

High altitude

A photograph of a high-altitude mountain peak, likely Mount Everest, with a string of colorful prayer flags in the foreground. The sky is a deep blue with scattered white clouds. The mountain is covered in snow and rocky terrain. The prayer flags are in various colors: red, white, blue, yellow, green, and red.

By Dr Stephan Sanders



Case Study 1

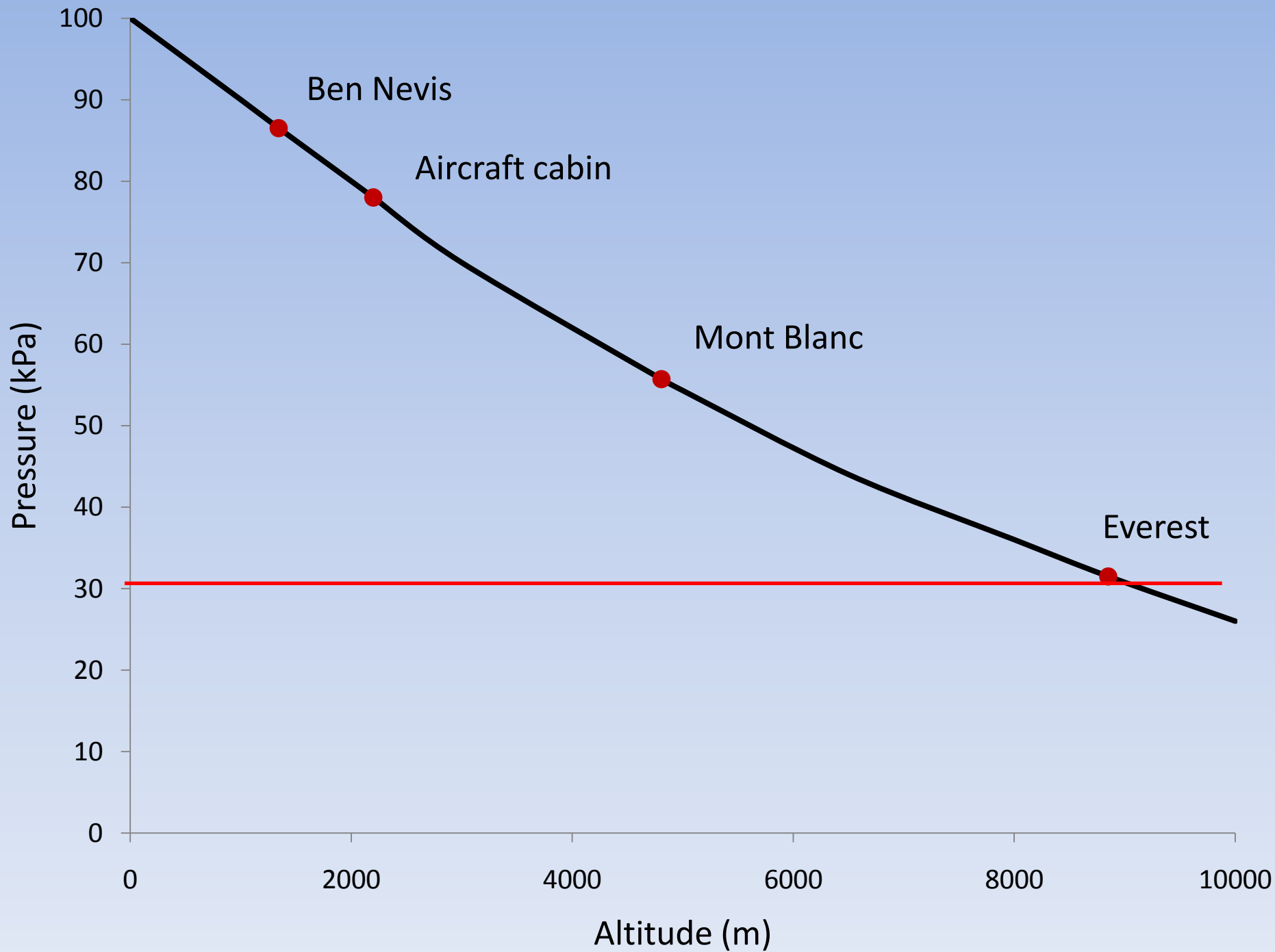
- **Diagnosis:** Acute Mountain Sickness
- **Management:**
 - Descent
 - Analgesia
 - Diamox

Learning points

- **Never ascend with a headache**
- Allow adequate time for acclimatisation
- Climb high, sleep low







Safe Ascent

- Never ascend with altitude symptoms
- Main risk factors for altitude illness:
 - Rate of ascent
 - Absolute ascent
- 300m (1,000ft) ascent per day above 2,500m (8,500ft)
- Rest day every 3 days or 1,000m (3,300ft)

The Environment

- Cold
- Wind chill
- Extreme weather
- Shelter, food and water
- Remoteness
- Mountaineering risks







Normal Altitude Symptoms

- Breathless
- Cough
- Bloating
- Flatulence
- Reduced appetite
- Nausea
- Weight loss
- Poor sleeping
- Periodic breathing
- Vivid dreams
- Tiredness
- Diuresis
- Lightheaded

Acute Mountain Sickness (AMS)

- **Headache**, nausea/vomiting, poor appetite, dizziness, tiredness, poor sleep
- Situation
 - >2,000m (6,500ft)
 - <36hrs of ascent
- Treatment
 - Stop ascent
 - Consider descent
 - Diamox, Oxygen, Gamow bag

Score	Headache	Gastrointestinal symptoms	Fatigue/ weakness	Dizziness/ lightheadedness	Difficulty Sleeping
0	No headache	No gastrointestinal symptoms	Not tired or weak	Not dizzy	Slept as well as usual
1	Mild headache	Poor appetite or nausea	Mild fatigue or weakness	Mild dizziness	Did not sleep as well as Usual
2	Moderate headache	Moderate nausea or Vomiting	Moderate Fatigue or weakness	Moderate dizziness	Woke many times, poor night's sleep
3	Severe headache, incapacitating	Severe nausea and vomiting, incapacitating	Severe fatigue/ weakness, incapacitating	Severe dizziness, incapacitating	Could not sleep at all

High Altitude Cerebral oEdema (HACE)

- Severe headache, **ataxia**, vomiting, visual disturbance, altered behaviour, **confusion**, coma
- Situation
 - Above 2,000m (6,500ft)
 - <36hrs of ascent
- Treatment
 - Immediate descent
 - Dexamethasone, Oxygen, Gamow bag

High Altitude Pulmonary oEdema (HAPE)

- **Breathless**, cough, frothy/pink sputum, cyanosis, coma, creps, fever
- Situation
 - >2,000m (6,500ft)
 - 24-72hrs of ascent
 - Can occur without AMS or after descent
- Treatment
 - Immediate descent
 - Nifedipine, Oxygen, Gamow bag



Key points

- 1) Never go higher with AMS
- 2) If AMS gets worse then go down
- 3) If in doubt assume AMS
- 4) Learn the symptoms of AMS, HAPE and HACE











Medex

- High altitude research
- www.medex.org.uk



- Download the free Altitude Travel Handbook



Wilderness Injuries

- Head and neck injury
- Bleeding
- Cuts
- Sprains and strains
- Broken bones
- Burns



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Bleeding

- The treatment for all bleeding is the same:
 - Elevate it (above the heart)
 - Press on it
 - All bleeding stops eventually
- Move to a safe sheltered location
- Try to make a bandage that presses on the wound eg using a sling
- Acetaminophen

Cuts and grazes

- Move to a safe sheltered location
- Similar to bleeding:
 - Elevate and compress
 - Try to clean with water (from bottle)
 - Dry then apply a non-stick covering
- Evaluate whether you can continue/move
- Keep them warm

- Upon descent clean properly under a tap, apply a proper dressing
- Consider getting medical help



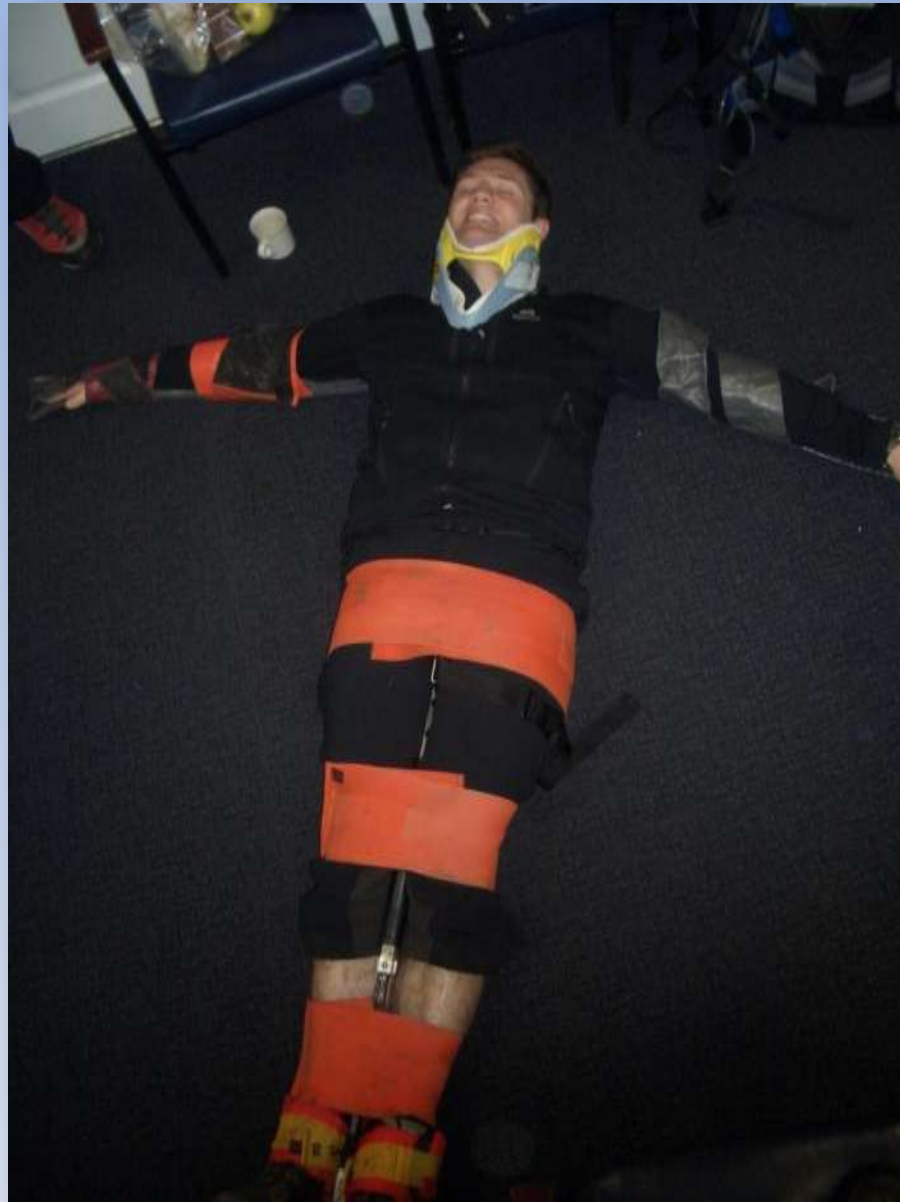
Sprains and strains

- Move to a safe sheltered location
- It is likely to swell, removing the boot may be a bad idea
- Give acetaminophen and ibuprofen
- Compress (slings, fleeces)
- Use snow/ice if there is no risk of frostbite/hypothermia
- Walking is unlikely to cause further damage



Broken bones

- Move to a safe sheltered location
- Three signs:
 - Pain when you press on a bony bit
 - Swelling
 - Reduced range of movement
- Give acetaminophen and ibuprofen
- Consider a splint (ice axe and slings)
- Unlikely to be able to walk out
- Keep them warm





Burns

- Use snow to cool the burn as soon as possible
- Try to cool it for at least 10min (not direct contact)
- Cover the burn with a non-stick dressing
 - Cling film works well
- Give acetaminophen and ibuprofen
- Seek medical help upon descent

Case Study 2

- **Diagnosis:**
 - Head ±neck injury
 - Broken ankle
 - Deep laceration to calf
- **Management:**
 - Protect neck and move to safe area
 - Press on laceration in calf and elevate it
 - Give analgesia
 - Splint the leg
 - Keep him warm whilst contacting help

Learning points

- **Never glissade wearing crampons**
- When you put on crampons put on a helmet
- Hypothermia and frostbite are often more dangerous than the injury itself
- Try to get casualties mobile using painkillers, bandages and splints

Questions

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