dysfunction
- ▶ Somatic skeletal neuromuscular dysfunction

# Scorpion Sting

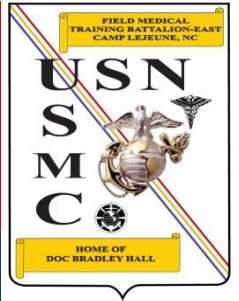


## Treatment:

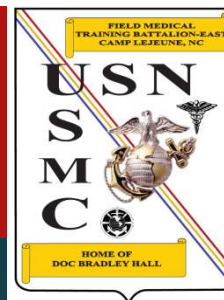
- ▶ Based on level of envenomation
- ▶ Ice
- ▶ Oral analgesics
- ▶ Monitor for anaphylaxis



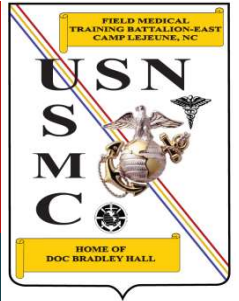
# Prevention of Arthropod Envenomation



- ▶ LEAVE THEM ALONE
- ▶ Avoid nesting sites and hives
- ▶ Personnel with known allergies should carry an Epi-pen or Ana-kit
- ▶ Shake out sleeping bags and clothing
- ▶ Check boots
- ▶ Wear shoes and gloves
- ▶ Remove rubbish and wood from camp
- ▶ Fill in cracks and recesses



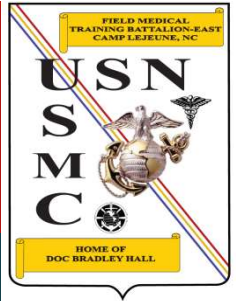
# Anaphylactic Shock



- ▶ Life threatening reaction to an allergen
- ▶ May have a rapid and severe onset
- ▶ May be caused by:
  - ▶ Injections
  - ▶ Stings
  - ▶ Ingestion
  - ▶ Absorption
  - ▶ Inhalation



# Anaphylactic Shock

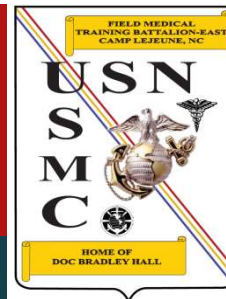


## Signs and Symptoms:

- ▶ Will progressively get worse
- ▶ Itching, redness, hives
- ▶ Respiratory depression
- ▶ Sense of fullness in throat
- ▶ Anxiety, SOB, lightheadedness
- ▶ Decreased LOC

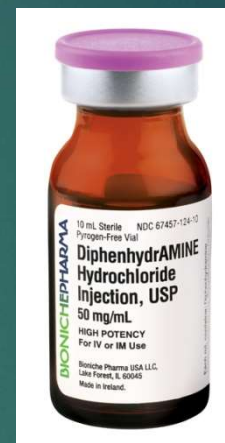
**The faster the onset of symptoms,**  
**the more severe the reaction!**

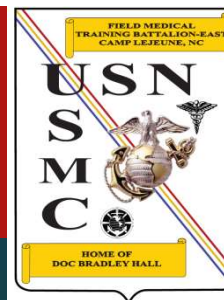
# Anaphylactic Shock



## Treatment:

- ▶ Maintain ABC's
- ▶ Benadryl
- ▶ Epinephrine
- ▶ Fluid resuscitation
- ▶ Documentation of medicines given
- ▶ TACEVAC





# ENVENOMATION INJURIES

