

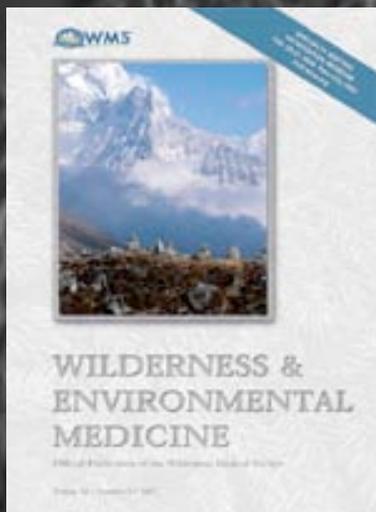
*Venomous Snakebite in
Mountainous Terrain:
Prevention and Management*

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*Official Recommendations of the ICAR
and UIAA MedComs*

“Snakebite in the Mountains”

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CONCEPTS

Venomous Snakebite in Mountainous Terrain: Prevention and Management

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“Snakebite in the Mountains”

Viper bites: treat or ignore?

Review of a series of 99 patients bitten by *Vipera aspis* in an alpine Swiss area

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Summary

In a well defined alpine area of Switzerland (Valais, about 300 000 inhabitants, tourists included) we studied retrospectively over 32 years, 99 patients bitten by vipers (*Vipera aspis*, the likely unique species in this area). The annual incidence was estimated at 3/100 000, as in other European countries. The mortality was 0% for the adults. The patients, 72 adults and 17 children (13 years and less), were classified in four groups: grade 0 no envenomation (8%), grade 1 minimal (42%), grade 2 moderate (40%), and grade 3 severe envenoma-

tion (10%). The 10 patients of grade 3 showed impressive clinical signs and blood abnormalities, as exemplified by our three most severe cases. Only patients of grade 3 must be treated with antivenom and other intensive treatments, but all patients, even grade 1, especially small children, must be observed for several hours.

Key words: viper bites; Vipera aspis; Valais; Switzerland

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Epidemiology

- Viperids
 - Old World Vipers
 - European asp (*Vipera aspis*)
 - Common adder (*Vipera berus*)
 - Nose-horned viper (*Vipera ammodytes*)
 - Russell’s viper (*Daboia russelii*)
 - Saw-scaled viper (*Echis carinatus* & *sochureki*)
 - Pit Vipers
 - Rattlesnakes (Crotalids)
 - Himalayan pit viper (*Gloydius himalayanus*)
- Elapids
 - Cobras (eg. *Naja naja*)
 - Spitting cobras and Rinkhals (*Hemachatus hemachatus*)

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– European asp (*Vipera aspis*)



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– Common adder (*Vipera berus*)



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– Nose-horned viper (*Vipera ammodytes*)



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– Russell’s viper (*Daboia russelii*)



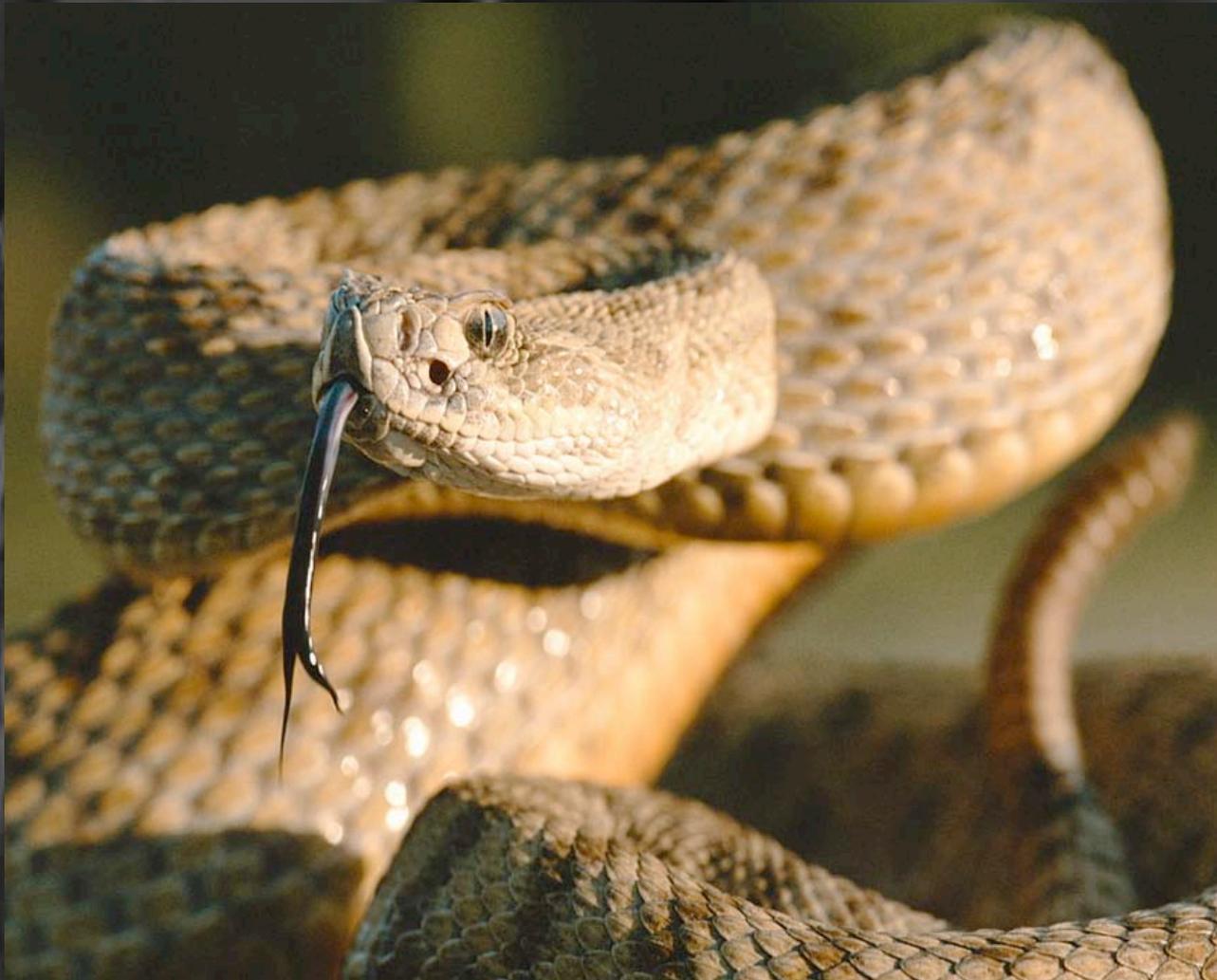
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– Saw-scaled viper (*Echis carinatus* & *sochureki*)



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– Rattlesnakes (Crotalids)



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– Himalayan pit viper (*Gloydius himalayanus*)



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– Cobras (eg. *Naja naja*)



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– Spitting cobras and Rinkhals (*Hemachatus hemachatus*)



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Epidemiology - hazard of snakebite

- only 15% of 3000 species dangerous
- pit viper bites - only 80% envenomation
- some elapids - only 20% envenomation
- case fatality rate - 1800's - 5-25%
 - critical medical care - 2.6%
 - antivenom - 0.3%
 - Nepal - 27%

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Toxicity and Symptoms/Signs

- Vipers (cellular and clotting toxins)
 - Local effects
 - Pain
 - Swelling
 - Bleeding, bruising
 - Tissue destruction
 - Systemic effects
 - Generalized bleeding
 - Shock
 - Cessation breathing
 - Early collapse

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Toxicity and Symptoms/Signs

- Elapids (nervous system toxins)
 - Systemic effects
 - Eyelid drooping
 - Difficulty speaking
 - Cessation breathing
 - (Generalized bleeding)
 - Local effects (Cobras)
 - Tissue destruction
 - Spitting cobras & rinkhals
 - Irritation eye
 - Permanent loss vision

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Prevention

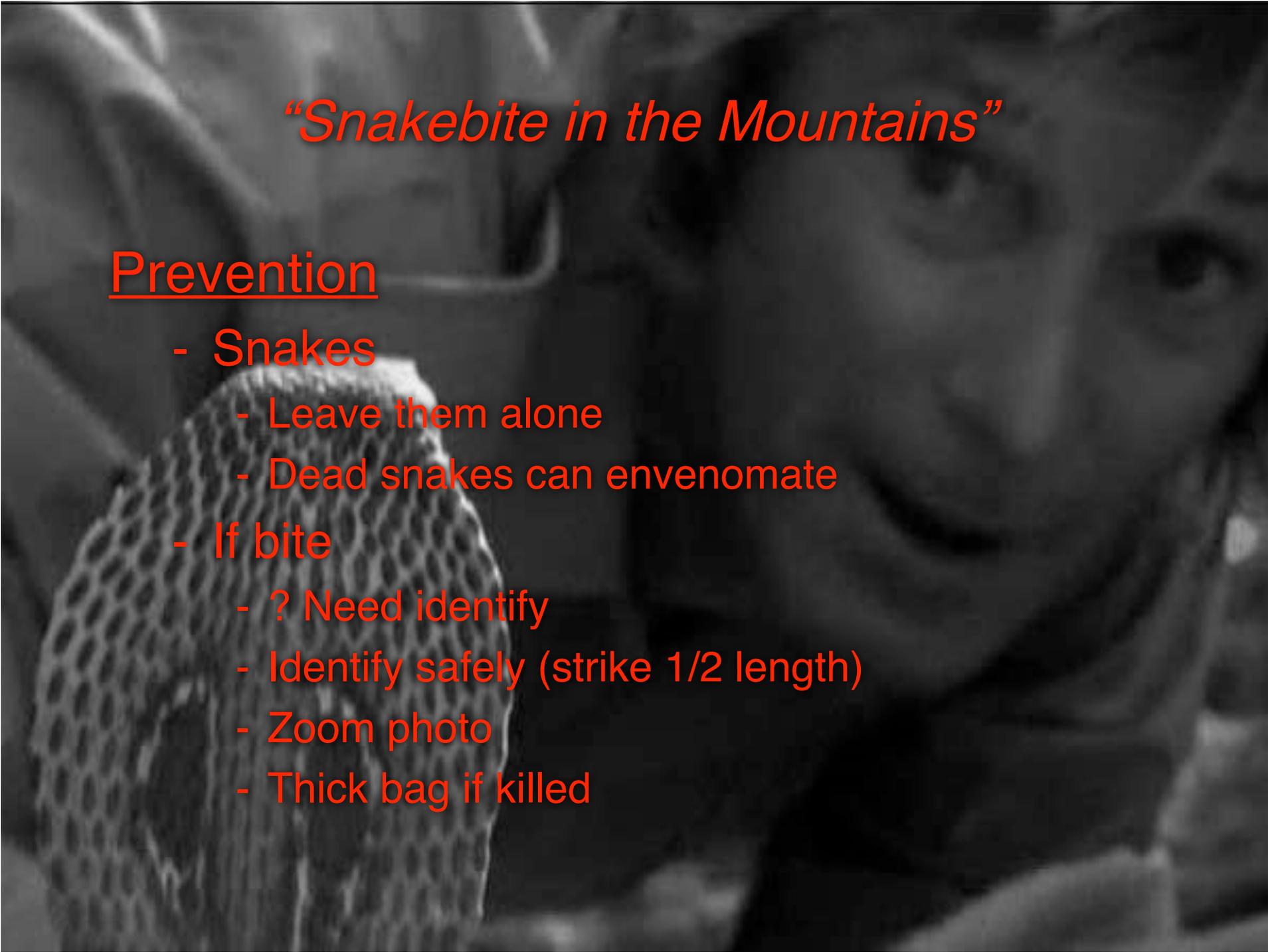
- Prepare
 - Learn before
 - References & photos
 - Management plans (logistics, antivenom)
- Clothing
 - Baggy (“bloused”)
 - Boots/gaitors
 - Gloves



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Prevention

- Look
 - Ahead
 - Torch/flashlight
 - Care cliffs and water
 - Probe
- Sleeping
 - Closed space
 - Above floor
 - Check bed



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Prevention

- Snakes
 - Leave them alone
 - Dead snakes can envenomate
- If bite
 - ? Need identify
 - Identify safely (strike 1/2 length)
 - Zoom photo
 - Thick bag if killed

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On-Site Treatment - First Aid

- Safety, Victim Comfort
- Basic Life Support
 - CPR early
 - Prolonged rescue breathing
- Identify (?)
- Evaluate bite
 - Bite
 - Mark leading edge with time
- Remove constrictions
 - Rings, watches, constricting clothing
- Splint



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On-Site Treatment - First Aid

- DO NO HARM
 - NO incisions, excision, heat, cold, electrical shocks, alcohol or stimulants, (no strychnine!)
- No constriction bands or tourniquets
- No mechanical suction
 - Does not extract venom
 - May impair natural oozing of venom
 - May increase tissue damage

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On-Site Treatment - First Aid

- Pressure immobilization
 - Elapid bites only
 - (Best not true cobras (local toxicity))
 - Reduces absorption and toxicity
 - Elastic bandage or stretchy clothing
 - Fingers/toes up limb, over bite, to top
 - Correct pressure (like sprained ankle)
 - Splint/sling
 - Second wrap over splint
 - Leave in place

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On-Site Treatment - First Aid

- Pain control
 - Paracetamol/acetaminophen
 - Not aspirin or ibuprofen
- Fluid (Food)
 - Clear fluids
 - Best no solid food
- Logistics
 - Mobilize & transport !EARLY!
 - Expert advice (Poison Centre, Emergency Departments)
 - Adequate team (Rescue breathing hours - days)

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On-Site Treatment - Advanced Medical

- Monitoring
 - Vital signs
 - ECG and oximetry monitoring
- Intravenous fluids
 - Shock resuscitation
 - Intraosseous access
- Oxygen
- Analgesia
 - Opiates
 - Ketamine
- Advanced life support
 - Shock, anaphylaxis, cardiac dysrhythmias
- Airway intervention
 - RSI & endotracheal intubation

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On-Site Treatment - Advanced Medical

- Antivenom
 - Field administration (esp. remote/delayed or Elapids)
 - Prepared shock, airway intervention
 - Intravenous or intraosseous
 - No skin pre-testing
- Anticholinesterase Trial
 - Post-synaptic blockers (Cobras, Tiger Snake, ? Others)
 - Neostigmine or edrophonium
 - Preload atropine
- Observation
 - Expert advice
 - Minimum 24 hours if Elapid, even if asymptomatic

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Conservation

