

Abstracts

7. Schweizer Bergrettungsmedizin-Tagung

7. Rencontre suisse de médecine de sauvetage en montagne

Interlaken 10. 11. 2012

www.sggm.ch/Bergrettungsmedizin



7. SCHWEIZER BERGRETTUNGS - MEDIZIN TAGUNG

7. Rencontre suisse de médecine de sauvetage en montagne

SA 10.Nov. 2012, AULA Sekundarschulhaus, Alpenstrasse 23, 3800 Interlaken

State of the art 2012

09.00 - 09.15	Welcome Mérat Michèle Durrer Bruno	Präsident in SGGM OK BRM SGGM
	Chair: Kottmann Alex, Albrecht Roland	
09.15 - 09.30	Mosimann Ueli	Demografische Merkmale bei Bergnotfällen
09.30 - 10.00	Albrecht Roland	Mechanische Reanimation Standpunkt 2012
10.00 - 10.15	Kottmann Alex	Human external cargo: dangerous?
10.15 - 10.30	Jelk Bruno	Update Luftrettung im Himalaya
10.30 - 11.00	Kaffeepause Prakt. Uebung airway management	Dembeck Axel, Wiedler Andreas
	Chair: Nägeli Ueli, Wälchli Peter	
11.00 - 11.15	Dembeck Axel	Polytrauma: Ist weniger mehr?
11.15 - 11.30	Felgenhauer Stefanie, Brodmann Monika	Beckentrauma in der Präklinik aus der Sicht des Notfalls
11.30 - 11.45	Durrer Bruno	Update Basejumping-Unfälle
11.45 - 12.00	Oggier Stéphane	Sauvetage Basejumper sans hélico
12.00 - 13.00	Lunch aus dem Rucksack Prakt. Uebung airway management	Getränke-, Sandwich- und Kaffee-stand Dembeck Axel, Wiedler Andreas
	Chair: Brodmann Monika, Dembeck Axel	
13.00 - 13.15	Schön Corinna	Der Bergtote
13.15 - 13.30	Schön Corinna, Deuschle Adrian	Suizid einmal anders
13.30 - 13.45	Jens Sonntag	Einsatz Herznotfall im Suldtal
13.45 - 14.00	Nägeli Ueli	Europäischer Konsens Höhlenrettung

	Chair: Oggier Stéphane, Walliser Martin	
14.00 - 14.15	Habegger Katrin, Brodmann Monika	Akzidentelle Hypothermie im alpinen Zentrumsspital: Ueberraschende Tatsachen
14.15 - 14.30	Esslinger Andrea	Weiss – Lawine in der Lunge
14.30 - 14.45	Oggier Stéphane	Avalanche de Valsorey
14.45 - 15.00	Walliser Martin	Update lokale Erfrierung
15.00 - 15.30	Kaffeepause Prakt. Uebung airway management	Dembeck Axel, Wiedler Andreas
	Chair: Walter Dani, Bardill Andres	
15.30 - 15.45	Walter Dani	Medizinische Ausbildung der Bergführer
15.45 - 16.00	Maurer Theo, Bardill Andres	Medizin ARS und neues Lehrmittel Alpine Rettung
16.00 - 16.15	Salis Christian	Expeditionsmedizin
16.15 - 16.45	Schlussdiskussion / Conclusions	
16.45 - 17.30	Generalversammlung SGGM Assemblée générale de la SSMM	

In den Kaffeepausen und über den Mittag besteht die Möglichkeit, die alternativen Atemwegshilfsmittel an drei Workstations unter Betreuung der Anaesthesie und des Rettungsdienstes FMI Interlaken praktisch zu üben.

Anerkannte Weiterbildungs- Credits:

SGNOR / SSMUS: 6

SGAM / SSMG: 7

Eine Anmeldung ist nicht nötig.

Die Tagung kann gebührenfrei durchgeführt werden, dank Beiträgen der SGGM, SGNOR, GRIMM, ARS, KWRO, Rettungsstation Zermatt, Rega, AirGlaciers, sowie der Apotheke zur Rose AG, der Mepha AG, der IBSA, der Victorinox sowie der Jungfrau- und Schilthornbahnen.

Die SGGM vergibt für die beste Präsentation einen Preis von Fr. 500.00.

Herzlichen Dank ! Merci pour le sponsoring !

„Der Bergtote“

Corinna Schön, IRM Bern

Es gibt viele Arten, wie man in den Bergen zu Tode kommen kann. Während es wie an jedem anderen Ort, aber insbesondere unter körperlicher Belastung, zu natürlichen Todesfällen kommen kann, ist in den Bergen die Anzahl von nicht natürlichen Todesfällen, z. B. durch Stürze oder äussere Einflüsse wie Steinschlag oder Lawinen, deutlich erhöht. Als Rechtsmediziner ist man sich jedoch bewusst, dass ein Sturz nicht ein Sturz sein muss und man stellt sich die Frage: gestürzt, gesprungen oder gestossen? Neben der Frage der Todesart soll in diesem Referat auf Besonderheiten von im Gebirge verstorbenen Personen eingegangen und diese aus rechtsmedizinischer Sicht relevanten Themen kurz rekapituliert werden.

In the mountains, there are different ways to die. Particularly with regard to physical activity it is possible to die a natural death, but the number of unnatural cases of death due to falls from height or forces of nature like falling rocks or avalanches is much more higher. As a forensic pathologist you know, that a fall can also be something else and therefore the question is raised: fallen, jumped or pushed? This presentation should repeat the meaning of the term manner of death and some other themes, which seems to be important examining persons who died in the mountains.

„Suizid mal anders“

Corinna Schön, IRM Bern

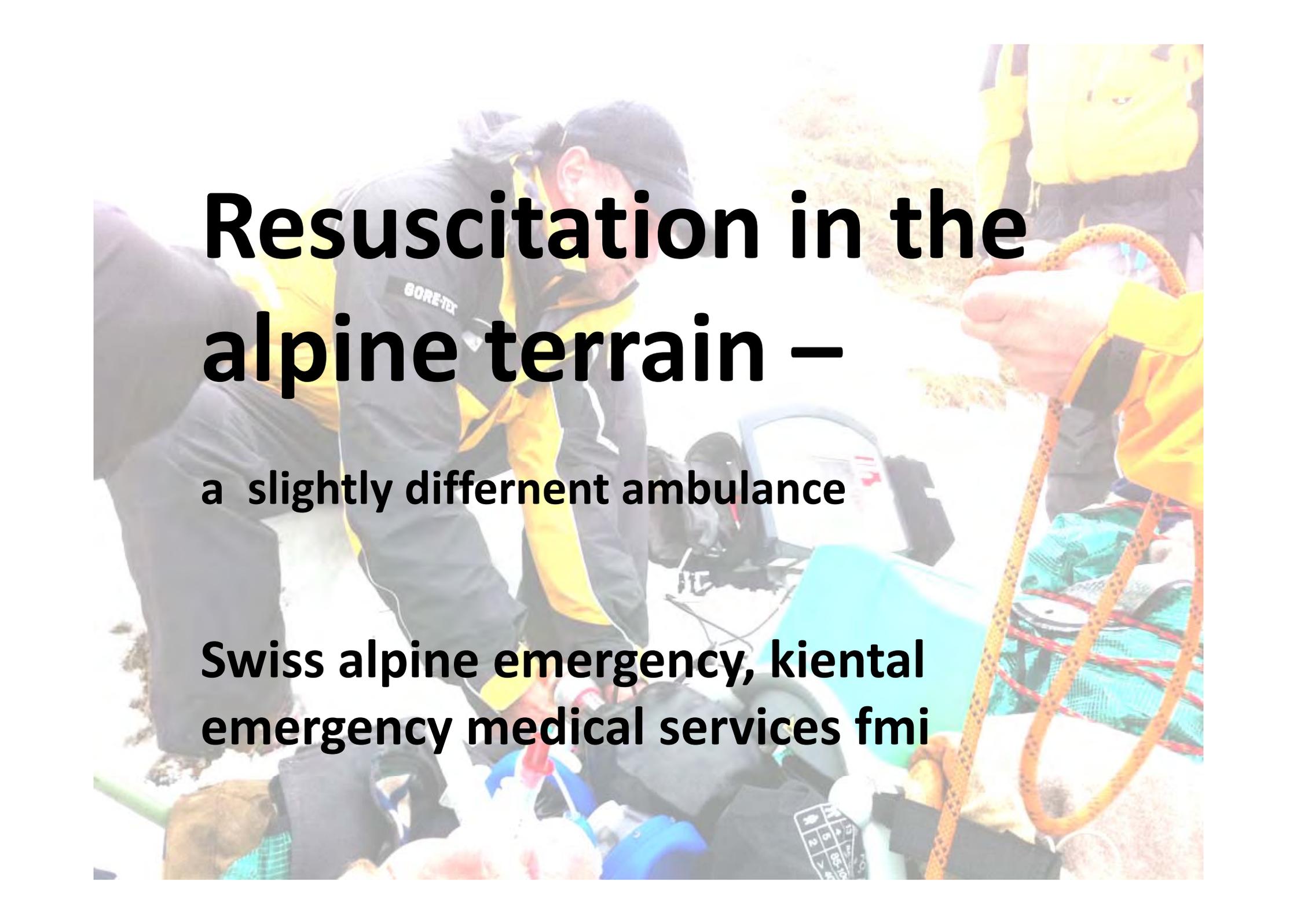
Adrian Deuschle, Kantonspolizei Bern

Durch den Rückgang der Gletscher im Rahmen der Klimaerwärmung kommen von Zeit zu Zeit Knochen oder auch ganze Leichen von seit vielen Jahren vermissten Personen zum Vorschein. Neben der Frage der Identifikation versucht man trotz des Zustandes eines Leichnams auch hier, Hinweise auf Todesart und –ursache zu eruieren.

Der hier vorgestellte Fall zeigt, dass eine genaue Untersuchung auch eines Leichnams mit bereits ausgeprägten späten Leichenveränderungen interessante Befunde aufweisen kann, die zudem insbesondere für einen Bergtoten aussergewöhnlich waren.

From time to time, glacial recession because of climate warming can unsheaths bones or whole corpses of missed persons. In addition to the identification it is always tried to find out the manner and cause of death in spite of the condition of the corpse.

The here presented case shows that an accurate examination also of a corpse with late postmortal changes can reveal interesting findings which were furthermore extraordinary for a person who died in the mountains.



Resuscitation in the alpine terrain –

a slightly different ambulance

**Swiss alpine emergency, kiental
emergency medical services fmi**

emergency call 10:38 h

02.11.2010

**70 year old patient with dyspnea
in Suldtal**

**Dispatcher heard expiratory
wheezing**

**Telephone connection breaks
down often**

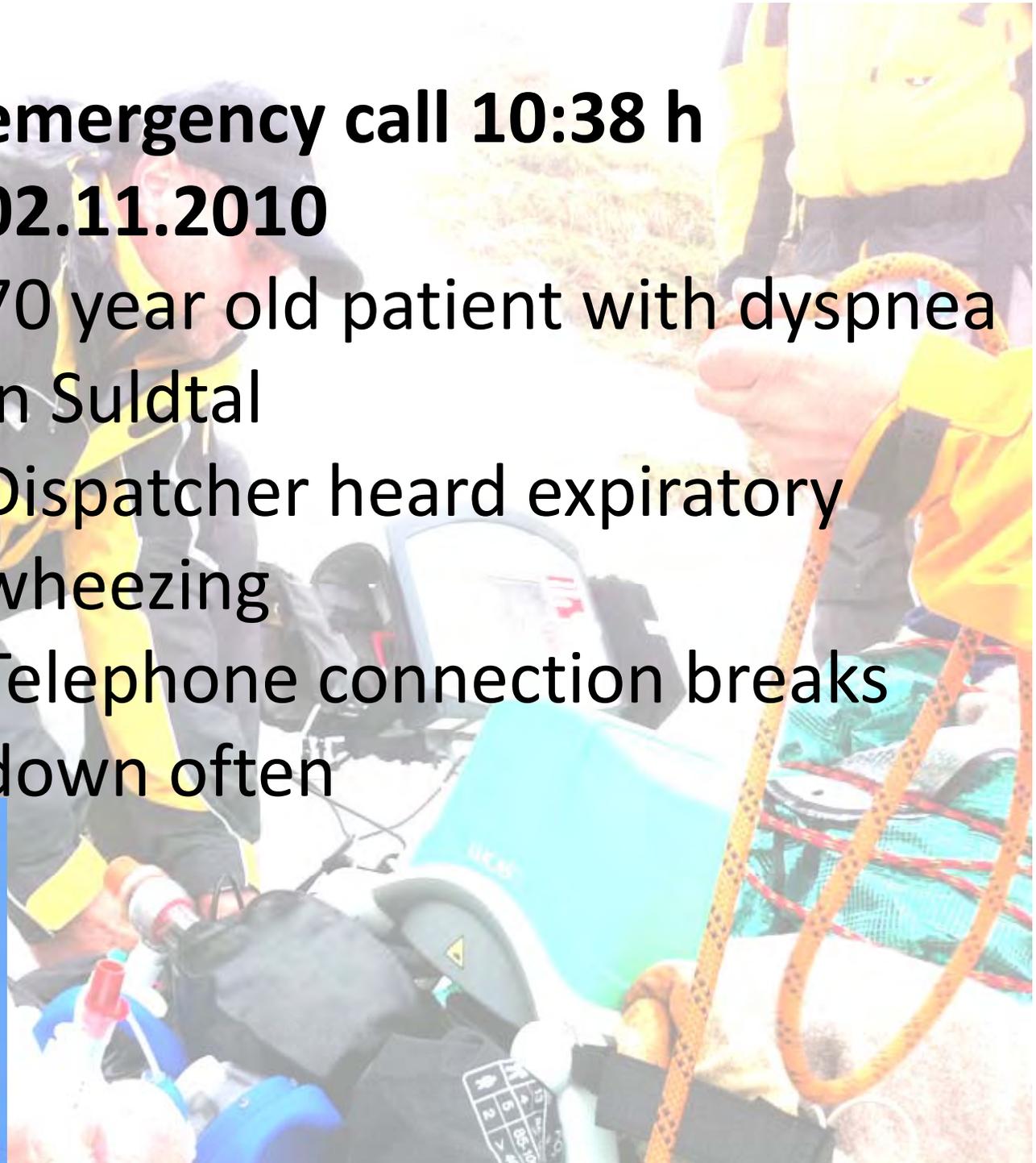


144
KRANKENTRUPPFENZENTRUM



27 Einsatzdienstleistungen
- 562 Anrufe pro Tag
- 110 Jahre
- 265.000 Anrufe
- 70.000 Funktionseinsätze
- 40.000 Einsätze im Kanton Bern

© 2010 - 144 Krankentrupppfenzentrum, Bern, Schweiz
144 ist ein Projekt der 144 Krankentrupppfenzentren im Kanton Bern
144 ist ein Projekt der 144 Krankentrupppfenzentren im Kanton Bern



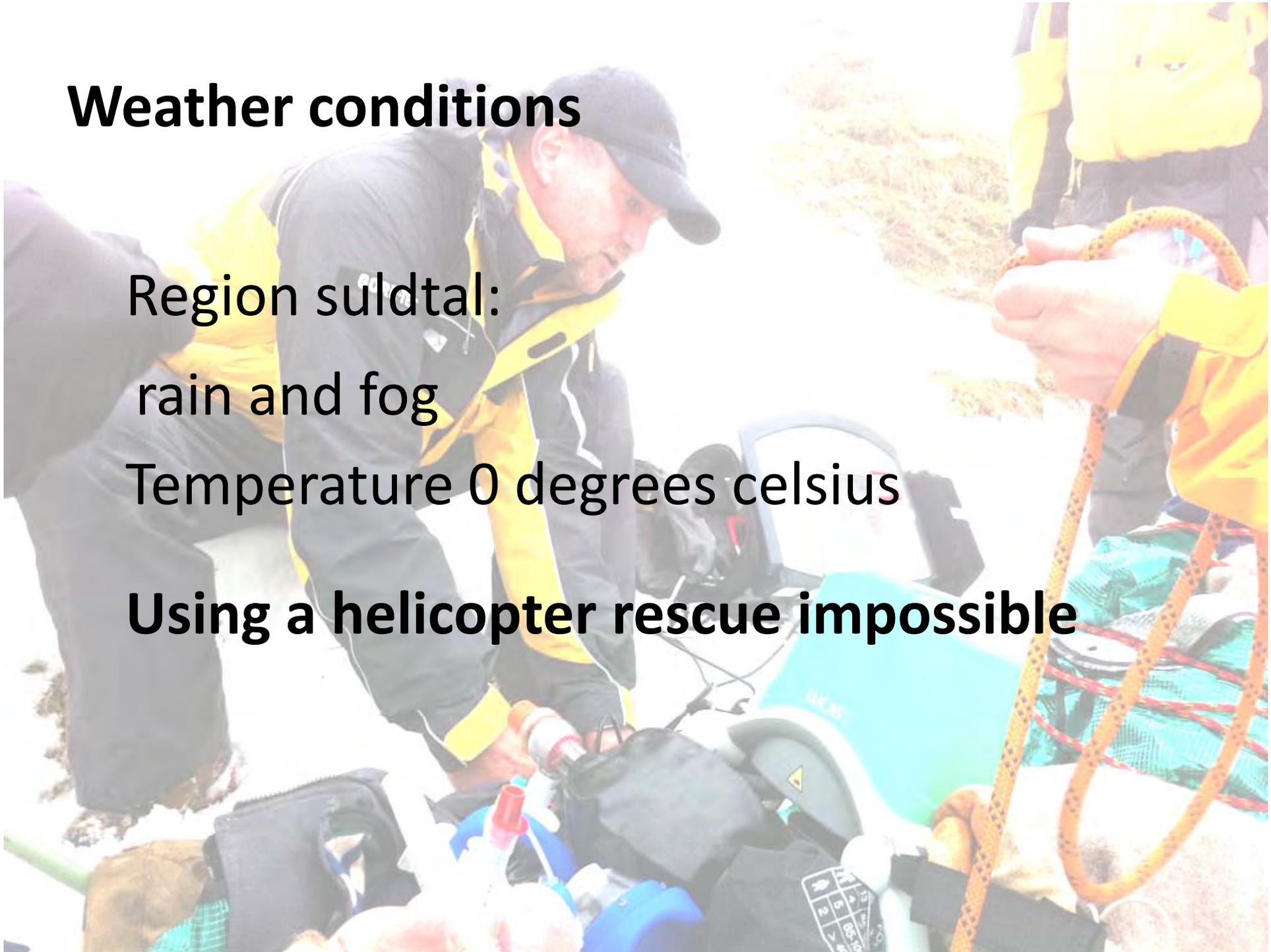
Weather conditions

Region suldtal:

rain and fog

Temperature 0 degrees celsius

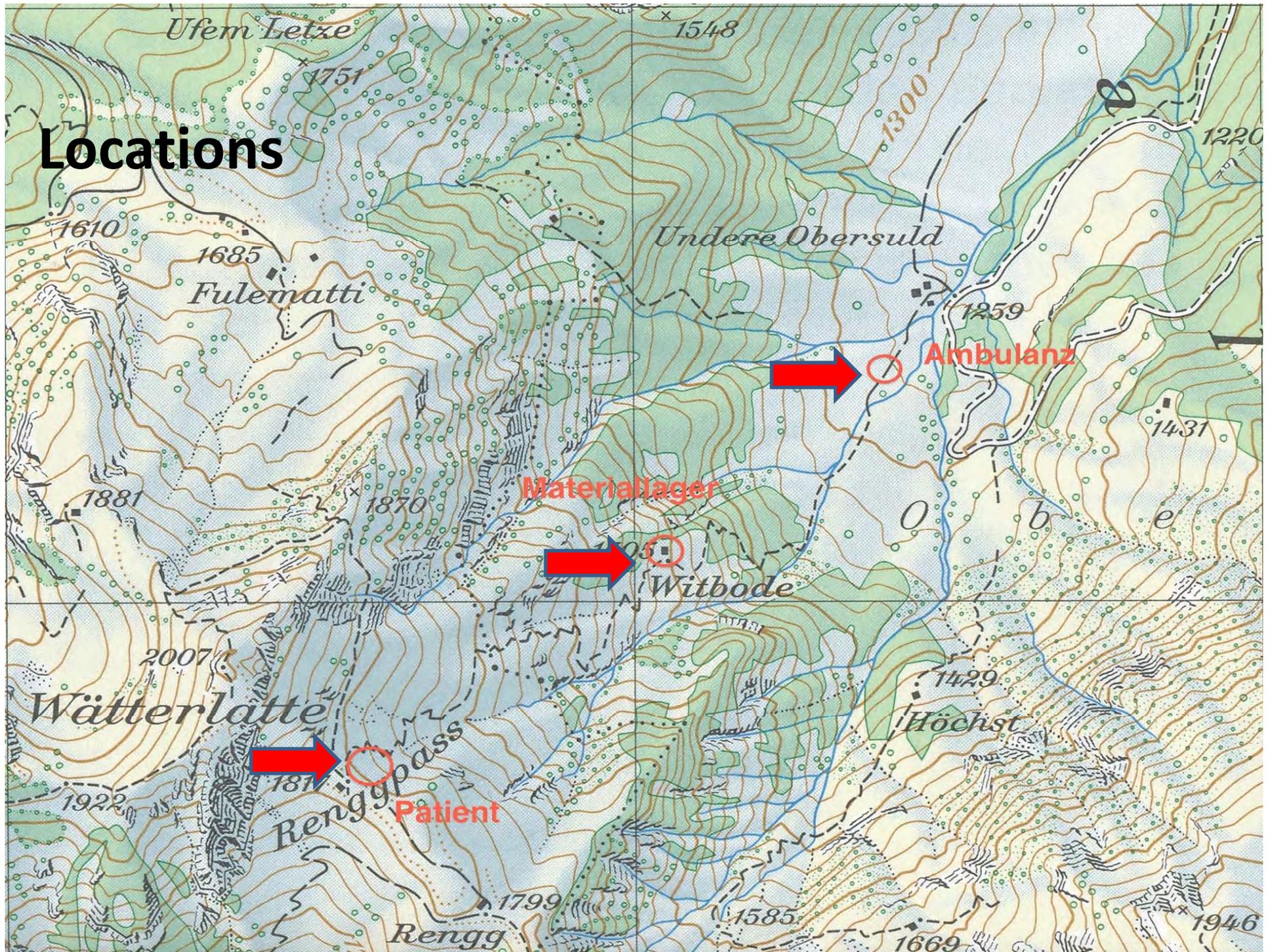
Using a helicopter rescue impossible





10:41 Ambulance alerting Frutigen
 Team with three medical rescuers
 10:51 Swiss alpine emergency alerting

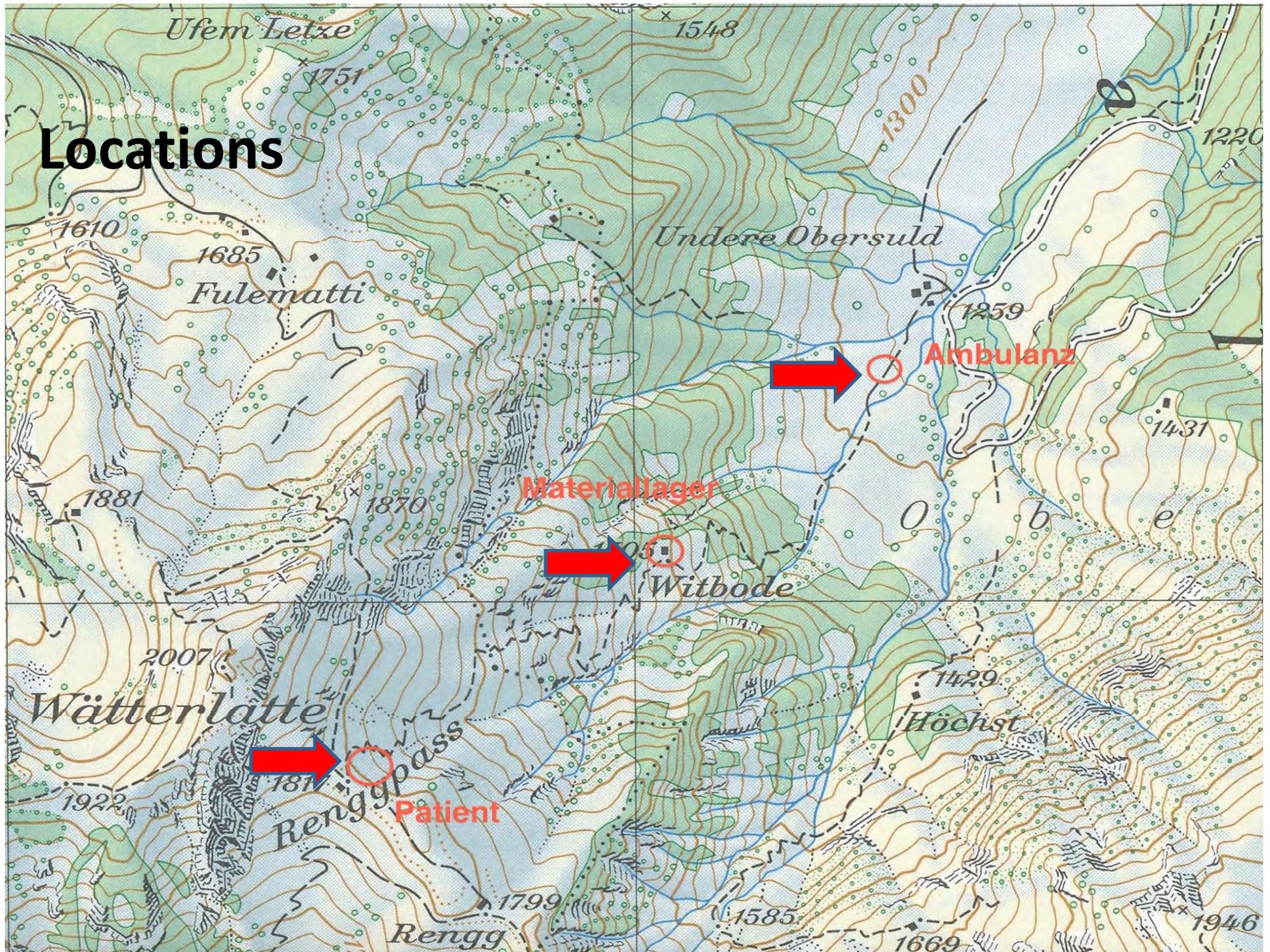
Locations



Ambulance team with the following equipment:



Locations



12:50 h the first patient contact

- Patient lying in the snow
- Patient was responsive
- Patient was tachypnoeisch
- Radial pulse was not palpable
- Well palpable carotid pulse
- Patient looked exhausted and hypothermic
- Patient indicates no pain
- Patient complains of breathing problems
- Allergies unknown
- Patient takes medication, but he can not name them
- Patient's has diabetes
- Last meal about 4 hours ago



13:00 clock
Transport towards
material storage



13:30 h

Cardiovascular arrest

CPR





13:45 h

Resuscitation with full ambulance team



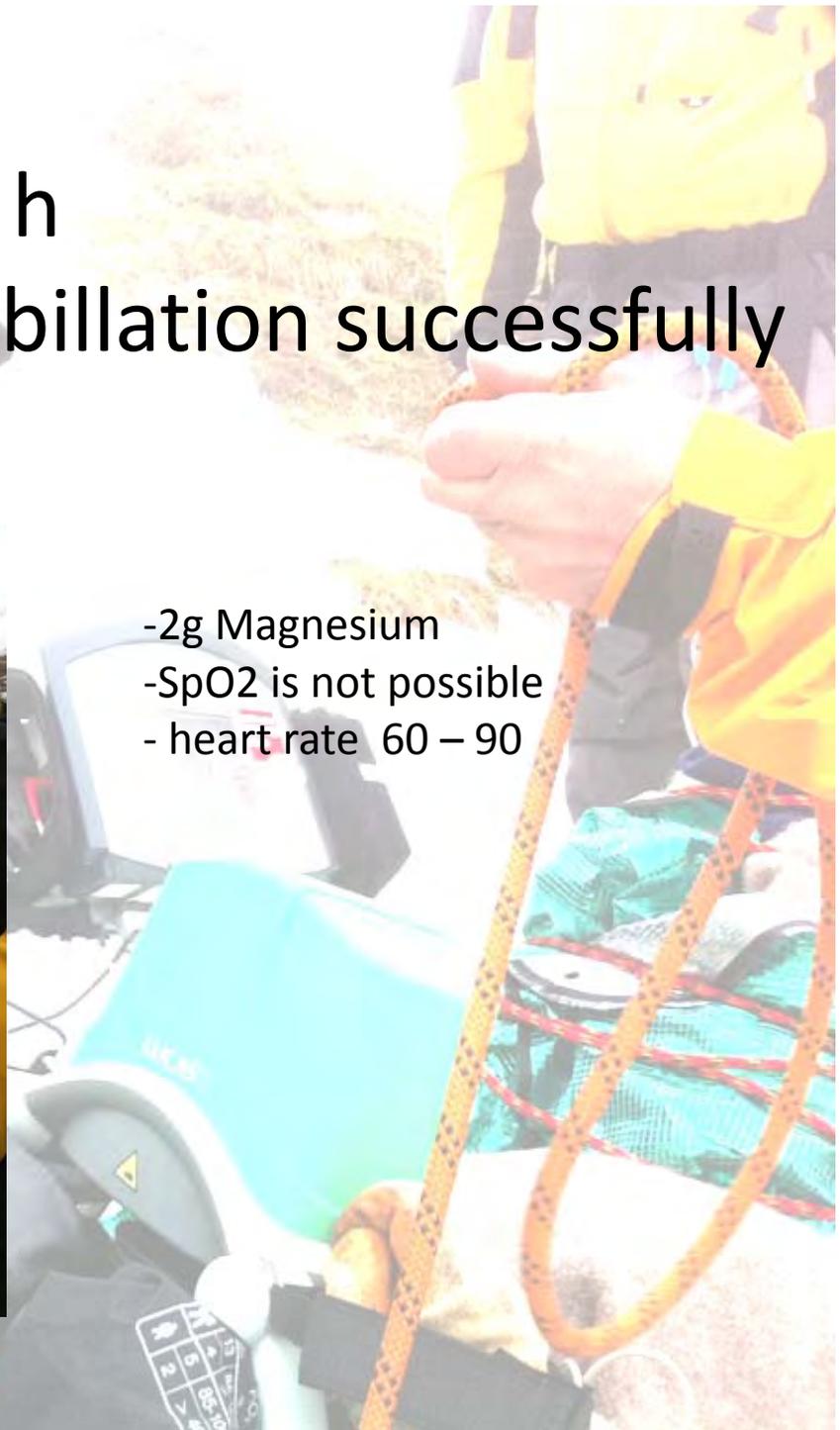
- First Defibrillation with 200 J
- Lukas 2 was attached to the patient on a mountain carrying
- mask ventilation
- Oxygen from 2ltr. bottle
- Intraosäre needle right proximal tibia
- 0,1 mg Fentanyl
- 10 mg Dormicum
- Larynxtube Gr.4
- Algorithmus SRC 2005
- Adrenalin
- Amiodaron 300mg about 100ml G5%

14:00 h

7. Defibrillation successfully



- 2g Magnesium
- SpO2 is not possible
- heart rate 60 – 90



14:15 – 16:00 h

Transport towards ambulance



16:00 h Patient is going to be prepared for ambulance transport



16:15 h Transfer to REGA



7. Schweizer Bergrettungsmedizinintagung

Interlaken, 10. November 2012

Dr. med. A. Kyburz
Notärztin Rega

november 2010
an extraordinary rescue

the main problem



- Exhausting rescue and episodes of reanimation during 4-5 hours after a cardiac arrest
- 15:30 Alarm Rega-Crew
- By the time of arrival (15:50) the paramedics were taking care of the patient inside the ambulance

first assessment

- Airway open with laryngeal tube
- Spontaneous breathing, ca. 15/min, symmetrical in auscultation
- O₂-saturation not measurable with cold extremities
- No endexpiratory CO₂-curve

Circulation

- Pulse of the carotid artery weak and irregular;
Centralisation with Hypothermia -> no peripheral pulses
- Noninvasive bloodpressure not measurable
- ECG: doubtful sinus rhythm, HR 70/min., many SVES, VES,

Disability/Environement

- GCS 6 without any sedative medication
- pupils narrow and isocor, no visible reaction to light
- Hypothermia, ca. 30°C

Decision for intubation

- absent endexpiratory CO₂ and a following difficult control of a sufficient spontaneous breathing with the risk of hypercapnia
- Hemodynamic instability with arterial hypotonia and arrhythmia
- Unconsciousness with the risk of aspiration (not save with laryngeal tube)

Flight to the university hospital of Berne





Medizinisches Behandlungskonzept in der Höhlenrettung – ein Europäischer Konsens

Über die Behandlung von Unfällen und Krankheitsfällen in Höhlen gibt es wenig Literatur. Meist handelt sich meist um einzelne Fallberichte, kaum grössere Zusammenfassungen und schon gar nicht evidenzbasierte Arbeiten. Etliche Ärztinnen und Ärzte haben sich natürlich schon Gedanken gemacht und auch publiziert. Seit Jahren gibt es auch einen gewissen internationalen Erfahrungsaustausch, bisher aber nicht in einer strukturierten Form, er hat meist am Rande der sporadisch veranstalteten internationalen Höhlenrettungs-Treffen stattgefunden.

2007 haben sich die Präsidenten der Europäischen Höhlenrettungsorganisationen erstmals getroffen um einen regelmässigen Erfahrungsaustausch zu beginnen. 2010 war „Medical treatment inside the cave“ Tagungsthema, ausser den Präsidenten nahmen darum auch verantwortliche Mediziner aus acht Organisationen teil. Das Dutzend Ärztinnen, Ärzte und Rettungssanitäter hatte dann aber ein Problem: Immer, wenn es für uns interessant war, wurde es für die andern langweilig. Statt langer Diskussionen und Erfahrungsaustausch wollte man lieber kurze klare Antworten – und die gab es oft einfach nicht.

Wir haben dann beschlossen, uns im folgenden Jahr, beim nächsten ECRM (European Cave Rescue Meeting) in Paklenica nochmals für einen Tag allein unter Medizinern zu treffen. Es ging uns darum, die internationalen Richtlinien auf ihre Anwendbarkeit unter den doch etwas speziellen Höhlenbedingungen zu überprüfen und einen minimalen Konsens zu finden was machbar und sinnvoll sei. Best medical treatment underground sozusagen. Es war von Anfang an klar, dass wir keine Guidelines erstellen konnten, dies wäre auch von den Delegationen mehrere Länder aus rechtlichen Gründen nicht akzeptiert worden. In einem „Consensus paper“ haben wir darum den grössten gemeinsamen Nenner definiert zu Themen wie Schmerzbekämpfung, Patientenbetreuung, Überwachung während des Transportes, Einsatz von Antibiotika und andern Medikamenten, Hypothermie-Prophylaxe und -behandlung.

Im Oktober 2012 haben wir uns nun erneut getroffen, diesmal waren Höhlentauchen und Gase in Höhlen die Schwerpunkt-Themen. Die Arbeit wird weitergeführt.



European Cave Rescue Meeting

Paklenica

Medical conference

16./17. September 2011

Consensus Paper

Reached by the participants: Stefan Allich (Germany), Hadrian Borcea (Romania), Ivana Buklijas (Croatia), Corrado Camerini (Italy), Paul Bogdan Csillag (Romania), Lana Donlagic (Croatia), Mircea Galu (Romania), Ulla Gressmann (Germany), Stefano Guarniero (Italy), Jochen Gürtler (Germany), Ulrich Heckmann (Germany), Regula Höhn (Switzerland), Tomaz Klinar (Slovenia), William Lumb (UK), Ueli Nägeli (Switzerland), Marko Petrovic (Serbia), Rok Stopar (Slovenia)

The group seeks to provide consensus and establish an expert body in cave rescue medicine. When practical, it is proposed to apply/adapt recognized international medical recommendations to the special conditions.

During the series of workshops the following subjects were explored and the following consensus statements agreed:

Any medical rescuer (doctors, paramedic etc.) needs to be competent caver (technical/speleological skills).

Cave rescue must always be considered a high risk mission due to a significant probability of secondary accidents.

Pain relief

Immobilisation

- Splinting and other types of immobilisation are the basis for pain relief
- Consider instructing first aiders to immobilise with whatever they have (commercial, e.g. vacuum or improvisation material) as soon as they can. Health care professionals should assess and replace as needed.
- Monitor carefully after splinting e.g. circulation

Drugs

- Every person has the right to adequate pain relief
- Try to use drugs that keeps the casualty mobile
- It is suggested that all cavers carry their own pain killers
- A basic combination of analgesics (e.g. paracetamol, NSAID, weak oral opiate) should be administered rapidly, potentially by non-medical personnel.
- Do not use ASA as a pain killer
- Ketamine is a useful agent in the treatment of severe pain.

Other

- Psychological first aid & care is very important in the treatment of pain
- Regional anaesthesia can be considered in special cases – it may help to maintain a list of suitably experienced doctors to undertake the procedure.

Patient Care

i.v. fluids

- Provide fluids orally if possible
- The use of i.v. fluid in cave rescue may be appropriate. Rescue complexity (duration, patient status, injuries) will influence the decision.
- In principle types of fluids or replacement regimes to use should be kept simple.
- All patients have the basic right of adequate hydration. The most appropriate method for monitoring hydration status is measuring the urine output (≥ 0.5 ml/kg bw/h)

Monitoring during transportation

- Preferably the i.v. line should be kept open during transportation (e.g. use pressure bag to keep it at 20 ml/h)
- For transportation on stretchers an i.v. line should be considered

Antibiotics

- If antibiotics are needed, start early
- Check for allergies
- Keep the route of administration as simple as possible
- Prophylactic treatment:
 - As per planned procedure, normally a single dose

- Treatment
 - Open fractures
 - Broad spectrum antibiotic with a good bone penetration, low allergy risk and good oral absorption
 - Complex wounds
 - Oral administration except in case of shock
 - In principle wounds should not be closed underground, exceptions include procedures to facilitate extrications and haemorrhage control
 - Consider anti-tetanus booster if rescue lasts longer than 72 hours
 - Facial trauma: Broad spectrum antibiotics, with good tissue penetration and anaerobic coverage
 - Burns: Match standard burn treatment as close as possible to national guidelines

Thromboprophylaxis

- Consider thromboprophylaxis if patient immobilised for more than 12 hours (caution in case of hypothermia or undergoes surgery within the next 12 hours)
- Low dose, low molecular weight heparin

Hypothermia

- All patients should be considered hypothermic unless proved otherwise; normal temperature should be the goal.
- Apply common sense measures to avoid temperature loss (insulation etc.)
- Re-warming underground is possible but hard work. Apply all available means
- After-drop exists but is not a reason to stop mobilizing
- Consider temperature assessment by clinical symptoms, e.g. walking capability. Any patient that can walk, keep mobile.
- In case of mild to moderate hypothermia, temperature measurement is used to indicate trends than reliable exact values. In case of severe hypothermia try to measure as accurately as possible, allowing the distinction between trauma and hypothermia as a cause of unconsciousness.
- Do not administer any medication below 30 °C core body temperature.
- In principle warm up severe hypothermic patients to at least 28 °C prior to starting transportation

Monitoring

- Electronic equipment has a high potential to fail under cave conditions
- Due to limited or no access to facilities, use incident and patient history, clinical observations and findings for the assessment
- Assessment should be a continuous process and documented (monitoring sheet)
- Consider that monitoring sheets may be subject to critical examination in the future and they can also act as an important training and audit resource
- The following physiological measurements should be considered in the initial assessment and ongoing care of the patient:
 - Temperature
 - Blood pressure
 - Oxygen saturation
 - Heart rate / pulse
 - Respiratory rate
 - Fluid intake & loss
 - Level of consciousness
 - Capillary refill
 - Pupil size
 - Pain scale
 - Blood samples
 - Blood sugar

Diabetics

- Cavers should carry their own drugs and peers should be competent in the indication for and use of diabetic medication
- Hypoglycaemia is seen more frequently, if unable to correct orally consider highly concentrated glucose i.v. treatment
- In cases of hyperglycaemia fluid therapy should be applied

Stroke

- Haemorrhagic stroke may be seen more frequently than statistically expected due to exertional extremes. The indication of ASA may be less obvious.

Open questions for follow up:

- Clarify the evidence base for the administration of i.v. fluids
- Check literature about antibiotic prophylaxis in case of large haematoma
- Consider testing the use of remote monitoring devices

- Clarify evidence base that surgical interventions underground (e.g. appendectomy) should be the last resort and explore practical alternatives e.g. high dose antibiotics
- The group agreed that during a cave rescue the need could arise for an especially skilled medical person only available in another country.
 - Legal aspects and procedures must be cleared
 - Liability and insurance questions sorted out

Further contacts and next meeting:

The group agreed that an exchange platform is very valuable and decided to stay in contact primarily by electronic means. In person meetings should be organized in a 12-18 months frequency, preferably in the context of broader rescue meeting events.

No commercial credit should be drawn by any individual from this work and publication of the results will be made in the name of the group.



European Cave Rescue Meeting

Châtel de Joux

Medical conference

19./20. October 2012

Consensus Paper

Reach by the participants: Tina Bijsak (Slovenia), Christian Dodelin (France), Lana Donlagic (Croatia), Jochen Gürtler (Germany), Regula Höhn (Switzerland), Ueli Nägeli (Switzerland), Marko Petrovic (Serbia), Sophie Pumir (Italy), France Rocourt (France), Rok Stopar (Slovenia), Alessandro Tuveri (Italy) and Valerio Tuveri (Italy)

The group seeks to provide consensus and establish an expert body in cave rescue medicine. When practical, it is proposed to apply/adapt recognized international medical recommendations to the special conditions.

During a series of workshops the work, begun in 2011 in Paklenica was continued, the following subjects were explored and the following consensus statements agreed:

- Medical problems in cave diving and rescue
- Underground gases, management of gas working with explosives

Diving and diving rescue

There needs to be a clear distinction between decompression sickness (DS), divers with trauma and combinations of the two scenarios.

Generally

- Muscular activity produces more bubbles and so causes more problems
- Severe decompression sickness (DS) often cannot be treated in the cave, because only the pressure chamber is really effective
- Bends in the joints are not life threatening but painful
- DS can begin even hours after leaving the cave
- Divers often, but not always know the first symptoms
- It is not important to know with which type of decompression-accident we have to deal with, because the treatment on the spot in the cave is always the same

- Divers can collapse leaving the cave as consequence of a decompression-problem
- Divers often are dehydrated

Prevention:

- Technical rescue divers should undergo complete medical check-up regularly including full cardio-pulmonary assessments.
- If a diver had an non-expected DS problem, an Echo Cardiogram or intracranial Doppler should be made
- Ensure proper hydration before diving
- Consider training technical divers in recognizing and treating typical medical situations (e.g. splinting a leg for transport through siphon)
- Every diving team should know where the closest hyperbaric centres are.

Diagnosis:

- If decompression sickness is suspected, neurological monitoring should be applied continuously.
- Keep in mind that some divers might have taken self-administered drugs previous or during the dive that can mask early symptoms of decompression disease.
- Decompression sickness (DS) in the cave can be very critical, any unclear symptom should be considered as DS until proven otherwise.

First aid/pre-hospital treatment in decompression accidents (only)

- 100% Oxygen by regulator or re-breather or at least by mask with reservoir even if 100% cannot be achieved. Nitrox is still better than air if no pure oxygen is available.
- Position the victim straight horizontal
- Administration of drugs is very controversy and there is no evidence of drugs for treating decompression sickness. The use of drugs for pain relieve can be considered (Pre-medication!)
- Fluid replacement by any way, intravenous application must be considered
- Unless the victim can be assessed by a doctor experienced in hyperbaric medicine on site, careful and rapid transportation to a centre for hyperbaric medicine is recommended.
- Prevention of hypothermia is even more important than in other cave rescue situations
- To prevent further progression of hypothermia, the body temperature needs to be stabilized before exposing a victim to cold water again. Be aware that re-warming in the case of severe hypothermia can lead to further progression of decompression sickness.
- Wet decompression is not recommended.

Treatment of trauma behind siphon:

- Any treatment needs to consider the diving requirements
- Regional anaesthesia may be a considerable alternative for pain treatment
- There are different ways for transporting a victim through a siphon. The medical condition of the victim may influence the choice of equipment and that influences the victim's preparation for the transport (e.g. combination of KED and immobilisation of a broken leg).
- To prevent further progression of hypothermia, the body temperature needs to be stabilized before exposing a victim to cold water again.

Combination of trauma and deco:

Such a situation will be too complex to be able to give standard recommendations

Gaz:

Prevention:

- The doctor may be the only one with experience on gas intoxications.
- The safety of the rescue team is essential
- Monitoring of critical gaseous (e.g. CO₂, CO, NO_x) may be necessary
- CH₄ (e.g. mines or caves with lots of organic material degradation) in addition has an explosion risk
- Remember: acetylene (carbide lamps) does impact the measurement.
- Natural CO₂ may accumulate at the lowest points even without blasting or without organic material
- In case of CO contamination it may be wise not to re-employ rescuers during the event.
- Consider air contamination in caves also several days after blasting
- The season may impact natural ventilation in the cave; artificial ventilation may push CO₂ further into the cave.
- Oxygen is an explosive – ensure safe transport.

Treatment of gas intoxication:

- Evacuate from dangerous environment as soon as possible and in case of CO poisoning decide if hyperbaric treatment may be needed
- Administer oxygen with reservoir mask
- Half time value of CO in blood is 3.5 to 6 hours, in pure oxygen atmosphere 1.5 hours. Damages may persist even after elimination of CO from the blood

Discussion of open questions of 2011:

Clarify the evidence base of iv.fluids: discussed, no additional aspects already covered

Check literature about antibiotic prophylaxis in case of large haematoma: In case of open haematoma or danger of penetration: yes; in case of closed haematoma: no

Consider testing remote devices: work in progress. Lana Donlagic reported positive results in a mostly dry cave.

Clarify evidence base that surgical interventions underground should be the last resort and explore practical alternatives: no news

Medical resources from other countries:

- Actual case of Croatia requested help from Slovenia: Contact was made by ministry of civil protection; collaboration was approved although finally not needed.
- Lethal accident in Slovenia where an Italian caver died close to the border. Italian rescue was alerted the same time as the Slovenian. Italians arrived first and started treatment. Excellent cooperation between the 2 organisations without formalities.

Conclusion: Ensure that authorities are properly informed, legal and liability aspects not yet cleared.

New open questions:

- Decision criteria for transportation behind the siphon should be evaluated and discussed

Accidental Hypothermia in a Level I Trauma Center - retrospective analysis from 01.01.2000 to 31.05.2012

Habegger Katrin, Exadaktylos Aristomenis, Brodmann Maeder Monika

Master's thesis for the academical degree of Master of Medicine
Bern University

Department of Emergency Medicine, University Hospital Inselspital Bern
Contact: monika.brodmann@insel.ch

Background: People involved in the mountain rescue mostly know the clinical picture in relation to avalanche victims, where the problems of hypoxia / asphyxia, trauma and accidental hypothermia multiply the medical problems and are always challenging situations in the preclinical setting. For the attending hospitals the decision-making especially of patients in deep hypothermia is difficult because of the low overall incidence of these situations. A multidisciplinary group of the Inselspital Bern developed a proposal for the decision-making in patients in deep hypothermia, the so-called Bernese Hypothermia Algorithm after a winter with a high incidence of avalanche victims in 2010. Due to another high incidence of patients with deep accidental hypothermia in the cold winter 2011/2012 we were interested to know more about the pathophysiology of these patients and the mechanisms that lead to this serious problem.

Methods: We conducted a retrospective study by searching patients of > 16 years with the diagnosis of "hypothermia" and "freezing" in our electronic medical records. With the help of the clinical records of the emergency department, the intensive care unit and if available further records we collected data on the incidence and the severity of the hypothermia, defined as mild (core temperature 35 - 32.1 °C), moderate (core temperature 32 - 28.1°C) or severe (core temperature 28 °C or less).

Results and Discussion: 458 patients with the diagnosis hypothermia or freezing could be found. After exclusion of 253 cases 205 patients could be included. In the presentation we will focus on the mechanisms leading to the accidental hypothermia, the overall incidence, mortality and the seasonal distribution. Moreover we will show the problems of measuring core temperature.

BRM 2012 Interlaken

Esslinger Andrea Notärztin Rega Samedan

Piz Grevasalvas: 9.2 Stunden – 22.9 Grad C Körper-Kerntemperatur

Fall-Bericht eines nächtlichen Lawineneinsatzes mit zwei Ganzverschütteten, bei dem ein Verschütteter nach ca. 9.2 Stunden Verschüttungsdauer mit freien Atemwegen und einer Atemhöhle sowie einer Kerntemperatur von 23°C lebend geborgen und erfolgreich mit Warmluft wiedererwärmt werden konnte. Nach der Bergung trat ein Lungenödem auf, das sich innerhalb von zwei Tagen spontan zurückbildete. Ein zweites Lawinenopfer wurde ebenfalls mit einer Atemhöhle, aber mit steif gefrorenem Thorax tot aufgefunden. Es werden die speziellen Umstände der Rettung sowie der Behandlungsprinzipien vorgestellt und diskutiert. Zudem wird die Bedeutung eines gefrorenen Brustkorbs für die Reanimationsentscheidung bzw. Todesfeststellung und die Triagierung bei mehreren Verschütteten auf einer Lawine dargestellt und diskutiert.

Local Freezing Injuries

An Update on Current Treatment Recommendations

Bergrettungstagung Interlaken, 10. November 2012

Walliser Martin
LA Unfallchirurgie
Kantonsspital Glarus

Overview

- Influence factors on local freezing injuries
- Prevention
- Pathophysiological aspects
- Grades and classifications
- Treatment options
- Case presentation
- Summary

Environmental Factors

- temperature
- wind chill factor
- air humidity
- altitude above sea level

Human Factors

- general hypothermia
- exposition (temperature loss, insulation)
- **very important:** dehydration
- exhaustion, injuries
- preexisting disease
- local factors (piercings, rings...)
-

Prevention

- first: prevent loss of body-temperature
 - tissue conservation possible
 - centralisation = peripheral decrease of circulation
- second: prevent local exposure
- recognize frostbite early (watch, observe, ask)
- early active rewarming

Effects during Freezing

Vascular (mainly arteries)

- vasoconstriction
- rise in viscosity
- thrombus formation (mainly arteries)
- vascular damage

Effects during Freezing

Cellular:

- ice crystal formation within cells
- changes in osmotic pressure, fluid shifts
- **RAPID FREEZING**
 - NO correction possible, destruction of cell membrane
- **SLOW FREEZING**
 - eventually correction possible, cell not destructed

Effects during Rewarming

Many effects to vessels and cells:

- vascular damage – hämorrhagic
- cellular damage – necrosis - tissue loss
- increased metabolism needs oxygen
- active and passive fluid shifts

Effects during Rewarming

Border zones are most critical

- rapid rewarming = faster restitution
- rapid rewarming = less tissue damage
- **AVOID:** slow rewarming
- **AVOID:** re-freezing

Grades and Classifications?

- NO distinction possible in the field!

Grades and Classifications?

Many different classifications known

superficial

• 1°

• Grad I

• 2°

• Grad II

– Oberflächlich

• 3°

– Tief

• 4°

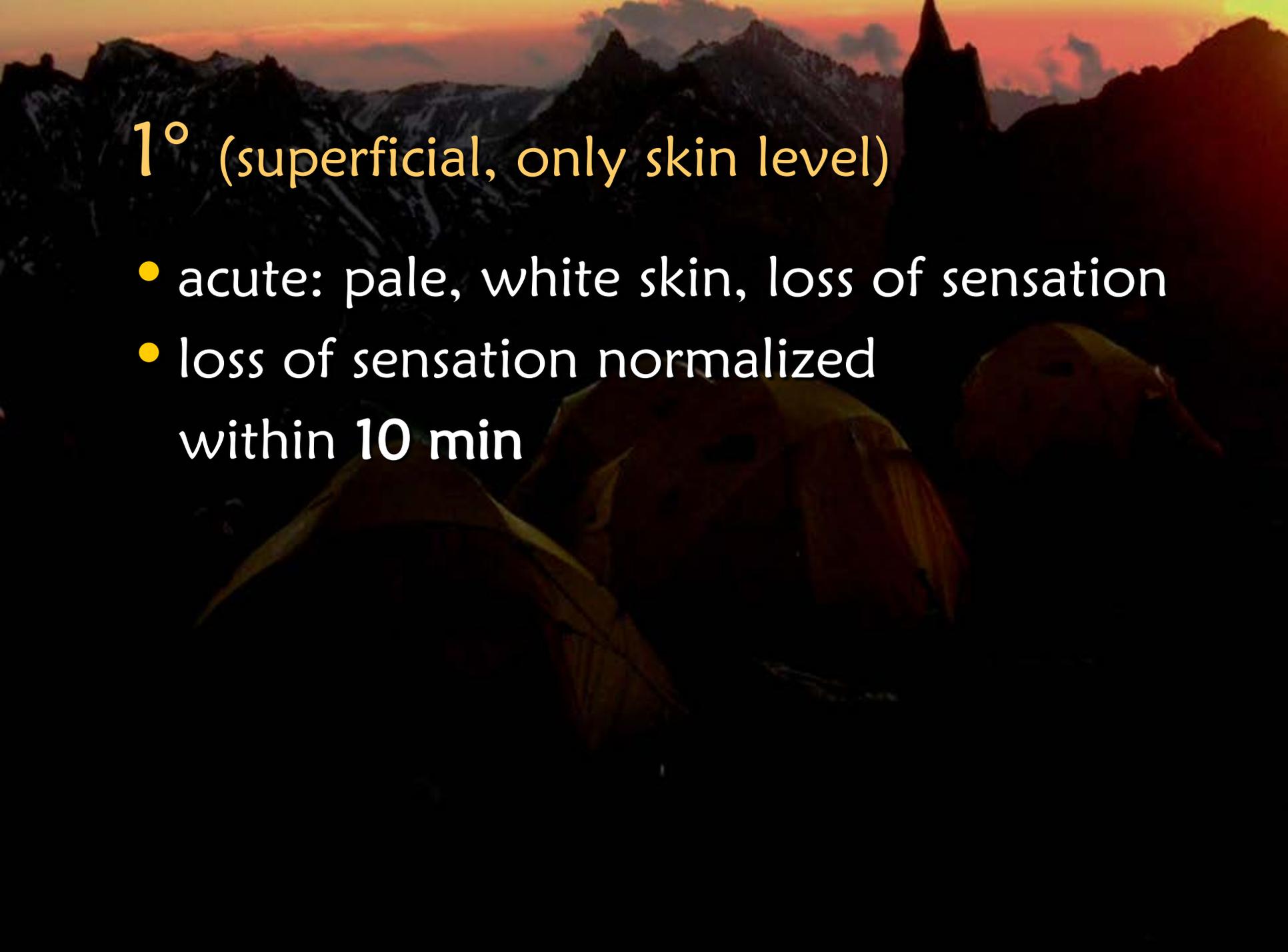
• Grad III

deep

Grades and Classifications?

How important are they?

- classification only retrospective
- superficial: 70%
 - sensation (feeling) returns after rewarming
 - generally NO tissue loss
- deep: 30%
 - NO sensation after rewarming
 - tissue loss possible (amputation)



1° (superficial, only skin level)

- acute: pale, white skin, loss of sensation
- loss of sensation normalized within 10 min

1° (acute)



1° (after 1w)



2° superficial

- skin level
- after rewarming
 - reddish / blue, warm
 - swelling
 - loss of sensation > 10 min, afterwards PAIN
 - blistering (clear fluid) after 1-2 days
- all changes are reversible!

2° superficial (1d)



2° superficial (1d)



2° superficial (1w)



3° deep

- skin level and subcutaneous tissue
- after rewarming
 - cool skin, **NO** feeling, pain at margins
 - swelling
 - blistering (dark, red) after 1-2 days
 - superficial tissue loss
- changes +/- reversible

3° deep (2d)



3° deep (1w)



3° deep (1d)



3° deep (1w)



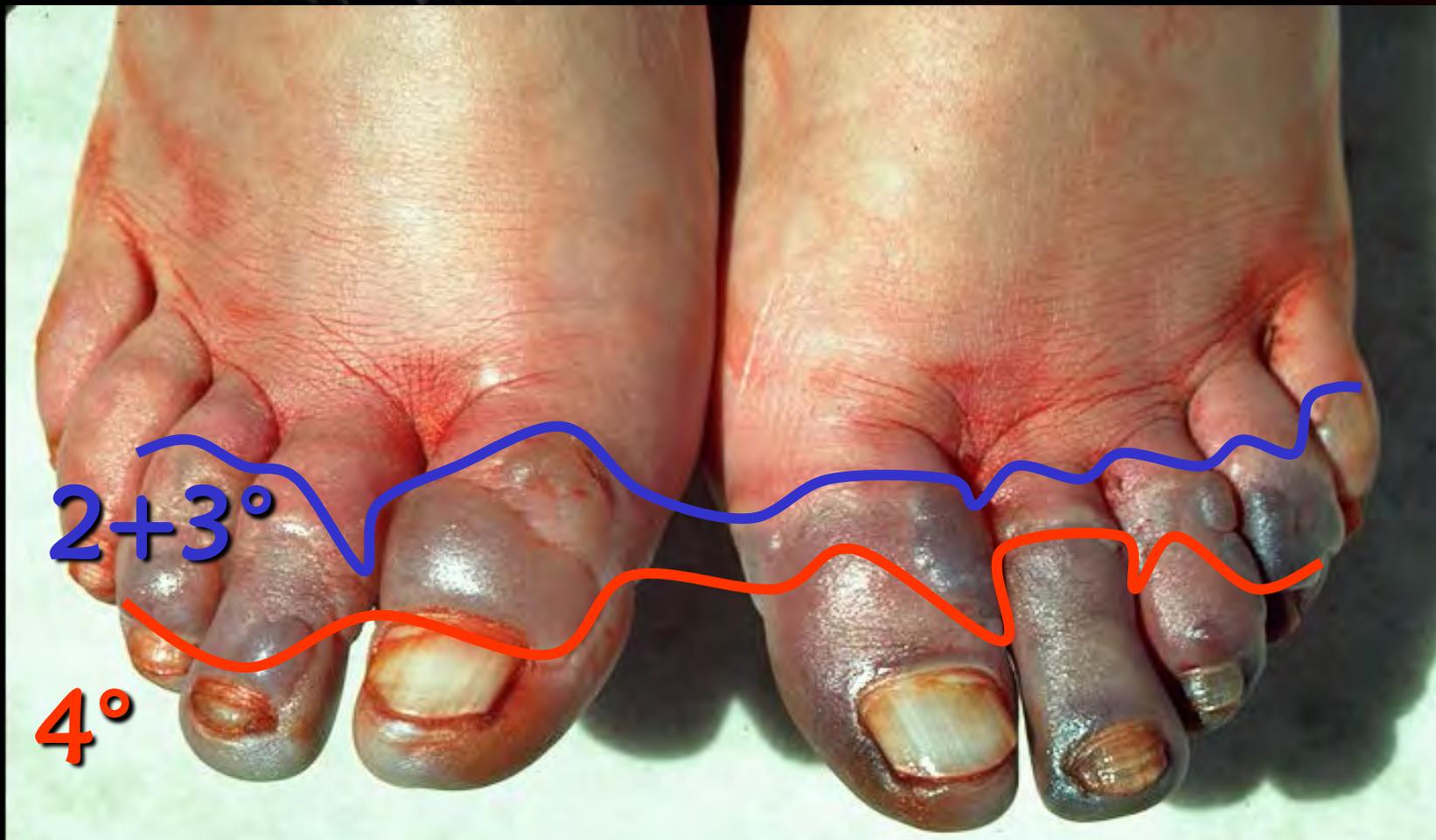
4° deep with tissue damage

- NO feeling after rewarming
- blistering only on margins
- demarcation after weeks / up to months
- tissue loss / amputation

4° deep (48 h)



4° deep (2d)



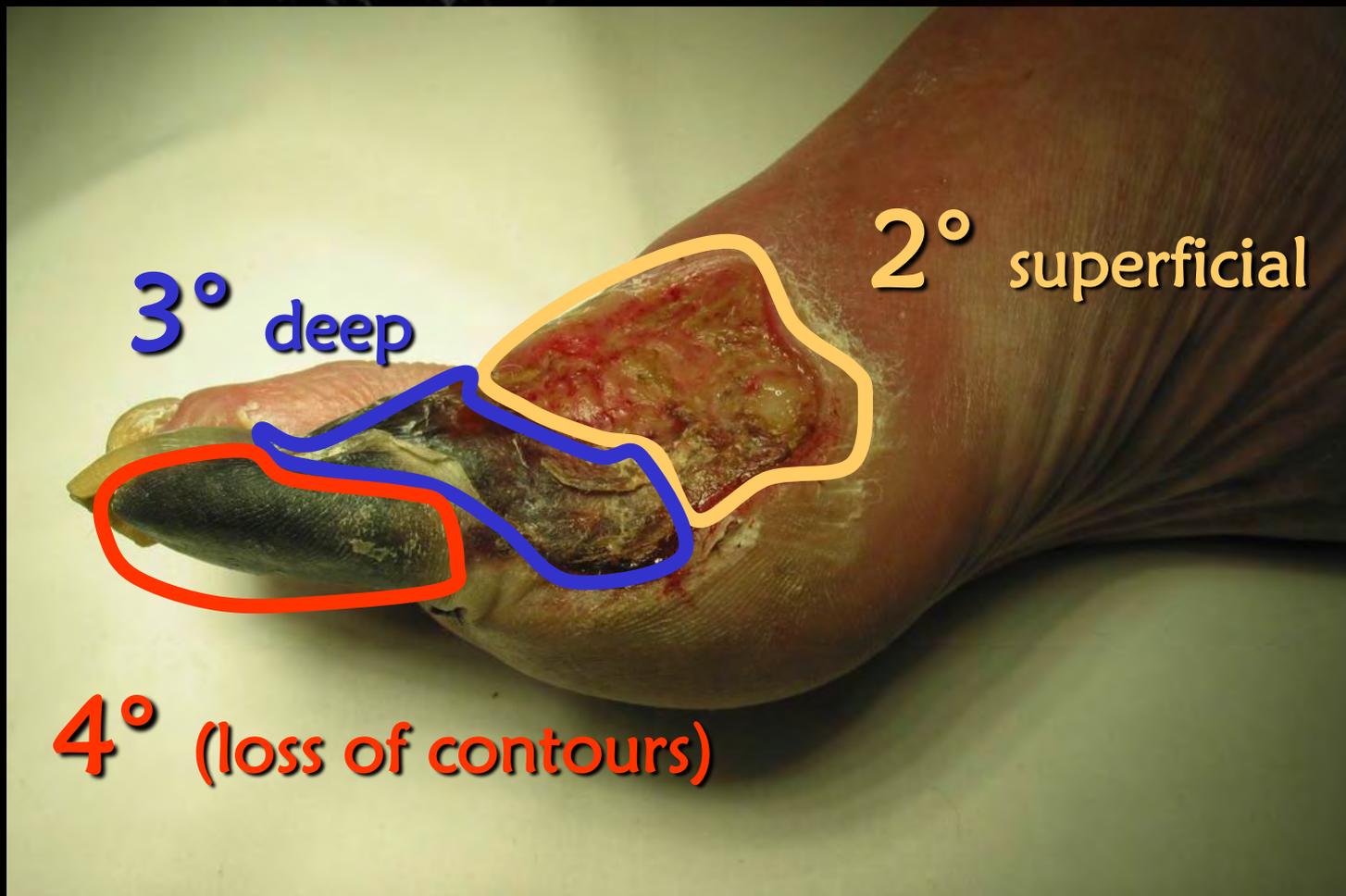
4°(1w)



4° deep (3w)



4° (5w)



Frostbite: Therapy I

Acute phase (outdoor, expedition)

- recognize early!
- immediate local rewarming
 - direct application of moderate heat
 - take off shoes / gloves, change clothes
 - allow optimal circulation
 - **DO NOT** rub in with snow
- continue tour only if damage reversible

Frostbite: Therapy I

Acute phase (outdoor, expedition)

- IF sensation does not return
 - turn around – go home
 - if possible: **DO NOT** walk on frozen feet!

Frostbite: Therapy II

Intermediate Phase (hut, base-camp)

- protection, dry clothes, rewarming, fluids
- local rewarming
 - rewarming devices
 - „handwarm “ water (max. 40°, 40 min)
 - **DO NOT USE:** dry heat, open fire, friction
 - elevate extremity after rewarming

Frostbite: Therapy II

Intermediate Phase (hut, base-camp)

- aspirin 500mg (Circulation / pain)
- additional pain medication
- oxygen (over 5000m)
- blisters should not be opened
 - eventually sterile evacuation
 - eventually antibiotics

Frostbite: Therapy II

Medications:

- painkillers recommended
- aspirin recommended (studies)
- antibiotics depending on condition
- alcohol recommended

Frostbite: Second Blow

- avoid re-freezing
 - extensive tissue damage
- in critical conditions
 - better walk with frozen feet
 - rewarm only, if re-freezing is highly unlikely

Frostbite: Therapy III

Late phase (hospital, medical care)

- superficial treatment: similar to burnings
- wait for demarcation (min 3-6 weeks!!)
- **NO** early amputation needed if there is no infection!
- **NO** early amputation without specific diagnostics

Frostbite: Therapy III

Additional Medications

- Iloprost, Ilomedin (Prostacyclin)
 - Urokinase (rt-PA)
 - Buflomedil (Alpha-Antagonist) **SIDE EFFECTS**
-
- E. Groechnig, Feldkirch, 1994
 - Kevin J. Bruen et al, University of Utah, Salt Lake City, 2007
 - E. Chaudry, B. Cheguillaume, E. Chetaille, Chamonix, 2011

Frostbite: Therapy III

Diagnostic Possibilities

- Technetium 99 Bone-Szintigraphy
 - Emmanuel Cauchy et al, Chamonix 2000
 - 3-7 days after frostbite injury
 - high prognostic reliability
 - earlier definitive treatment possible

Summary

- Prevention is better than treatment
- **SLOW FREEZING** causes LESS damage
- **FAST THAWING** causes LESS damage

Summary

- Grades and Classifications
 - not important in the field
 - **SUPERFICIAL** = full restitution
 - **DEEP** = healing with defects
- Rewarming / Thawing
 - Only if **RE-FREEZING** is out of bound
 - **DAMP HEAT** (40°, ca 30 – 45 Minutes)

Medizinische Ausbildung der Bergführer

Formation médicale des guides de montagne



Daniel Walter

Geschichte der medizinischen Ausbildung von Bergführern in der Schweiz

Histoire de la formation médicale des guides de montagne en Suisse





Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Bundesverwaltung admin.ch

Eidgenössisches Volkswirtschaftsdepartement EVD

Bundesamt für Berufsbildung und Technologie
BBT

Startseite | Übersicht über die Website des BBT | Kontakt | Index | Druckhilfe | Bedienungshinweise

Deutsch | Français
Italiano | English

Aktuell | Themen | Dokumentation | Dienstleistungen | Das BBT

Administration fédérale admin.ch

Département fédéral de l'économie DFE

Office fédéral de la formation professionnelle et de la technologie
OFFT

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

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Deutsch | Français
Italiano | English

Actualité | Thèmes | Documentation | Services | L'OFFT

Bergführer mit eidg. Fachausweis Bergführerin mit eidg. Fachausweis

Berufsnummer: 95040

Prüfungsordnung vom: 12.02.2003

Trägerschaften

Schweizer Bergführerverband SBV, Hadlaubstrasse 49, 8006 Zürich, 044 360 53 66,
E-Mail: sbv-asgm@4000plus.ch, Internet: www.4000plus.ch

Prüfungssekretariat

Schweizer Bergführerverband Ausbildungssekretariat, Gärbigässli 1, Postfach 770, 3855
Brienz, 033 952 15 19, E-Mail: ausbildung@4000plus.ch, Internet: www.4000plus.ch

Links

 [Prüfungsordnung](#)
 [Berufsinformation](#)

Guide de montagne avec brevet fédéral

No profession: 95040

Prescriptions d'examen du: 12.02.2003

Organisations responsables du monde du travail

Schweizer Bergführerverband SBV, Hadlaubstrasse 49, 8006 Zürich, 044 360 53 66,
E-mail: sbv-asgm@4000plus.ch, internet: www.4000plus.ch

Secrétariat des examens

Schweizer Bergführerverband Ausbildungssekretariat, Gärbigässli 1, Postfach 770, 3855
Brienz, 033 952 15 19, E-mail: ausbildung@4000plus.ch, internet: www.4000plus.ch

Liens

 [Règlement d'examen](#)

Strukturierter Modulbeschrieb

Spécifications modulaires structurées

Schweizer Bergführerausbildung

Formation suisse des guides de montagne

Modulbeschrieb Medizin (3 Tage)	Description du module Médecine (3 jours)
Anhang zur Wegleitung zum Reglement über die Erteilung des eidgenössischen Fachausweises als Bergführer oder Bergführerin gemäss Art. 18 der Wegleitung	Annexe de la directive pour le règlement régissant l'octroi du brevet fédéral de guide de montagne selon Art. 18 de la directive
Anbieter	Idendification du prestataire
Schweizer Bergführerverband SBV	Association Suisse des Guides de montagne ASGM
Voraussetzungen zur Zulassung	Prérequis
<ul style="list-style-type: none">- Modul Lawinen (Ausnahme: Kletterlehrer)- Bezahlung des Kursgeldes	<ul style="list-style-type: none">- module avalanche (exception: moniteur d'escalade)- payement frais du cours
Handlungskompetenz	Compétences
Die Teilnehmenden haben Kenntnisse über die im Gebirge speziellen Gefährdungen für die Gesundheit. Sie können ihre Begleitenden auf die Besonderheiten aufmerksam machen und vorbeugend instruieren. Sie wissen wie eine Bergführerapotheke zusammengestellt ist und können den Inhalt korrekt anwenden. Bei einem Notfall in den Bergen sind sie in der Lage richtige Entscheidungen zu treffen und erste Hilfe im Gelände zu leisten.	Le participant connaît les risques pour la santé inhérents à la montagne. Il est capable de rendre ses hôtes attentifs à leurs particularités et à les instruire à titre préventif. Il sait constituer une pharmacie de guide et en utiliser correctement le contenu. En cas d'urgence en montagne, il est capable de prendre les bonnes décisions et de dispenser les premiers soins sur place.

Medizin
médecine

Übergeordnete Ziele

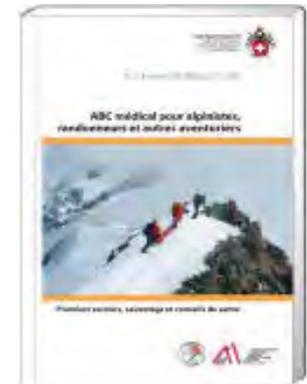
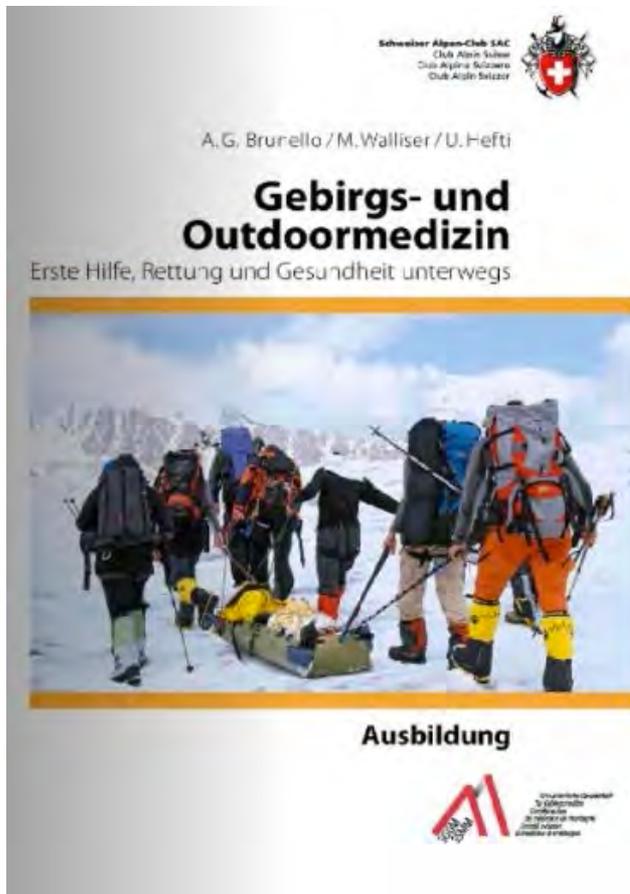
Objectifs globaux

- Inhaltlich von Organisationen (REGA, Alpine Rettung Schweiz, Air Zermatt, KWRO, Air Glaciers etc) unabhängige, praxisbezogene medizinische Grundlagenausbildung, die auf die Bedürfnisse der BergführerInnen ausgerichtet ist.

Formation médicale de base; indépendante des organisations (REGA, Secours Alpin Suisse, Air Zermatt, OCVS, Air Glaciers etc), pratique et dirigée par les besoins des guides de montagne.

Ausbildungsgrundlage/ Literatur

Formation de base / littérature



ABC médical pour alpinistes,
randonneurs et autres
aventuriers: Premier secours,
sauvetage et conseils de santé

Stoffinhalte Modul Medizin

Thèmes du module médical

- 2 Tage, resp. 17h
Unterricht, Verhältnis
Theorie zu Praxis ca.
50:50
- 1h Prüfung (theoretisch):
35 Fragen (max. 140
Punkte)
- 1 Tag, resp. 6.5h
„organisierte Rettung“ und
praktische Rettungsübung
aus dem Eisfall

- 2 jours, donc 17h de cours,
de la théorie à la pratique
rapport d'environ 50:50
- Un examen théorique: 35
questions (max. 140
points)
- 1 jour, donc 6.5h
„sauvetage organisé“
exercice pratique,
sauvetage dans la cascade
de glace

Detaillierte Stoffinhalte – erster Tag

Sujets en détail - premier jour

- Reanimation
- Patientenbeurteilung
- Improvisierte Fixationen
- Rückentrauma/Wirbelsäulenverletzung, improvisiert/organisiert
- Kälte
- Höhenbergsteigen und Trekking
- Sportklettern

- Réanimation
- Evaluation du patient
- Fixations improvisées
- Traumas/blessures du rachis, improvisé - organisé
- Le froid
- Expéditions et trekking
- Escalade sportive

Detaillierte Stoffinhalte – zweiter Tag

Sujets en détail - deuxième jour

- Unfall/Verletzungen
- Bergung, Lagerung
- Improvisierter Transport, spezielle Techniken
- Medizinische Notfälle
- Spezielle Themen (Hängen im Seil, Schlangenbisse, Senioren/Kinder, kulturelle Besonderheiten bei Expeditionen/Trekkings)
- Bergführerapotheke

- Trauma/blessures
- Evacuation, position de choc etc
- Transport improvisé, techniques spéciales
- Les maladies aiguës
- Sujets spéciaux (suspension prolongée à la corde, morsures de serpent, personnes âgées/enfants, caractéristiques culturelles des expéditions/treks)
- Pharmacie du guide

Ausbildung Berg- und Skiführer in Deutschland

Formation en Allemagne...

- LG 111, „Theorie 1“ und LG 112, „Theorie 2“
 - **„Sportphysiologie“**: Herz-Kreislauf, Atmung, Muskulatur, Ernährung, Energiestoffwechsel, Höhenphysiologie. **6h**
 - **„Sportbiologie, Anatomie“**: Zellen, Gewebe, Organe; ausgewählte Körperteile (Kopf, Wirbelsäule...). **5h**
 - **„Erste Hilfe, Unfallkunde“** (Theorie): Weichteilverletzungen, Knochenverletzungen, Gelenkverletzungen, Schädelverletzung, Wirbelsäulenverletzung, Bauchraumverletzung... **5h**

Medizinische Ausbildung aufgeteilt in 3 Lehrgänge:

Formation médicale en 3 modules:



Ausbildung Berg- und Skiführer in Deutschland

Formation en Allemagne...

LG 122, Bergrettungslehrgang: „**Erste Hilfe und Notfallmedizin am Unfallort**“ (Praxis)

- **Sichern und Überwachen der Vitalfunktionen**
 - orientierende Untersuchung, ABC
 - Update Kardiopulmonale Reanimation
 - Praktische Übungen zur Reanimation
- **Lagerungen von Verunfallten**
 - bei Bewusstlosigkeit (stabile Seitenlage), Schock (div. Arten), Kopfverletzung, Bauchverletzung, Atemnot und Herzbeschwerden (Infarkt), bei Wirbelsäulenverletzung (Vakuumbett)
- **Versorgung von Frakturen**
 - Erkennen von Frakturen (Extremitäten, Schlüsselbein, Oberarm, Rippen, Unterschenkel)
 - Ruhigstellung durch behelfsmäßige Schienung
 - Versorgung von offenen Frakturen

Ausbildung Berg- und Skiführer in Deutschland

Formation en Allemagne...

- **Versorgung von Bänder- und Gelenkverletzung**
 - Erkennen v. Gelenk- und Bänderverletzungen
 - Versorgung und Ruhigstellung
 - Tapeverbände für Knie und Sprunggelenk
 - Reponieren von Schulterluxationen
 - Reponieren von Sprunggelenksluxationsfrakturen
- **Wundversorgung**
 - lebensbedrohliche Blutungen (Hochhalten, Abdrücken, Druckverband, Abbinden), Verbände allgemein/mit Dreiecktuch, Fremdkörper in der Wunde
- **Blitzunfall**
- **Lawinenmedizin und Unterkühlung**
- **Bergführerapotheke**

2 Tage

2 jours

Ausbildung Berg- und Skiführer in Österreich

Formation en Autriche...

II. STUNDENTAFEL

(Gesamtstundenzahl und Stundenausmaß der einzelnen Unterrichtsgegenstände. Die Aufteilung der Stunden innerhalb der einzelnen Semester erfolgt durch den Schulleiter.)

	1. Semester	2. Semester	Summe
A. Pflichtgegenstände			
I. Theorie			
1. Religion	5,0	-	5,0
2. Deutsch	2,5	-	2,5
3. Lebende Fremdsprache	10,0	-	10,0
4. Politische Bildung und Organisationslehre	2,5	-	2,5
5. Betriebskunde, Kaufmännisches Rechnen und Berufskunde	2,5	2,5	5,0
6. Geschichte des Sports (der Alpinistik)	2,5	-	2,5
7. Sportbiologie (Funktionelle Anatomie, Physiologie und Gesundheitserziehung)	5,0	2,5	7,5
8. Erste Hilfe	5,0	5,0	10,0
9. Sportpsychologie und Lebenskunde	5,0	2,5	7,5
10. Pädagogik, Didaktik, Methodik, Tourenplanung und -führung	10,0	5,0	15,0
11. Bewegungslehre und Biomechanik	5,0	5,0	10,0
12. Trainingslehre	5,0	5,0	10,0
13. Alpine Gefahren und Unfallkunde	7,5	7,5	15,0
14. Wetterkunde	5,0	2,5	7,5
15. Orientierungs- und Kartenkunde	5,0	-	5,0
16. Schnee- und Lawinenkunde (Theorie)	5,0	5,0	10,0
17. Gerätekunde und Ausrüstung	5,0	2,5	7,5
18. Biwakkunde	-	2,5	2,5
19. Gletscherkunde	2,5	-	2,5
20. Alpine Geographie und Geologie	5,0	-	5,0
21. Tier- und Pflanzenwelt, Natur- und Umweltschutz	5,0	2,5	7,5
22. Skilanglauf und Skiwandern	2,5	-	2,5
	102,5	50,0	152,5

Ausbildung Berg- und Skiführer in Österreich

Formation en Autriche...

8. ERSTE HILFE



Bildungs- und Lehraufgabe:

Vermittlung von Kenntnissen, die notwendig sind, um im Ernstfall Hilfe leisten zu können.

Lehrstoff:

1. Semester

Verletzungen und lebensbedrohliche Zustände (Unterkühlung, Schock, Hitzschlag, Sonnenstich usw.); richtige Versorgung und Atemspende; Lagerung des Verletzten; Flugrettungsübungen.

2. Semester

Wiederholung wichtiger Teilgebiete; Hinweise auf spezifische Verletzungen beim Bergsteigen, Canyoning und Sportklettern, deren Vermeidung bzw. entsprechende Versorgung; Ergänzungen durch praktische Übungen (z.B. Flugrettungseinsatz usw.).

9. SPORTPSYCHOLOGIE UND LEBENSKUNDE

Bildungs- und Lehraufgabe:

Wissen um eine adäquate Betreuung der dem Bergführer anvertrauten Personen sowie um eine sinnvolle Lebensführung.

Geschichte der Schweizer Bergführerapotheke



Histoire de la pharmacie guide de montagne suisse

- Bergführerapotheke, „erfunden“ von Urs Wiget und Bruno Durrer.
- Grundsatz: Medizinische Ausbildung des Bergführers (Wissen) erlaubt ihm die sichere Anwendung der Apotheke (Werkzeug).

- La pharmacie des guides, „inventée“ par Urs Wiget et Bruno Durrer.
- Principe: l'éducation médicale du guide (connaissances) permet l'application en toute sécurité de la pharmacie (outil).

Schweizer Bergführerapotheke

La pharmacie guide de montagne suisse

- Auslegung für einen Bergführer mit zwei Gästen eine Woche auf Tour (für Trekkings und Expeditionen ist zusätzliches Material notwendig).
- Klein, leicht, stabil, wirksam, ungefährlich, zahlbar...

- Conception: un guide de haute montagne avec deux clients pour une semaine (pour un trekking et des expéditions il faut du matériel supplémentaire).
- Petit, léger, solide, efficace, sûr, payable ...

Schweizer Bergführerapotheke

La pharmacie guide de montagne suisse

- Bis 2012: Bezug nach Abschluss des Führerkurses
- Ab 2013: Bezug bereits nach bestandenem Medizinmodul
- „zur Rose“ bekommt die Liste mit den bezugsberechtigten Bergführer aspiranten, Wanderleitern und Kletterlehrern direkt vom Ausbildungssekretariat des SBV

- Jusque 2012: Obtention de la pharmacie à la fin du cours de guide complet
- A partir de 2013: après avoir passé le module médical
- “zur Rose” reçoit la liste des aspirants, guides de randonnée et d'escalade ayant droit d'une pharmacie du Secrétariat de l'ASGM

Schweizer Bergführerapotheke

La pharmacie guide de montagne suisse

- Die Bezugsberechtigten bestellen die Bergführerapotheke selber:
 - Email-Adresse: bestellung@zur-rose.ch
 - Fax Nummer: 0800 85 11 18
- Preise (inkl. Versandkosten):
 - Komplet: Fr. 110.-
 - Auffüllung: Fr. 75.-

- Les ayants - droit commandent la pharmacie eux-mêmes:
 - Adresse Email: bestellung@zur-rose.ch
 - Numéro de fax: 0800 85 11 18
- Tarifs (frais de port inclus):
 - Pharmacie complète: CHF 110 -
 - Reconstitution: CHF 75 -

Bergführerapotheke in anderen Ländern

La pharmacie guide de montagne ailleurs

- Deutschland: Verband Deutscher Berg- und Skiführer (VDBS) gibt Empfehlungen über die Bestückung einer persönlichen Apotheke.
- Österreich:

- Allemagne: Recommandations pour une pharmacie personnelle par l'Association allemande des Guides de Montagne.
- Autriche:

Ausblick zur medizinischen Ausbildung von Bergführern

Perspectives pour la formation médicale des guides de montagne

- Nicht nur medizinische Ausbildung als Aspiranten, sondern...
 - ...als Tages- oder Wochenendkurs im Rahmen der Bergführer-Weiterbildung („Refresher“).
 - Aus- und Weiterbildung für Bergführer und „verwandte“ Berufe/Tätigkeitsfelder (Wanderleiter, Schneesportlehrer, Canyoning-Führer etc...).
- Non seulement l'enseignement médical comme aspirants, mais ...
 - comme cours d'une journée ou de week-end, formation continue (cours de répétition).
 - Formation pour les guides et professions / domaines d'activités similaires (guide de randonnée, moniteurs de sports de neige, canyoning guide, etc.)

Bewertung der medizinischen Ausbildung der Bergführer in der Schweiz

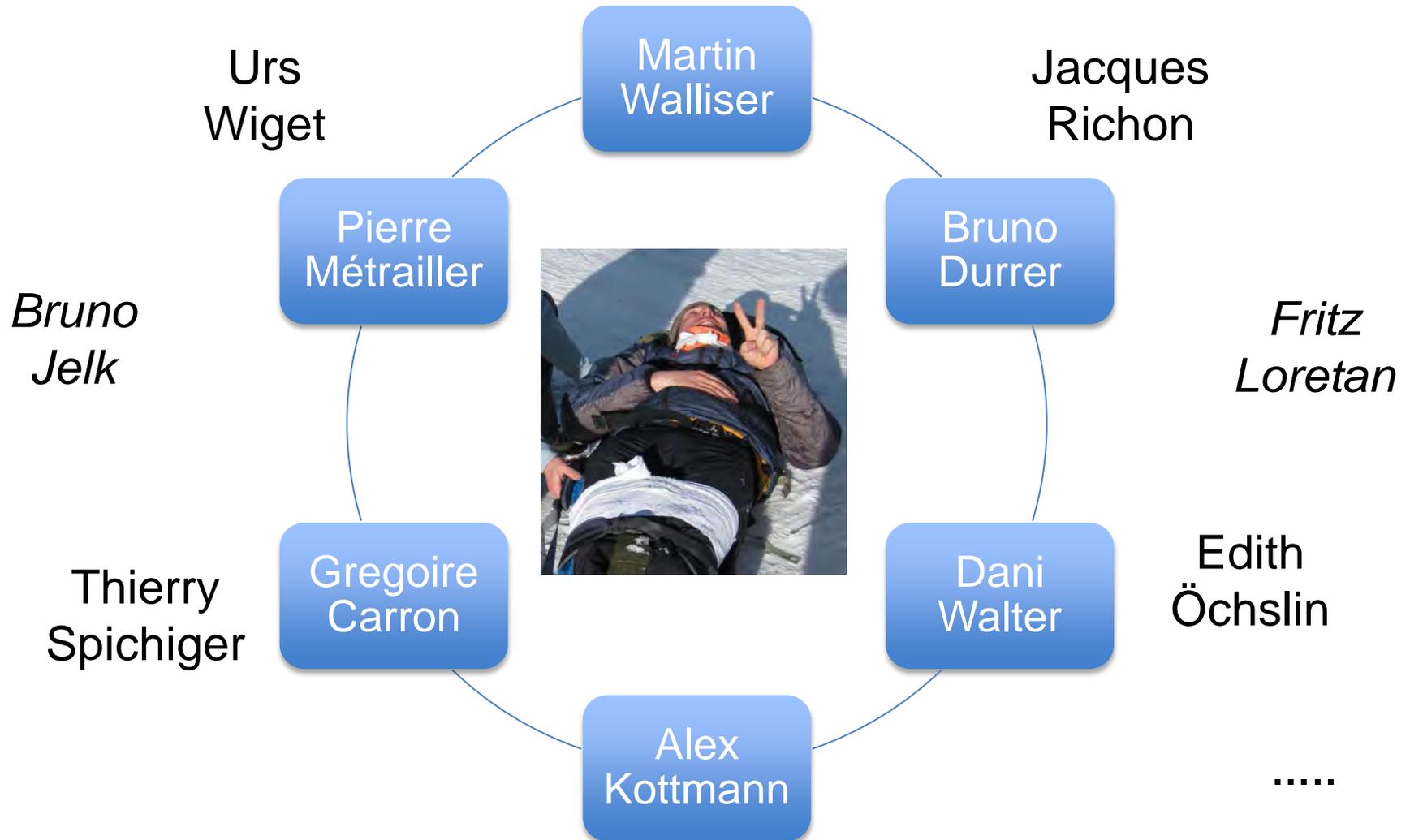
Evaluation de la formation médicale des guides de montagne en Suisse

- Individuell...
- Aus Sicht
 - des Bergführers
 - des Arztes, Notarztes, Chirurgen...
 - des Retters
 - des Patienten
 - des SBV
 - ...

- Individuellement...
- Du point de vue...
 - du guide de montagne
 - du médecin, médecin d'urgence, chirurgien...
 - du sauveteur
 - du patient
 - l'ASGM
 - ...

Medizinisches Team

Equipe médicale



7th SWISS MOUNTAIN RESCUE MEDICINE CONFERENCE

Interlaken, 10 November 2012



Andres Bardill
Theo Maurer

Agenda

- a) Case study Hasliberg
 - b) New “Alpine Rescue Manual”
 - c) Medicine at Swiss Alpine Rescue, ARS
- 
- Decorative wavy lines in shades of gray at the bottom of the slide.

Case study: Hasliberg Bernese Oberland



Avalanche Mägisalp Hasliberg

Thursday, 26.01.2012 11:10



Avalanche Mägisalp Hasliberg



Avalanche Mägisalp Hasliberg



Avalanche Mägisalp Hasliberg



Avalanche Mägisalp Hasliberg



Avalanche Mägisalp Hasliberg



Avalanche Mägisalp Hasliberg



Avalanche Mägisalp Hasliberg



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Avalanche Mägisalp Hasliberg



Avalanche Mägisalp Hasliberg



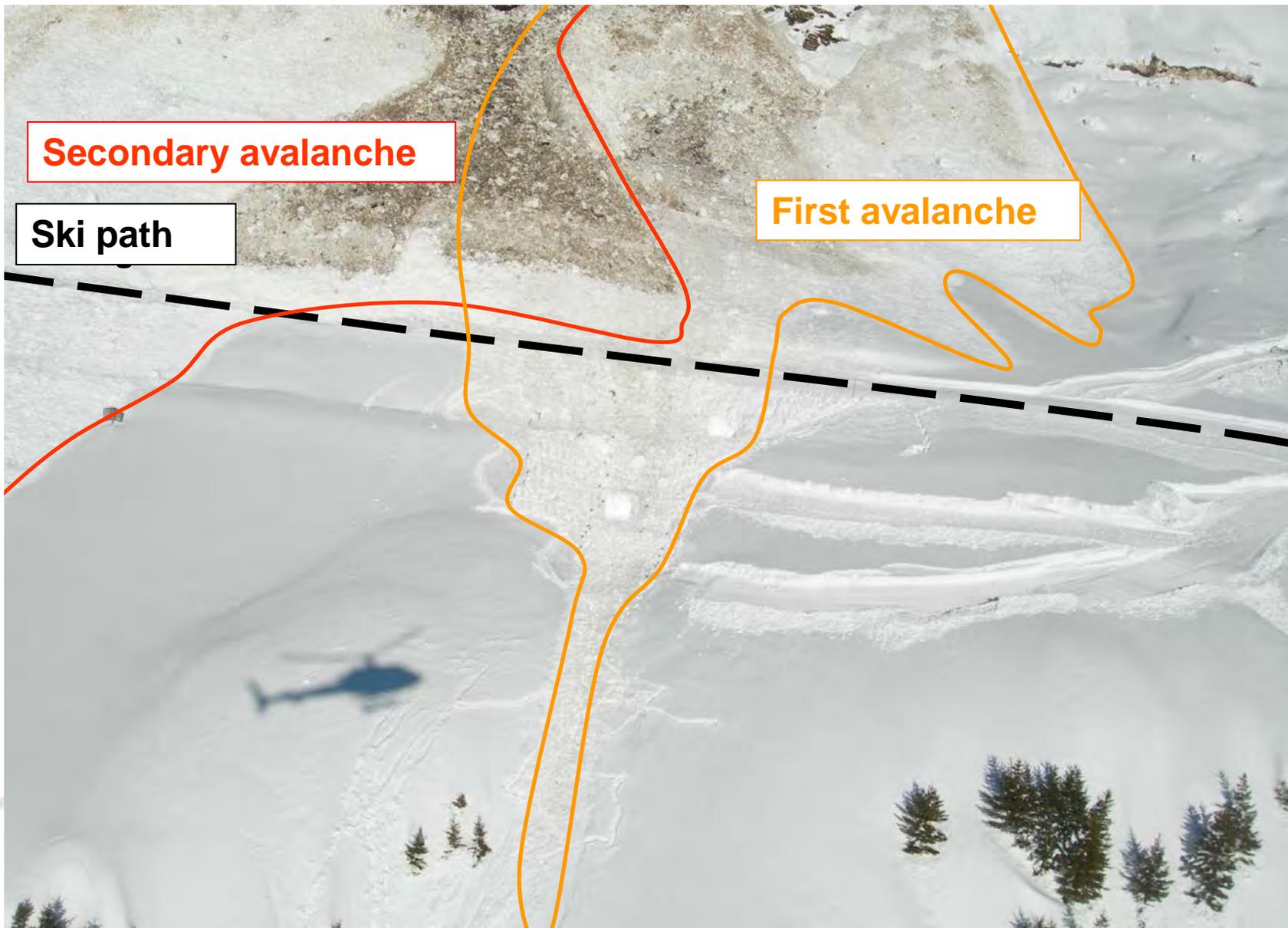
Avalanche Mägisalp Hasliberg



Avalanche Mägisalp Hasliberg



Avalanche Mägisalp Hasliberg



Avalanche Mägisalp Hasliberg



Presentation of the new Alpine Rescue Manual

2008 Initial clarifications

Cooperation between: **Swiss Alpine Rescue, ARS**

Canton Valais Rescue Organisation KWRO

Swiss Army

2009 Table of contents, authors commissioned (various rescuers)

2010 – 12 Compilation of text and drawings

End of September 2012: Publication, on sale online via the website

A large, light gray, stylized graphic at the bottom of the slide, consisting of several overlapping, curved lines that suggest a mountain range or a stylized landscape.

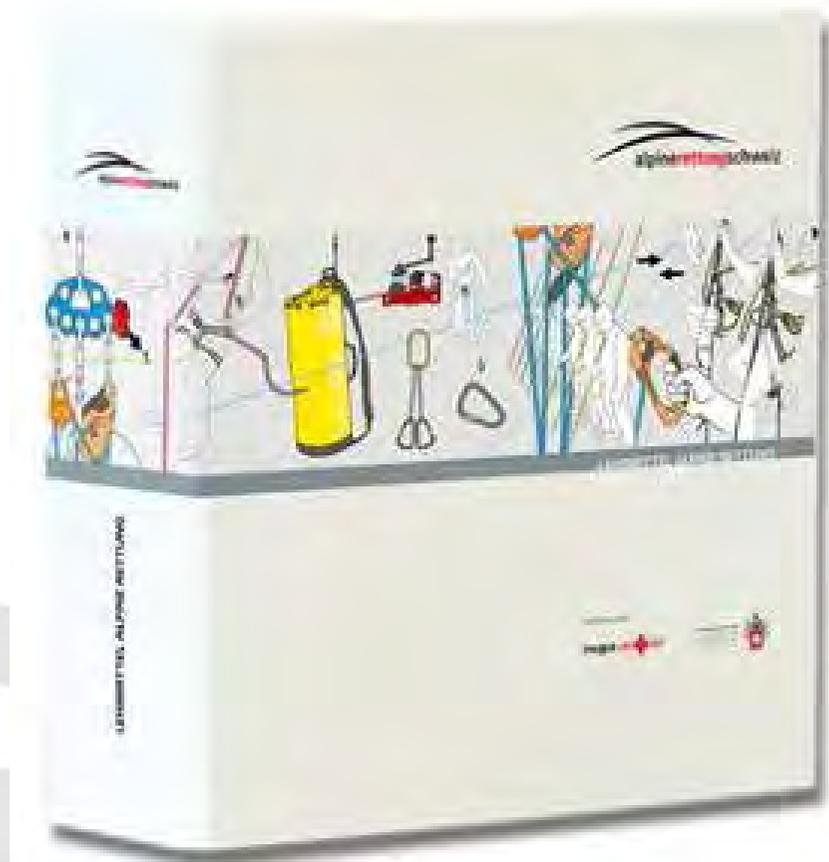
Alpine Rescue Manual

Basic training:

- | | |
|--------------------------------|--|
| Bergsport Winter | SAC-Verlag |
| Bergsport Sommer | SAC-Verlag |
| Erste Hilfe | SAC-Verlag |
| Formation Canyoning Ausbildung | International Federation of Mountain Guides Associations (IFMGA) |



Organised rescue:



Alpine Rescue Manual

First edition:

1500 German

600 French

400 Italian

200 English

Format: A5



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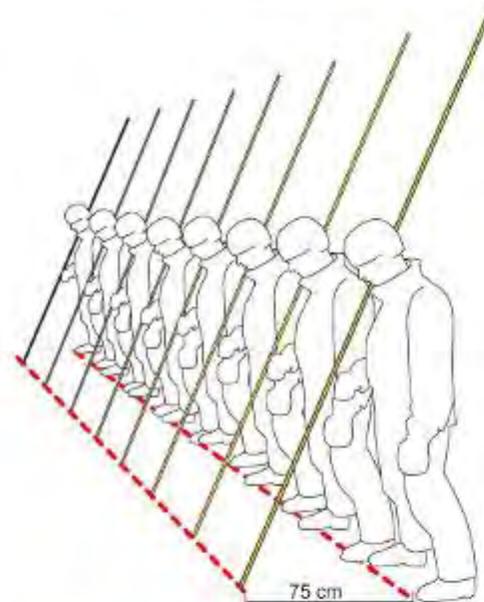
1. Introduction
2. Fundamentals
3. Improvised rescue techniques
4. Rescue techniques (Parts 1-3)
5. Avalanches
6. Helicopters
7. Rescue dogs
8. Incident command
9. Communication



Total number of pages 420

5 Avalanches

ALPINE RESCUE MANUAL



5.1 Introduction

To ensure that buried victims can be found as rapidly as possible, it is advisable to follow a set procedure for an avalanche rescue. Speed, anticipation and organisation are of central importance for a rescue mission and are decisive for the survival of the avalanche victims.

An organisation chart and checklists show the rescuers the best way to proceed.

5.2 Organisation

The size of the incident fundamentally determines the number of people who need to be deployed on the different tasks. The bigger the incident, the more differentiated the functions will be.

Fig. 111 Organisation chart

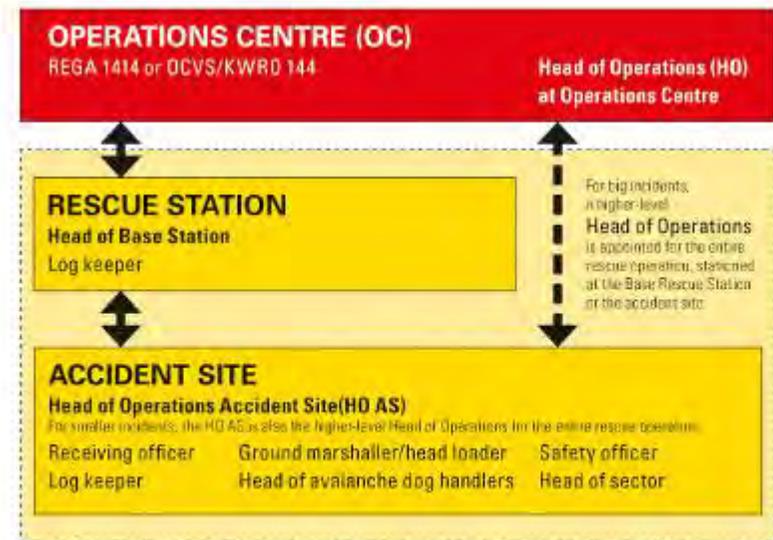
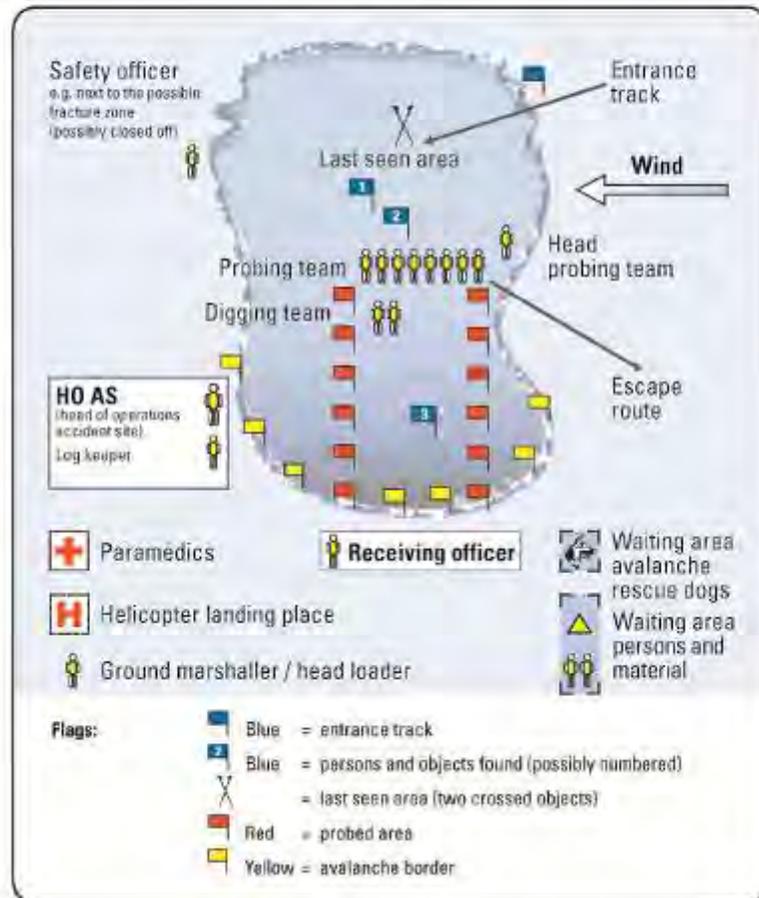


Fig 5.11 Organisation chart for the accident site

- A clear structure is necessary to ensure that an overview can be maintained at all times.
- Discipline must be quite clear, with the back areas (waiting and material/equipment areas, helicopter landing point etc.) being kept clearly and consistently separate from the avalanche field.
- Sufficient distance must be maintained between the back areas and the avalanche field with the probable entrance routes.
- Only people with clearly allocated tasks may be present on the avalanche field.



5.2.1 Functions

5.2.1.1 The operations centre (OC) – Rega 1414 or OCVS/KWRO 144

The alarm is generally sent to the operations centre (OC). The operations centre deploys the different resources (helicopter, rescue station team, avalanche dog team, etc.) in line with its internal procedures. During the rescue mission, the operations centre provides support in organisational terms for the on-site emergency personnel.

5.2.1.2 The rescue station

The rescue station is the deployment point for the individual rescuers (as per the rescue station's alarm procedure). In the case of avalanche rescue missions, a **Head of Base Station** for the rescue station is deployed down in the valley at the location where the accident has taken place. He coordinates and organises the resources on the spot, liaising with the operations centre and the Head of Operations Accident Site:

- ▷ Rescuers
- ▷ Rescue equipment
- ▷ Dog teams
- ▷ Medical personnel
- ▷ Others ...

Additional human resources

- ▷ Ski-resort rescue service
- ▷ Ski schools
- ▷ Fire brigade
- ▷ Army
- ▷ Others ...

Additional transport resources

- ▷ Cable cars and ski lifts
- ▷ Snowmobiles
- ▷ Others ...

Additional tasks of the rescue station

- ▷ Keeping a written record (log)
- ▷ Questioning witnesses and looking after them up to the end of the operation
- ▷ Organising a care team

Communication

- ▷ Maintaining the link to the operations centre and the accident site
- ▷ Informing the authorities
- ▷ Informing the media (see Chapter 9.2, p. 18)

5.2.1.3 Accident site

Head of Operations Accident Site (HO AS)

The Head of Operations Accident Site leads the rescue mission and holds responsibility for it. He deploys the appropriate search resources and coordinates the operation. In the event of large-scale incidents, a higher-level head of operations is deployed, who then holds overall responsibility.

The Head of Operations Accident Site specifies suitable **rescuers for the following tasks:**

- ▷ Receiving officer
- ▷ Safety officer
- ▷ Head of avalanche dog handlers
- ▷ Log keeper
- ▷ Head of sector (for large-scale operations)

Important!

A radio link must be ensured between the members of the rescue team and the partner organisations.

The Head of Operations Accident Site instigates and delegates **immediate measures at the accident site:**

- ▷ obtain an overview, if possible by flying over the site (possibly with a rescue beacon switched to receive mode)
- ▷ assess the safety of the rescuers using the checklist: "Risk check avalanche cone"
- ▷ attend to survivors and question them
- ▷ immediately question any witnesses on the spot:
 - Time the avalanche occurred?
 - Number of victims buried by the avalanche?
 - Has a search already been performed by eye and ear, rescue beacon and RECCO®?
 - Entrance track and last seen area?
 - Sequence of events during the accident?
- ▷ observe the wind direction (deployment of avalanche dog)
- ▷ immediate search: by eye and ear, avalanche dog; the rescue beacon and RECCO® can be used on foot or out of the helicopter right from the start
- ▷ if more than one helicopter has been deployed: specify the approach/ departure paths
- ▷ once the immediate measures have been launched, send feedback to the operations centre and/or base station: size of the incident, additional resources required and estimated duration of mission

General recommendations regarding the organisation of the accident site:

- ▷ once the search with rescue beacons has been completed, switch the rescuers' personal rescue beacons to TRANSMIT mode
- ▷ attend to and protect those involved in the accident
- ▷ store objects that are found separately and keep a record of them
- ▷ close off the avalanche field and potential fracture zone
- ▷ keep radio communications short and precise

The Head of Operations Accident Site must take **further measures** if the rescue mission is a lengthy one (more than one hour):

- ▷ continuously reassess the deployment of the search resources and the rescue team's own safety
- ▷ send feedback to the operations centre and/or base station
- ▷ conduct coarse probing
- ▷ document and flag the following:
 - entrance track **blue flag**
 - persons and objects found **blue flag (possibly numbered)**
 - last seen area **two crossed objects (skis, sticks, flags)**
 - probed area **red flag**
 - avalanche edge **yellow flag**
- ▷ replace team, request additional rescuers
- ▷ request additional equipment/possibly lighting
- ▷ request food and drinks
- ▷ plan and secure withdrawal
- ▷ search surrounding area
- ▷ conduct fine probing
- ▷ dig by hand or with snow grooming vehicles

Receiving officer

The receiving officer supports the Head of Operations Accident Site in organisational and technical matters:

- ▷ designation of suitable rescuers as:
 - ground marshaller/head loader
- ▷ definition of the following necessary areas (ensuring an easy overview and sufficient distance from the avalanche cone):
 - helicopter landing point
 - medical point (triage point)
 - waiting area for persons and equipment
 - waiting area for avalanche dogs
- ▷ reception, registration and information for newly arriving rescuers
- ▷ division into teams and governing the replacement of team members

5.4 Risk assessment

Rescue missions in winter are frequently conducted under difficult weather conditions and with an increased risk of avalanches, as well as under enormous pressure of time. The rescuers must not be exposed to an unnecessary risk during the operation. We use the following checklist as an aid in assessing the risk.

5.4.1 Checklist "Rescue mission in winter"

This checklist is not a universally binding set of rules for rescue teams but rather a tool to assist in decision-making when risks are being assessed. The standardised decision-making process makes it possible to cut down on misjudgements or perception traps during an emergency rescue mission.

Fig. 114 3 x 3 Rescue mission in winter

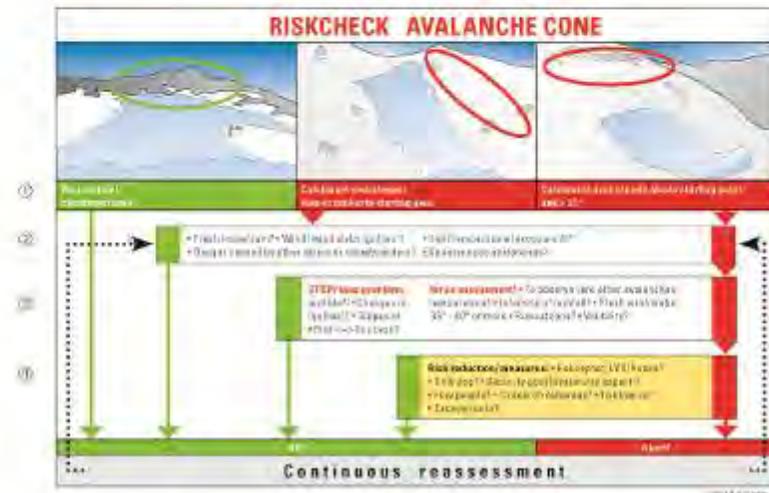
The front side of the checklist shows the "3 x 3 Rescue mission in winter"

The checklist is used for the systematic collection and evaluation of information. The three factors of "Conditions", "Terrain" and "Human factor" are assessed at three different levels. The situation is observed on an increasingly detailed basis at the progressive levels, ensuring that the 3x3 acts as a filter and cuts down on errors. The checklist is designed to support those involved in taking decisions and to ensure that these decisions can be readily comprehended and substantiated.

3x3 RESCUE MISSION IN WINTER			
	Conditions	Terrain	Human factor
Before the mission	Course of the winter	Knowledge of the region	Deployment, material
ALARM			
Planning and on-site operation	Onset of avalanches? (Fresh snow, rain, wind, warmth)	External starting areas? (Slope, exposure, altitude)	Personal equipment? Team? Perception trap? Tunnel vision? Decision?
RISKCHECK			
Continuous re-assessment	Fresh snow or rain? Wind slabs? In-solation? Visibility? Spontaneous avalanches?	Change of perception? Change of mission?	More people? Different rescuers? Resources exhausted? Pressure from outside?

Fig. 116 Risk check "Avalanche cone"

On the rear of the checklist card is the "Risk check avalanche cone" which has been designed specifically for use during avalanche rescue missions. The risk check has deliberately been kept short so that it can also be used under pressure of time during a mission.



The checklist is worked through from top to bottom:

- ▷ green means: no danger, implement the action.
- ▷ red means: stop, potential danger, check next point.
- ▷ ① terrain: is there a catchment area for secondary avalanches?
- ▷ ② have we any problems in respect of the points listed?
- ▷ ③ is there a problem under ②: stop!
Take the time to conduct a detailed assessment.
- ▷ ④ if, after a detailed assessment, there is a problem under ③, the risk can be reduced through selective measures. If the implemented measure does not bring about the necessary risk reduction, then the action must be terminated.

Important: The situation must be continually re-assessed while the action is being carried out.

5.6.4 Avalanche dog

If possible, a dog team should be included in the leading group for each avalanche rescue mission. If several dogs are deployed, then a lead dog handler must be determined. The Head of Operations Accident Site coordinates the search work of the dog teams with the lead dog handler.

5.6.5 Search with rescue beacon (RB) and RECCO® out of a helicopter

The decision in favour of this search method is made by the Head of Operations Accident Site in consultation with the helicopter crew.

Advantages:

- a big area can be searched quickly
- where there is a danger of avalanches, a search can be conducted from outside the danger zone
- only a few rescuers are required

Drawbacks:

- requires a trained crew for the search out of the helicopter
- a helicopter cannot be deployed in bad weather
- a large number of rescuers on the avalanche field make it impossible to deploy a helicopter

The technique and method to be employed is described in detail in the manuals (Flight Operation Manual, Training Manual and Standard Operation Procedures) of the helicopter operating company.

Using rescue beacons and/or RECCO®, the crew establishes the rough position of the buried victim from the airborne helicopter. An appropriate object is thrown down to mark the location point (e.g. a coloured ribbon with a weight). The rescuers present on the avalanche field then take over and establish the precise position.

5.6.6 Probing

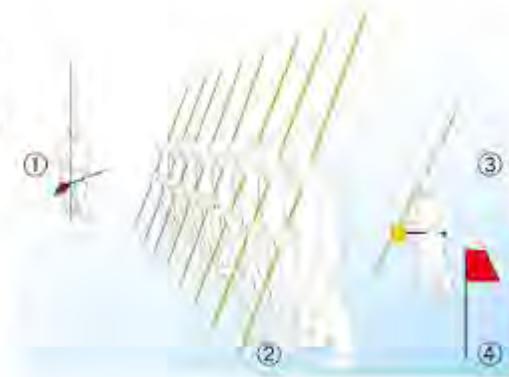
5.6.6.1 General information

Probing is generally only performed if the electronic resources and avalanche dogs have not produced positive results. The success of systematic probing depends to a very great extent on the management and discipline of the team.

Fig 177 Functions during probing

The head of the probing team should issue clear instructions from a sufficient distance in front of the team and make sure that these instructions are actually followed.

- ① head of probing team
- ② probing team
- ③ one or two people for digging with shovels and spare probes
- ④ red flags marking the area already searched



The following points should be borne in mind when probing:

- ▷ only hold probes with gloves (exception: in hot weather)
- ▷ always insert probes vertically
- ▷ check the screw connections between the individual sections of the probe from time to time and tighten them where necessary
- ▷ in the event of a presumed hit, leave the probe in the snow and continue the search with a spare probe; the digging team checks and digs down along the inserted probe
- ▷ the probing team should comprise 10 to 20 people
- ▷ the digging team (with shovels and spare probes) is approximately 5m behind the probing team
- ▷ mark the probed area (coarse, every 5m; fine, every 2m) and enter on the accident sketch
- ▷ when the team is replaced, leave the probes in position in the snow; the teams should walk along the edge of the avalanche

Probing systems

One of the following three probing systems is employed as a function of the particular situation:

- ▷ coarse probing
- ▷ fine probing
- ▷ rapid probing (probing with just a few rescuers)

5.6.6.4 Rapid probing (probing by just a few rescuers)

Rapid probing makes it possible to probe an area rapidly with just a few rescuers. Rapid probing is employed if a leading group has to carry out probing already following a vague alert by an avalanche dog (or another search system), or if an object is found. If a first round of rapid probing does not prove successful, a second round will be conducted, in a slightly staggered position or at right angles to the first round.

Hit probability: approx. 90%

Fig 5.14 Rapid probing: grid

For step (50cm) the probes are inserted twice (on the right and on the left) down to a depth of 2m (probe length 3m).



Fig 5.15 Lining up

Those conducting the probing line up in a single row. They stretch out one arm and place their hand on the shoulder of the next person to ensure the correct spacing between individuals.

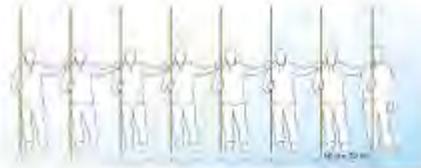


Fig 5.16 Aligning the probes

The probe tip is placed on the surface of the snow 50cm in front of the tip of the right shoe, with the probe resting on the right shoulder. The head of the probing team issues instructions.



Procedure for rapid probing

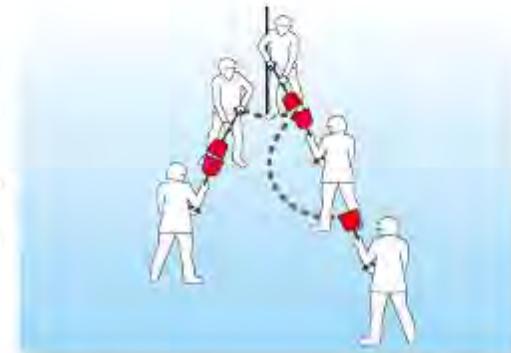
- ▷ The head of the probing team issues the instruction "Probe!"
- ▷ The rescuers take a step forward (50cm) without moving the probe tips and insert the probes vertically into the snow to a depth of 2m, on the right and left at a distance of 50cm. After the probe has been inserted for the second time, it is positioned ready for the next insertion and correctly aligned (probe tip 50cm in front of the tip of the right shoe, probe resting on the right shoulder).
- ▷ The head of the probing team issues the instruction "Probe!", and so on.

5.6.7 Digging

To dig out a buried victim, it is necessary to dig a big hole. To ensure that this can be done as quickly as possible, it is worthwhile adopting a systematic approach. The so-called "V-shaped conveyor method" (Genswein and Eide 2007) is a system of this type.

Fig 5.17 V-shaped conveyor method: configuration

The rescuers line up in a V shape behind the probe with which the victim has been located. The distance between the individual rescuers is determined using the shovel. With shallow burial depths, the V should be approximately twice as long as the depth of the buried victim. The width of the V at its open end should always correspond to the depth of the buried victim.



Important:

- Digging should always be done systematically.
- Good-quality, robust shovels should always be used for digging (ideally telescopic metal shovels with a hardened blade and a D-shaped handle).

Fig 5.18 Digging

At the front, the snow is dug out over the length of the probe that is still in the snow. In the middle, the snow is passed back in the same way as on a conveyor belt. To ensure that the rescuers do not get tired so quickly, they should switch positions after 4 to 5 minutes when the rescuer at the tip of the V issues the command rotating in the clockwise direction.



On sale in the public web shop

The Manual can be purchased via our website with either payment by credit card or delivery with an invoice; it costs CHF 90 plus shipping costs to Switzerland and abroad (public web shop):

<http://www.alpinerettung.ch>



www.alpinerrettung.ch

AKTUELL >

PORTRAIT >

AUSBILDUNG >

ALARMIERUNG >

SHOP >

SPENDEN UND LEGATE >



30.09.2012

Lehrmittel Alpine Rettung – aus der Praxis für die Praxis

Das in der Ausbildung sehnlichst erwartete Lehrmittel liegt vor! Ein gelungenes Gemeinschaftswerk...

[Mehr Informationen...](#)

13.09.2012

Bergwacht Stuttgart und Alpine Rettung Schweiz trainieren gemeinsam.

Die Bergretter der Station Jura der Alpinen Rettung Schweiz waren von 17. bis 19. August 2012 zu...

[Mehr Informationen...](#)

ARS Medicine



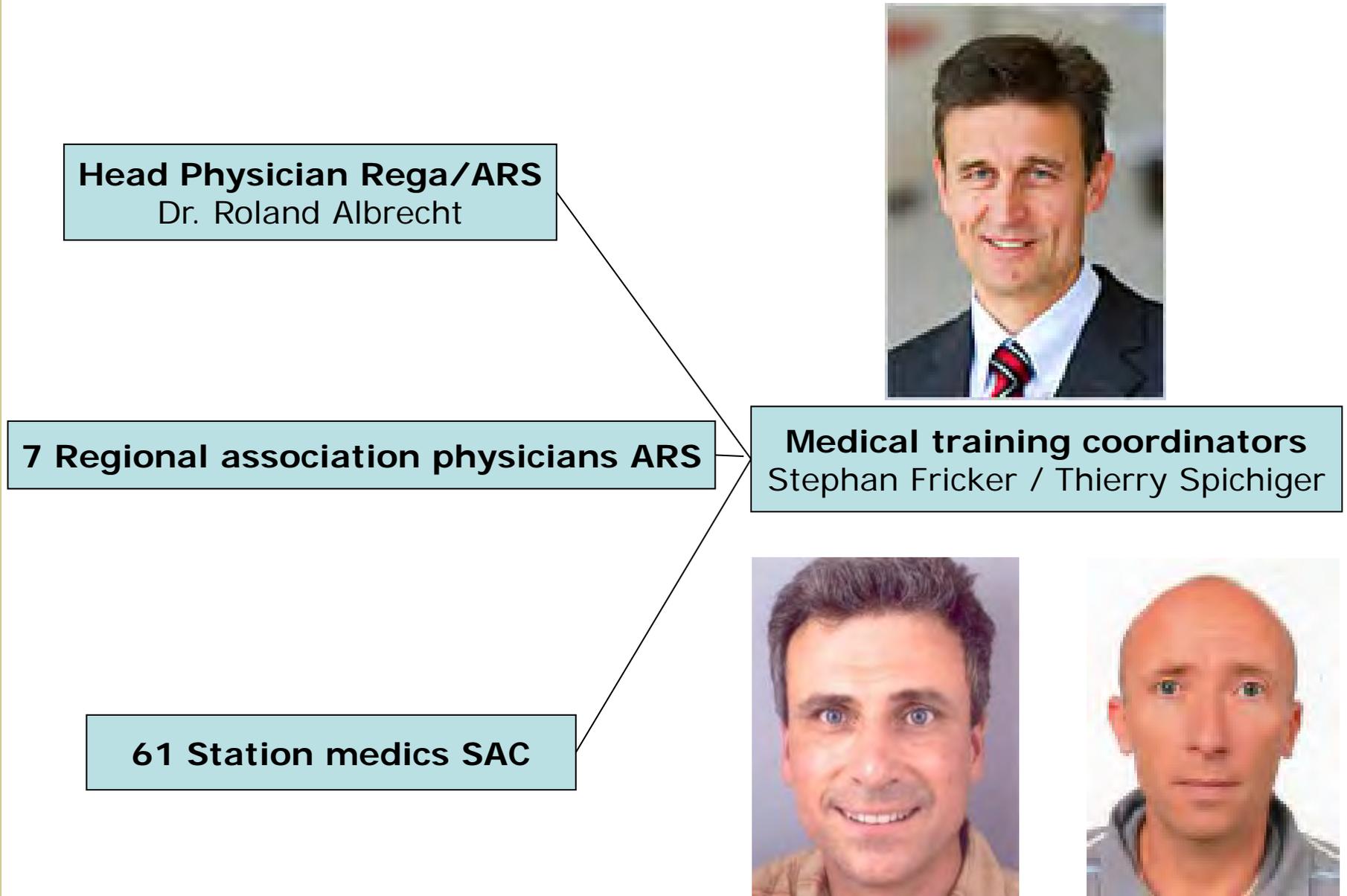

alpine**rettung**schweiz

Contents

- Organigram
- Drugs in the rescuers' medical kit
- BLS equipment
- Further training / quality assurance for specialist medical personnel
- Medical equipment at the rescue stations
- Visions for the future



Organigram Medicine Rega in the ARS



Drugs in the rescuers' medical kit

- Uniform selection of drugs defined
- Published in the Extranet
- Distribution and management are the responsibility of the regional association doctor or station medic



BLS equipment



A second set of BLS equipment has been purchased. This comprises:

- 4 adult dummies
- 2 junior dummies
- 4 AED trainer

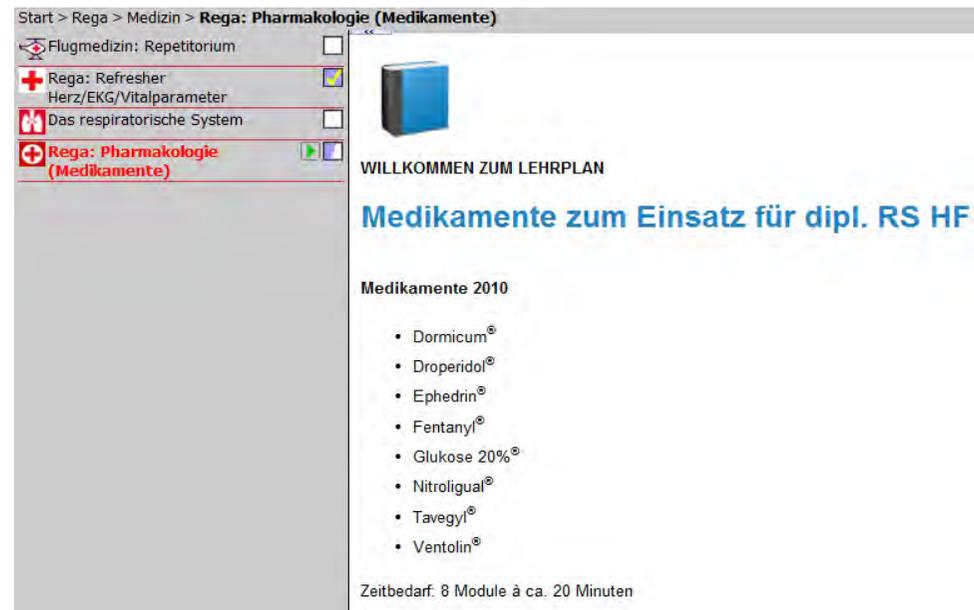
It can be used to instruct a class of 12 people in accordance with SRC instructions

BLS equipment

- **Proposed distribution:**
- **Equipment Rega Center:** ARG, ARO, ARGL, ARZ
- In charge: Rega equipment service
- **Equipment EBLs:** SARO, KBBK, SATI
- In charge: Thierry Spichiger
- Objective: coordination of the course dates for the regional associations to ensure the fewest possible journeys to transport the equipment

Quality assurance for specialist medical personnel

e-learning is now available in all three languages
The 2013 modules will be posted online in the next few days.



Quality assurance for specialist medical personnel

- By the end of August, 15 station medics had successfully completed the modules and received the 2012 Delegation of Competence.

Medizin ARS 

Kompetenzdelegation selbständige Medikamentenverabreichung durch dipl. Rettungsanwärter HF (Medikamente Klasse 1)

Kompetenzdelegation 2012 für den Einsatz als dipl. Rettungsanwärter HF im Rahmen der Tätigkeit bei der Alpinen Rettung Schweiz

Name: _____ Rettungsstation: _____

Präparat	Indikationen	Dosierung
Adrenalin (Adrenalin) 1 mg/1 ml 10 mg/10 ml	1) Reanimation 2) Anaphylaktischer Schock 3) Asthma bronchiale	1) 1.0 mg weise i.v. 2) 10-100 µg weise i.v. 3) 3 mg zur Inhalation oder 10 µg weise i.v.
Atropin (Atropinsulfat) 3 mg/3 ml	1) Symptomatische Sinusbradykardie 2) Vergiftungen (Organophosphate usw.)	1) Initial: 0.5 mg bis 1.0 mg i.v. Maximal: 3.0 mg i.v. 2) nach Klinik
Dormicum® (Midazolam) 5 mg/5 ml	Sedation Hypnotikum Epileptischer Krampfanfall Ankolyse	Initial: 1.0 mg i.v. Repetitiv: 1.0 mg i.v. Maximal: 5.0 mg i.v.
Droperidol® (Dehydrotropidol) 1 mg/2 ml	Antiemese	Initial: 0.5 mg i.v. Repetitiv: 0.5 mg i.v. Maximal: 1.0 mg i.v.
Ephedrin (Ephedrinhydrochlorid) 50 mg/5 ml	Hypotonie Bradykardie Anaphylaxie	5 bis 10 mg weise i.v. Maximal: 50 mg i.v.
Fentanyl (Fentanyl-Base) 0.1 mg/2 ml 0.5 mg/10 ml	Starke Schmerzzustände SHT: zur Verhinderung der hormonellen Stressantwort	Initial: 0.05 mg i.v. Repetitiv: 0.05 mg i.v. Maximal: 0.20 mg i.v.
Glukose 20%® (Glukose) 100 ml = 20g	Hypoglykämie	5 g weise (25 ml) i.v. nach Bewusstsein und BZ-Kontrollmessung
Ketamin (Ketaminhydrochlorid) 100 mg/2ml	Analgesie	Initial: 0.25-0.5mg/kgKG i.v. Maximal: 0.50 mg/kgKG i.v.

Kompetenzdelegation_02_072_2012_0400 Seite 1 von 2

Medizin ARS 

Kompetenzdelegation selbständige Medikamentenverabreichung durch dipl. Rettungsanwärter HF (Medikamente Klasse 1)

Präparat	Indikationen	Dosierung
Morphin (Morphinhydrochlorid) 10 mg/1ml	Analgesie Myokardinfarkt / AP Kardiales Lungenödem Sedation	Initial: 2.0 mg i.v. Repetitiv: 2.0 mg i.v. Maximal: 10 mg i.v.
NaCl. 0.9% 10 ml/100ml	Trägerlösung für Medikamente Lösung zum Spülen von Kathetern / Wunden / Nase / Augen usw.	Nach Bedarf
Nitrolingual-Spray® (Glyceroltrinitrat) 1 Sprühstoss (SS) = 0.4mg	Akutes koronares Syndrom Kardiales Lungenödem Symptomatische Hypertonie Akute Linkssherzinsuffizienz	Initial: 1-2 SS sublingual Repetitiv: alle 5 Min. 1 SS Maximal: 4 SS (1.60 mg)
Ringer-Fundin® 500 ml	Substitution extrazellulärer Flüssigkeit bei isotoner Dehydratation Offenhalten von venösen Zugängen	40 ml/kg KG/Tag Im Notfall mehr
Stesolid® (Diazepam) 5 mg / 2,5 ml Rektiole	Krampfneigung Sedation von Kindern	5 mg/2.5 ml rektal
Tavegyl® (Clemastin) 2 mg/2ml	Anaphylaktische Reaktion Angioneurotisches Ödem Pruritus	2.0 bis 4.0 mg i.v.
Ventolin-Spray® (Salbutamol) 1 Hub = 0.1mg	1) Asthma bronchiale 2) Tokolyse	1) Initial: 1-2 Hübe Repetitiv: 1 Hub (0.1 mg) 2) 4 SS (0.4 mg)
Voluven 6% balanced® 500ml	Hypovolämie	Maximal 50 ml/kg KG/Tag Normaler Einsatz im Verhältnis 2:1 d.h. 500ml Voluven 6% balanced® auf 1000 ml Ringer-Fundin®

Ort / Datum: _____ Ort / Datum: Zürich, 09.03.2012

Unterschrift: _____ Unterschrift: _____

Mitarbeiter _____ Dr. med. Roland Albrecht
Chefarzt Rega / Chefarzt ARS

Kompetenzdelegation_02_072_2012_0400 Seite 2 von 2

Medical equipment at the rescue stations

- Feedback from pilot stations by the end of September
- Definition and presentation of a uniform selection of contents at the “Specialists’ Conference Medicine” on 6 November 2012
- 2013: equipping 25 additional stations



Aims and visions

- Equipping the rescue stations with a uniform medical kit step-by-step throughout Switzerland
- Module-based medical training courses throughout the country
- Establishing medicine in the rescue stations
- Involvement of local and regional rescue structures



Questions?

A large, light gray, stylized mountain range graphic in the background, consisting of several curved, overlapping lines that suggest the shape of a mountain range.

Thank you very much

Medical assistance of the SAC-high performance mountaineering expedition to Peru 2012

Dr. med. Christian Salis

7. Schweizer Bergrettungsmedizintagung Interlaken 10.11.2012

Topics

- Expedition
- Team
- Medical equipment
- Medical problems
- Equipment considerations

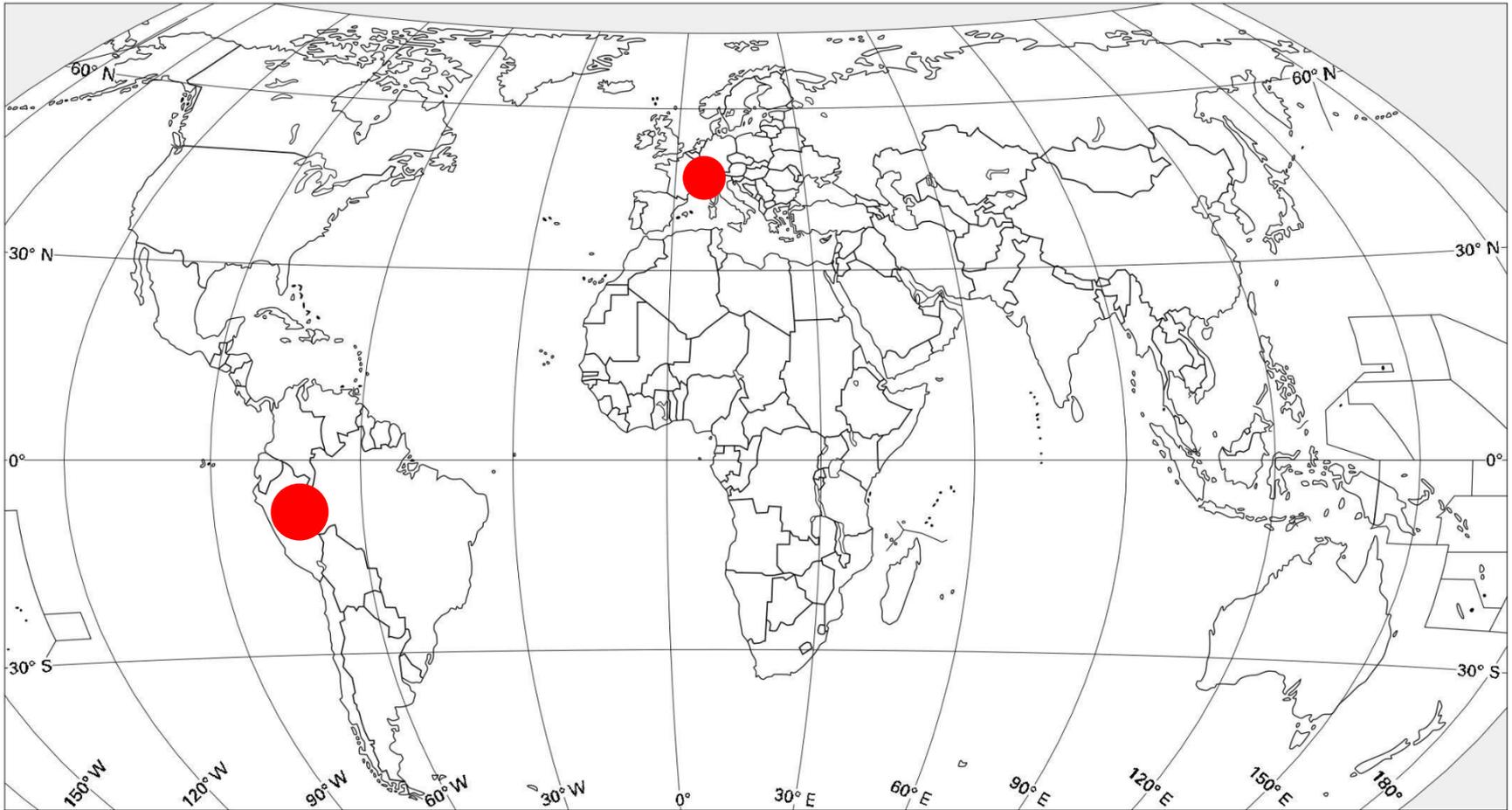
Expedition

- Swiss alpine club (SAC)
- Pilot project 2009
- Goal: promotion of the classic alpinism
- Team SAC-high performance mountaineering
- 3 years of extra-occupational formation
- Expedition as final exam of the formation
- Duration of the expedition 6 weeks

Schweizer Alpen-Club SAC
Club Alpin Suisse
Club Alpino Svizzero
Club Alpin Svizzer



Expedition place



Cordillera blanca Peru

Team



Christelle Marceau
10.08.1988
CAS Neuchâteloise



Yolan Aubert
12.06.1990
CAS Les Diablerets



Marco Burn
22.02.1989
SAC Wildstrubel



David Hefti
04.07.1992
SAC Davos



Jonas Jurt
18.04.1991
CAS Neuchâteloise



Marcel Probst
17.07.1990
SAC Brandis



Gian Sebegondi
08.04.1990
SAC Rätia



Martin Kimmig
13.03.1992
SAC Monte Rosa



Sébastien Pochon
18.11.1989
CAS Moléson

Instructors



Roger Schaeli
Pro-alpinist
Mountainguide



Denis Burdet
Pro-alpinist
Mountainguide

Expedition doctors



Dr. med. Urs Hefti



Dr. med. Christian Salis



*Schweizerische Gesellschaft
für Gebirgsmedizin
Société suisse
de médecine de montagne
Società svizzera
di medicina di montagna*

Climbed peaks

- **Esfinge 5325 m.a.s.l**
- **Artesonraju 6025 m.a.s.l**
- **Pyramide 5885 m.a.s.l**
- **Chacraraju Oeste 6112 m.a.s.l (partially)**
- **Huandoy Sur 6160 m.a.s.l**
- **Huandoy Este 6000 m.a.s.l**
- **Huandoy Norte 6395 m.a.s.l**
- **Huandoy Oeste 6356 m.a.s.l**
- **Pisco Este 5700 m.a.s.l**
- **Pisco Oeste 5725 m.a.s.l**

Medical equipment

3 Levels

- Personal first-aid kit for each athlete
- Advanced base camp pharmacy
- Modified emergency bag (rega-Oxybag)

- No recompression bag

Personal first-aid kit for each athlete

Persönliche Apotheke			
Symptom	Inhaltsstoff	Name	Dosierung/Anwendung
Desinfektionsmittel	Jod	Betadine	Wenige Tropfen auf Wunde
			(2Trp/Liter) = Wasser trinkbar
Infektionen Magen- Darm	Ciprofloxacin	Ciproxine	250 mg alle 12h, 3 Tage
Schmerzen Bewegungsapparat	Ibuprofen	Irfen	600mg alle 6-8h
Kopfschmerzen, Fieber	Paracetamol	Panadol	500mg alle 6-8h
Akute Bergkrankheit (Kopf-Schmerzen)	Ibuprofen	Irfen	600mg alle 6-8h
Akute Bergkrankheit (Akklimation)	Azetacolamid	Diamox	125-250mg alle 12h
Höhenlungenödem	Nifedipin	Nifedipin	20mg ret. alle 8h / Abstieg !
Schwere akute Bergkrankheit	Dexamethason	Dexamethason	4mg alle 6h. Zu Beginn 8mg
Höhenhirnödem	Dexamethason	Dexamethason	Und zwingend Abstieg!!!

Advanced base camp pharmacy

- Antibiotics (Ciprofloxacin, Amoxicillin/Clavulanacid)
- AMS, HAPE, HACE (Dexamethason, Diamox, Nifedipin)
- Desinfectant and dressing material
- Painkillers (Ibuprofen, Paracetamol, Tramadol)
- Rehydration substance (Elotrans[®])
- Probiotics (Bioflorin[®])

Medical problems

- Symptoms of AMS (2 athletes)
- Thigh contusion (1 athlete)
- Insertion tendinitis of the knee (1 athlete)
- Rupture of a shoulder tendon (1 athlete)
- Diarrhea and vomitus (6 athletes, 1 porter)

Medical problems

Problem

- 10-60% of all travellers get diarrhea

Prophylaxis

- Hand hygiene
- Water hygiene (bring water to boil)
- Food hygiene (cook it, boil it, peel it or leave it)

- Steffen R, Rickenbacher M, Wilhelm U, Helminger A, Schär M; J Infect Dis. **Health problems after travel to developing countries**. 1987 Jul;156(1):J84-91.
- **Guidelines for drinking-water quality**, fourth edition 2011 World Health Organization (WHO) ISBN: 978 92 4 154815 1

Medical problems

- Equipment: completeness versus weight
- No regular air rescue service
- Distribution of the athletes
- Regional hospital Huaráz (4 h drive)
- Full facility hospital Lima (13h drive)
- Communication (Sat-phone/Radio)

Medical problems

- Instruction of improvisational first-aid for the athletes



Equipment considerations

Problem: Opioids

- Export regulations
- Different import regulations for each country



Equipment considerations

Peru

- Valid prescription
- Certificate from the health authorities of the country of origin
- Severe punishment for violation of the regulations (2-25 years prison in Peru)

Equipment considerations

812.121.1

**Verordnung
über die Betäubungsmittelkontrolle
(Betäubungsmittelkontrollverordnung, BetmKV)**

vom 25. Mai 2011 (Stand am 1. Juli 2011)

Art. 27 Notfallausrüstung

Für Notfälle dürfen Ärztinnen und Ärzte, ärztlich geleitete Rettungsdienste sowie Tierärztinnen und Tierärzte ohne Bewilligung eine kleine Menge an Arzneimitteln mit kontrollierten Substanzen zu medizinischen Zwecken einführen oder, wenn die zuständigen Behörden der betroffenen Länder dies erlauben, ausführen.

Equipment considerations

Solution

- No opioids
- Ketamin/Midazolam
- Regional anesthesia
- Fixation/Immobilisation

Equipment considerations

Problem: Oxygen bottle

- Pressure 300 bar
- Dangerous goods
- Transportation problems

Solution

- Never take a oxygen bottle with you on a plane!!!

