



SPOLEČNOST HORSKÉ MEDICÍNY



ČESKÝ HOROLEZECKÝ SVAZ
CZECH MOUNTAINEERING ASSOCIATION

XXXIV. PELIKÁNŮV SEMINÁŘ HORSKÉ MEDICÍNY

2024



**Hotel Medlov, Fryšava pod Žákovou horou
8.–10. 11. 2024**

CONFERENCE REPORT

34. Pelikan Seminar of Mountain Medicine 8.-10. 11. 2024

Hotel Medlov, Fryšava pod Žákovou hora

On November 8-10, 2024, more than one hundred people interested in mountain medicine gathered at the Hotel Medlov in Fryšava under Žákovou Hora for the traditional seminar organized by the Czech Society of Mountain Medicine and the Czech Mountaineering Association.

Traditionally, the Friday evening was devoted to travel lectures. This time **RNDr. Jan Pala, Ph.D.** took the participants to **active and extinct volcanoes on skialps**. And followed by a video about **Michal Marosi The One Who Celebrates Every Day**.

Saturday morning was already dedicated to the professional program. The opening speech was given by the President of the Society of Mountain Medicine, **Lenka Horáková, M.D., Ph.D.**, who welcomed all participants on behalf of both organizing organizations. At the same time she continued with **the introduction of the new medical discipline MOUNTAIN MEDICINE AT THE 3RD FACULTY OF MEDICINE OF CHARLES UNIVERSITY IN PRAGUE**. First of all, she mentioned the Mountain Medicine Course, which was organized by MUDr. Kristýna Höschlová in 2016-2021 and which was attended not only by doctors but also by paramedics and others. This academic year, however, the opportunity for training in this field will be opened at least within the undergraduate medical education at the 3rd Medical Faculty. The course will consist of theoretical seminars and a practical weekend workshop and will include an internship at the Institute of Aviation Medicine in Prague.

The first section ***Women and Children in the Mountains*** was opened by **Ing. Petra Dvořáková** with her contribution **Mothers in Running or Training is not like Training**, in which she shared her experience of running with a stroller not only in training but also in races.

We were taken from running to cycling by **Bc. Barbora Veselá** in her post **With children on a bike to Grossglockner Hochalpenstrasse**, where she shared a number of practical tips on how to take such a trip and especially how to prepare your children and yourself for it. The lecture provoked many questions and an exchange of experiences with the audience. Barbora

added a case study of a fall of an adult and a child while sledding in Croatia. She first noted that the accident happened despite the extensive experience of parents and children rappelling and awareness of the additional risks. She described the circumstances of the accident, where the fall of both climbers occurred due to a change of plan at the end of the climbing route: they switched to rappelling instead of the originally planned rappelling. The fall was apparently due to a short rappel rope (2 m maximum - there was no check that both ends of the rope were already on the ground), a break from the established routine of preparing the rappel rope, and the lack of control of the climbers by another person on the ground who was distracted by another child. Barbara pointed out especially the need for even greater vigilance in such situations, given that climbing with children is challenging with constant distractions from the children.

Back to the education in mountain medicine, **MUDr. Barbara Niznanska** brought the participants back to the lecture **Books, conferences and course ZDrSEM¹ - first aid by experience z.s.** First she presented a book on first aid with the electronic magic pencil system Save a Life with the Nehoda's² family children. She didn't want first aid for children to be designed to just bandage a teddy's paw. So she created a lavishly illustrated book where she shows children in a simple and understandable way the various conditions in which proper first aid needs to be given. The page on stroke is a case in point, as children may be the only ones with a grandparent when they are affected by this acute and life-threatening condition. There are also pages dedicated to spinal injuries, burns, etc. She also introduced the courses that ZDrSEM organises. For example, they have added a course for children aged 11-16, which for example also shows the symptoms of kratom intoxication etc. Finally, she added information about the conference Teaching First Aid, the 8th edition of which is taking place this year on 30.11.2024 and serves, among other things, as a networking event for first aid teachers.

Dita Voltr Podhadská, DiS. presented the **educational courses Horal and Horal PLUS from ZDrSEM**. The course HORAL as the basis of outdoor first aid for the public,

¹ first aid and emergency medicine education organization - **Experiential first aid training**

² Nehoda = accident, mishap, casualty

which has been running for more than 20 years, is designed for 20 participants, 8 lecturers and 13 figurants and lasts 5.5 days. It covers the basics of first aid and is enriched with specific outdoor topics. As of 2021, it is included in the HORAL+ continuation offer, which expands the outdoor assistance with the MARCH and ABCDE concepts. A number of simulations take place on day trips. The HORAL++ pilot course will run from 2025 and will cover winter first aid, avalanche accident, hypothermia, frostbite in winter environments, but without technical first aid, which belongs to other courses. Due to the demand from graduates of these courses, the inclusion of follow-up refresher courses is being considered.

The section dedicated to ***Men and Electronics in the Mountains*** was opened by **Vladimir Student, MD**, with a lecture on **The Effect of Exposure to High Altitudes on Semen Quality**. Vladimir first stated that there are many indicators of semen quality, whether its quantity, sperm count and concentration, but also its longevity and morphology. Exposure to hypobaric hypoxia at high altitude has a negative effect on sperm through various pathophysiological processes, be it hormonal changes in the hypothalamus-pituitary axis or oxidative stress. Sperm quality temporarily decreases in all men as a result of travel to high altitude, and exposure to hypobaric hypoxia may be a risk factor increasing the prevalence of male infertility in the population. The lecture generated interesting discussion, including questions on female fertility and early pregnancy in hypoxia, to which the speaker, as an experienced gynaecologist and obstetrician, could respond well.

Josef Škola, M.D., Ph.D. focused on a technical topic in his lecture **We need HELP! Calling for help in the mountains in the era of satellite communication**. He first presented a map of Austria with mobile coverage, which still contains numerous white spots where travellers are often found even in mountain activities. Satellite communicators, which are now also affordable, are an option for communication in these uncovered areas. However, the entire chain of rescue is important, i.e. the device must be operational (battery functionality), the device must be within signal range, you must also be physically able to operate the device (location of storage, limiting injuries), and the call must be relayed to the appropriate rescue services. He also mentioned the physical and geographical limitations of

satellite communication, e.g. lack of coverage on Svalbard, or lack of view of the southern horizon, e.g. on the north face of the Eiger. He presented a comparison of available systems, including the advantages of Iridium or SRSAT-based communicators. Also important is the ability of the device to send an active emergency message, which can often be problematic, e.g. even with commercial mobile phones that offer this feature. However, up to 98% of activations of these S.O.S. systems are false activations. Moreover, the problem is where such an emergency call will be forwarded in the Czech Republic, which the author of the lecture analysed and questioned, but unfortunately did not get clear answers from the manufacturers of the mentioned devices, nor from official locations within our country. The paper provoked a rich discussion.

Another contribution on technology was made by **Markéta Zvara, MD: Acclimatization in the Himalayas with smart watches: case study and limitations**. She first reiterated basic facts about acclimatization, differences between native population and low altitude tourists. She measured herself on her recent trek through the Three Saddles in the Himalayas using a smartwatch that allowed, among other things, measurement of blood oxygen saturation. She described symptoms during acclimatisation, monitored clinically and with the smartwatch. The data from the watch showed the onset of tachycardia, desaturation and periodic breathing.

The session was closed by **Ing. Ladislav Sieger CSc. and Mgr. Gabriela Hodková Electronics in the mountains**. As our behaviour in the mountains has changed in recent years, we are abandoning paper maps and buzzes and replacing everything with mobile devices and other electronics. But what are the limitations and pitfalls of charging these electronics in particular? Chargers give a voltage of 5 V, but there are already fast chargers that are capable of giving up to 12 V. The quality of the connecting cable is also important. The differences are not only USB-A and USB-C, but also the communication standards. Connectors of the v. 3.0 and higher standard have nine connectors, while the 2.0 version has only four connectors. Originally, these connectors were intended only for data connectivity and only secondarily were given a charging function and their design was modified accordingly. The USB-micro is also only ever 4-pin, so fast charging with a fast charger is never possible over it,

even when connected via a USB-C reduction. Likewise, connections via a computer will charge slowly. Simple power banks also give no more than 5V, but more expensive ones can be found with a USB-C connector. Photovoltaic panels for the mountains are a possible solution, especially in places like the Himalayas where charging at the huts is charged, but to achieve higher power outputs a large panel area is needed and thus the weight increases significantly. Finally, the authors of the communication gave us some tips on how to extend the life of the mobile: download lighting that is energy intensive, turn off transmitters and receivers like GPS, Wi-Fi, mobile data, and turn off the mobile in case of poor signal, as the mobile is constantly trying to connect to the available BTS.

This year there were three workshops for participants after lunch, and everyone had the opportunity to attend all stations. **Ing. Ladislav Sieger, CSc.** with **Mgr. Gabriela Hodková** followed up their theoretical presentation with a practical demonstration of **Electronics in the outdoor environment**. **RNDr. Jan Pala, Ph.D.** with **Mgr. Ivana Sikulová, Ph.D.** prepared an **avalanche workshop and current news** with practical training on how to work with a search engine, including the use of new models. **Mgr. Gabriela Tóthová** allowed the participants to try **AcroYoga**.

The outdoor workshops were followed by the **Mountains, Frostbite and Hypothermia** section. **MUDr. Jana Kubalová** and **Michal Jakubů** started with an interactive workshop **Standard pill in non-standard situations and conditions**. PWorkshop started with a discussion with participants regarding the composition of expedition first aid kit for different types of trips. They then prepared descriptions of three different expeditions and three different pathological conditions (thrombophilia, chronic arterial hypertension, asthma) and interactively discussed each condition with the audience. They pointed out, for example, the risks of the effect of extreme high temperatures on the pressure vessels of inhaled antiasthmatics, which, on the contrary, are not so bothered by frost. However, there is a risk with particulate aerosols, where wetting can damage drug delivery. On the other hand, LMWHs such as Clexane do not have a protein component, so e.g. application after prior freezing of the drug is not a problem, but the drug should not discolour or show precipitation or crystals.

Jana Kubalová, MD, continued with Recovery from high-altitude pulmonary oedema - is descent enough?

This was a case report of a middle-aged man who was planning to climb a seven-thousand-foot peak and already had practical experience in the mountains. During the ascent, he developed a significant decline in performance, exertional dyspnoea without signs of acute altitude sickness. He was repeatedly administered dexamethasone i.m. and diagnosed with high-altitude pulmonary edema (HAPE) by the on-site physician. However, even after evacuation, the resting dyspnoea persisted, and his condition did not improve until about a month later. The author of the lecture searched the literature for sources regarding the "normal course of HAPE, but of course this is very individual. Structural remodelling of the pulmonary capillaries takes on the order of 2-5 days, and therefore HAPE rarely occurs after this time window. Importantly, the recurrence rate of HAPE is up to 60% and mortality in untreated cases is up to 50%. If symptoms do not improve, it is important to think of pulmonary embolism in the differential diagnosis. Symptom modification should be within a few days according to the available literature, and 24-48 h is faster in children.

Jaroslava Říhová, MD, presented a summary of the **Complications of frostbite treatment, aggravating factors**. Frostbite is often aggravated by poor preparation for the expedition: lack of necessary equipment (spare gloves, socks, headlamp), lack of medication. Not adapting the hike to the weakest member of the group is also problematic, as evidenced by the case of frostbite of such a hiker complicated by trauma and hypothermia. Impatience in treating frostbite can lead to hasty medical interventions. Rejection of proven treatments and complementary examinations (especially bone scintigraphy), or interventions by a physician who is inexperienced with frostbite and the recommended examination methods, are also problematic. As of February 2024, according to the FDA, the drug iloprost is approved in the US for the indication of treating grade 3 and 4 frostbite. This treatment is not available or approved in the Czech Republic. In conclusion, the author summarized that the treatment of frostbite should always be started as soon as possible, preferably within 5 hours of the injury, treatment must be aggressive and comprehensive; in the field, it is necessary to prevent further hypothermia,

administer sufficient fluids, do not walk on the feet for frostbite of grade 3-4, transport ideally by air. To the previously mentioned treatment, add positioning, analgesics, treatment of infection (disinfection, ATB), the principle of not puncturing blisters unless absolutely necessary.

MUDr. Lucie Smrčková from the Institute of Hand Surgery in Vysoké nad Jizerou followed up with a lecture on **Frostbite - first aid in the field and subsequent treatment**. It is a sad fact that in many even renowned domestic and foreign departments patients are often not treated correctly. Initially, all frostbite looks the same, but only with the passage of time does the extent of the disability become unmasked. She pointed out the risks associated with wearing rings and bracelets on the hands, even in cases where there is "only" a risk of first-degree frostbite. In first aid in the field, analgesic, antiplatelet, anti-inflammatory medication, sterile coverage with Betadine, possibly with oily tulle. Do not warm up in the field frostbitten parts, unless perfect thermal comfort can be ensured during transport to the place of definitive treatment. Ideally, medical therapy should mainly take place initially during hospitalization, which is usually the most difficult step in the whole treatment process. Due to limited availability, hyperbaric oxygen therapy usually starts after discharge from the hospital. In the context of surgical intervention, it is necessary to wait for tissue demarcation and not to rush amputation. Any black necrotic tissue must be removed immediately according to general surgical instructions, but this does not apply to frostbite! Frostbite scabs "pull" healthy tissue with them and this may improve the final outcome. A patient educated in the treatment of frostbite may resist amputations. She attached two case reports. *A French proverb says: you frostbite in January, you cut in June*. Treatment of frostbite is long-term and cannot be completed entirely abroad; repatriation to the Czech Republic should be completed as soon as possible.

MUDr. Robert Nagypál from the ECMO centre in Banská Bystrica brought a communication about the **Severe Accidental Hypothermia Protocol - the details matter**. The theoretical basis of the project is the revised Swiss Hypothermia Scale and experience from abroad. The starting point was the statistics of the Rescue Service and the problematic cooperation with cardiac centres, which usually do not want to accept a group of patients

in severe hypothermia, as they often have associated injuries. The challenge is the conflict between the pre-hospital and hospital phase of treatment of this group of patients. Due to the air perimeter within Slovakia, Banská Bystrica has set itself the goal of becoming a national centre for the treatment of accidental hypothermia. The application of the protocol was tested in a series of field exercises. The first real patient was treated according to the protocol only 2 days after the training with a successful outcome. The author of the communication mainly evaluates the challenges as the unification of cardiac center vs. general hospital procedures, the centralization of highly specialized care (hypothermia center), so patients cannot be taken anywhere where they have ECMO - it is not just about the ownership of the device itself, but about the application of a working protocol in the environment of a working team.

The Saturday evening programme was dedicated to the **memory of Jiří Pelikán , MD**, in whose honour the classmates of the circle at the Faculty of General Medicine (now the 1st Faculty of Medicine) of Charles University began with a memorial lecture on Jiří Pelikán not only from the time of his studies in 1970 to 1976. **MUDr. Blanka Cieslarová, MUDr. Jaroslav Žížka and MUDr. Jana Kodadová** personally presented the lecture and MUDr. Jiří Novotný and MUDr. Zdeněk Šudoma helped with the preparation. Unfortunately, a significant part of MUDr. Jana Kodadová's archive was lost during the floods in 2002. Nevertheless, they managed to collect a number of unique photographs detailing their shared history from the moment they met while studying medicine and in Dobronice. Subsequently, they became intensively involved in sporting activities - mainly skiing and canoeing. To this were added the first trips to the rocks with the then standard "chest" harness made of rope. They also founded the TJ Medicina and started to go to the Sand Rocks *Sedmihorky*, Tisá, the Western and High Tatras. There was also a joint photo from their graduation on 15 July 1976 and wedding on 26 June 1976. The photos were accompanied by funny comments by Jiří Pelikán's classmates present. The end was dedicated to the eight-thousandth Annapurna (8091 m), where Jiří Pelikán slipped during his descent and fell about 2500 meters from the height of 7800 meters.

MUDr. Igor Hermann continued by quoting from the proceedings of the first Pelikan Seminar in 1990 and added his memories of Jiří Pelikan. **MUDr. Jarka Říhová** together with Igor then presented the history of the Medical Commission of the Czech Medical Association and the Society of Mountain Medicine, where MUDr. Ivan Rotman and a number of other doctors were the main driving force from the beginning.

RNDr. Jan Pala with **Ing. Juraj Rokfalusi** recalled Slovak colleagues Tono Dobes and Peter Šperka, who were murdered by Taliban in the base camp under Nanga Parbat (8125 m) on 23 June 2013.

The Saturday evening program was concluded by **MUDr. Jitka Růžicková** with an overview lecture **Skialpen in Alaska** in April 2024 describing the areas, snow conditions, accommodation and refreshment options.

Sunday's section ***Mountains, snow and accidents*** was opened by **Bc. Barbora Veselá** with a lecture on **Using hypoxic tent for better acclimatization**. She first reiterated the differences between hypobaric and normobaric hypoxia and the physiology of acclimatization. She showed a model of a hypoxic tent which is spacious but only simulates an altitude of about 4000 m above sea level, moreover the hypoxia generator is noisy and there is panting and sweating in the tent. During the stay in the tent it is possible to observe changes commonly observed during acclimatization in the mountains, including diuresis, deterioration of sleep quality, etc. She also listed the risks of staying in a tent, including deterioration of sleep quality and recovery, dehydration with impaired breathing, deterioration of immunity (risk of infection e.g. during subsequent stay in the plane), risk of thromboembolic complications, manifestations of AMS/HAPE/HACE etc. It is important to emphasise that simulation does not equal acclimatisation and there are different body responses to normobaric and hypobaric hypoxia. This approach seems to be a good alternative in preparation for high altitude ascents to shorten acclimatization and it is probably advisable to

complement both methods. She also described some practical experiences of Czech climbers, including measurement of physiological parameters using smart watches.

Mgr. Jan Jiráček from the Czech Hydrometeorological Institute presented an interesting paper **How climate change affects winter sports**. The assessment of climate change and extremes is carried out at the Czech Hydrometeorological Institute within the PERUN project. The assessment of the current situation can be made on the basis of a dense network of thermometer, rain and snow gauge sites, temperature records from Klementinum³ date back to the 18th century. Over the last 30 years assessed, there has been an increase in average temperature of more than 1°C. The assessment of the number of ice days is also significant; for example, they have almost completely disappeared in the Moravian Highlands region where the Pelikan Seminar is now held. The sharp decline in the number of ice days in *Pec pod Sněžkou in Krkonoše* (Giant Mountains), and, conversely, the marked increase in the number of summer days in the same area is also a significant phenomenon observed in recent years. In Central Europe, climate change concerns us mainly in terms of changes in temperature, with smaller differences in precipitation - the recently discussed dry season is more likely to be related to the aforementioned temperature extremes in the form of drying. The number of days with snow cover >20 cm in the Czech Republic (which is also the limit for e.g. cross-country skiing races): in 1961-1990, 40 such days were recorded at an altitude of 600-800 m above sea level, in 1991-2000 only 29 days at the same altitude. There are more days with rain than snow in the winter months at many higher altitudes, including in the so-called alpine areas >1300 m a.s.l. The past winter season 2023/2024 was the second warmest after 2006/2007, when the highest snow cover was in December and most of the area did not renew its cover for the rest of the winter season. As a case study, he described the situation in the Jizera Mountains in recent years, including its impact on the well-known cross-

³ Klementinum (formerly spelled Collegium Clementinum, abbreviated Clementinum), a former Jesuit college, is a large complex of Baroque buildings near Charles Bridge in Prague's Old Town. Clementinum occupies an important position in the history of Czech Catholic religion, mathematics and meteorology. Meteorological

observations here began in the mid-18th century and have been systematically recorded since 1775, making them the longest continuous series of observations in Central Europe. Wikipedia.

country race *Jizerska 50*, part of which, especially the final route, is situated at an altitude below 800 m above sea level. In total, the race has been cancelled six times (1988, 1990, 1998, 2007, 2014, 2024). On many runs and races, some of the snow has to be replaced with artificial snow and distributed by trucks and sledges. Currently, there are various pessimistic scenarios that predict a significant increase in average temperature, not only in the mountains.

Marie Lollok Klementová presented the **accident rate in the Alps** based on statistics from the Austrian Alpine Safety Curatorium. The data is reported to the register by the Mountain Rescue Service and the Alpine Police. The number of deaths in the Austrian Alps, as a long-term stable average, stands at 266, with a predominance of men (86%), more than 60% of the persons are over 50 years old. Every year the mountain service in the Austrian Alps responds to 13,000 cases, but one third of these are uninjured persons (e.g. loss of orientation of uninjured persons). Most deaths and accidents occur in Tyrol due to the presence of higher areas in this region. Czechs have traditionally been reported as one of the biggest population at risk in Austria, but even in last year's statistics they ranked fourth in terms of personal deaths by nation, after Austrians, Germans and Dutch, with 10 deaths in 2023. The majority of fatal accidents in 2023 occurred during hiking and climbing (99 deaths), 29% were caused by cardiovascular disorders, 13% by tripping or falling. Often this is partly due to the use of mobile phone apps and maps, where, for example, a road being blocked by flooding leads to injuries because without a map, hikers are unable to avoid the closed road by another route. Traditionally, most accidents occur in July. The statistics are very nicely broken down by sporting activity. Compared to the deaths, the accident rate is balanced between the sexes: 56% male, 43% female, with 1% gender undetermined (person not identified). The year 2023 had a higher death and accident rate compared to the 10-year average, which according to the curatorium could be due to the hottest summer on record, there was also a sudden deterioration in the weather with thunderstorms and this was associated with a large increase in accidents.

Avalanche accidents of winter 2023 and 2024 in Slovakia were presented as usual by **Mgr. Ivana Sikulová, Ph.D.** Last winter recorded two deaths due to avalanche accidents, which is below the long-term average of three deaths per

year. She also mentioned a worse winter, which for example meant two months less snow cover, winter ended in April and avalanche danger reporting ended on May 2, 2024. Most of the avalanche danger level 2 was reported, this season there was not even a level 4 declared at all. Out of 35 accidents, there were 29 accidents at avalanche danger level 2, the number of avalanche accidents in the Western Tatras (mainly Salatin) increased. She then presented case studies of several avalanche accidents. Three avalanche accidents occurred during a weekend in early December 2023. These were slab avalanches, the skiers escaped without injuries. In the High Tatras, the skier also had an activated avalanche pack, which apparently tore during the fall against the rocks, but probably saved the skier from worse injuries. The cause was probably the small distance between the skiers. She also recalled the December 2022 accident of two hikers, which was unfortunately fatal for both of them, and Iva reiterated the avalanche risk factors for a level 2 avalanche hazard. Another accident was also caused by bad weather. In this one, the Polish ski mountaineers shared their location with their loved ones throughout the trip, but suddenly the signal disappeared, so their loved ones activated the rescue services. Fortunately, both escaped without any serious injuries, certainly due to the fact that they had full avalanche equipment, including an avalanche pack, but they chose an inappropriate target and even a fall with a small avalanche made evacuation from the mountain environment impossible. Tragic was January, when a lone climber was found under the route *Batizovska probe* on *Gerlachov Peak* in High Tatras, the circumstances of his fall are not clear. The second tragic accident happened in Veľká Fatra Mountains to two ski mountaineers without avalanche equipment, below the mountain Malá Křížná, on a slope of 30-40°, the avalanche gained great speed with a reach into the forest. One of the partially buried rescued himself from the avalanche, found his friend without avalanche equipment, managed to dig him out thanks to a protruding shoe, rescued him, but the fall through the forest caused serious head injuries to the buried (they did not have helmets), he also had a blocked airway and even despite the initiation of lay CPR and follow-up extended CPR failed to revive the man. In the previous season, the first Level 3 avalanche hazard was declared on 11/1/2023 and six avalanche accidents occurred. In one of the accidents, although the athlete had an activated avalanche pack with him, he was still critically buried. Thanks to his complete avalanche equipment, a

friend was able to rescue the fallen athlete and provide first aid. Iva concluded by reiterating the most important and unfortunately recurring causes of many avalanche accidents. It is mainly underestimation 2. degree of avalanche danger, lack of avalanche equipment of winter visitors to the mountains (mainly non-skiers), and then certain specifics of the Slovak mountains; most of the winter days are windy in the Slovak mountains, which promotes the formation of compacted slabs from day to day, a large number of skiers go out on the first sunny day after a period of snow and wind and often go into unsuitable terrain with troughs, rock thresholds and windward slopes.

Lucie Bloudková, MD, presented Relative Energy Deficiency in Sport, i.e. **RED-S in sport climbing**. Since March 2024, basic and advanced testing has been conducted during climbing competitions; random testing is conducted during competitions in an attempt to detect competitors suffering from this problem. Testing takes the form of questionnaires regarding fatigue, food restriction, remains and BMI determination, and heart rate and blood pressure measurements. In case of risk values, the athlete undergoes detailed testing, including for example DXA, T3, etc. Random pre-race testing includes measuring height, weight, blood pressure, heart rate and performing an orthostatic test. No license has ever been denied to a Czech republic, no disqualification due to RED-S. Prevention of the problem lies in the training itself and setting up a training plan, often involving mental coaches. There is even a guidebook for builders that includes rules for building competition routes so as not to favour routes only on small holds that would favour climbers potentially at risk of RED-S. Climbing is also becoming more and more spectator friendly, and so there is an increasing emphasis on these requirements not only for climbers but also for the organizers themselves. MUDr. Smrčková added that she has practical experience with this syndrome, where girls experience the disappearance of menstruation, not only weight gain, which might be a particular concern for climbers, but it is about the overall compensation of the caloric deficit in cooperation with nutritionists. Setting a lower BMI limit was also discussed with the audience.

Igor Hermann, MD, followed with a lecture on a related topic: **weight loss at high altitude**. He was inspired to make this presentation by the complaints of the Czech

mountaineer Radek Jaroš about weight loss and loss of muscle mass during his expeditions to the high mountains. In addition to mountaineers, trekkers, who are often sedentary and usually move at altitudes up to 5000 m above sea level, suddenly find themselves in a cold environment with the necessity of walking up to 8 hours a day. For these people, weight loss during the trek to BC Everest is about 1.3 kg and in the following weeks the weight stabilizes. It depends on the amount of fat - greater loss occurs in those with >13% body fat. The loss is 75% due to loss of fat mass, 25% protein, so it is equivalent to simple starvation. A different group, however, are mountaineers at higher altitudes, where weight loss of up to 4 kg has been reported at 5400-6300 m. Conversely, 73% of the weight loss is due to protein and only 27% is due to loss of adipose tissue. The problem is that this cannot be influenced by diet composition. The causes are increased basal metabolic rate, increased sympathetic tone and thyroid function, reduced energy intake due to inappetence, vomiting even in the mild form of AMS, higher levels of leptin and cholecystokinin (hormones responsible for satiety) and lower levels of ghrelin, the hormone that induces hunger. At altitudes of 5400 m above sea level, the absorption of fat nutrients is impaired by 49%, as well as other nutrients. A high altitude diet is important, due to the respiratory quotient a high carbohydrate diet is important. There is no point in giving vitamin preparations to trekkers on short expeditions, nor is the availability of amino acids such that their supplementation is meaningful. Iron supplementation is only relevant for women of childbearing age. Weight loss and muscle atrophy cannot be prevented in the high altitude environment, but muscle mass is rebuilt after returning to the home environment and improving nutrition. The author of the lecture, with extensive experience of high mountain climbing, recommends eating whatever suits your taste, also for psychological well-being.

Lenka Horáková, M.D., Ph.D. also presented a message from the field of diet and metabolism, namely **Diabetes, nutrition and movement in the mountains**. First, for the lay part of the audience, she repeated the basic facts about diabetes mellitus and then focused on its two basic types, type 1 and type 2, their differences and recommendations for people with this disease at high altitudes and on expeditions in remote areas. She also

introduced the audience to a number of technical innovations with which today's diabetics are equipped, such as discrete glucose monitoring devices, insulin pens and pumps. Only some of these devices have been tested for use at higher altitudes, so the manufacturer's instructions for this medical equipment should also be followed. It is important that everyone in a group of climbers is aware of the presence of a diabetic and knows the principles of first aid and possibly they should be able to help the diabetic, for example with insulin administration, glucose measurement, etc. Further useful advice, for example on the recommended equipment for a diabetic first aid kit, is included in the recommendations of the UIAA Medical Commission for Diabetes.

Jan Pala, Ph.D., as the last lecture, presented the **Solution of Ski-Alpine Accidents in Austria and Slovenia**. He reported on two trips to Austria and Slovenia that ended in accidents. In the accident in

Austria, some members of the group who were not directly involved in the accident were charged for rescue costs, although no rescue took place for their persons. Therefore, the author of the lecture recommends that in Austria all circumstances of any accident should be documented (photos, video, record of the route, individual steps) and if you are just a bystander and do not need any help, do not be legitimized. In Slovenia, the experience was quite the opposite: for rescue, the rescuers did not even immediately require insurance legitimation for this type of accidents, nor did they care about other participants who did not require help or treatment.

This last lecture ended the 34th. Pelikan Mountain Medicine Seminar and the President of the Society of Mountain Medicine MUDr. Lenka Horáková, Ph.D. invited everyone interested to next year's seminar to be held in a similar November date.

Lenka Horáková, Jan Pala, 10. 11. 2024, translation Ivan Rotman & DeepL, 23.01.2025.