SGGM | SSMM

Schweizerische Gesellschaft für Gebirgsmedizin
Societé Suisse de Médecine de Montagne
Società Svizzera di Medicina di Montagna

10. Schweizer Bergrettungsmedizin-Tagung

10ème rencontre suisse de médecine d'urgence et de sauvetage en montagne

Interlaken, 27.10.2018

HANDOUT

www.sggm-ssmm.ch

Bild: Albert Bierstadt

Sponsors


rega


alpinerettungschweiz


AIR ZERMATT


AIR-GLACIERS
COMPAGNIE D'AVIATION


SGNOR • SSMUS • SSERM


Seilbahnen Schweiz
Remontées Mécaniques Suisses
Funivie Svizzere
Pendicularas Svizras


OCVS
organisation cantonale valaisanne des secours
kantonale walliser rettungsorganisation
KWRO
144


MEDECIN
GRIMM


Schilthorn
Piz Gloria


LOWA
simply more...


JUNGFRAU
TOP OF EUROPE

9h00	**Opening of the meeting**	
9h15	Actuality on cave rescue in Switzerland	A. Nauer
9h30	e-Rés@mont: Development of a smartphone application to assess and guide treatment of acute mountain sickness by telemedicine in the Swiss Alps	N. Holthof
9h45	Advanced airway management & HEC operations	U. Pietsch
10h00	First SGGM Mountain Emergency Medicine Course	P. Métrailler
10h15	Pause	
10h45	Skitourenguru: digital skitour planning in Switzerland	G. Schmudlach
11h00	Characterizing conditions leading to severe avalanche accidents and rescue interventions	F. Techel
11h30	Technical and medical requirements for HEMS avalanche rescue missions, a 15-year retrospective analysis in a HEMS in Switzerland	A. Kottmann
11h45	Forensic basics for mountain rescuers	C. Schön
12h00	**General Assembly SGGM/SSMM**	C. Schön
13h15	Severe Hypothermia after a crevasse fall – successful resuscitation after 5h44 of cardiac arrest	M. Kuhnke
13h30	A frozen tragedy on Pigne d'Arolla	F. Roten / P. Gaspoz
13h45	Hospital management of the hypothermic victims of Pigne d'Arolla	Hospital teams
14h00	Hypothermia outcome prediction after extracorporeal life support for hypothermic cardiac arrest patients: The HOPE score.	M. Pasquier
14h15	Pause	
14h30	The mountain guide first aid kit, what's new in 2018?	P. Métrailler / D. Walter
14h45	Prehospital administration of blood products in Switzerland	O. Kreuzer / O. Reisten / Ph. Venetz
15h00	Terrestrial rescue on the Mönch	M. Lei
15h15	Effect of body position on management of buried avalanche victims	B. Wallner
15h30	Öffentlicher Filmvortrag: „Im Polarmeer überlebt: Dort beginnen wo die meisten Anderen aufhören"	Thomas Ulrich, Polarfahrer, Bergführer, Abenteurer
16h45	Closure of the meeting	

Aktualitäten Höhlenrettung Schweiz
Actualités Spéléo-Secours Suisse
Actuality on cave rescue Switzerland

Bergrettungstagung Medizin Interlaken 27.10.2018

Andreas Nauer

Spéléo-Secours Suisse

- Le Spéléo-Secours Suisse est part de la Société Suisse de Spéléologie (1 des totale 10 Comissions)
- +/- 220 Secouristes
- Structure: organisation en colonnes régionales et des colonnes des spécialistes (plongeurs, artificiers, spécialistes des pompes, médecine,...)
- centrale d'alarme: 1414

Fachspezialist Medizin ARS (Speleo & Alpin)

- Arzt mit Notfallausbildung
- Dipl. Rettungssanitäter HF
  - Inkl. Kompetenzdelegation
  - Inkl. Nachweis Weiterbildung 40 h pro Jahr (IVR)
- Alter: 23 – 50 Jahre
- Verfügbarkeit für Einsätze und Ausbildung
- Bereitschaft zur Mitarbeit in Ausbildungskursen

Spécialiste médecine SAS (Alpin & Speleo)

- Médecin avec formation d'urgence
- Ambulancier diplômé ES
  - y compris délégation de compétences
  - y compris attestation de formation continue annuelle 40 heures (IAS)
- Âge: 23 à 50 ans
- Disponibilité pour les missions et la formation
- Volonté de participer à des cours de formation

Fachspezialist Medizin ARS – die Unterschiede

„Speleo“

- Aktiver Höhlenforscher
- Aktives Mitglied Rettungskolonne Speleo-Secours Schweiz
- Empfehlung des Kolonnenchefs der Ärztekolonne und des Vorstandes Speleo-Secours Schweiz

„Alpin“

- Aktiver Berggänger
- Aktives Mitglied einer Rettungsstation ARS
- Empfehlung des zuständigen Rettungschefs, des regional verantwortlichen Regionalvereinsarztes und des Regionalvereinspräsidenten

Spécialiste médecine SAS – les differences

„Spéléo“

- Spéléologue actif
- Membre actif dans une équipe de secours du Speleo-Secours
- Recommendation du chef de colonne médecins Spéléo-Secours et du conseil Spéléo-Secours

„Alpin“

- Alpiniste actif
- Membre actif dans un centre de secours SAS
- Recommendation du chef de sauvetage responsable, du médecin de l'association régionale responsable au niveau régional et du président de l'association régionale

Ausbildung Fachspez. Medizin ARS

- Total 5 Tage:
- Eintrittstest: Medikamentenprüfung via e-learning (jährliche Überprüfung)
- 1 Tag - ARS und Rega
- 1 Tag - Gebirgsausbildung
- 2 Tage - Lawinenausbildung
- 1 Tag - terrestrischer Einsatz

Formation Spécialiste médecine SAS

- Total de 5 jours:
- Test d'entrée: Test de médication via e-learning (contrôlé annuellement)
- 1 jour - SAS et Rega
- 1 jour - entraînement en montagne
- 2 jours – cours d'avalanche
- 1 jour – interventions terrestre

Obligatorische Weiterbildung

- Jährlich mind. 2 Tage:
  - Rettungsübung in einer Kolonne Speleo-Secours Schweiz
    - oder
  - Rettungsübung in einer Rettungsstation ARS
    - oder
  - Einsatz Speleo-Secours Schweiz
- mind. alle zwei Jahre:
  - Teilnahme am Zentralen Fortbildungstag der ARS für Fachspez. Medizin
- mind. alle drei Jahre:
  - Bestehen des Leistungstests ARS

Formation continue obligatoire

- 2 jours par an:
  - Exercice de sauvetage dans une colonne de Spéléo-Secours
    - ou
  - Exercice d'une station de sauvetage de SAS
    - ou
  - Opération de sauvetage de Spéléo-Secours
- Tous les deux ans:
  - Participation à la Journée centrale de Formation SAS
- Tous les 3 ans:
  - Réussir le test de performance SAS

Arbeitsvorgaben Fachspez. Medizin ARS

- Algorithmen (Handlungsanweisungen) und Medikamentendosierungen der Rega
- Grundsätzlich wird nach Richtlinien von PHTLS (PreHospital Trauma Life Support) und AMLS (Advanced Medical Life Support) gearbeitet
- Einsatzdokumentation

Spécifications du travail

- Les algorithmes et les dosages des médicaments de la Rega s'appliquent
- En principe, on travaille selon les directives de PHTLS (PreHospital Trauma Life Support) et AMLS (Advanced Medical Life Support)
- Documentation

Ausrüstung

- Vollständige persönliche Höhlenausrüstung
- Aktuell 3 identische Schleifsäcke Medizin (19 kg):
  - Kloten ZH
  - Lausanne VD
  - Mollis GL

Équipement

- Equipement spéléo personnell
- Actuellement: 3 sacs Spéléo-Secours médicale identiques (19 kg):
  - Kloten ZH
  - Lausanne VD
  - Mollis GL

e-RÉS@MONT

A smartphone application to *assess and guide treatment of acute mountain sickness* by telemedicine in the Swiss Alps

Niels Holthof

10ème rencontre suisse de médecine d'urgence et de sauvetage en montagne
/ 10. Schweizer Bergrettungsmedizin-Ta g u n g
Interlaken 27.20.2018

What is e-Rés@mont?

- International project: Switzerland – France – Italy
- Funded by the European Union through the Interreg-program, Swiss contributions by the Canton of Valais, Lotterie Romande
- Cooperation between medical and rescue services across the international borders of the Mont Blanc massif
- MedMont (2006-2008), Résamont (2009-2011), Résamont2 (2013)

What is e-Rés@mont?

- e-Résamont = further developing applications of mountain medicine in the Mont Blanc area

- Project duration: 18 months, June 2016 – December 2017

- Multiple organizations involved:

The Swiss Project

- Development and testing of a smartphone application dedicated to telemedicine

- Assess and guide treatment of AMS in the Swiss Alps

- Two partners (GRIMM / HES-SO)

Acute mountain sickness (AMS)

Generally develops at 2500m and higher (symptoms have been described at 1500m!), 6-12 hours after arrival at altitude

Monte Rosa	2820m	9%
Mönchjoch	3650m	34%
Margharita	4559m	52%

Maggiorini M et al. BMJ 1990;301:853-5.

Why a smartphone application?

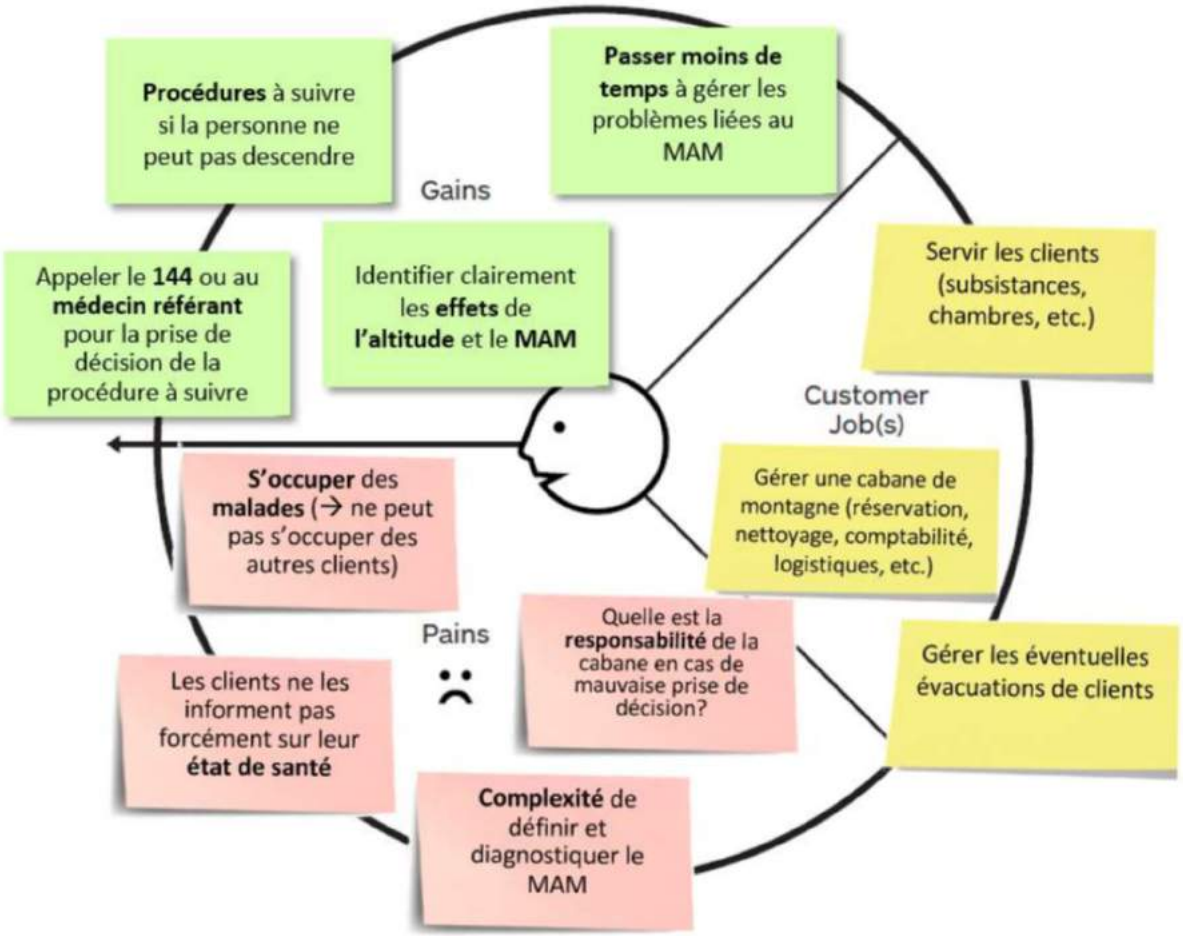
- Insufficient knowledge and misconceptions among the public regarding pathophysiology, prevention and treatment of AMS

- The application would aim to be a portable information resource and provide tools for:
  - Prevention
  - Patient self-evaluation and decision-making
  - Guiding telemedical consultations

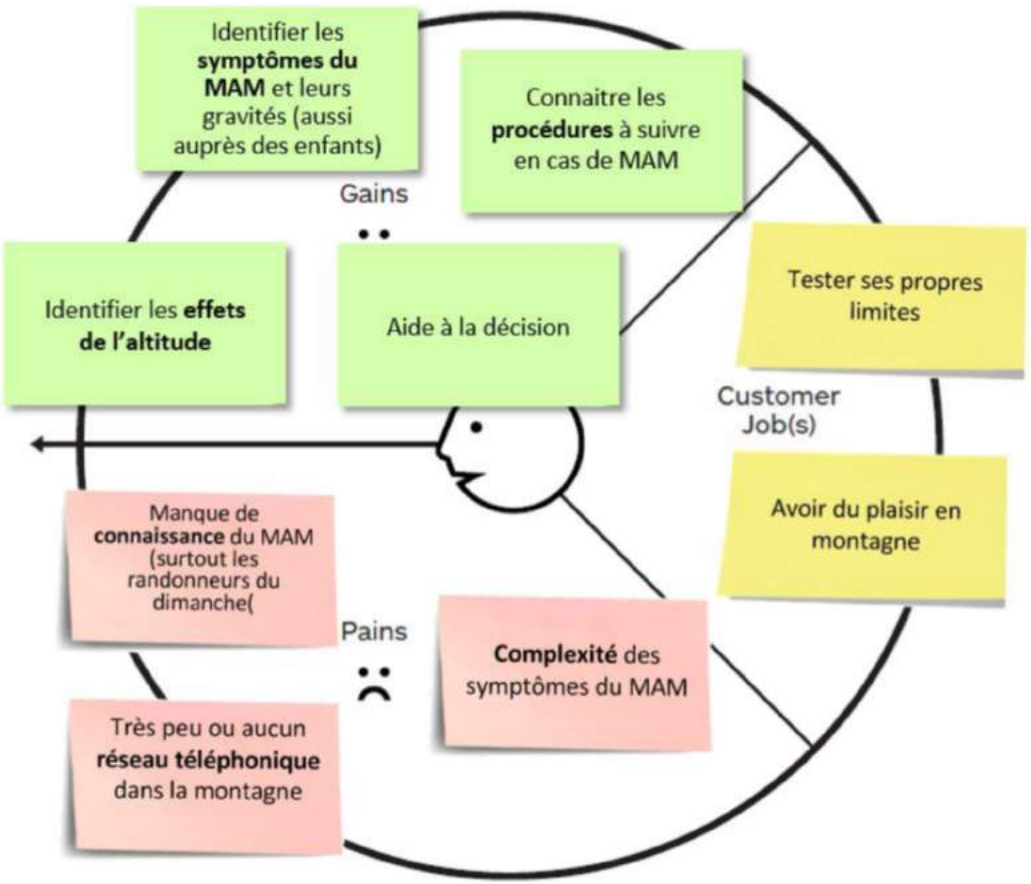
Development plan

- Focus group (hut staff, guides, alpinists, trekkers)
  -> Evaluate public knowledge of AMS
- Online market study
  -> Evaluate relevant content / application functions
- Application development
- Field testing
- Feedback
  -> Satisfaction survey

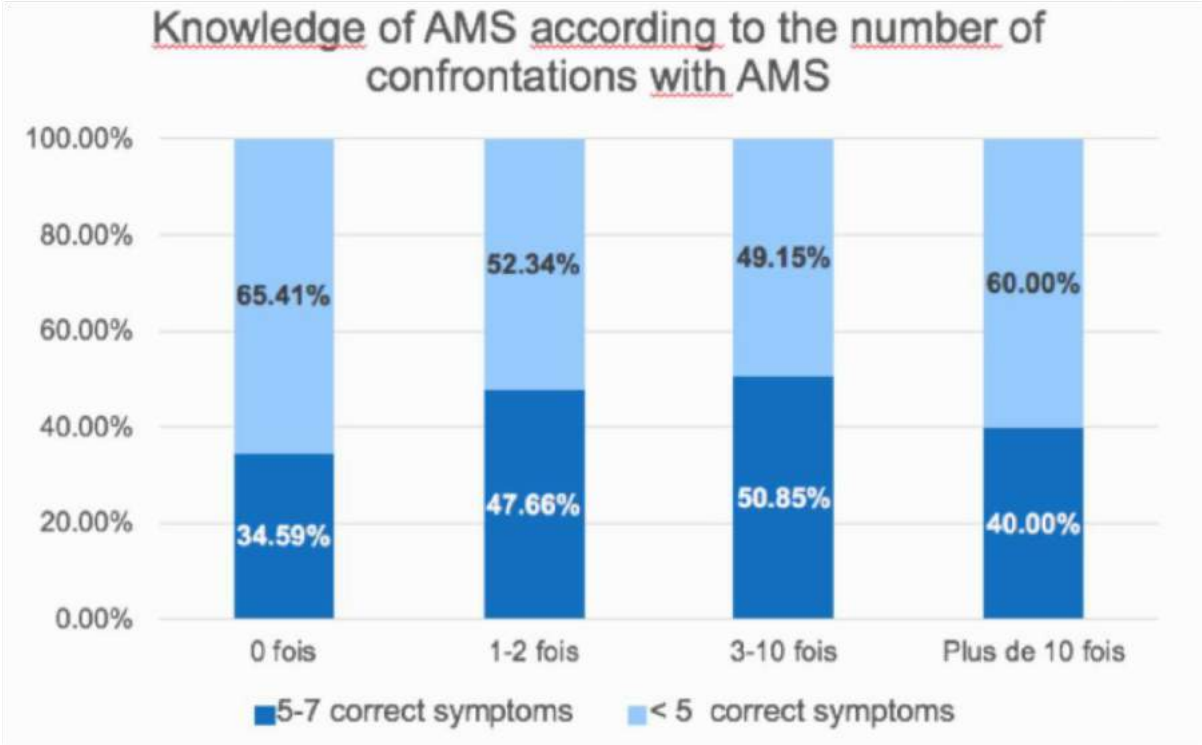
Relevancy for the alpine hut staff



Relevancy for the alpinist



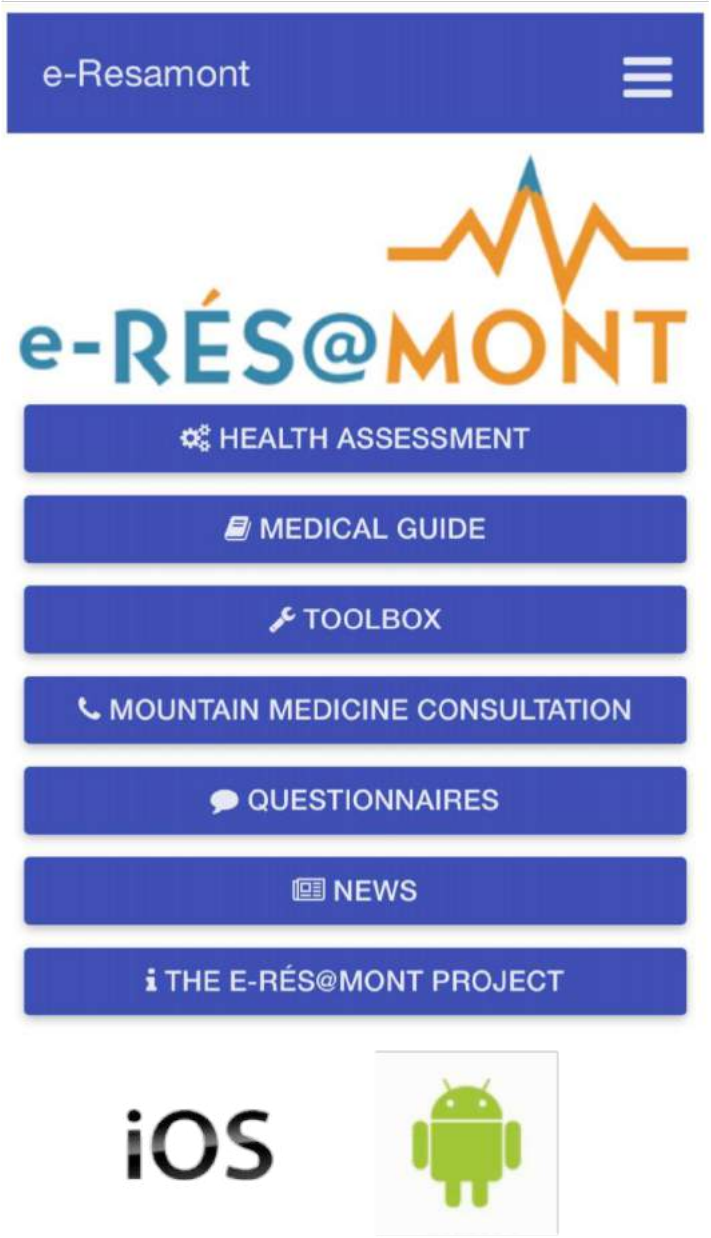
Online market study (n=396)



< 50% of the public could correctly cite the complete set of AMS symptoms

Online market study

- Most cited symptoms: **headache** 91.7%, nausea 75.3%, fatigue 63.9%, vomiting 53.8%, respiratory problems 53.3%
- 78.3% would start descent if AMS is suspected
- Generally good knowledge about single symptoms of AMS but not necessarily the combination of them



Application

- Developed to meet users' main requirements
- Content defined by medical team / technology developed by IT team
  - Health assessment through algorithms
  - Medical guide
  - Adresses of European mountain medicine consultaBon centers

e-Resamont

e-RÉS@MONT

- HEALTH ASSESSMENT
- MEDICAL GUIDE
- TOOLBOX
- MOUNTAIN MEDICINE CONSULTATION
- QUESTIONNAIRES
- NEWS
- THE E-RÉS@MONT PROJECT

< Health assessment

The following questionnaires allow you to assess your health status in relation to the Acute Mountain Sickness.

- The Lake Louise questionnaire allows each mountaineer to assess his or her condition

- The oxygen saturation algorithm makes it possible to better target the state of the climber taking into account its oxygen level in the blood. But it requires an oximeter.

- LAKE LOUISE QUIZ
- OXYGEN SATURATION ALGORITHM
- CHECKLIST FOR TELEMEDICINE

Headache

- (○) No headache (0)
- (●) Mild headache (1)
- (○) Moderate headache (2)
- (○) Severe headache, incapacitating (3)

Gastrointestinal symptoms

- (○) None (0)
- (●) Poor appetite or nausea (1)
- (○) Moderate nausea and/or vomiting (2)
- (○) Severe nausea and/or vomiting (3)

Fatigue and/or weakness

- (○) Not tired or weak (0)
- (●) Mild fatigue/weakness (1)
- (○) Moderate fatigue/weakness (2)

Dizziness / light-headedness

- (●) Not dizzy (0)
- (○) Mild dizziness (1)
- (○) Moderate dizziness (2)
- (○) Severe dizziness, incapacitating (3)

Difficulty sleeping

- (○) Slept as well as usual (0)
- (●) Did not sleep as well as usual (1)
- (○) Woke many times, poor sleep (2)
- (○) Could not sleep at all(3)

Score: 4

For a score of 4 to 5, your diagnosis is as follows:

This is a moderate high mountain sickness.
It is necessary to stop the ascent and stay at least one night at the same altitude. If the symptoms pass then we can continue the ascent. If not, we must go down

Back

Algorithme de saturation en oxygène

Algorithme de saturation en oxygène

Cet algorithme permet de calculer une valeur de saturation en fonction de l'altitude. Ceci nécessite d'utiliser un oxymètre

Altitude (mètres)

- < 2500
- 2500 - 3499
- 3500 - 4500
- >4500

Saturation (%)

- <70
- 70 à 74
- 75 à 79
- 80 à 84
- 85 à 90

Algorithme de saturation en oxygène

Resultat: 1

Valeurs normales

Valeurs normales :
Fréquence cardiaque normale : 60 à 100 battements/min
Saturation normale entre 0 et 2000m : 90 à 100 %

En fonction de l'altitude, les valeures normales varient :
Altitude 2500 à 3500 m : 85 – 95%
Altitude 3500 à 4500 m : 80 – 95%
(Altitude 4500 à 5500m : 75 – 90%)

Altitude (mètres)	Valeurs normales (% saturation)	Valeurs trop basses (% saturation)	Valeurs inquiétantes (% saturation)
< 2500	> 90	< 90	< 85
2500 - 3500	> 85	< 85	< 80
3500 - 4500	> 80	< 80	< 70
> 4500	> 75	< 75	< 70

Medical guide

1. ACUTE MOUNTAIN SICKNESS (AMS)
2. HIGH ALTITUDE LOCALISED OEDEMA (HALE)
3. HIGH ALTITUDE PULMONARY OEDEMA (HAPE)
4. HIGH ALTITUDE CEREBRAL OEDEMA (HACE)
5. FROSTBITE
6. HYPOTHERMIA
7. HYPERTHERMIA - HEAT STROKE
8. SUNSTROKE
9. DEHYDRATION
10. AVALANCHE
11. SNOW BLINDNESS
12. HIGH-ALTITUDE RETINAL HAEMORRHAGE
13. HYPERBARIC CHAMBER
14. LIGHTNING
15. PROTECTION AGAINST LIGHTNING
16. SICKNESS AND FAINTING
17. PRECAUTIONS FOR WOMEN AT ALTITUDE
18. PRECAUTIONS FOR MINORS
19. MOUNTAIN MEDICINE CONSULTATION
20. MOUNTAIN MEDICINE FOR EVERYONE

3. High altitude pulmonary oedema (HAPE)

High altitude pulmonary oedema (HAPE) is one of the major complications of mountain sickness.
It shows initially with shortness of breath at the slightest effort, a cough and a decreased ability to perform any effort. These symptoms indicate a pulmonary oedema and allow it to be detected before it is too late.

HAPE SYMPTOMS:

Initial:

- shortness of breath even when resting

- cough
- remarkable fatigue

Advanced stadium:

- pink sputum
- shortness of breath when lying down
- oxygen saturation <75% (digital oximeter)

4. High altitude cerebral oedema (HACE)

This is a lethal complication of AMS which may occur during the first part of an altitude stay, in most cases during the initial adaptation phase. The brain suffers from a lack of oxygen and an increase in pressure in the cranial cavity at the same time. As with mountain sickness, the risk increases with altitude and the climbing speed.

The warning symptoms are:

- Persisting AMS with headache and vomiting which do not decrease despite strong doses of aspirin or paracetamol
- Balance (ataxia) and behaviour disorders: incoherence, delirium, hallucinations, aggressive behaviour

- Onset of somnolence, then of a comatose state

Field tes)ng

Call center 24/7

Te l e m e d i c i n e 24/7

6 alpine huts

Check-list pour télémédecine

Avant d'appeler un médecin veuillez remplir cette liste pour vous faciliter la téléconsultation

Données personnelles du patient

Prénom :

Nom :

Date de naissance :

Adresse :

Numéro de téléphone du patient :

Signes et symptômes

De quel type :

Mode d'apparition :

Provoqué par :

Intensité :

Irradiant vers :

Depuis quand :

Informations de santé

Allergies :

Médicaments :

Problèmes de santé connus :

Dernier repas pris :

Evénements (qui amènent au problème) déclenchant :

Signes vitaux mesurables

Etat de conscience :

Agité, nerveux

Respiration :

Rapide

Caractéristiques de la peau :

Bleutée

Chaude Froide

Humide Sèche

Température :

Chaude

Saturation (mesure avec un saturomètre) :

Fréquence cardiaque (compter les pulsations radiales si possible sur 60 secondes) :

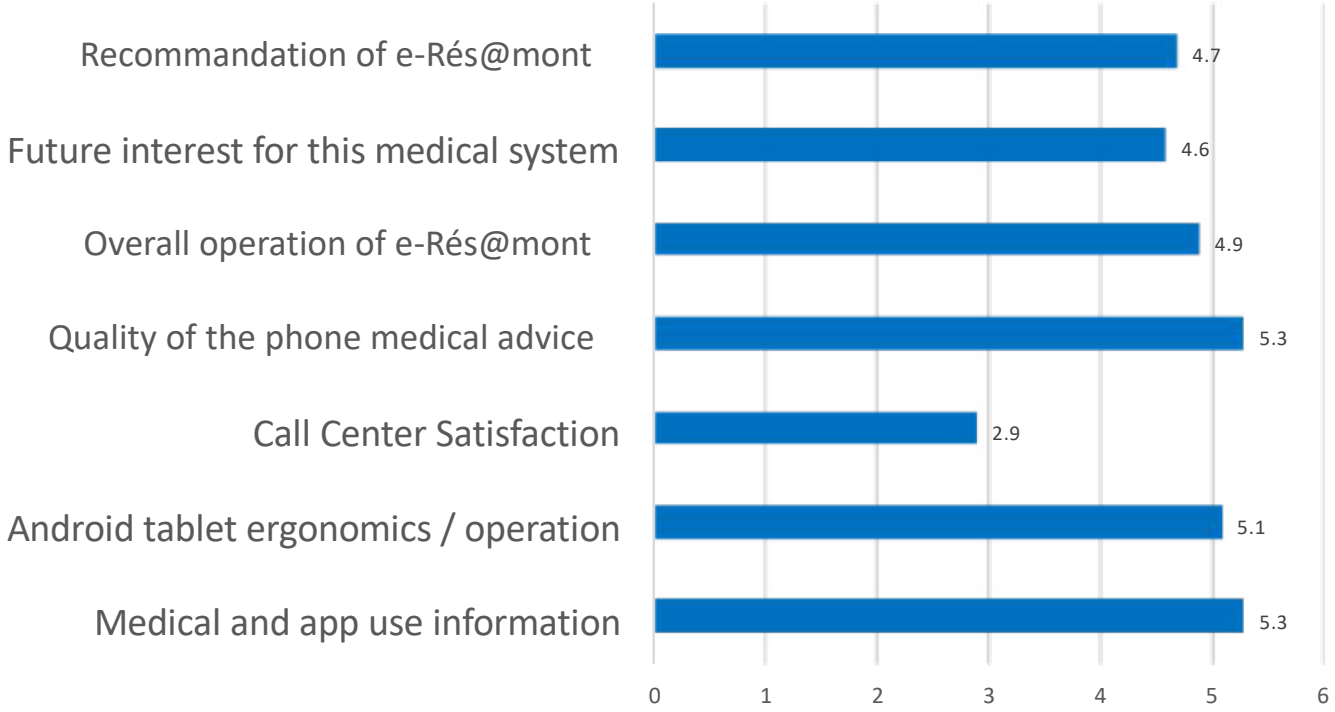
Réaction des pupilles à la lumière :

Oui Non

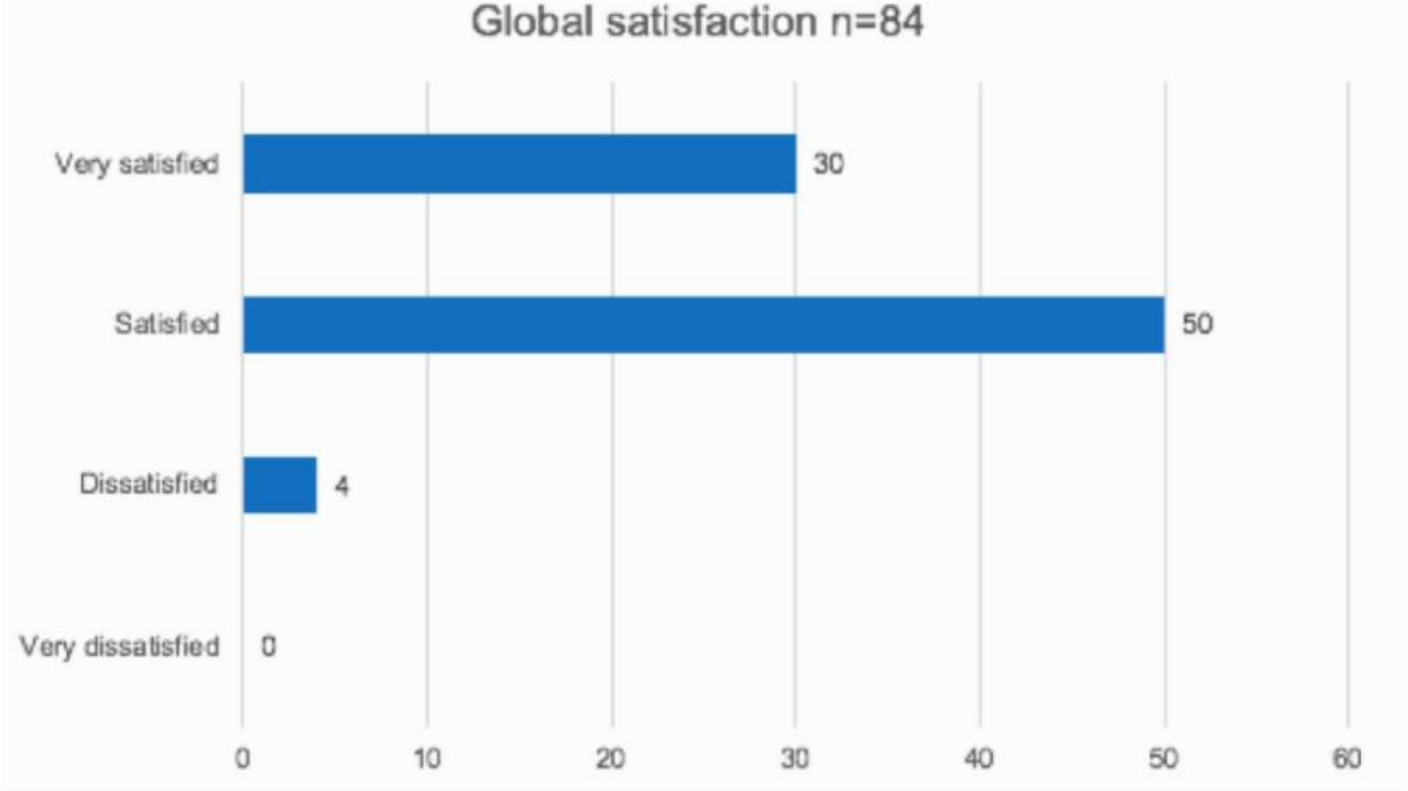
Results

- Total of 14 calls (7 test calls)
- Symptoms ranging from mild to severe AMS according to the LLS
- 100% medical response rate
- 1 patient airlifted to regional hospital
- 6 patients showed clinical improvement after on-site treatment (independent descend or continued ascent)

Hut staff feedback



- Global satisfaction with the application as a decision making tool
- Are used to calling the official emergency number but would use telemedicine if easy to use and functional



- 522 downloads during the field test, 564 since the beginning of the project
- 84 responses to the satisfaction survey

- Improvement points:
- Ergonomics of the app
- More precise and simple information

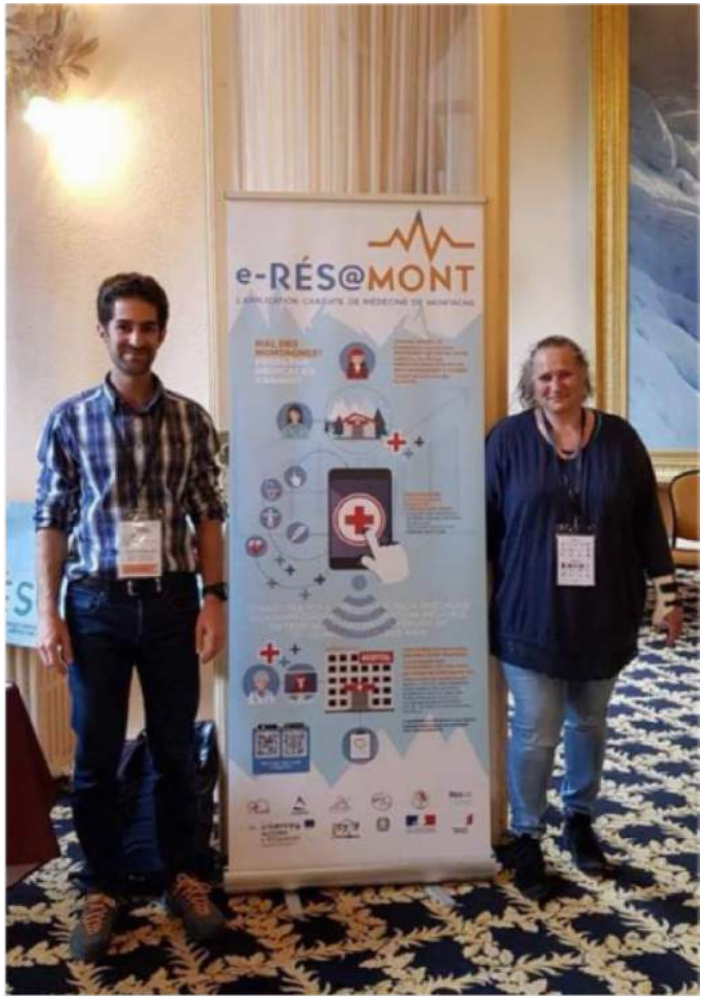
Chamonix-Mont-Blanc 2018

4TH

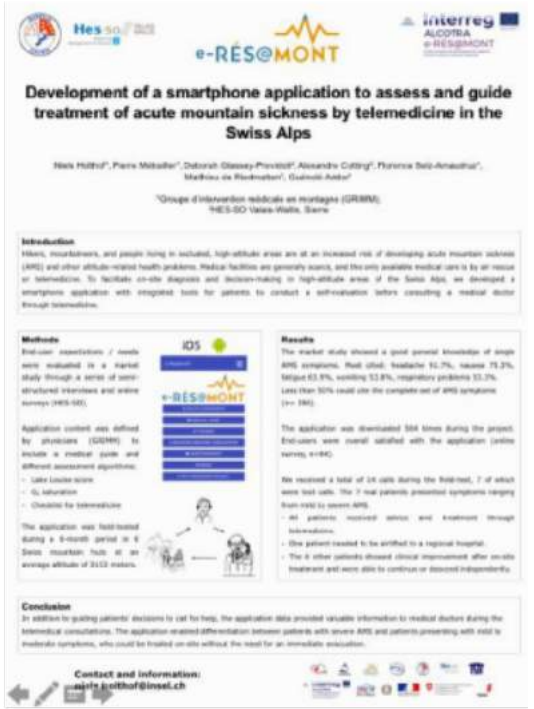
SUSTAINABLE SUMMITS CONFERENCE

CONFÉRENCE DE PRESSE

Innovation en montagne : développement de la télémédecine grâce à un projet de l'Espace Mont-Blanc



- Poster presenta+on
- Abstract in **«High Al)tude Medicine & Biology»**



And now?

- Development of telemedical consultations in Swiss alpine huts?
  - Subscription? Pay on demand?
  - Legal implications?

- Integrate e-Resamont into an existing platform/application?
  - Promote prevention strategies
  - Provide a portable information resource
  - Guide telemedecine through easy-to-use algorithms

Thanks for your attention!

Advanced airway management & HEC operations

27.10.2018 / 10. Schweizer Bergrettungsmedizin-Tagung

Dr.med. Urs Pietsch EDIC/DESA

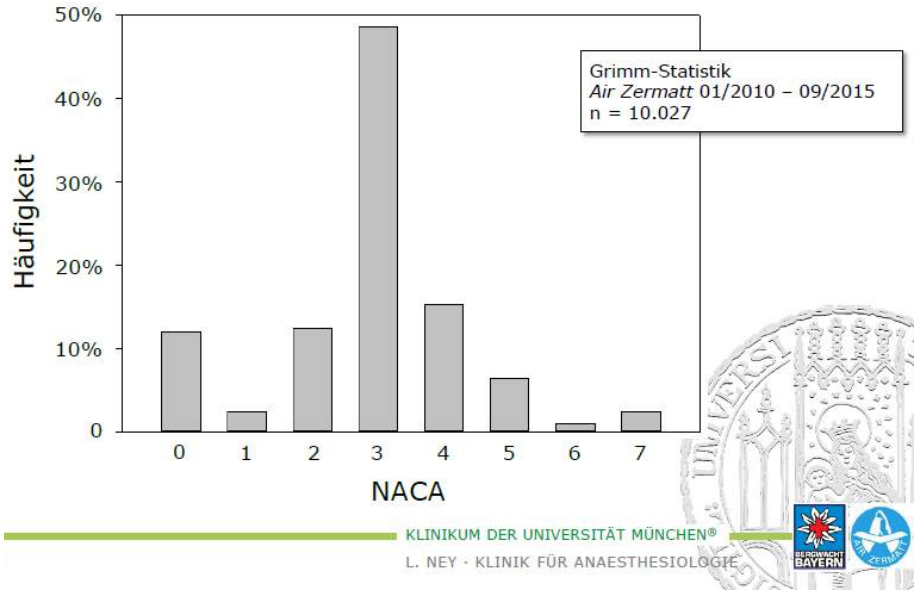
Prof. Volker Lischke

HEMS in alpine areas

The use of a helicopter emergency medical service can significantly shorten rescue times, especially in mountainous areas and can therefore improve patients outcome

Air Zermatt 2010 - 2015

Verteilung der NACA-Scores



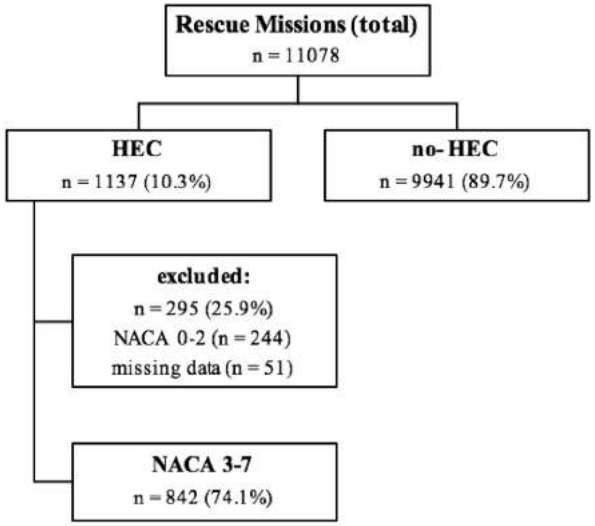


Fig. 1: HEMS rescue missions between January 2010 and September 2016

Table 5: Distribution of NACA score in trauma and non-trauma victims			
NACA	Trauma, n (%)	Non-trauma, n (%)	total, n (%)
3	548 (65)	40 (5)	588 (70)
4	120 (14)	24 (3)	144 (17)
5	43 (5)	11 (1)	54 (6)
6	1 (0.2)	5 (0.8)	6 (1)
7	41 (5)	9 (1)	50 (6)
total	753 (89)	89 (11)	842 (100)

Unpublished data

Air Zermatt 2010 - 2015

Bergungsart *vs.* NACA-Score

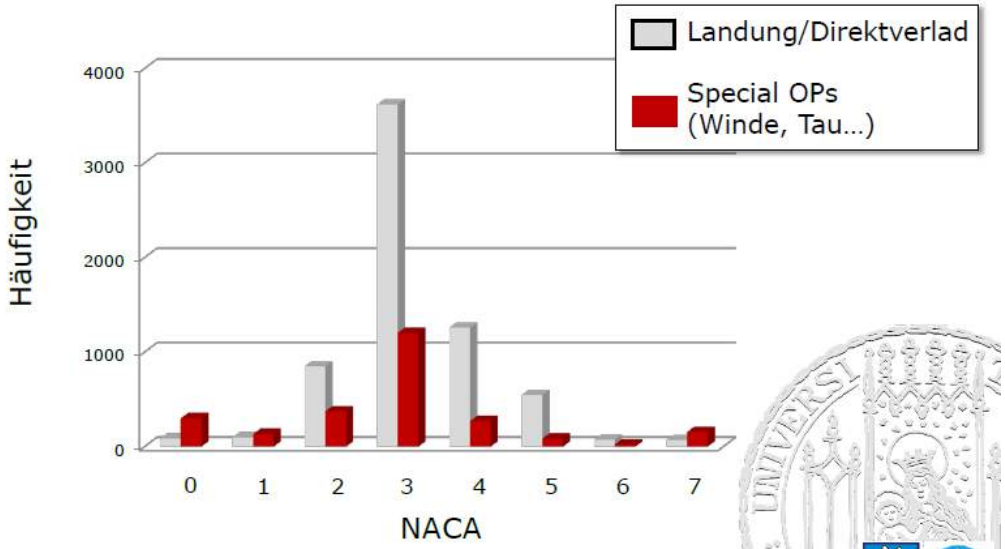


Table 6: Medical interventions before and after human external cargo (HEC) extraction.		
Medical intervention	before HEC, n (%)	after HEC, n (%)
i.v. line	573 (68)	4 (1)
Analgesia (low dose)	430 (51)	47 (6)
Analgesia (high dose)	142 (17)	20 (2)
Oxygen (without signs of shock/hypoxemia)	91 (11)	10 (1)
CPR	14 (2)	2 (0.2)
Drugs	101 (12)	27 (1)
Volume resuscitation ≥1,000 ml	39 (5)	3 (0.4)
Vasoactive Drugs	19 (2)	6 (1)
Endotracheal intubation/RSI	29 (3)	14 (2)
Ventilation (bag mask ventilation)	20 (2)	5 (1)
Joint reduction (with signs of neurological/vascular impairment)	12 (1)	0
Chest tube	3 0.4)	0

Unpublished data

Guidelines for medical interventions, especially for airway management in casualties that require evacuation by HEC operation are limited and outdated.

ICAR **REC M 0011 E**

International Commission for Alpine Rescue

Commission for Mountain Emergency Medicine

Recommendation REC M 0011 of the Commission for Mountain Emergency Medicine

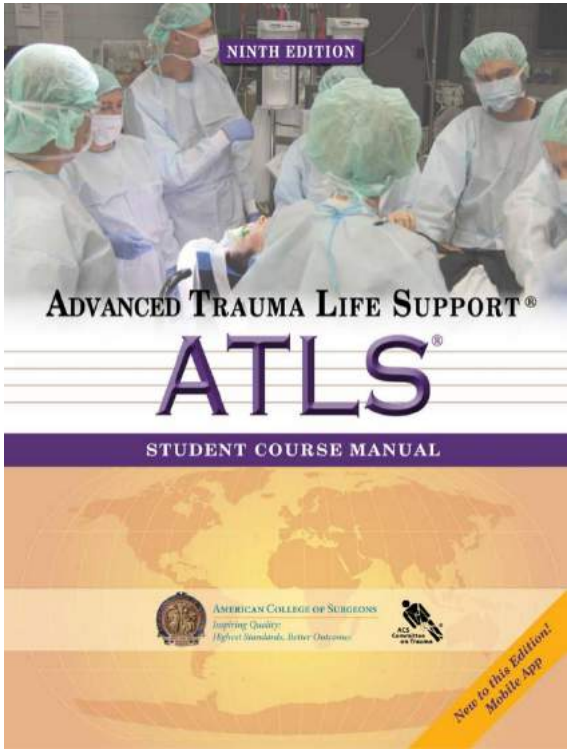
of 1998

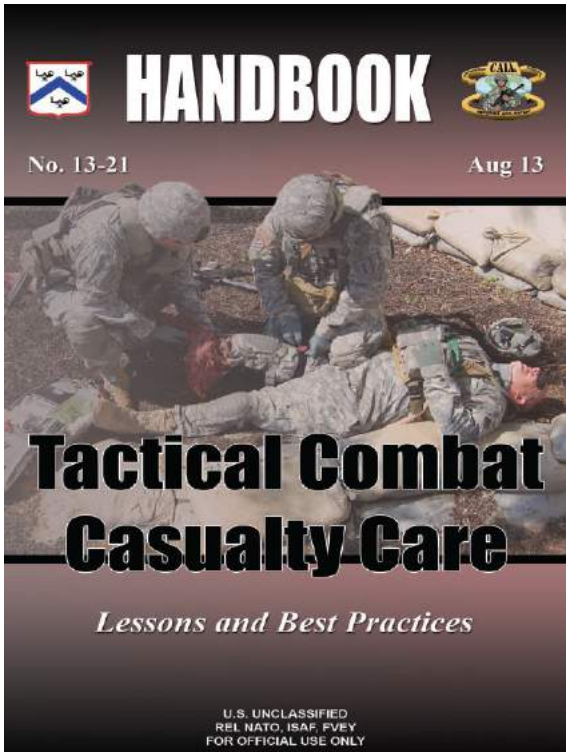
Emergency Intubation and Ventilation on the Field

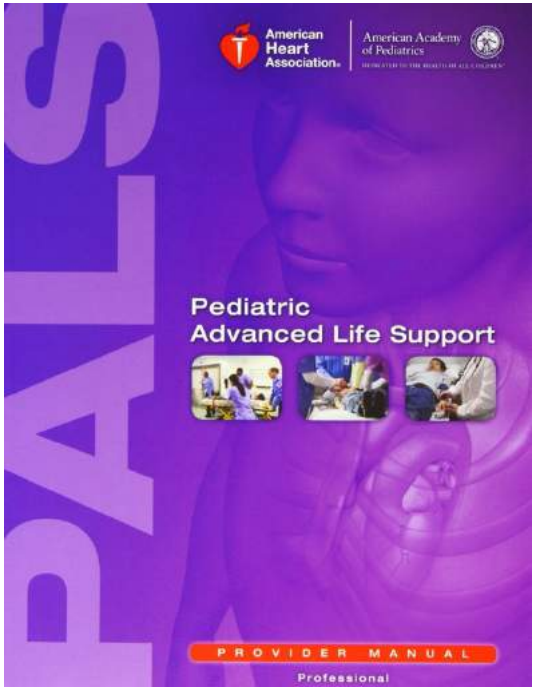
A. Thomas, G. Rammlmair, U. Wiget

Intended for Mountain Emergency Physicians

Follow the guidelines as far as possible !!!
BUT…in Mountain HEMS?







Pietsch et al. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine (2018) 26:23
https://doi.org/10.1186/s13049-018-0490-5

Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine

REVIEW Open Access

Advanced airway management in hoist and longline operations in mounta considerations in austere envi narrative review This review is the International Commission Emergency Medicine (ICAR ME

Urs Pietsch[1,2,3*†], Jürgen Knapp[2,4†], Oliver Kreuzer[2], Ludwig Ney[2,3,5], Gi Roland Albrecht[1,7], Patrick Phillips[8] and Simon Rauch[6]

Table 2 Characteristics of patients and medical interventions in human external cargo missions

Study	Study design	Setting	Patients	Findings
Corniche J [10]	Prospective study. Review of primary rescue interventions in all missions involving hoisting of a physician, Switzerland, 1998 to 2002	1855 HEMS missions, 156 (8%) HEC missions with physician, 133 patients (7%) for analysis, pre-alpine region of Switzerland	trauma: $n = 102$ (77%) minor trauma: $n = 14$ (10%).	medical interventions: • major analgesia with sedation: $n = 4$ (3%) • fracture reduction: $n = 5$ (4%) • intravenous fluid administration (> 1500 ml): n = 4 (3%) • endotracheal intubation: $n = 5$ (4%), (point of time not mentioned)
Sherren PB [11]	Prospective study. Review of physician only interventions in all missions involving hoisting of a physician, Australia, 2009 to 2012	1582 HEMS missions, 130 (8%) HEC missions with physician, 120 patients (8%) for analysis, remote and inaccessible regions of New South Wales, Australia	trauma: $n = 108$ (90%)	63 physician only interventions in $n = 48$ (40%) patients • advanced analgesia: 44 (70%) • advanced airway management: 5 (8%) (point of time not mentioned) • circulatory support: 3 (5%) • orthopedic manipulation of joints/ limbs: 6 (10%) • thoracostomy: 1 (2%) • diagnostic ultrasound: 1 (2%) • hypertonic saline administration: 3 (5%)
Ausserer J [12]	Retrospective registry study. Review of trauma patients with the aim to identify victims sustaining major trauma during recreational activities in mountainous terrain, Austria 2011 to 2013	58 major trauma victims (Injury Severity Score ≥ 16), 40 (69%) HEC operations, in remote and mountainous areas in the State of Tyrol	head/neck trauma: $n = 25$ (35%) chest trauma: $n = 27$ (37%)	medical interventions: • ATLS before HEC operation: $n = 30$ (75%) • advanced airway management: $n = 23$ (40%) (point of time not mentioned)
Ney L [6]	Retrospective study. Air Zermatt database, Switzerland, 2010 to 2015	10,027 HEMS missions, 2808 (28%) HEC evacuations, in the high alpine regions of Switzerland		HEC evacuation and NACA-Score ≥ 4: $n = 602$ (21% of all HEC evacuations)
Ruppert M [21]	Retrospective registry study. Review of all primarily admitted patients with and without hoist rescue, Germany, 2006 to 2015	20,241 HEMS missions, 1813 (9%) HEC operations, two HEMS bases in the pre-alpine regions of Germany	trauma in HEC missions: $n = 850$ (71%) major trauma in HEC missions: $n = 127$ (11%) cardiovascular diseases in HEC missions: $n = 129$ (11%)	medical interventions in HEC missions: • reposition of joint or limb: $n = 190$ (11%) • endotracheal intubation: $n = 83$ (5%) (point of time not mentioned) • CPR: $n = 41$ (2%) • thoracostomy: $n = 8$ (0.4%) • intraosseous access: $n = 6$ (0.3%)
Pasquier M [4]	Retrospective study. Review of medical interventions in all missions involving hoisting of a physician, Switzerland, 2003 to 2008	9879 HEMS missions, 921 (9%) HEC operations, in the alpine region of Switzerland	trauma in HEC operations: $n = 840$ (91%) paedatric patients (≤15 years): $n = 56$ (6%)	HEC operation and NACA-Score ≥ 4: $n = 246$ (27% of all HEC operations) medical interventions in HEC missions: • major analgesia: $n = 478$ (52%) • vasoactive drugs: $n = 26$ (2%) • endotracheal intubation: $n = 16$ (2%) (at the scene of accident) • intravenous fluid administration (> 1000 ml): $n = 16$ (2%) • CPR: $n = 7$ (1%)
Carpenter J [22]	Retrospective study. Review of patient demographics hoisted in the backcountry of Utah, USA, from 2001 to 2011	171 HEC missions with 214 patients	trauma in HEC missions: $n = 146$ (68%)	Medical interventions in HEC missions: • CPR: $n = 5$ (2%)

ATLS advanced trauma life support, *CPR* cardiopulmonary resuscitation, *HEC* human external cargo, *HEMS* helicopter emergency medical service, *NACA* National Advisory Committee for Aeronautics

Intubation before HEC

- Corniche et al. 2012 => 3,2 %
- Sherren et al. 2014 => 3,1 %
- Ney et al. 2016 => 2,2 %
- Ausserer et al. 2017 => 13 %
- Pietsch et al. 2018 => 3.0 %

Indications for assisted or controlled ventilation in HEC operations

Absolute indication (?)

- Apnea or agonal respiration
- Traumatic brain injury with insufficient ventilation or oxygenation despite high flow O_2
- Severe (chest) trauma patient with insufficient ventilation or oxygenation despite high flow O_2
- Cardiopulmonary resuscitation (CPR) with mechanical chest compression devices, e.g., due to a hypothermic arrest

Relative indication

- GCS < 9 with limited oxygenation

Medical difficulties and challenges

Technical difficulties and challenges

Non-technical difficulties and challenges, human factors

Medical difficulties and challenges

- Airway device displacement
- Hyper−/hypoventilation
- Disconnection airway device and ventilation bag or respirator
- Limited monitoring possibilities (no acoustical, limited visual observation) during HEC operation
- Inability to perform any airway device corrections of false placement during HEC operation
- Complex and time-consuming securing of all medical devices (e.g., oxygen bottles, monitors, respirator etc.) for HEC operation
- Risk of hypothermia due to prolonged exposure to the elements

Bag-valve-mask (BVM) ventilation, which requires maintenance of an adequate mask seal, is not feasible during human external cargo operations

Threshold for advanced airway management prior to HEC should probably b higher than by ground EMS

Endotracheal intubation in exposed terrain and under harsh environmental conditions

EMA Emergency Medicine Australasia

Emergency Medicine Australasia (2017) doi: 10.1111/1742-6723.12845

PREHOSPITAL AND RETRIEVAL MEDICINE

Ventilatory choices for intubated patients during helicopter stretcher winching

John HOLLOTT

Hunter Retrieval Service, Hunter New England Local Health District, Newcastle, New South Wales, Australia

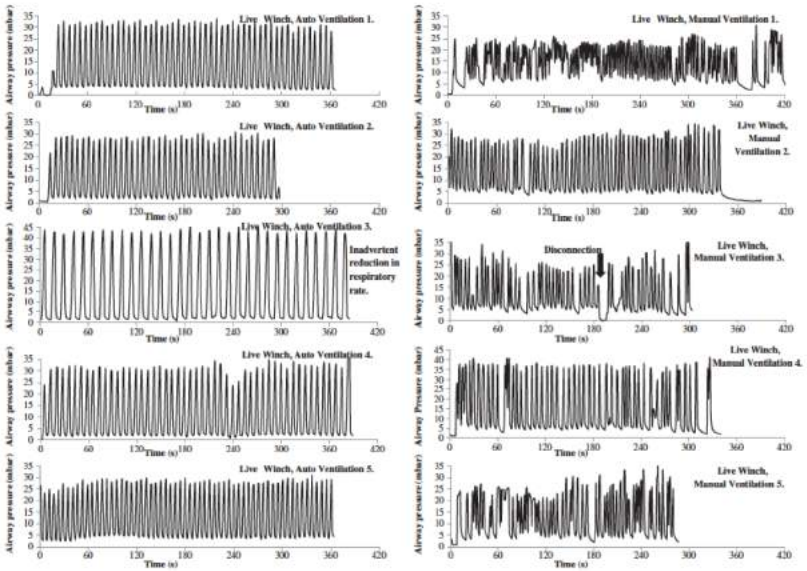


Figure 3. *Airway pressures during live winching using automatic (left) and manual (right) ventilation.*

Compared the use of a self-inflating bag versus a mechanical ventilator during the helicopter hoisting (or winching) of a manikin, measuring airway pressures.

The use of automatic ventilation was found to be more reliable, consistent and safer. As pointed out in Pietsch's article, airway monitoring and disconnection is a major concern, but of a low risk if managed appropriately, and the safety benefits to the patient make it potentially the optimal method. In addition, the enhancement of situational awareness for the attendant when freed from the task of ventilation is likely to particularly benefit operational safety.

Technical difficulties and challenges

- Loss of the resuscitation bag or other medical devices, due to downwash or gravitational forces
- Displacement of the airway device following exposure to downwash, which could interfere with re-inflation of the BVM during manual ventilation

Bag-Ventilation

Oxylator-Ventilation

ECG
$EtCO_2$
SaO_2
BP

Ventilator

Bag Valve Mask Failure during HEMS Intubated Stretcher Winch

Brian J. Burns, MD, FACEM,[1] Keith Edwards, MD, FACEM,[1] and Thomas House, CHC[2]

Figure 2. Laerdel Silicone Resuscitator

Figure 3. Disposable Manual Resuscitator

Non-technical difficulties and challenges, human factors

- Limited situational awareness
- Increased work load during highly complex rescue maneuvers
- Involuntarily shift of focus from safety during hoist operations to medical care
- Prolonged exposure to physical hazards (e.g., rockfall) due to prolonged time on scene

Conclusions

- The placement of an advanced airway device prior to HEC extraction is rarely performed.
- A careful risk/benefit analysis should be undertaken before advanced airway management is performed prior to HEC operation.
- A SOP for HEC operation should be developed.
- HEC with intubated pats. should be included in the SOP.
- Equipment for ventilation of patients during HEC operations has to meet specific requirements (e.g., dimensions, fall protection, functionality in strong downwash).
- Monitoring of correct ventilation is extremely limited.

“Dream teams are made – not born”

Characterizing conditions leading to severe avalanche accidents and rescue interventions

Frank Techel

WSL Institute for Snow and Avalanche Research SLF, Davos, Switzerland

Correspondence to: Frank Techel (techel@slf.ch)

presented at 10th Schweizer Bergrettungsmedizin-Tagung, 27 Oct 2018, Interlaken, Switzerland

1 Introduction

Today, most avalanche accidents occur during recreational activities away from avalanche-secured areas (Techel et al., 2016). Avalanche conditions and the number of people exposed to the hazard influence the number of avalanche accidents (Techel et al., 2015). Avalanche warnings should therefore reach the target audience particularly when critical avalanche conditions and a large number of users are expected. On these days, avalanche accidents leading to intervention by organized rescue teams are more likely.

Using reported accidents and forecast avalanche conditions, simple rules are extracted which may guide avalanche forecasters on when to make an increased effort at communicating avalanche hazard, and professional rescue teams on when the likelihood of severe accidents is higher, and thus rescue intervention necessary.

2 Data and Methods

Severe avalanche accidents are explored for the ten winter seasons 2008/09 - 2017/18 (1 Dec - 30 Apr). Here *severe* accidents are defined as a snow avalanche in which at least one person of the accident party was either fully buried (head in snow), injured, or died as a consequence of the accident.

Accident data was extracted from the accident data base at SLF[1]. Conditions are described using the avalanche forecast (*danger level*, *avalanche problem*; SLF, 2017) and the weather observations made every morning by more than 100 observers in the Alps.

In Switzerland, 486 severe avalanche accidents were reported, 165 caused the death of at least one person. 91% of these events required intervention by organized rescue teams. In these avalanches, 901 people were caught, of which 352 (39%) were fully buried, and 210 (23%) died. Essentially all accidents (96%) occurred during leisure activities in terrain away from avalanche-secured areas.

3 Results

On 79% of the 1512 days during the explored winters, there was no severe accident. However, on 7% of the days two or more severe accidents occurred. Days, when accidents occurred can be characterized as follows:

- It was a **weekend-day**. On those two days of the week, 52% of the accidents occurred.
- The **weather was fine** (Fig. 1). 71% of the accidents occurred on these days, which is similar to the overall proportion fine weather was reported (69%).
- The forecast **avalanche danger level was *3-Considerable*** or higher on the five-level danger scale (Fig. 2). Compared to danger level *1-Low*, there were 7 times more accidents at danger level *2-Moderate* and 15 times more accidents at danger level *3-Considerable*.
- The forecast avalanche **problem was defined as *new snow*** (Fig 3) and / or ***old snow*** (Fig. 4). A *new snow* problem forecast, indicated that there was fresh snow within the last 24 hours. It was often forecast in combination with danger level *3-Considerable*. Accidents

[1]WSL Institute for Snow and Avalanche Research SLF, Davos, Switzerland

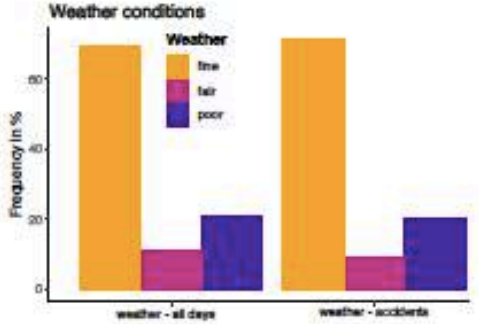


Figure 1. Distribution of weather conditions: all days (left), accident days (right).

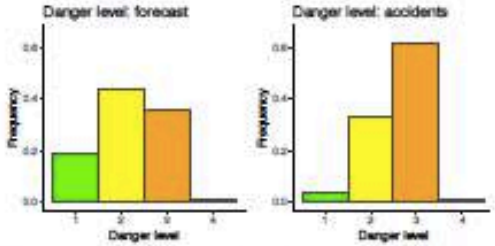


Figure 2. Forecast avalanche danger level, distribution in all forecasts (left) and on accident days (right).

were 1.9 times as likely to occur on these days compared to days when no *new snow* problem was communicated. When an *old snow* problem was indicated (persistent weak layers deeper in the snowpack existed and could be the cause for avalanche release), 1.3 times more accidents occurred compared to days without this problem.

4 Conclusion

If the first sunny day after a period of snowfall, with elevated avalanche danger and weak layers in the snowpack, falls on a weekend, it is more likely that one or several severe avalanche accidents will occur.

References

SLF: Avalanche bulletin interpretation guide, WSL Institute for Snow and Avalanche Research SLF, http://www.slf.ch/lawineninfo/zusatzinfos/interpretationshilfe/interpretationshilfe_e.pdf, edition December 2017, 53p., 2017.

Techel, F., Zweifel, B., and Winkler, K.: Analysis of avalanche risk factors in backcountry terrain based on usage frequency and accident data in Switzerland, Nat. Hazards Earth Syst. Sci., 15, 1985–1997, doi:10.5194/nhess-15-1985-2015, 2015.

Techel, F., Jarry, F., Kronthaler, G., Mitterer, S., Nairz, P., Pavšek, M., Valt, M., and Darms, G.: Avalanche fatalities in the European Alps: long-term trends and statistics, Geographica Helvetica, 71, 147–159, doi:10.5194/gh-71-147-2016, 2016.

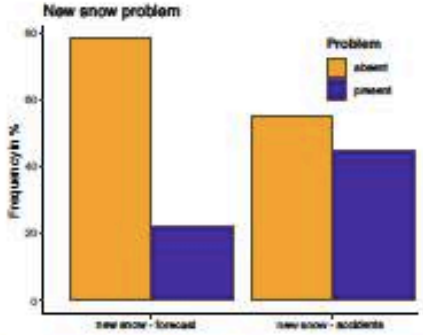


Figure 3. Forecast new snow problem, distribution in all forecasts (left) and on accident days (right).

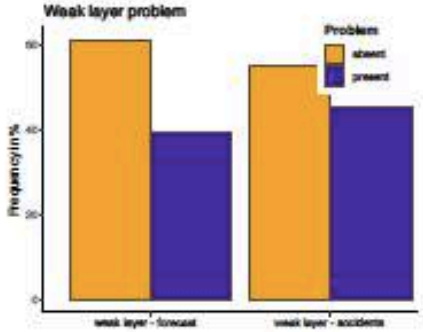


Figure 4. Forecast persistent weak layer problem, distribution in all forecasts (left) and on accident days (right).

Identification of the technical and medical requirements for HEMS avalanche rescue missions through a 15-year retrospective analysis in a HEMS in Switzerland. A necessary step for quality improvement.

Alexandre Kottmann, Pierre-Nicolas Carron, Lorenz Theiler, Roland Albrecht,

Mario Tissi, Mathieu Pasquier

Scand J Trauma Resusc Emerg Med (2018); **26**(1): 54.

Background: Avalanche rescues mostly rely on helicopter emergency medical services (HEMS) and include technical rescue and complex medical situations under difficult conditions. The adequacy of avalanche victim management has been shown to be unexpectedly low, suggesting the need for quality improvement. We analyse the technical rescue and medical competency requirements of HEMS crewmembers for avalanche rescue missions, as well as their clinical exposure. The study aims to identify areas that should be the focus of future quality improvement efforts.

Methods: This 15-year retrospective study of avalanche rescue by the Swiss HEMS Rega includes all missions where at least one patient had been caught by an avalanche, found within 24 h of the alarm being raised, and transported.

Results: Our analyses included 422 missions (596 patients). Crews were frequently confronted with technical rescue aspects, including winching (29%) and patient location and extrication (48%), as well as multiple casualty accidents (32%). Forty-seven percent of the patients suffered potential or overt vital threat; 29% were in cardiac arrest. The on-site medical management of the victims required a large array of basic and advanced medical skills. Clinical exposure was low, as 56% of the physicians were involved in only one avalanche rescue mission over the study period.

Conclusions: Our data provide a solid baseline measure and valuable starting point for improving our understanding of the challenges encountered during avalanche rescue missions. We further suggest QI interventions, that might be immediately useful for HEMS operating under similar settings. A coordinated approach using a consensus process to determine quality indicators and a minimal dataset for the specific setting of avalanche rescue would be the logical next step.

Forensic Basics for Mountain Rescuers

CA Schön

Glücklicherweise können in Not geratene Berggänger in den allermeisten Fällen gerettet werden. Leider bleibt es aber nicht aus, dass sich auch immer wieder Todesfälle im Gebirge ereignen. In der Schweiz sind diese Todesfälle, in Abhängigkeit von den Umständen, mehrheitlich meldepflichtig, was bedeutet, dass sich eine Untersuchung der zuständigen Ermittlungsbehörde anschliesst. Im Gegensatz zu anderen so genannten «aussergewöhnlichen Todesfällen» (agT) findet die von der Staatsanwaltschaft in Auftrag gegebene Leichenschau (Legalinspektion) bei diesen Todesfällen jedoch quasi nie am Ereignisort statt. Fast immer wird der Leichnam ausgeflogen, um dann in einem Spital oder einer Aufbahrungshalle untersucht zu werden. Dies bedeutet für die Untersucher (Polizei, Rechtsmedizin) aber, dass ihnen allenfalls wichtige Informationen fehlen. Aus diesem Grund kommt den Beobachtungen des Bergrettungsteams vor Ort eine wesentliche Bedeutung zu. Sich dessen als Retter generell bewusst zu sein, zu wissen, worauf geachtet und was dokumentiert werden soll, und die Informationen so rasch als möglich weiterzuleiten kann helfen, die sich anschliessenden Ermittlungsarbeiten zu unterstützen.

Hypothermia outcome prediction after extracorporeal life support for hypothermic cardiac arrest patients: The HOPE score.

Pasquier M., Hugli O., Paal P., Darocha T., Blancher M., Husby P., Silfvast T., Carron P. N., Rousson V.

Resuscitation (2018); **126**: 58-64.

AIMS: Currently, the decision to initiate extracorporeal life support for patients who suffer cardiac arrest due to accidental hypothermia is essentially based on serum potassium level. Our goal was to build a prediction score in order to determine the probability of survival following rewarming of hypothermic arrested patients based on several covariates available at admission.

METHODS: We included consecutive hypothermic arrested patients who underwent rewarming with extracorporeal life support. The sample comprised 237 patients identified through the literature from 18 studies, and 49 additional patients obtained from hospital data collection. We considered nine potential predictors of survival: age; sex; core temperature; serum potassium level; mechanism of hypothermia; cardiac rhythm at admission; witnessed cardiac arrest, rewarming method and cardiopulmonary resuscitation duration prior to the initiation of extracorporeal life support. The primary outcome parameter was survival to hospital discharge.

RESULTS: Overall, 106 of the 286 included patients survived (37%; 95% CI: 32-43%), most (84%) with a good neurological outcome. The final score included the following variables: age, sex, core temperature at admission, serum potassium level, mechanism of cooling, and cardiopulmonary resuscitation duration. The corresponding area under the receiver operating characteristic curve was 0.895 (95% CI: 0.859-0.931) compared to 0.774 (95% CI: 0.720-0.828) when based on serum potassium level alone.

CONCLUSIONS: In this large retrospective study we found that our score was superior to dichotomous triage based on serum potassium level in assessing which hypothermic patients in cardiac arrest would benefit from extracorporeal life support. External validation of our findings is required.

The mountain guide first aid kit: what's new in 2018?

Pierre Métrailler
&
Daniel Walter

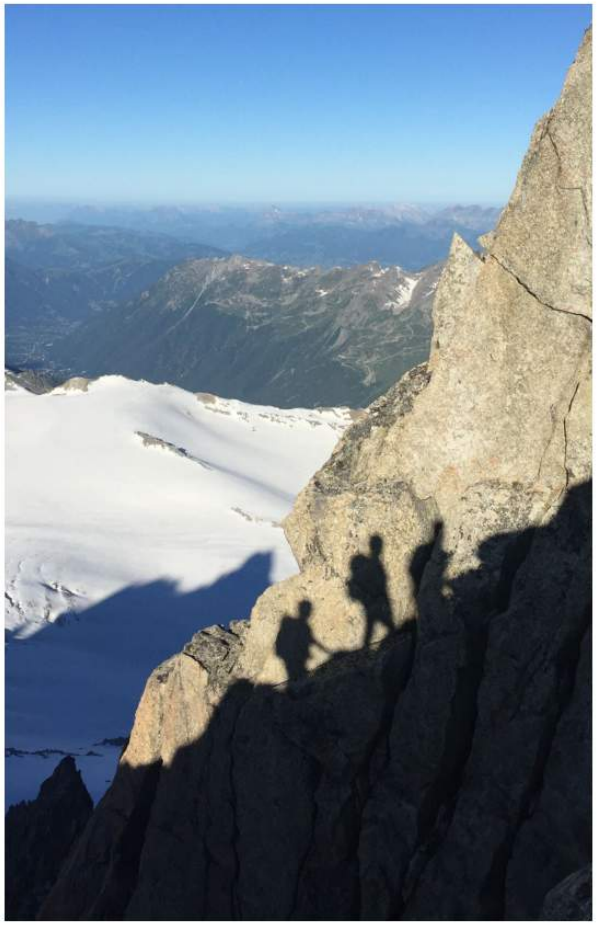
Interlaken 27. Oktober 2018

10. Schweizer Bergrettungsmedizin-Tagung
& SGGM Generalversammlung 2018

10ème rencontre suisse de médecine d'urgence et de sauvetage en montagne
& Assemblée Générale SSMM 2018

SGGM | SSMM
Schweizerische Gesellschaft für Gebirgsmedizin
Societé Suisse de Médecine de Montagne
Società Svizzera di Medicina di Montagna

Swiss mountain guides



- High professional standards
- Reference among IFMGA mountain guides
- Major actor for health care prevention and treatment in the mountains
- First aid providers in case of medical event
- Reference and resource for other mountaineers

First aid kit for mountain guides

Adapted to the need of mountain guides in most situations

Always carried, frequently used

Part of a medical concept:
- education
- first aid kit
- communication device
- telemedical advice

History of the Mountain guide's first aid kit

1974-2011 „invented by“

Urs Wiget and Bruno Durrer

Mepha = pharma partner

2011-2017 medical lead by Bruno Durrer

Pharma partner „Apotheke zur Rose“

By the end of 2016, withdrawel of „Apotheke zur Rose“

???

Evaluation of the medical kit

Questionnaire to all (1350) swiss mountain guides about:

Guides' activity

Type and frequency of medical events

Medical education

Use of the medical kit

Clinical vignettes

467 answers

54 (11.6%) are guides frequently involved in higher altitude expedition (HA guides)

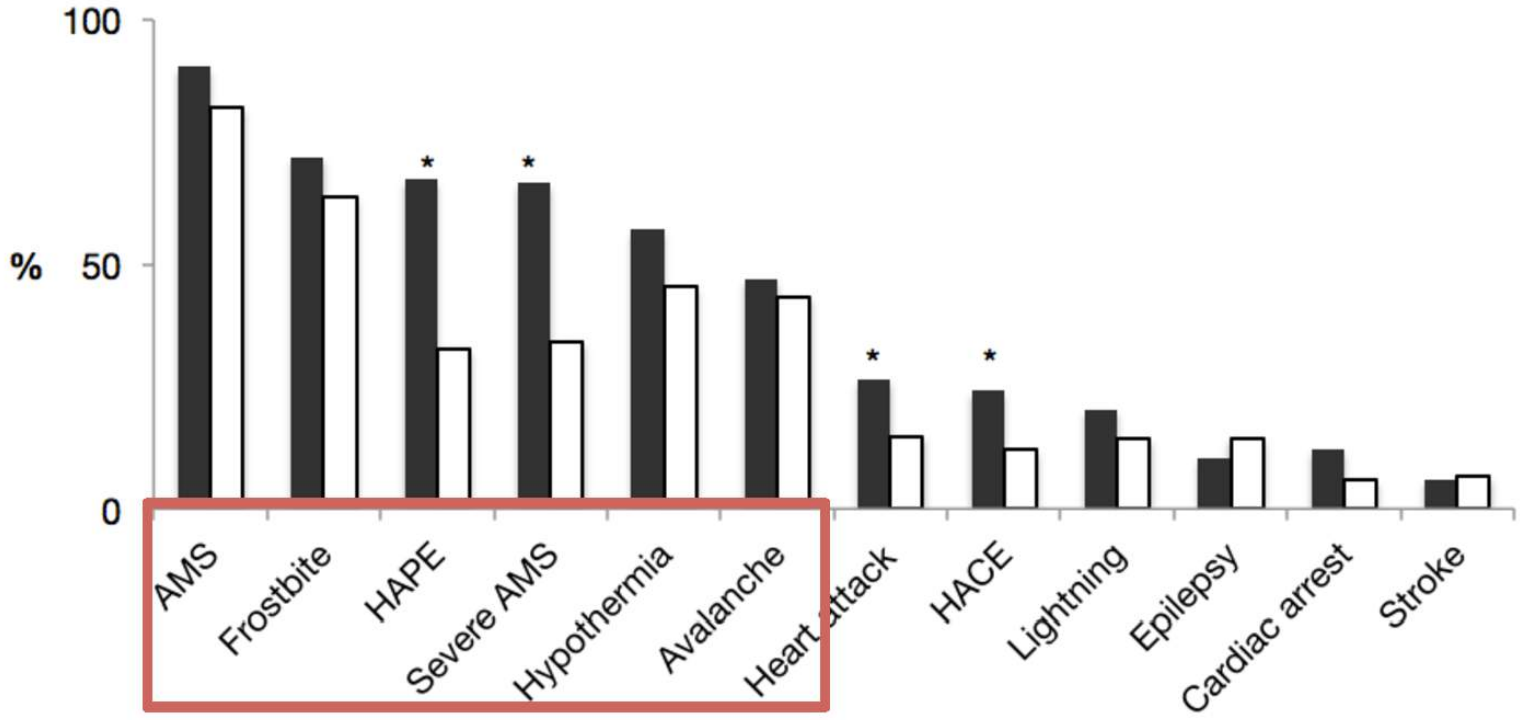
Answers rate and mountain guides characteristics

	All	HA-guides	MA- guides	P =
General characteristics				
Number (%)	467	54 (11.6)	413 (88.4)	
Age (years)	47.3 ± 0.6	48.5 ± 1.4	47.1 ± 0.6	0.40
Women n= (%)	13 (3.9)	3 (6.2)	10 (3.5)	0.35
Experience (years)	19.7 ± 0.7	20.1 ± 1.6	19.8 ± 0.7	0.88
Percentage of activity spent at >2500 m (%)	73	76	73	0.70

54 (11.6%) are guides frequently involved in higher altitude expedition (HA guides)

Global interest of the medical kit

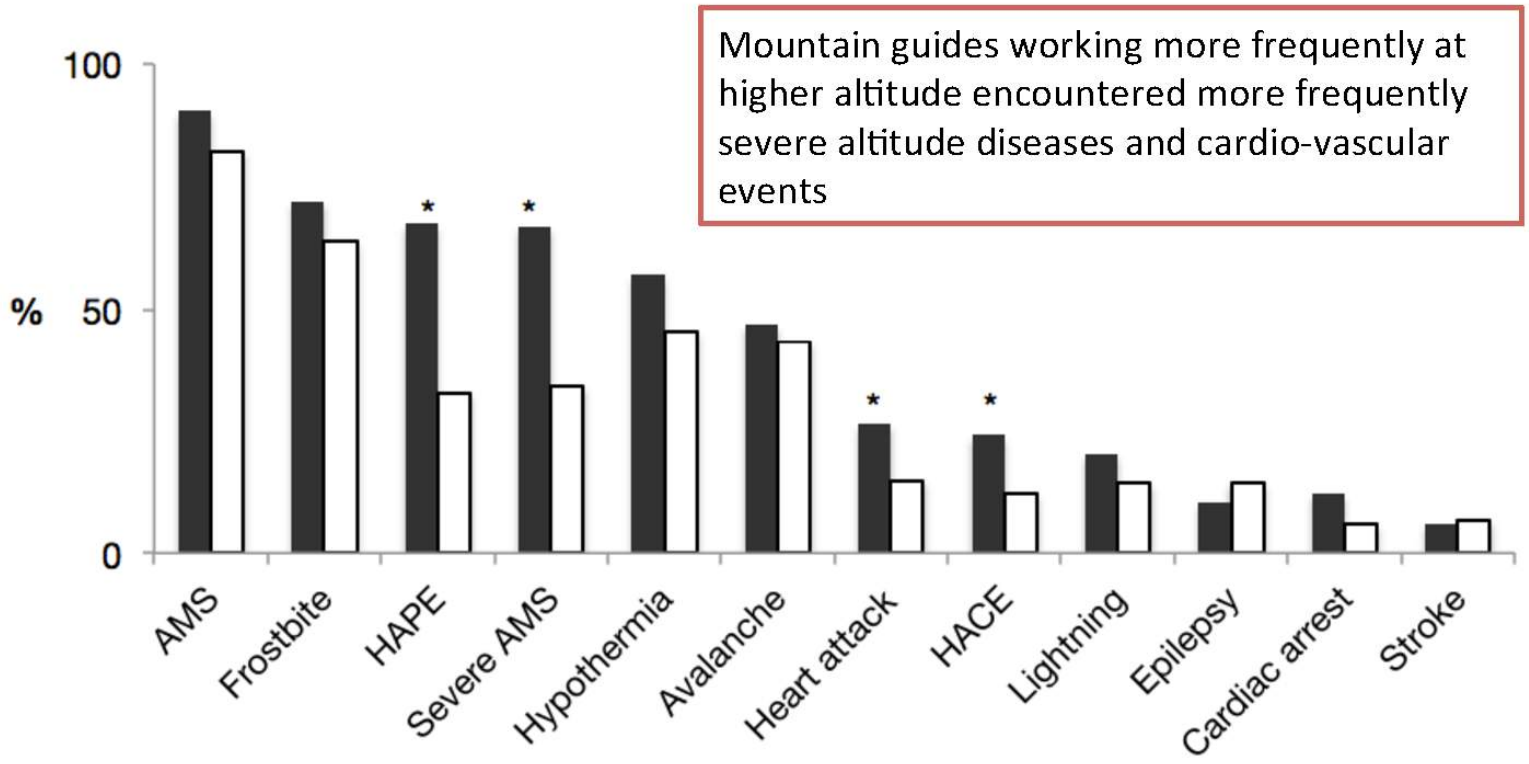
N= (%)	All n=467	HA-guides n=54(11.6)	MA-guides n=413(88.4)	P=
Medical kit				
Number of use of medical kit per year	5.0 ± 0.2	7.1 ± 0.3	4.7 ± 0.2	0.01
Is satisfied with the content of medical kit n= (%)	271 (79.9)	39 (84.4)	232 (79.5)	0.32



Percentage of mountain guides that encountered each disease at least one time during his career

AMS: Acute Mountain Sickness; Severe AMS: AMS with necessity of evacuation. Avalanche: Injury due to avalanche; HAPE: High Altitude Pulmonary Edema; HACE: High Altitude Cerebral Edema; Lightning: Injury due to lightning.

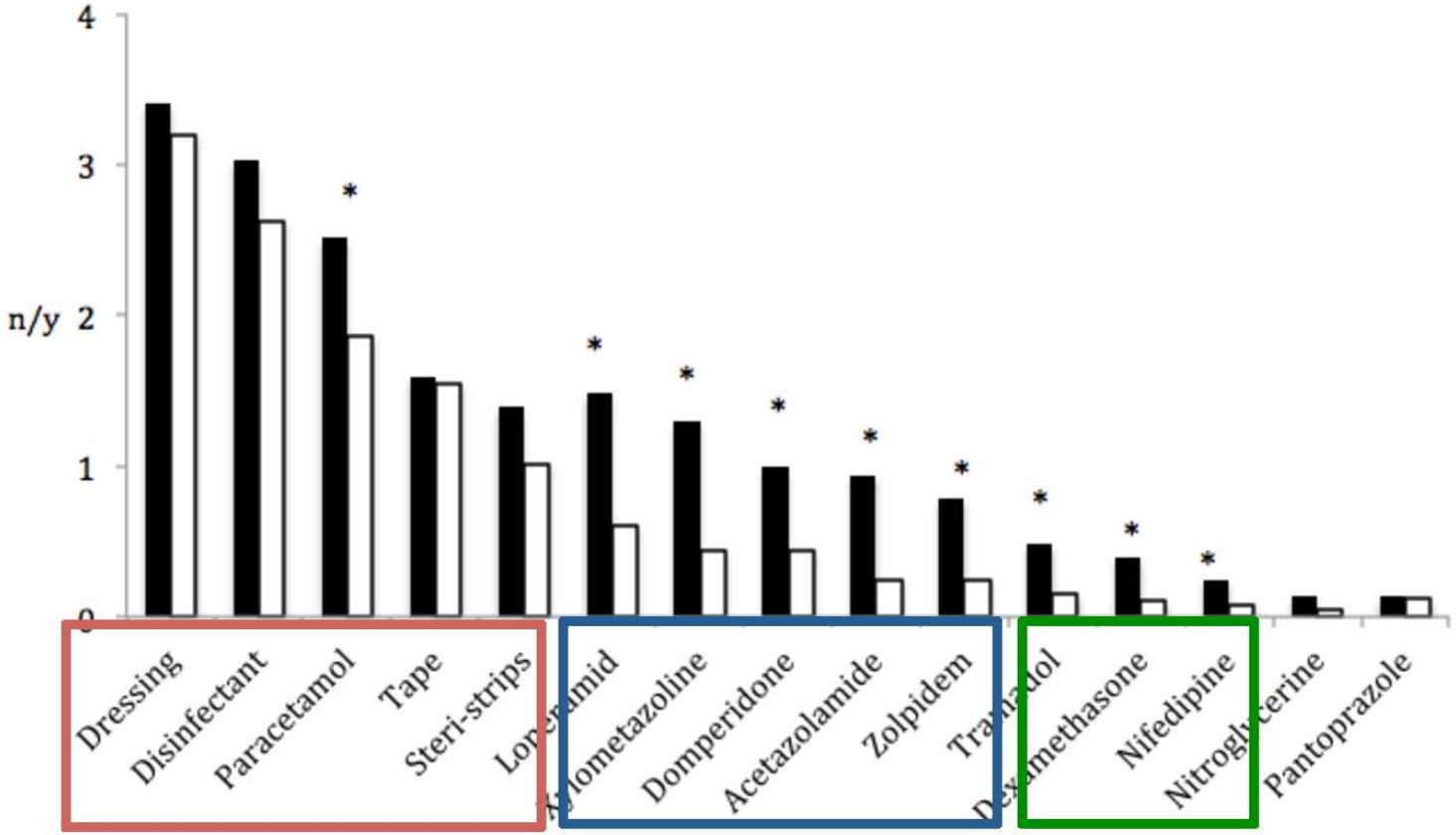
HA-guides in black, MA-guides in white (* $p<0.05$ HA-guides versus MA-guides).



Percentage of mountain guides that encountered each disease at least one time during his career

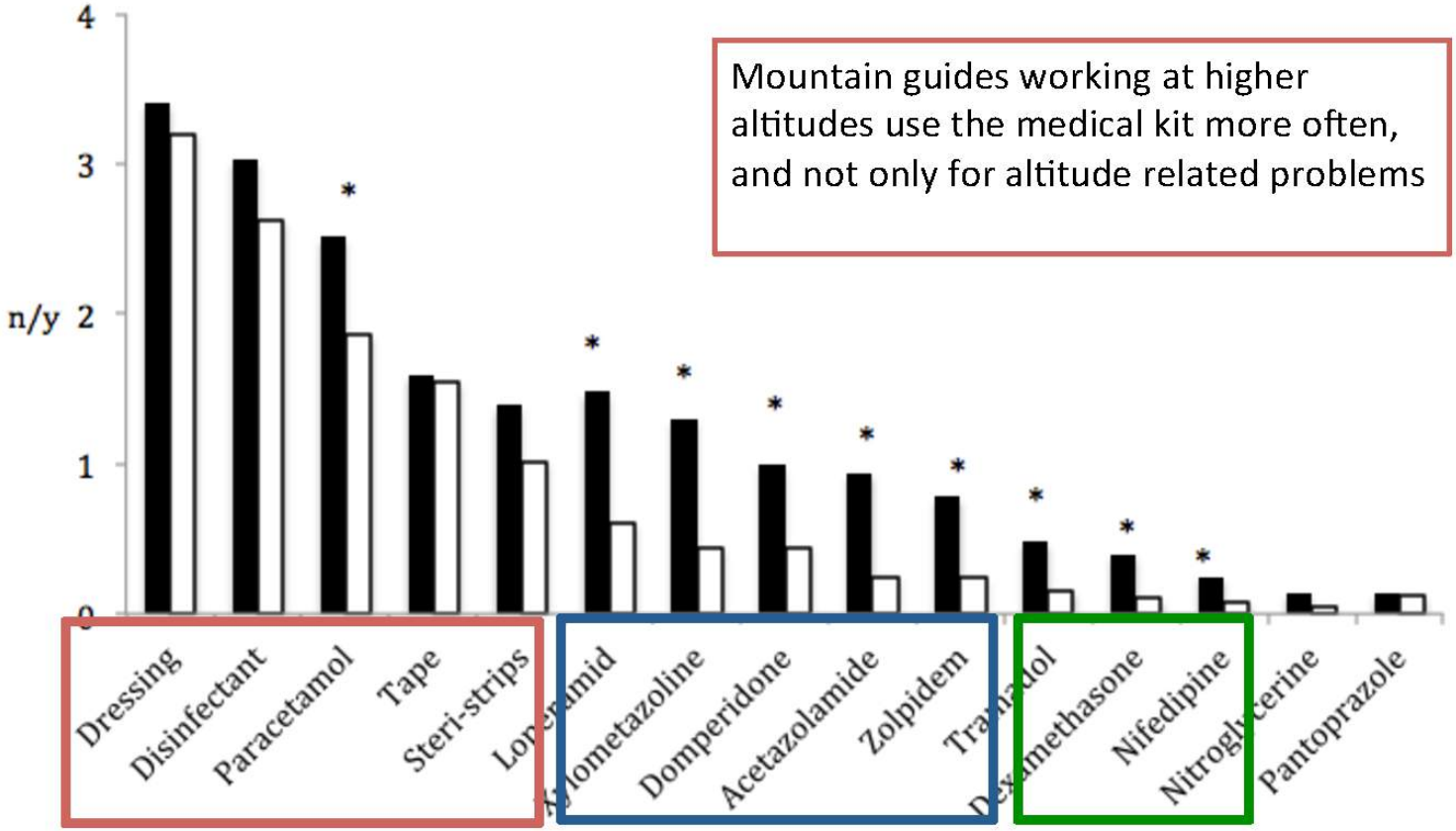
AMS: Acute Mountain Sickness; Severe AMS: AMS with necessity of evacuation. Avalanche: Injury due to avalanche; HAPE: High Altitude Pulmonary Edema; HACE: High Altitude Cerebral Edema; Lightning: Injury due to lightning.

HA-guides in black, MA-guides in white (* $p<0.05$ HA-guides versus MA-guides).



Answers to the question: "How many times per year do you use this item from the medical kit?"

High-Altitude guides (HA-guides) in black, Moderate-Altitude guides (MA-guides) in white (* $p<0.05$ HA-guides versus MA-guides).



Answers to the question: "How many times per year do you use this item from the medical kit?"

High-Altitude guides (HA-guides) in black, Moderate-Altitude guides (MA-guides) in white (* $p<0.05$ HA-guides versus MA-guides).

Thanks

Swiss mountain guides: medical education, knowledge and practice.

Pierre Métrailler[1,2,3], Jens Greiser[1], Gilles Dietrich[4], Daniel Walter[5], Jacques Richon[3,6], Martin Walliser[7], Urs Wiget[3], and Claudio Sartori[1]

1 Internal Medicine, University Hospital, Lausanne-CHUV, Switzerland

2 Emergency Service, University Hospital, Lausanne-CHUV, Switzerland

3 GRIMM, Groupe d'intervention médicale en montagne, Maison FXB du Sauvetage, Sion, Switzerland

4 Medical School, University of Lausanne, Switzerland

5 General Internal Medicine practice, Jenaz, Switzerland

6 General Surgery practice, Martigny, Switzerland

7 General Surgery, Trauma Unit, State Hospital Glarus, Switzerland

Special thanks, in memoriam, to Bruno Durrer (1953- 2016)

Primary medical formation

Basic medical formation (knowledge) at the beginning of the mountain guide formation allows the safe use of the mountain guide‘s first aid kit (tool)

General medical formation: Trauma, BLS, High altitude-medicine, prevention…

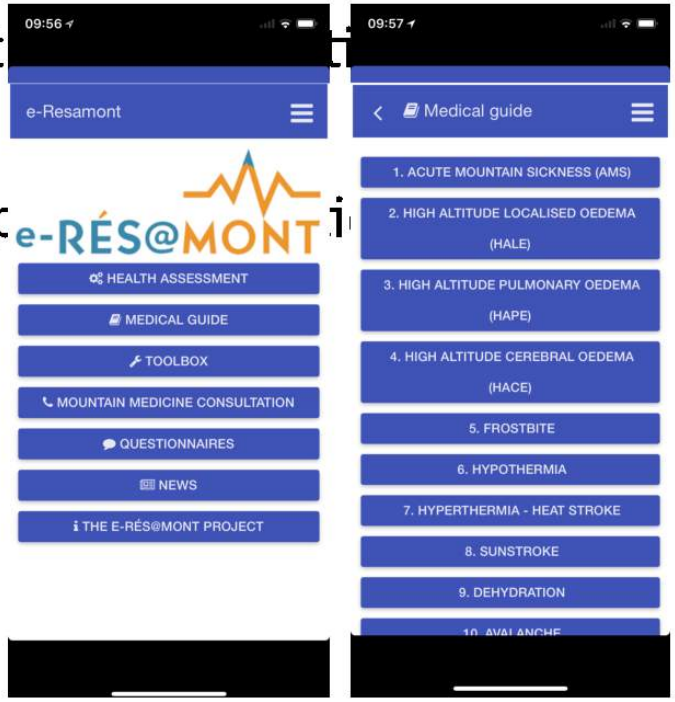
Specific formation on the topic «mountain guide first aid kit»

Mountain guide's medical education

Mountain guide's medical education

Further medical formation

- The medical education focus now even more on specific mountain illnesses or accidents, because that's what happen the most frequently
- Medical refresher courses are et
  regional)
- Training as a rescue specialist (sp
- Guides involved in high altitude expedition should follow a specific course
- Implementation of new tools,
  e.g. App based



New Swiss mountain guide first aid kit

What's new in the mountain guide's first aid kit?

- „Out": TRAMAL ampoules (formerly [i.v./ i.m.] oral intake); syringe, multivitamin; sleeping pill (ZOLPIDEM); Nitroglycerin; PANTOPRAZOL as a treatment for certain stomach and esophagus problems such as acid reflux

- „In": TRAMAL ret. tabl (oral intake); Tape (LEUKOTAPE CLASSIC 3.75cm); Samsplint; sterile gauze; gloves; CETIRICIN MEPHA (antihistamin) to treat allergies

New Swiss mountain guide first aid kit

DAFALGAN 500 Tbl, 10 Stk
IRFEN 600, Lactab, Mepha, 10 Stk
TRAMADOL-MEPHA RETARD DEPOTABS. 50MG, 5 Stk
OTRIVIN SCHNUPFEN Gtt Nas 0.1 % 10 ml, 1 Stk
ANGINA MCC, 10 Stk
IMODIUM lingual Schmelztabl 2 mg 10 Stk
MOTILIUM LINGUAL Schmelztabl 10 mg 5 Stk
FUCITHALMIC Tropfgel 5 g, 1 Stk
CETIRICIN MEPHA Lactab 10mg, 10 Stk
FORTECORTIN Tabl 4 mg 10 Stk
DIAMOX Tabl 250 mg 8 Stk
NIFEDIPIN Mepha Ret Tabl 20 mg 5 Stk
MERFEN Wässrige Lösung farblos 1 ml

Terumo Nadeln Luer 21G 0.80x40mm grün, 2 Stk
SWANN MORTON Skalpell Klingen No 15, 3 Stk
3M STERI STRIP 3x75mm weiss verstärkt 1 x 5 Stk
SENSITIVE PFLASTER, 5 Stk
ELASTOMULL HAFT Gazebinde weiss 4mx4cm Rolle, 1 Stk
SEMPERCARE nitrile Latex-free, Powder-free, 4 Stk
LEUKOTAPE CLASSIC COLOR BLAU 3.75cm x 10m , 1 Stk
TOPPER 12, 5x5cm steril, 2 Stk
SAMSPLINT 11x91cm (36"), gefaltet, 1 Stk

SCHWEIZER BERGFÜHRERAPOTHEKE (NEUE VERISON AB 8/2017)
Bemerkung: diese Anleitung ersetzt eine fundierte Aus- und Weiterbildung nicht! Medikamente können auch potentiell schwere Nebenwirkungen haben. Es muss klar sein, was therapiert wird – sonst nachfragen.

SCHMERZEN
Schmerzen: **Dafalgan 500mg** 4 x 1-2 Tabl max. 8/24Std, **Irfen 600mg**, max 4/24 Std. Bei starken Schmerzen: 1-2 **Tramadol retard Tbl 50mg**, max. alle 12 Std. Schmerz ist ein Warnsymptom des Körpers – bei fehlendem Ansprechen auf Schmerzmittel ärztlichen Rat einholen.

FIEBER
Dafalgan 500mg 3 x 1-2 Tabl, max. 8/24Std oder **Irfen 600mg**, max 4/24 Std

ERKÄLTUNG
Otrivin Nasentropfen, reichlich warme Getränke, Wasserdämpfe inhalieren.

HUSTEN
wie unter Fieber. Viel trinken (wenn möglich warm), Hustenbonbons.

HALSWEH
Angina MCC Lutschtabletten, max. 6/24 Std + Schmerzmittel (siehe oben), wenn nötig.

DURCHFALL
Wenn weniger als 3 Tage: viel trinken und Schonkost. Wenn nicht besser: **Imodium lingual,** 2 Tabl. auf der Zunge zergehen lassen, dann 1 nach jedem flüssigem Stuhl, max. 6/24 Std. Bei lang anhaltendem oder blutigem Durchfall unbedingt Arzt aufsuchen.

ERBRECHEN, REISEKRANKHEIT
Motilium lingual Tabl auf die Zunge geben, max 3/24 Std.

SCHNEEBLINDHEIT
Nasse Schwarzteesäcklein auf die geschlossenen Augen, **Dafalgan** und/oder **Irfen** gegen die Schmerzen. **Fucithalmic Gel** 3-5 x pro Tag in beide Augen. Sonnenbrille. Wenn in einer Hütte und Rasttag möglich: Augenklappe nach Piratenart (verhindert Blinzeln).

SCHWERE ALLERGIE
Z.B. durch Wespen oder Bienen: Nesselfieber am ganzen Körper, zunehmende Atemnot, Gesichtsschwellung – frühzeitig alarmieren, insbesondere beim bekannten Allergiker! **Fortecortin Tabl 4 mg** und **Cetirizin Mepha Lactab 10mg** je 2 Tabl sofort geben.

BRUSTSCHMERZ, ANGINA PECTORIS/HERZINFARKT
An einen möglichen Herzinfarkt denken! Patienten kennen diese Schmerzen („Stein auf der Brust") häufig. Anhalten, ruhen, beruhigen. Frühzeitig alarmieren, dem Patienten kann es schnell schlechter gehen. Eventuell AED (Defibrillator) organisieren.

LOKALE ERFRIERUNGEN (TYP. AN HÄNDEN UND FÜSSEN)
Während der Tour: Einengende Kleidung öffnen, nasse Kleidung wechseln. Bewegung, trockene Massage. Warme Getränke.
In sicherer Umgebung (Hütte, Basislager): Erfrorenen Körperteil in warmem Wasser aufwärmen und Desinfektionsmittel (z.B. **Merfen**) ins Wasser geben. Zudem **Dafalgan** und/oder **Irfen** und/oder **Tramadol** gegen die Schmerzen verabreichen. Viel zu trinken geben. Wenn die Füsse/Hände aufgewärmt sind: sauberer, lockerer Verband. Bei erfrorenen Füssen: Nicht mehr gehen lassen (Transport notwendig)! Nicht wieder einfrieren lassen!

ALLGEMEINE UNTERKÜHLUNG
Wenn Patient bei Bewusstsein ist und laufen kann: Laufen lassen, begleiten. Trockene Kleider anziehen. Warme Flüssigkeit zu trinken geben.
Bewusstloser Patient: vorsichtig (Vorsicht, drohender „Bergungstod"!) an windgeschützten Ort bringen, vor weiterer Auskühlung schützen. Frühzeitig alarmieren!

DOSIERUNG DER MEDIKAMENTE FÜR KINDER
Normale Dosen (wie oben beschrieben) ab 12 Jahren, darunter ½ der angegebenen Dosis.

SCHÄDEL-HIRN-TRAUMA
Bewusstseinstrübung bis zur Bewusstlosigkeit möglich, Erbrechen oder wiederholt gleiche Fragen: Arztkonsultation notwendig. Eventuell Seitenlagerung (bei erhaltener Atmung!), falls Erbrechen befürchtet wird und eine starke Bewusstseinstrübung besteht; oder überwachte Flachlagerung mit Offenhalten der Atemwege.

WIRBELSÄULENVERLETZUNG
Dran denken! Insb. auch im Zusammenhang mit einem Schädel-Hirn-Trauma. Nur bewegen, wenn nötig – dann rückenschonendes Tragen, Halswirbelsäule immobilisieren (manuell oder mit **Samsplint**)

BEIN- ODER ARMBRUCH
Immobilisation (Ruhigstellung), z.B. mittels **Samsplint** ist eine gute Massnahme gegen die Schmerzen. Schmerzmittel können/sollen gegeben werden.

WUNDEN
Mit Wasser reinigen, desinfizieren mit **Merfen**. Grosszügig zum Arzt bei grossen Wunden und Wunden im Gesicht oder bei Kindern. Wenn stark blutend: **Kompression – Druckverband – zweiter Druckverband – Abbinden** (breite Bandage, sehr stark anziehen!). Wenn breit klaffend: komprimieren, um Blutung zu stoppen, dann mit **Steristrip** oder **Heftpflasterstreifen/Tape** quer zur Wunde, Wundränder einander annähern, Verband darüber. Grosse Wunden sollten innerhalb 6 Stunden chirurgisch versorgt werden. Mit einer **Nadel** kann eine Blase eröffnet oder ein Fremdkörper entfernt werden. Die **Skalpell-Klingen** dienen als scharfes, sauberes Messer.

KREISLAUFSTILLSTAND
Tiefe Bewusstlosigkeit (nicht weckbar durch rufen oder Schmerzreiz) + keine oder keine richtige Atmung = Kreislaufstillstand. Alarmieren, dann sofort mit Herzdruckmassage beginnen, AED (Defibrillator) organisieren; wenn möglich (wenn man es sich zutraut und es gelernt hat) im Verlauf zusätzlich Beatmung, wenn möglich mit Maske (Verhältnis Herzdruckmassage : Beatmung = 30 : 2)

HÖHENKRANKHEITEN

AKUTE BERGKRANKHEIT (AMS): Beginn ca. 6-12 Std. nach (schnellem...) Aufstieg in Höhen über 2500 m.ü.M. Kopfschmerz, Müdigkeit, Übelkeit/Unwohlsein, Erbrechen, Appetitlosigkeit, Schlaflosigkeit. **Dafalgan 500mg** und/oder **Irfen 600mg** gegen Kopfschmerzen, **Motilium lingual 10mg** bei Übelkeit; ev. **Rasttag**; ev. **Diamox 125 mg** alle 12 Std. Ev. **Abstieg**.

HÖHENHIRNÖDEM (HACE): Meist erst ab ca. 3500 m.ü.M. Starke Kopfschmerzen, die nach Dafalgan und Irfen (siehe oben) nicht verschwinden, zusätzlich auch wiederholtes Erbrechen und Gangunsicherheit, Verwirrtheit, Schläfrigkeit. **Abstieg!!! Fortecortin 4 mg** 2 Tabl. zusammen nehmen, dann alle 6 Std. 1 x **Fortecortin 4 mg**. Absteigen trotz eventueller Besserung! Ev. **Diamox 250 mg** alle 12 Std., wenn nicht abgestiegen werden kann. Sauerstoff und Überdrucksack, wenn vorhanden.

HÖHENLUNGENÖDEM (HAPE): tritt erst in der Nacht auf, mit Atemnot, Husten, Engegefühl in der Brust, Blauverfärbung der Lippen. **Abstieg!!! Nifedipin Mepha ret. 20 mg** alle 8 Stunden, bei schwerer Ausprägung ev. zusätzlich **Fortecortin 4 mg** (wie oben beschrieben). Sauerstoff und Überdrucksack, wenn vorhanden.

PROPHYLAXE: Vernünftiges Anstiegsprofil (langsamer Aufstieg, erste Nacht unter 3000m.ü.M, nicht mehr als 300-500m Schlafhöhendifferenz, alle 3-4 Tage ein Rasttag auf gleicher Höhe), grosse Anstrengung in der Akklimatisationsphase vermeiden, nicht zu schnell zu hoch, ausreichend trinken... Gespräch mit höhenerfahrenem Arzt.

ALARMNUMMERN/ALARMMÖGLICHKEITEN
SANITÄTSNOTRUF: **144**. REGA: **1414**. AIR ZERMATT: **144**.
AIR GLACIER: **1415**. Funk: E-Kanal (161.300MHz). Diverse Apps: iRega, my144, Echo112 u.a. Bei Unsicherheiten mit der medizinischen Beurteilung/der Abgabe von Medikamenten aus der Schweizer Bergführerapotheke kann telefonisch nachgefragt werden bei
Dr. med. Daniel Walter (079 320 29 67),
Dr. med. Martin Walliser (079 488 02 29),
Dr. med. Andrea Martin (079 419 84 53),
Dr. med. Pierre Métrailler (079 200 58 39) oder
Dr. med. Jacques Richon (079 212 27 70) dw 15.8.17

PHARMACIE DE GUIDE SUISSE (Nouveau dès le 8/2017)
Remarque: Ce mode d'emploi ne remplace pas la formation continue! Avant de donner un médicament, il convient de vérifier l'absence d'allergie chez le patient. En cas de doute, toujours demander un conseil médical.

DOULEURS
Dafalgan 500mg 1-2 comprimé(cpr) max 4x/24h, **Irfen 600mg** 1cpr max 4x/24h, **Tramadol retard 50mg** 1-2cpr max 2x/24h. La douleur est un signe d'alarme, en cas de non réponse aux antidouleurs, demander un conseil médical.

FIEVRE
Dafalgan 500mg 1-2cpr max 4x/24h ou **Irfen 600mg** 1cpr max 4x/24h. Hydratation, repos.

REFROIDISSEMENT
Otrivin gouttes nasales, boissons chaudes, inhalations.

TOUX
Comme sous fièvre et refroidissement, bonbons pour la toux.

MAUX DE GORGE
Angina MCC tablettes, max. 6x/24h et antidouleurs si nécessaire.

DIARRHEES
Boire beaucoup. **Imodium lingual** 2mg 2cpr sous la langue, puis 1cpr après chaque selle liquide, max 6x/24h. Conseil médical en cas de diarrhée persistante ou sanglante.

VOMISSEMENTS, MAL DES TRANSPORTS
Motilium lingual 10mg 1cpr sous la langue, max 3x/24h.

OPHTALMIE DES NEIGES, CONJONCTIVITE
Compresses de thé noir tièdes sur les yeux fermés. **Dafalgan** et/ou **Irfen** selon les douleurs. **Fucithalmic gel** dans chaque oeil 3-5x/24h. Pansement occlusif si possible.

ALLERGIE
Urticaire, rougeur et gonflement de la peau. Peut causer de la peine à respirer, une gonflement du visage et du cou, un étouffement, un état de choc. Alarmer tout de suite! **Donner Cetirizin 10mg** 2cpr (max 1x/24h) et **Fortecortin 4mg** 2cpr.

DOULEURS THORACIQUE, ANGINE DE POITRINE/INFARCTUS DU MYOCARDE
Penser à un possible infarctus du myocarde (crise cardiaque). Mettre au repos et alarmer. En cas d'arrêt cardiaque, débuter la réanimation et prévoir un défibrillateur externe automatique (AED).

GELURES
Dans le terrain: desserrer les habits, ouvrir les chaussures et réchauffer pieds ou mains contre le corps pendant max 10 min, puis remettre les chaussures. Boissons chaudes.
Dans un abris sûr (cabane, camps de base): Réchauffer les parties gelées dans de l'eau chaude (37°) avec du désinfectant durant min 30'. Pansement propre et souple. Donner des antidouleurs (**Irfen, Dafalgan +/- Tramadol**). Protéger absolument du froid, évacuer.

HYPOTHERMIE
Si le patient est conscient et peut marcher: bouger, accompagner. Vêtements secs. Boissons chaudes.
Si le patient est inconscient ou somnolent: Surveillance, mobilisation prudente. Protéger du vent, vêtements secs, isoler du sol, réchauffer par contact corporel. Alarmer!

DOSAGE DES MEDICAMENTS POUR LES ENFANTS
Dosage normal dès 12 ans, avant 12 ans donner une demi-dose.

TRAUMA CRANIO-CEREBRAL (TCC)
Après un accident avec choc à la tête: vomissements, propos incohérents, trouble de l'état de conscience ou coma: Consultation médicale nécessaire. Protection de la colonne toujours! Position latérale de sécurité si coma.

BLESSURE DE LA COLONNE VERTEBRALE
Toujours y penser en cas d'accident, surtout si TCC associé. Mobiliser seulement si nécessaire, en protégeant l'axe tête-cou-tronc. Maintien de la tête avec les mains ou minerve avec une **samsplint**.

FRACTURE DE BRAS OU JAMBE
Immobilisation avec **samsplint**, et antidouleurs. L'immobilisation est une bonne mesure contre les douleurs.

PLAIES
En cas de saignement, comprimer directement, pansement compressif, puis un deuxième et si nécessaire faire un garrot. Les plaies doivent être nettoyées à l'eau, enlever les corps étranger avec une aiguille, désinfecter avec du **Merfen**. Consulter en cas de plaie profonde, au visage et chez les enfants. En cas de plaie net et propre, utiliser des **steristrips**.

ARRET CARDIO-RESPIRATOIRE (ACR)
Patient qui ne respire pas, ou respiration apnéique, inconscient = ACR! Alarmer et chercher un AED! Débuter tout de suite le massage cardiaque. Si possible pratiquer aussi la respiration artificielle (massage-respiration: 30-2).

MALADIES D'ALTITUDE

MAL AIGU DES MONTAGNES (AMS): Maux de tête, fatigue, insomnie, vertige, inappétence, nausée ou vomissements, début 6-12 heures après l'arrivée en altitude au dessus de 2500 m. Pour les maux de tête : **Dafalgan 500mg** 1-2 comprimé(cpr) max 4x/24h et/ou **Irfen 600mg** 1cpr max 4x/24h. En cas de nausées: **Motilium lingual** 10mg 1cpr sous la langue, max 3x/24h. Faire un jour de repos sans ascension. Ev. **Diamox 125mg** 1cpr chaque 12 heures si mauvais acclimatation. Avis médical. Si pas d'amélioration, **descente**.

OEDEME CEREBRAL D'ALTITUDE (HACE): Maux de tête qui résistent aux antidouleurs, vomissement, somnolence, troubles de l'équilibre, qui surviennent en général au dessus de 3500 m après 48 à 72 heures. **DESCENTE IMMEDIATE!** Le HACE peut s'aggraver avec coma puis décès. **Fortecortin 4mg** 2 cpr tout de suite, puis 1cpr chaque 6 heures. **Diamox 250mg** 1cp 2x/jour. Oxygène et caisson hyperbare si disponible sans retarder la descente.

OEDEME PULMONAIRE D'ALTITUDE (HAPE): Fatigue, difficultés respiratoires, toux, oppression thoracique, survenant en général après 48 à 72 heures en altitude, plutôt la nuit. **DESCENTE IMMEDIATE!** Le HAPE peut s'aggraver avec détresse respiratoire, expectorations mousseuses et rosées, puis coma et décès. **Nifedipine ret 20mg** chaque 8 heures. En cas de signes de HACE, ajouter **Fortecortin 4mg** 2cpr (comme décrit plus haut). Oxygène et caisson hyperbare si disponible et sans retarder la descente.

PROPHYLAXIE: Ascension lente et progressive, 1ère nuit en dessous de 3000m puis élever de 300 à 500m par jour l'altitude du lieu où l'on dort. Chaque 3 à 4 jours prévoir un jour de repos. Bien s'hydrater, éviter les efforts intenses. Pas d'ascension en cas de maladie. En cas de mauvaise tolérance à l'altitude, demander conseil à un médecin expérimenté.

NUMEROS D'URGENCE: 144. REGA: **1414**. AIR ZERMATT: **144**.
AIR GLACIER: **1415**. Radio 161.300 MHz (Canal E).
Applications pour smartphone: iRega, my**144**, Echo112.

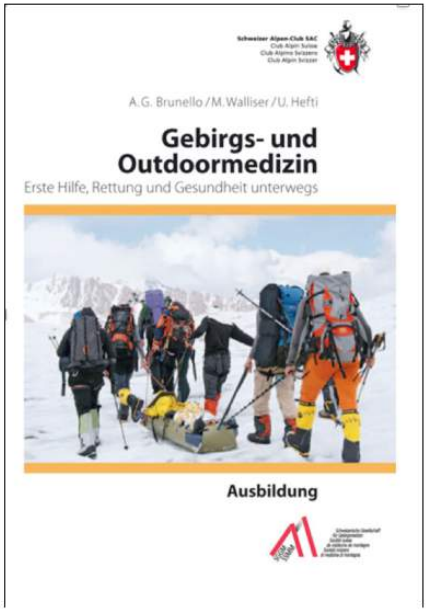
En cas de problèmes de santé ou d'accident, si vous avez besoin d'un conseil pour le diagnostic, le traitement ou l'utilisation de la pharmacie, n'hésitez pas à demander conseil à l'un des médecins répondants n'importe quand!
Dr. med. Pierre Métrailler (079 200 58 39),
Dr. med. Jacques Richon (079 212 27 70),
Dr. med. Daniel Walter (079 320 29 67),
Dr. med. Martin Walliser (079 488 02 29) ou
Dr. med. Andrea Martin (079 419 84 53) pm 26.6.17/dw 15.8.17

New Swiss mountain guide first aid kit

- The mountain guide's first aid kit can be bought by the mountain guide, aspirant, hiking instructor or climbing teacher after attending the medical formation and passing a medical exam.
- Ordering process: SBV (ausbildung@4000plus.ch), resp. ASGM (sbv-asgm@4000plus.ch) → e-mail daniel.walter@praxisjenaz.ch → package will be sent by post
- Price
  - Complete (box, content, Samsplint): Fr. 110.-
  - Refill content: Fr. 70.-
  - Refill content plus Samsplint: Fr. 95.-
- 85 orders vom 8/2017 till 7/2018 (12 month)
  - 96 have been packed untill today

How it should be used?

- The mountain guide first aid kit should be used after a proper assessment of the patient as a simple and safe tool
- Easily understandable instruction
- Telemedical advice encouraged
- Refresher courses are recommended



Thanks

CHUV Centre Hospitalier Universitaire Vaudois

DÉPARTEMENT DE MEDECINE

praxisjenaz


Thank you for your attention!

Out-of-Hospital Use of Blood products in Mountain Rescue

Oliver Kreuzer, Oliver Reisten, Philipp Venetz

In Switzerland so far, it is quite unusual to use blood products out-of-hospital. Even more in mountain rescue this way of treating serious bleeding is not established. Instead, and even though there is strong evidence of serious adverse effects and bad outcome, still infusions of colloid and crystalloid fluid are very commonly used with high volumes.

In Europe and world-wide, various EMS services use blood products with success and reasonable risk. Is there a more appropriate and more goal-directed approach? Can we do better?

Air Zermatt has established a pilot phase with the use of out-of-hospital blood product application in certain indications.

We report on the general situation on out-of-hospital use of blood products, lessons to learn from others, the Air Zermatt pilot phase and some case reports.

Avalanche Medicine – Companion Rescue and Survival after Complete Avalanche Burial

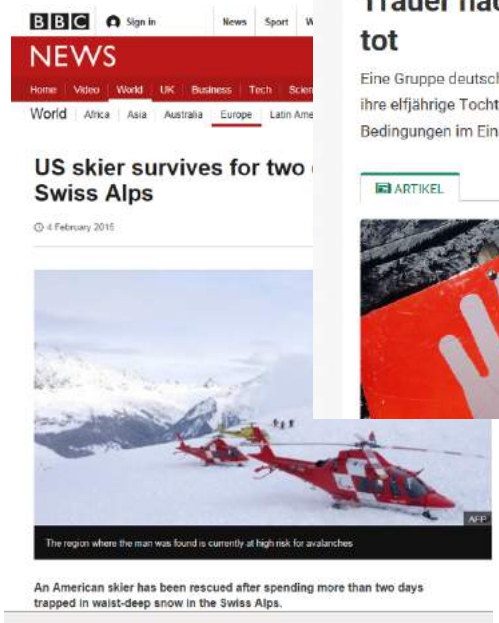
Bernd Wallner, MD
Eurac Research
Medical University Innsbruck


The Province
Rescuers dig out U.S. snowboarder buried in Whistler avalanche


Iceland Review
NEWS FEATURES TOURS IN ICELAND [SUBSCRIBE] DE


TT 4 Wochen gratis
testen und eine von
100 Jahresvignetten
gewinnen!
Tiroler Tageszeitung
ÜBERBLICK TIROL POLITIK WIRTSCHAFT PANORAMA SPORT LEBENSART TT CLUB IMMO JOBS MOTOR MEINS.AT SERVICE
SÜDTIROL
Trauer nach Lawinenunglück in Südtirol: Mutter und Tochter tot
Eine Gruppe deutscher Skifahrer löste bei einer Tour im Vinschgau vermutlich selbst ein Schneebrett aus. Eine Mutter und ihre elfjährige Tochter wurden unter der Lawine begraben und starben. Die Rettungskräfte waren unter widrigsten Bedingungen im Einsatz.
ARTIKEL


at's
ion you need about Iceland


BBC
Sign in
News
Sport
NEWS
Home
Video
World
UK
Business
Tech
World
Africa
Asia
Australia
Europe
US skier survives for two
Swiss Alps
4 February 2015
The region where the man was found is currently at high risk for avalanches
An American skier has been rescued after spending more than two days trapped in waist-deep snow in the Swiss Alps.


LONG READS
INDY100
lps avalanche: Five soldiers
heir deaths in Savoie in
ine tragedy
el are believed to have been taking part in an exercise when the avalanche struck
an border
Monday 18 January 2016 15:15 | 0 comments

AVALANCHE EXTRICATION

- Companion Rescue
  - Most important (survival ≈75%)
  - Survival = time dependent

- Professional Rescue
  - Often too late (survival ≈30%)
  - Accuracy of organized rescue

Slotta-Bachmayr; How Burial Time of Avalanche Victims is Influenced by Rescue Method; Natural Harard (2005) 34: 341-352

AVALANCHE EXTRICATION

- Survival Rate:
  - Visible body parts ≈85%
  - Avalanche beacons ≈60%

- Burial time <60min
- Avalanche size <7.1ha
- Burial depth <71cm

Slotta-Bachmayr; How Burial Time of Avalanche Victims is Influenced by Rescue Method; Natural Harard (2005) 34: 341-352

BURIAL DURATION

- Survival Rate
  - Alive: 31±59 min
  - Dead: 139 ±232 min
- Survival with good neurological outcome
  - within 15min: 90%
  - after 35min: 30%

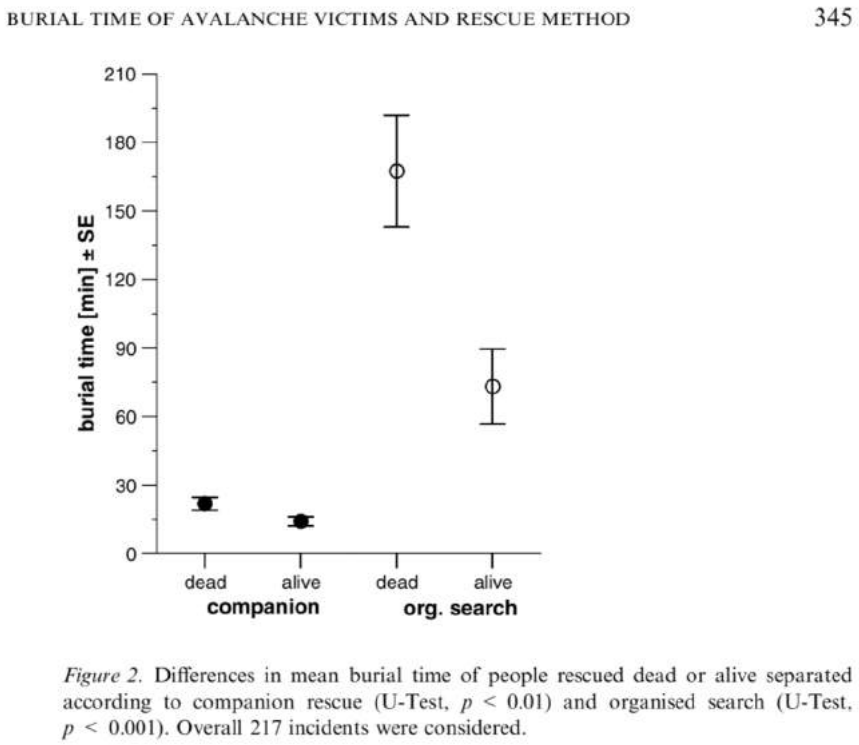


Figure 2. Differences in mean burial time of people rescued dead or alive separated according to companion rescue (U-Test, $p < 0.01$) and organised search (U-Test, $p < 0.001$). Overall 217 incidents were considered.

Slotta-Bachmayr; How Burial Time of Avalanche Victims is Influenced by Rescue Method; Natural Harard (2005) 34: 341-352

COMPANION RESCUE

- Localisation
- Probing
- Shovelling

- Wide variation
- Rule of thumb:

  Extrication from 1m depth takes 10 minutes!

M. Genswein et al. ISSW Whistler 2008 | B. Edgerly et al. ISSW Whistler 2008 |

EXTRICATION TIMES

- Overall improvement
  (29 min ->18 min)
- Better transceiver technology
- Localisation 5-10min

- Extrication
  - 10-20min
- Rapid extrication is crucial for overall rescue time and reduces mortality!

K. Schindelwig; Does Avalanche Shovel Shape Affext Excavation Time: A Pilot Study; sports (2017) , 5, 31, doi:10.3390/sports5020031

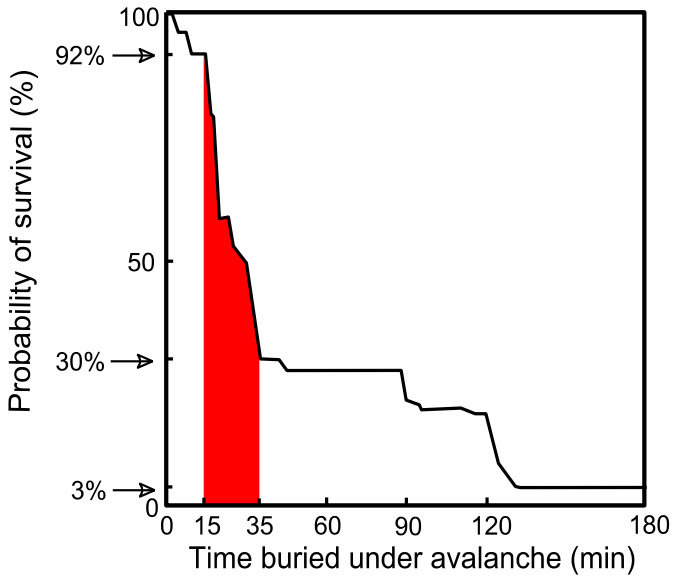
COMPANION RESCUE – TECHNIQUES

- Airport approach for localisation
- V-shaped human conveyor belt for extrication

AVALANCHE SAFETY: Manuel Genswein's V-Shaped Snow Conveyor Belt Shoveling Technique

AVALANCHE SURVIVAL CURVE

- Influence of trauma
- Asphyxia phase
  Influence of snow climate on the onset of asphyxia
- Survival phase
  Influence of rescue and medical on-site treatment



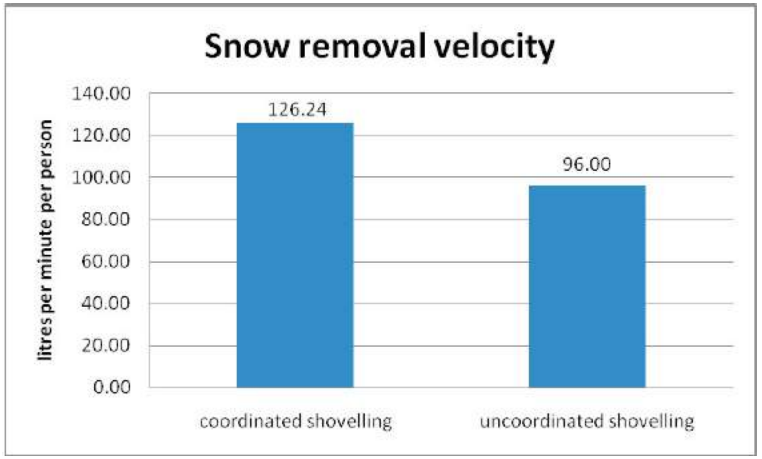
Falk M, Brugger H, Kastner L. Nature 1994. Brugger H et al Resuscitation 2001

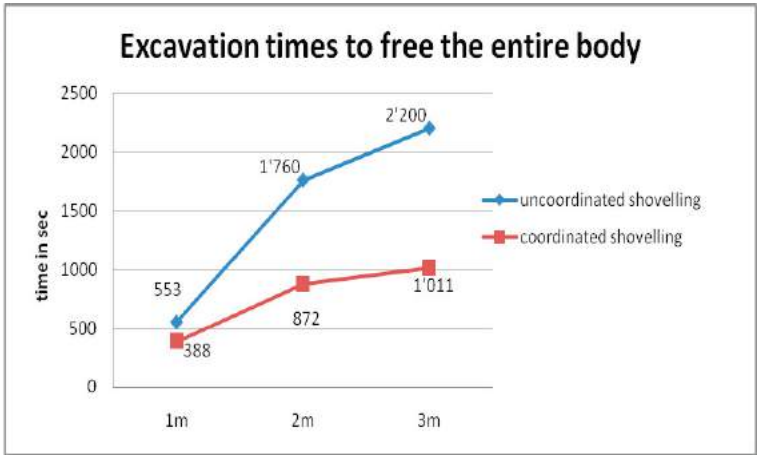
PREVIOUS STUDIES

International Snow Science Workshop

THE V-SHAPED SNOW CONVEYOR BELT

Manuel Genswein, Meilen, Switzerland
Ragnhild Eide, Koppang, Norway





M. Genswein et al. ; The v-shaped snow conveyor belt; ISSW Whistler 2008

CURRENT STUDY

Precognition and Training improve burial time in companion avalanche rescue - A randomized single blinded mannequin study

CURRENT STUDY

Aim of the study

Study extrication times of a completly buried avalanche victim and the influence of

- Burial position
- Number of rescuers
- Sequence of experiments
- Gender of rescuers

CURRENT STUDY

Methods

- 18 medical students
- Artificial Avalanche
- Burial Depth 1m
- 3 Test Series
- 3 most common Burial Positions
- 3 Time Points
- Single Rescuers vs Double Rescuers

CURRENT STUDY

Results

- Time until first contact with victim
  - median 2.5 min
  - (range 0.6 – 8.6)
- Time until free victim's airway
  - median 7.2 min
  - (range 2.3–20.4)
- Time until complete extrication in standard CPR position
  - median 10.1 min
  - (range 3.0 – 24.9)

CURRENT STUDY

Results

Time point T2	Single Rescuer	Double Rescuer	All
Head Downhill Prone	9.7 (2.3-16.7)	6.5 (4.8-19.2)	7.4 (2.3-19.2)
Head Uphill Prone	7.3 (5.4-12.7)	7.4 (5.7-10.9)	7.3 (5.4-12.7)
Head Uphill Supine	6.5 (4.2-20.4)	6.5 (2.8-9.5)	6.5 (2.8-20.4))
All positions	7.3 (2.3 – 20.4)	6.6 (2.8 – 19.2)	7.2 (2.3 – 20.4)

CURRENT STUDY

Results

Time point T2	Single Rescuer	Double Rescuer	All
Head Downhill Prone	9.7 (2.3-16.7)	6.5 (4.8-19.2)	7.4 (2.3-19.2)
Head Uphill Prone	7.3 (5.4-12.7)	7.4 (5.7-10.9)	7.3 (5.4-12.7)
Head Uphill Supine	6.5 (4.2-20.4)	6.5 (2.8-9.5)	6.5 (2.8-20.4))
All positions	7.3 (2.3 – 20.4)	6.6 (2.8 – 19.2)	7.2 (2.3 – 20.4)

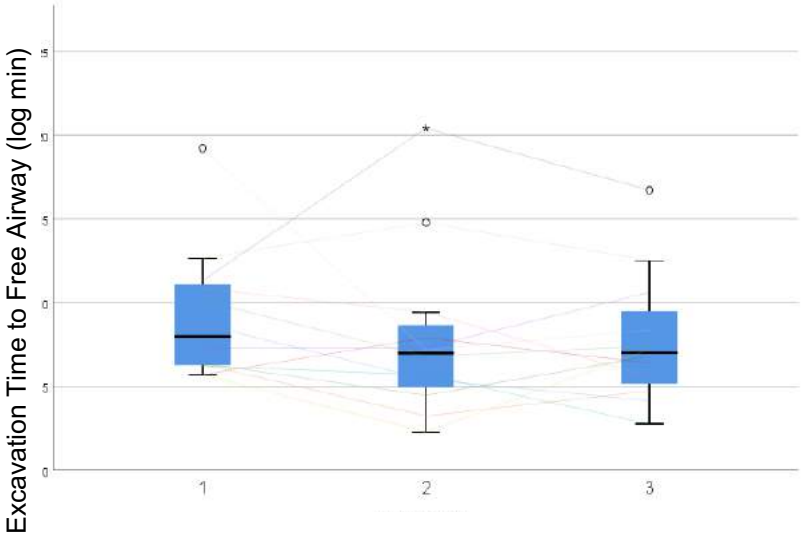
CURRENT STUDY

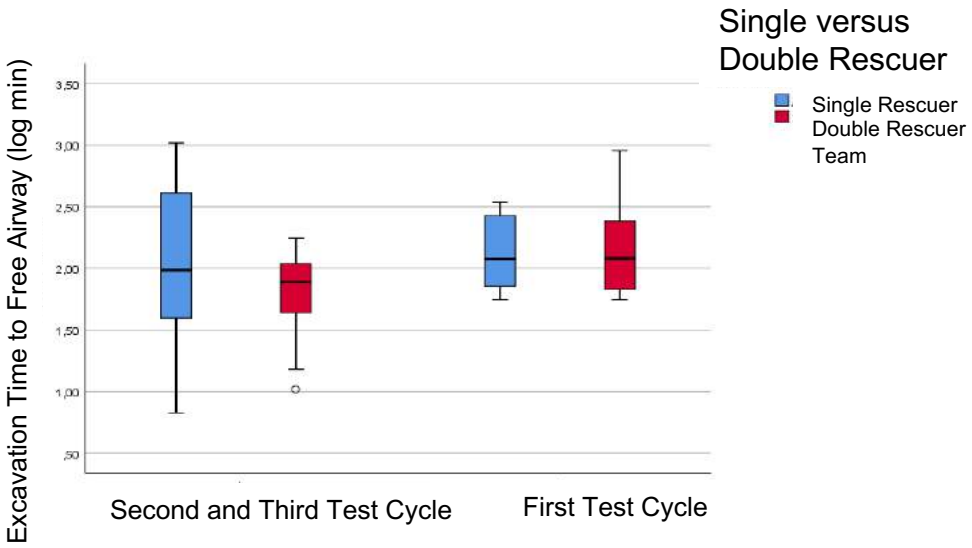
Results

Time point T2	Single Rescuer	Double Rescuer	All
Head Downhill Prone	9.7 (2.3-16.7)	6.5 (4.8-19.2)	7.4 (2.3-19.2)
Head Uphill Prone	7.3 (5.4-12.7)	7.4 (5.7-10.9)	7.3 (5.4-12.7)
Head Uphill Supine	6.5 (4.2-20.4)	6.5 (2.8-9.5)	6.5 (2.8-20.4)
All positions	7.3 (2.3 – 20.4)	6.6 (2.8 – 19.2)	7.2 (2.3 – 20.4)

CURRENT STUDY

Results





CURRENT STUDY

Results

- Significant influence
  - Training effect
  - Double rescuer training
  - Knowledge & Precognition
- No influence
  - Body Position
  - 1 vs 2 rescuers

Knowledge and Training	Median (min-max)	p- value
Basic or advanced knowledge	6.1 (2.3 – 7.2)	p=0.015
No knowledge	11.0 (4.2 – 20.4)	
Winter sport activities 1-3x/week	7.2 (2.3 – 20.4)	p=0.782
Seldom	7.3 (4.5 – 14.8)	

CURRENT STUDY

Discussion

- First study with defined extrication times during companion rescue
- Differentiation between “airway free” and standard position for CPR
- Significant improvement during the course of three experiments

CURRENT STUDY

Discussion

- Long time between First Contact
  - -> Airway Access
  - -> Standard position for CPR
- Overall long extrication times
- Large variation between participants
- Importance of physical fitness and previous knowledge

CURRENT STUDY

Outlook and Implications

- Stages of avalanche rescue
  - Clear definition of burial time
  - “Airway free” clinical important
  - Target times during extrication
- Start of rescue breaths during extrication?
- Training of CPR as part of extrication workshops!

CONTACT US

Bernd WALLNER, MD
Eurac Research
Medical University Innsbruck
bernd.wallner@i-med.ac.at
www.eurac.edu
www.i-med.ac.at