

High Altitude Trekking or Mountaineering: Pre-trip Evaluation

Screening

Training

Pre-acclimatization

Trip planning re acclimatization

Pre-trip Screening

- Want to match client to trip, trip to client
- Assessment of competence, fitness, health
- Who will evaluate client responses?
- Any testing or certain experience required?
- Require physician approval?

Special altitude considerations

- Altitude experience
- Aerobic fitness, endurance
- Experience on rugged terrain
- Medical issues and altitude

Pre-trip medical questionnaire

Level 1: Simple, no doctor required

Do you have any physical or medical conditions?

Are you taking any medication?

Do you have any allergies?

Please explain (what, why)

And then who evaluates this?

Pre-trip medical questionnaire

Level 2: Thorough, usually requires physician

“It is vital that persons with medical problems make them known to us well before trip departure.

XXX assumes no liability regarding provision of medical care. Trip members will receive appropriate health information and a Medical Certificate to be filled out and returned to us. You will need to provide us with your accurate and complete medical history for the last three years. If you are age 65 or older (or on high altitude trips), the Medical Certificate must be signed by your physician.”

Please list on this Medical Certificate all abnormalities in your health and medical history. Mountain Travel Sobek does not evaluate the medical information that you provide. We make it available to the trip leader to provide to attending medical personnel in the case of a medical emergency during your trip. You are responsible for consulting your physician to determine your suitability for the trip.

TRIP MEMBER

TRIP DEPARTURE DATE

PLEASE MAIL OR FAX THIS FORM BACK TO US AS SOON AS POSSIBLE.

I. THIS PART MUST BE COMPLETED BY ALL TRIP MEMBERS.

Use a separate piece of paper for explanations requiring additional space.

Do you have or has a doctor told you that you had: (circle if yes)

- | | | |
|---|---|---|
| • epilepsy | • ulcers | • significant foot, leg or back problems |
| • diabetes | • high blood pressure | • colitis or recurrent intestinal trouble |
| • heart disease: congestive failure, angina | • arthritis | • asthma or lung disease |
| • prior heart attack or bypass surgery | • recurring thrombosis in legs or lungs | |

If yes, please explain in detail.

For each question below, please circle the appropriate answer.

Yes No Do you have any other significant medical problems that require the regular care of a doctor? Explain.

Yes No Have you been **hospitalized** and/or had **surgery** in the past three years? When and why?

Yes No Do you have **allergies** or have you had any bad reactions to drugs? Which ones and what side effects?

Yes No Are you regularly taking any medications? **If so, please list and state their purpose (print).**

- If you are 65 years or older at time of travel your physician **MUST** complete page 2.
- If you are participating in one of our "Ultimate Challenge" trips your physician must complete page 2.
- If you are participating in one of our High Altitude Treks please also sign page 2.
- It is my understanding that I will notify Mountain Travel Sobek immediately if my medical health has changed between the time I return this form and my scheduled departure date.

II. IF YOU ARE AN APPLICANT FOR A HIGH ALTITUDE TREK

I have received and read Mountain Travel Sobek's information on health problems at high altitude, which is included in the General Health Information booklet. Furthermore, I and my physician agree that in an emergency or life-threatening situation, without immediate access to physician assistance, the local operator may, if it deems necessary, administer needed assistance, including—but not limited to—the use of prescription drugs.

SIGNATURE OF APPLICANT **DATE**

Parent or guardian must sign if trip member is 17 years or younger.

III. IF YOU ARE AGE 65 OR OLDER AT TIME OF TRAVEL OR A PARTICIPANT ON ANY OF OUR "ULTIMATE CHALLENGE" TRIPS, YOUR PHYSICIAN MUST COMPLETE THE FOLLOWING:

Please provide physician with trip itinerary, this form, and attached note to physician.

PHYSICIAN TO COMPLETE BELOW

PLEASE SEE "TRIP DETAILS" ON THE FIRST PAGE OF THE TRIP ITINERARY FOR A DESCRIPTION OF THE PHYSICAL DEMANDS OF THE TRIP.

☐ I HAVE DISCUSSED THE TRIP WITH MY PATIENT, AND

THE APPLICANT AGE

HAS BEEN EXAMINED AND WAS FOUND TO BE PHYSICALLY QUALIFIED TO PARTICIPATE IN THIS TRIP.

☐ I DO NOT RECOMMEND THIS TRIP OR I HAVE SERIOUS RESERVATIONS CONCERNING THIS PATIENT TAKING THIS TRIP FOR THE FOLLOWING REASONS:

.....
.....
.....

SIGNATURE OF PHYSICIAN **DATE**

NAME AND ADDRESS OF PHYSICIAN (PLEASE PRINT OR TYPE)

.....

NOTE TO THE PHYSICIAN

The Mountain Travel Sobek Catalog describes what conditions can be expected on each of our trips. For example: “easy to moderate walking, medium elevation, no camping,” “rugged road travel, optional walking, high altitude, no camping,” or “strenuous walking, high elevation, 15 nights camping.”

Easier

Many activities are optional and involve fairly easy travel. Trips may include short hikes of two to three hours or optional walks at low elevations.

Moderate

More active trips involving hiking over moderate terrain, usually—but not always—with vehicle support and at elevations less than 10,000 feet, or trips with long hiking days, wilderness camping, or other mandatory activity. On many trips, you can elect to skip a day’s hike, depending on logistics.

Strenuous

Hiking over steeper or more rugged terrain or where elevations exceed 10,000 feet. Usually includes river rafting trips with more challenging Class IV-V rapids.

Ultimate Challenge

Our most demanding trips: hiking over steep, rugged terrain at high elevations (no vehicle support) or with substantial altitude gains and losses; trips to remote, extreme wilderness.

“Mountaineering” incorporates “Strenuous” hiking conditions at altitudes that may reach 20,000 feet.

More details of the trip are provided to each trip member in the Trip Itinerary, especially in the “Activity Level” paragraph.

Medical facilities ***may not be available*** on Mountain Travel Sobek trips. (On mountaineering trips, local facilities are non-existent, and evacuation is prolonged and difficult). A trip physician may or may not accompany the trip.

High altitude mountaineering expeditions pose a special health risk to participants. Please read the letter prepared by Mountain Travel Sobek on health problems at high altitudes that is intended for both client and physician. It will help you counsel your patient as to whether or not he or she should participate in such an expedition.

We have no standard physical exam form but do expect a thorough medical examination with emphasis on cardiovascular and respiratory status, peripheral circulation, blood pressure and potentially debilitating problems—e.g., gall bladder disease, kidney stones, asthma, active ulcer, colitis, hernia, back problems, and other. Lab data should include a CBC, urinalysis, blood sugar, BUN or creatinine, resting cardiogram. Testing of pulmonary function, a recent chest x-ray and an exercise EKG are appropriate, if history indicates. A published protocol that you may find helpful for cardiac evaluation of travelers to altitude is included on the reverse side.

Suggested approach to evaluation of individuals for trekking or high altitude travel*

All persons over 50 years age should have a thorough medical history, physical examination, electrocardiogram, and chest x-ray (if not recorded within the past 5 years). Four general categories of individuals should be evaluated as follows:

- 1) ***Asymptomatic, without evidence of coronary disease, no risk factors for coronary disease.***
Risk category: LOW. Treadmill test optional.
- 2) ***Asymptomatic, with one or more risk factors for coronary disease.*** Treadmill test indicated.
 - a) Treadmill test negative or minimally positive. Risk category: LOW
 - b) Treadmill test strongly positive; thallium scan indicated.
 - i) Thallium scan normal. Risk category: LOW.
 - ii) Thallium scan strong positive. Risk category: HIGH. Coronary arteriography indicated.
- 3) ***Known coronary artery disease, such as history of prior infarct, history of unstable angina, presence of stable angina, prior bypass surgery, or angioplasty.*** Treadmill indicated.
 - a) Treadmill test strongly positive. Risk category: HIGH.
 - b) Treadmill test negative or minimally positive. Risk category: LOW.
- 4) ***Age less than 50 years.***
 - a) One or more risk factors for coronary disease. Treadmill test optional.
 - b) No risk factor for coronary disease. Treadmill test not indicated.

Definitions for above guidelines

- 1) Risk factors for coronary disease increase the possibility of coronary disease:
 - a) Family history (sudden death, angina before 55 years in family members);
 - b) History of or presence of hypertension;
 - c) ST segment depression of any magnitude in the resting electrocardiogram; and
 - d) Prior episode of chest pain.
- 2) Treadmill test negative or minimally positive: patient can walk ≥ 9 min. (through Stage 3 Bruce Protocol) without chest pain and with ≤ 1 mm ST segment depression.
- 3) Strongly positive treadmill test: patient walks ≤ 6 min. (Bruce protocol) and has either chest pain and/or ≥ 2 mm ST segment depression.
- 4) Risk categories:
 - a) LOW RISK: minimal risk for a coronary event (angina, sudden death over 5 years of 2-4%);
 - b) HIGH RISK: a substantial risk for a coronary event in 5 years of 10-20%; requires coronary arteriography.

*Hultgren HW: Coronary heart disease and trekking. J Wilderness Med, 1990; 1: 154-161.

Pre-trip medical evaluation

- Develop a policy
- Get a good medical advisor
 - A doc with wilderness/altitude expertise
- Check with risk management

Pre-trip medical

- Information to get

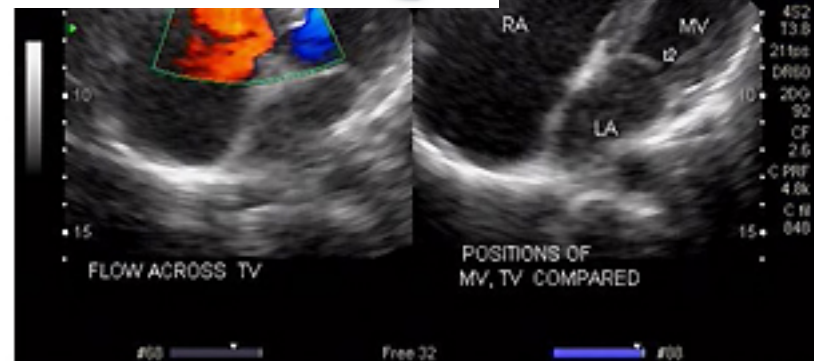
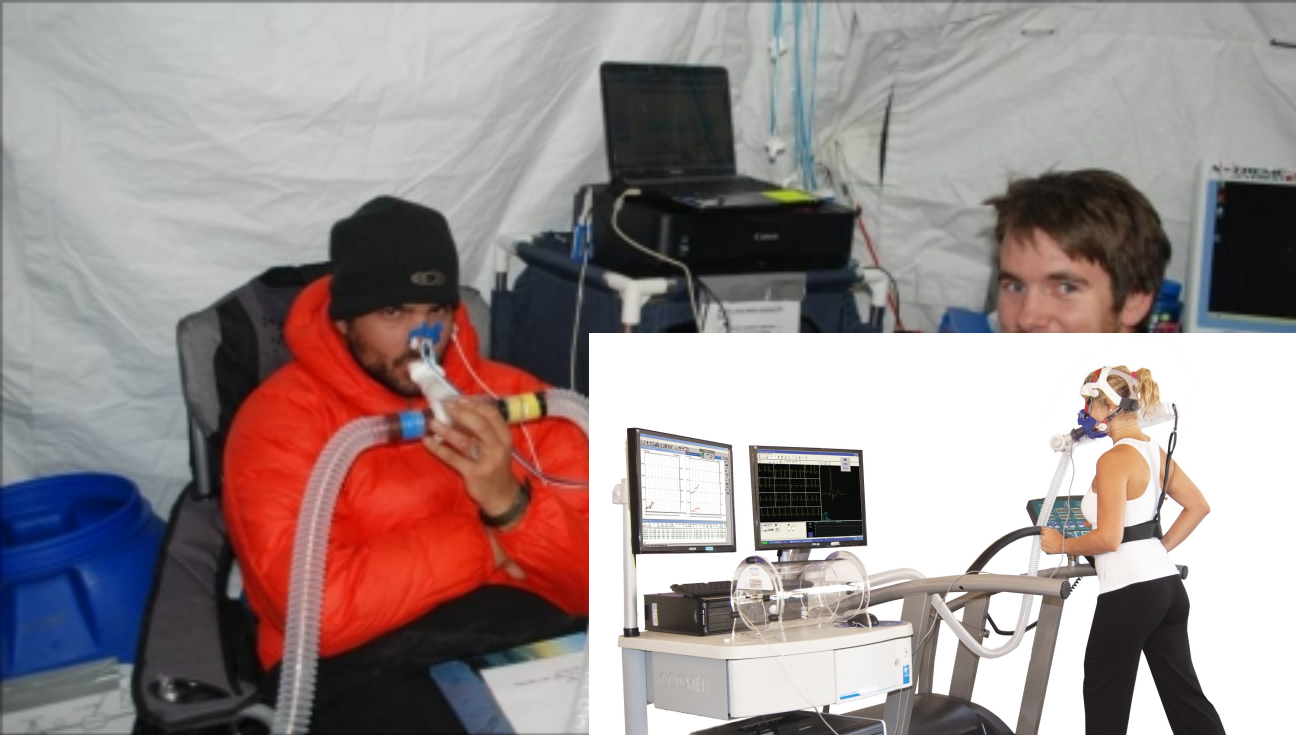
- Previous altitude experience
- Previous HAPE or HACE?
- Allergies, meds
- Medical conditions that could be an issue
 - Lung disease, cardiac problems, hypertension, seizures, migraine or chronic headache, pregnancy, diabetes, sickle cell trait

- Provide detailed info to clients

- Altitude acclimatization, expectations at altitude
- Altitudemedicine.org, ismmed.org

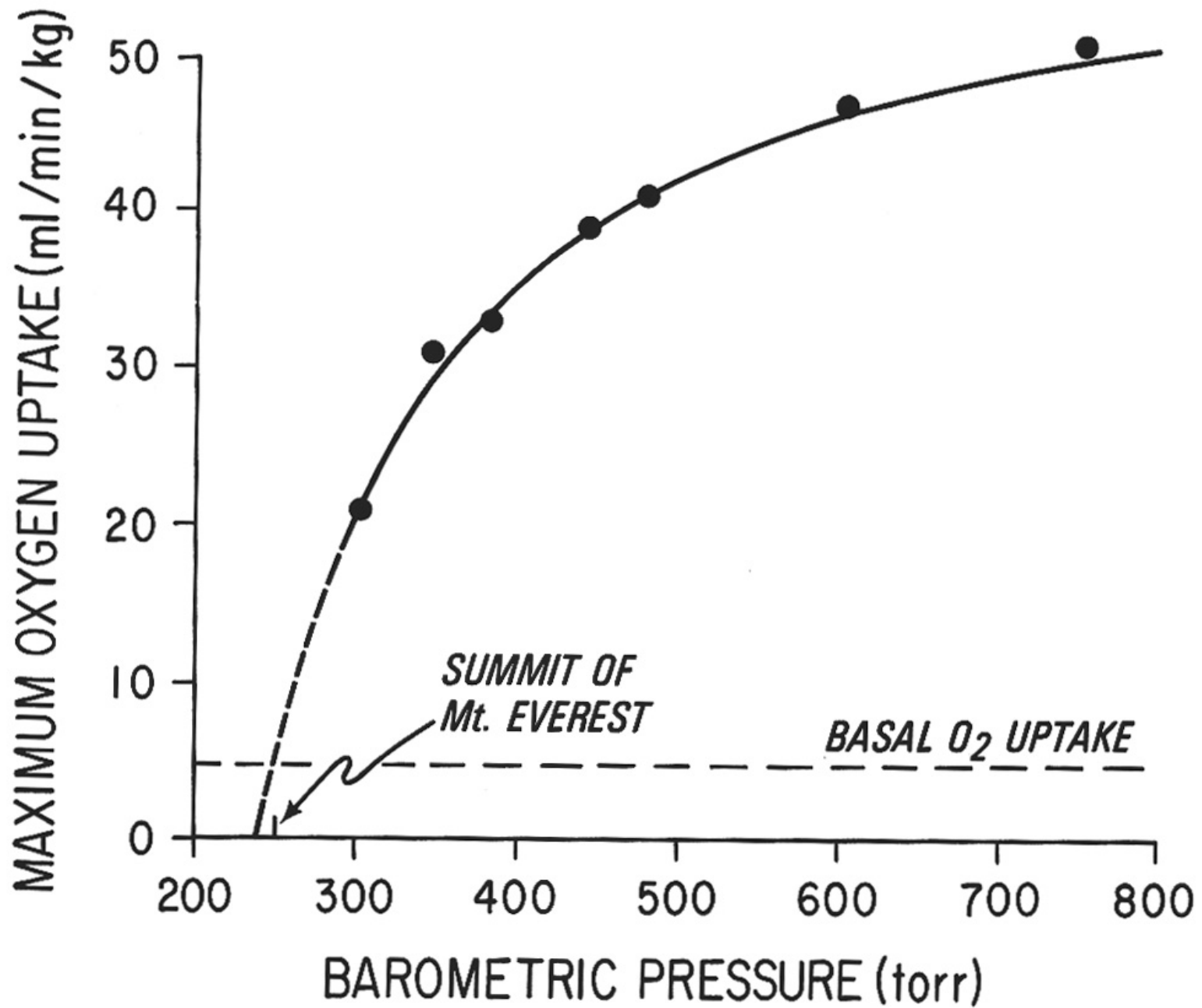
Screening for altitude illness

- Past history important, but not absolute
- Lung disease? (not asthma)
- Testing
 - Hypoxic ventilatory response? No
 - Pulmonary artery pressure response? Maybe for HAPE susceptibility
 - Hypoxic exercise test? Maybe...
 - None easy, available, prediction still difficult
- Bottom Line: no practical testing to predict AMS, HAPE

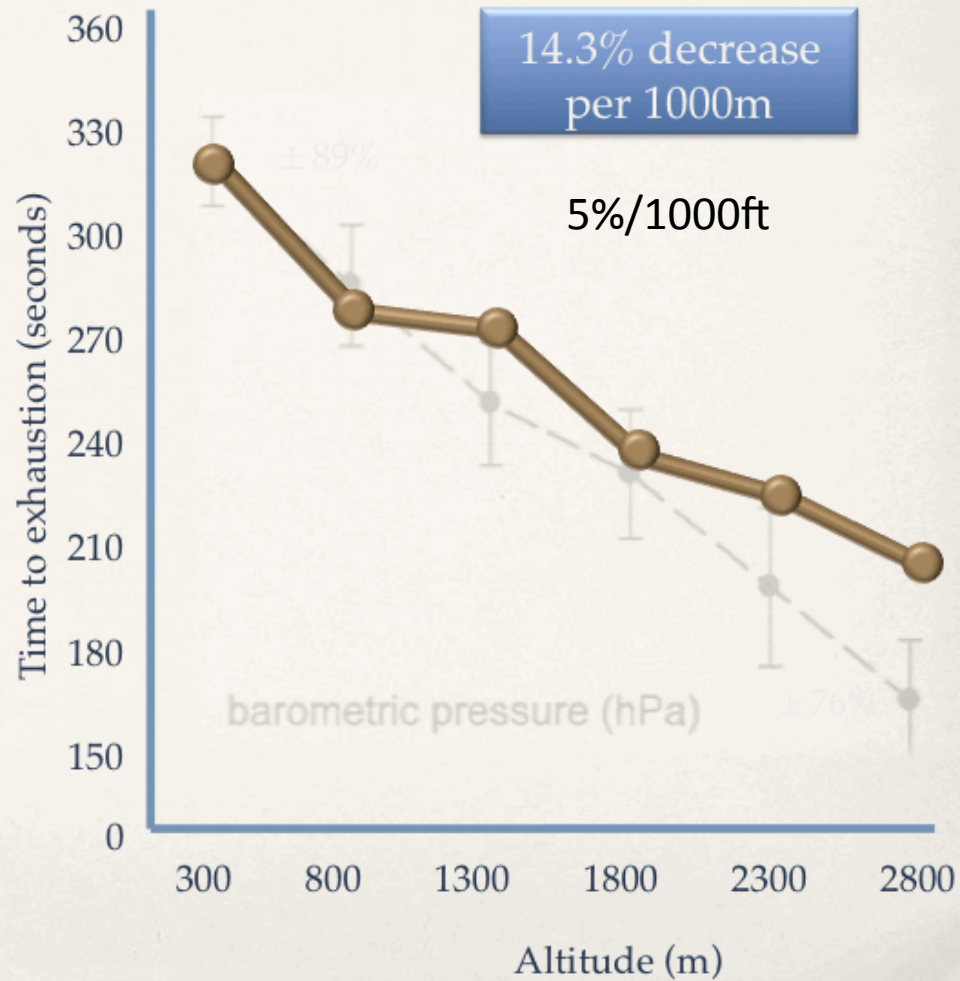
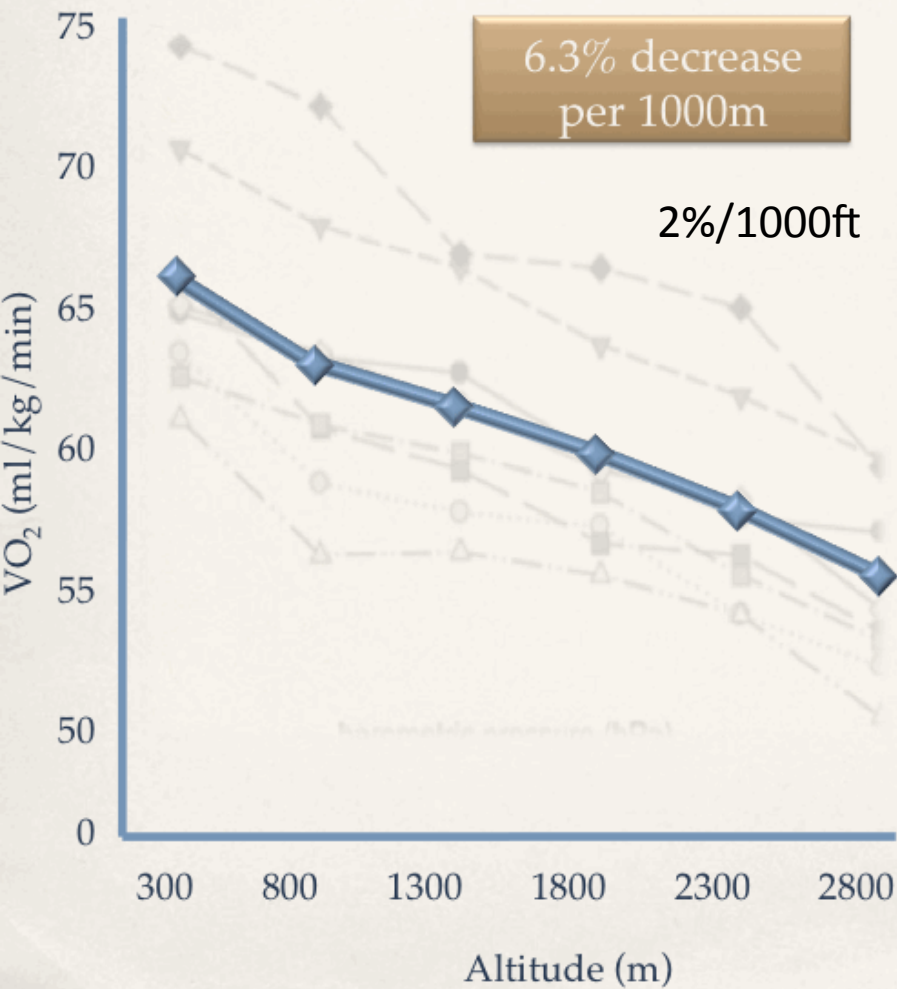


Pre-trip fitness evaluation

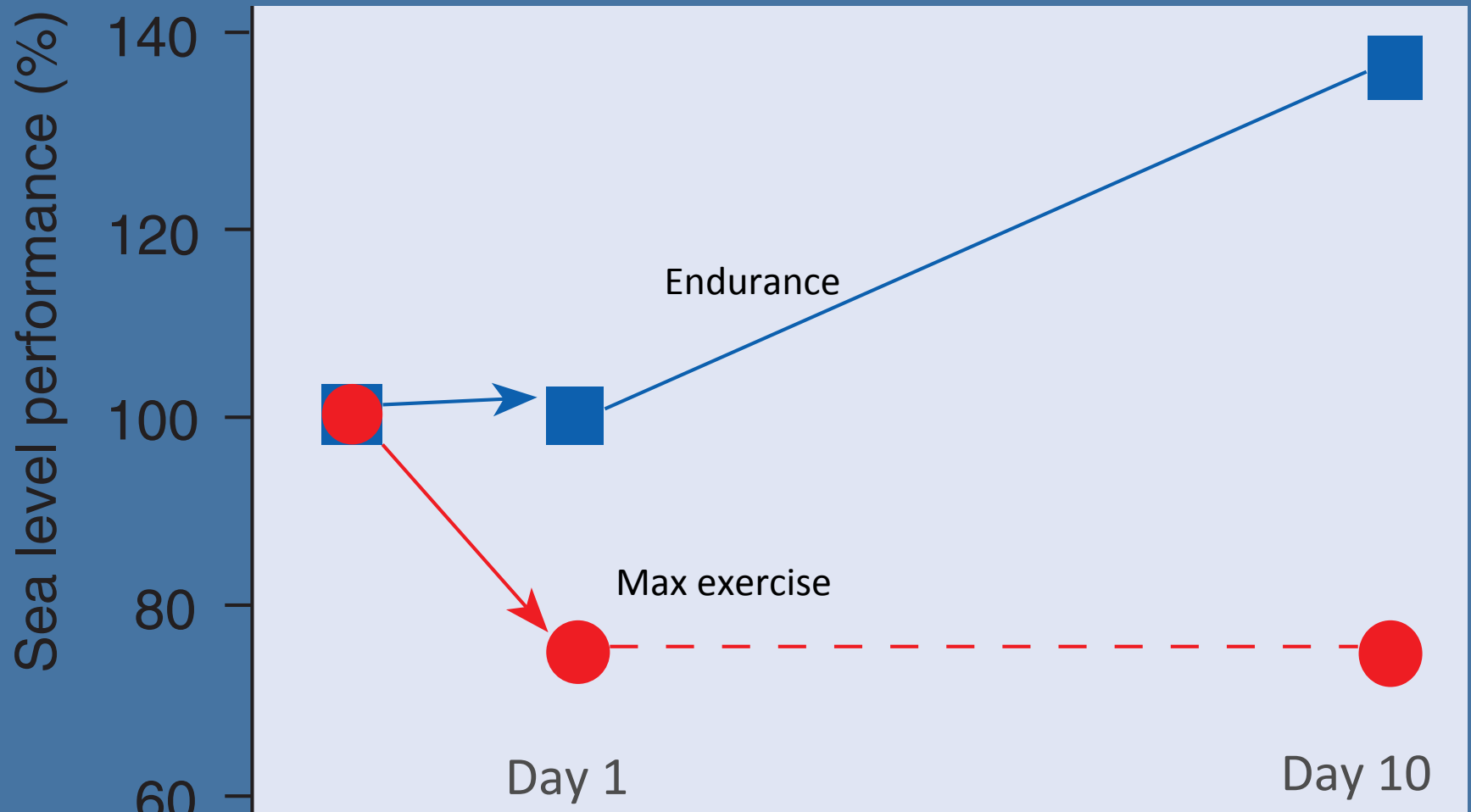
- What's necessary in terms of fitness?
 - Trip requirements
- Good baseline “fitness” important, but does not protect from HAI
 - 12 minute mile with no pack?
 - Accustomed to regular, vigorous exercise?
 - Frequent trips in the mountains?
- Exercise is limited at altitude: “the great equalizer”



High-intensity exercise is very impaired by altitude



Endurance improves with time at altitude



Exercise at altitude

- One has to expect less
 - Adjust pace
 - Able to talk while exercising
 - Take more breaks
 - Adjustment each time coming to altitude
 - Takes 10-14 days for increased endurance
- Or: suffer fatigue, exhaustion

Pre-trip training

- No specific training for high altitude
- Train for exercise demands
 - Good cardiovascular fitness and strength
 - Balance
 - **Scrambling skills:** moving over rough terrain
 - Endurance: long day hikes, not gym

Physical Conditioning for Mountaineering Expeditions

www.alpineinstitute.com/.../physical-conditioning-for-mountaineering-

Physical Conditioning for Mountaineering Expeditions. by Coley Gentzel, Former AAI Program Coordinator and Guide. Mountaineering Fitness and Training | RMI Expeditions - RMI.com

Training for an Alpine Ascents International Program

www.alpineascents.com/denali-train.asp

A Training Program for the Prospective Mountaineering Hardman. By Stacy Taniguchi. Jump to Training Chart So the lure of the "Great One" is getting to the ...

12 Week Mountaineering Fitness Plan Intermediate - FitClimb

www.fitclimb.com/page/12-week-mountaineering-fitness

by Ali Alami - This 12 week training plan is designed to get a person in shape for a mountaineering summit attempt of standard routes on Mt. Rainier, Mt. Shasta, Mt. Whitney, ...

Mountaineering Fitness: Climb Like Ed | Backpacker Magazine

www.backpacker.com/article/9627

In May, mountaineering legend Ed Viesturs became the first American to summit all 14 ... You'll also get an exclusive look at his training regimen (don't worry, we ...

Mountain Athlete: Weight Training for Climbing - Alpinist.com

www.alpinist.com/doc/web08x/wfeature-mountain-athlete-training

How to Prepare for Mountain Climbing: The Exercise Regimen That ...

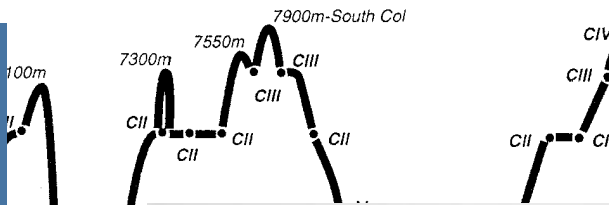
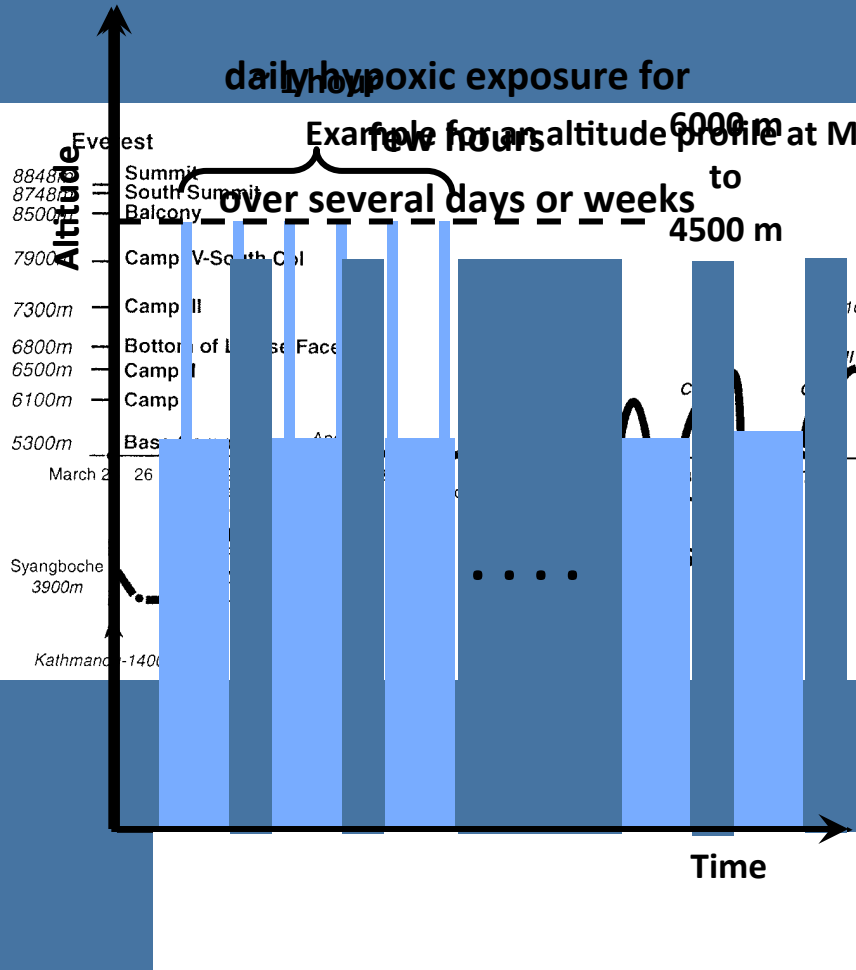
Pre-acclimatization

- YES! If at all possible
 - Altitude exposure is the best
 - Hypoxic exposure to simulate altitude
 - Does it work?

Acclimatization

daily hypoxic exposure for

Example for an altitude profile at Mt. Everest
 over several days or weeks to 6000 m
 4500 m



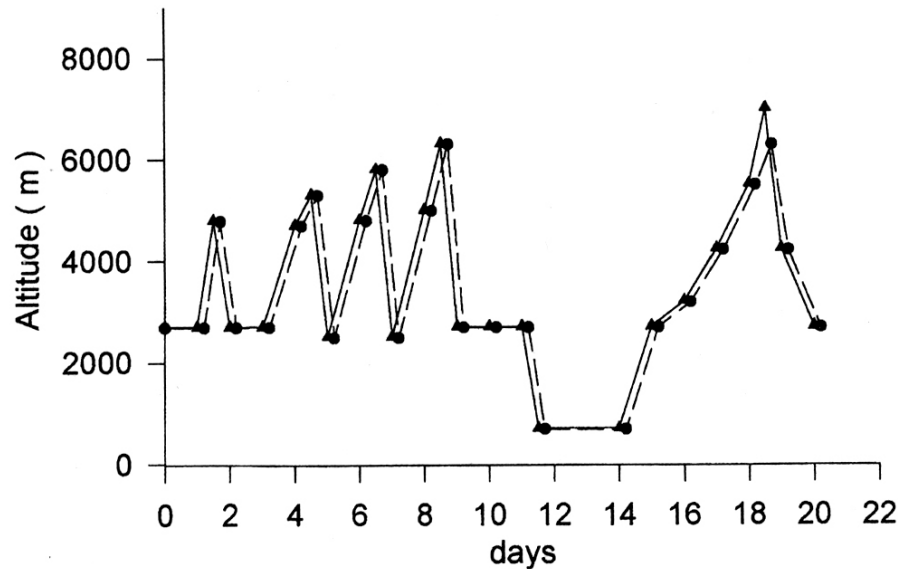
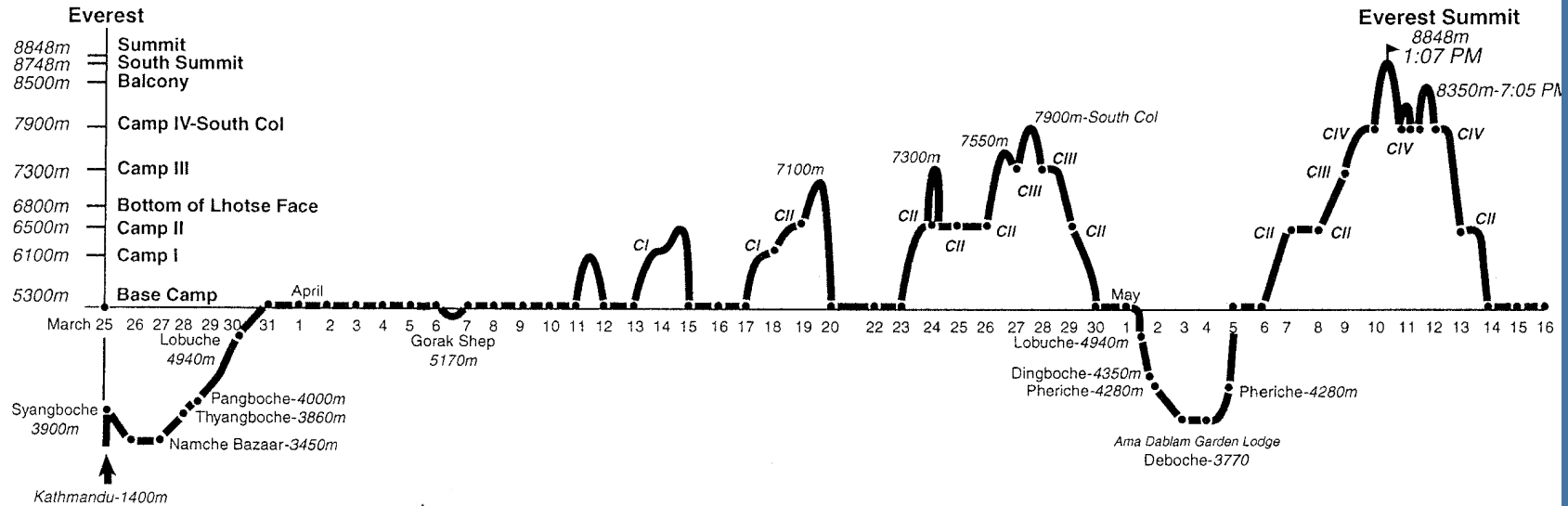
Intention for high altitude

- avoid acute mountain sickness (AMS)
- (improve performance)

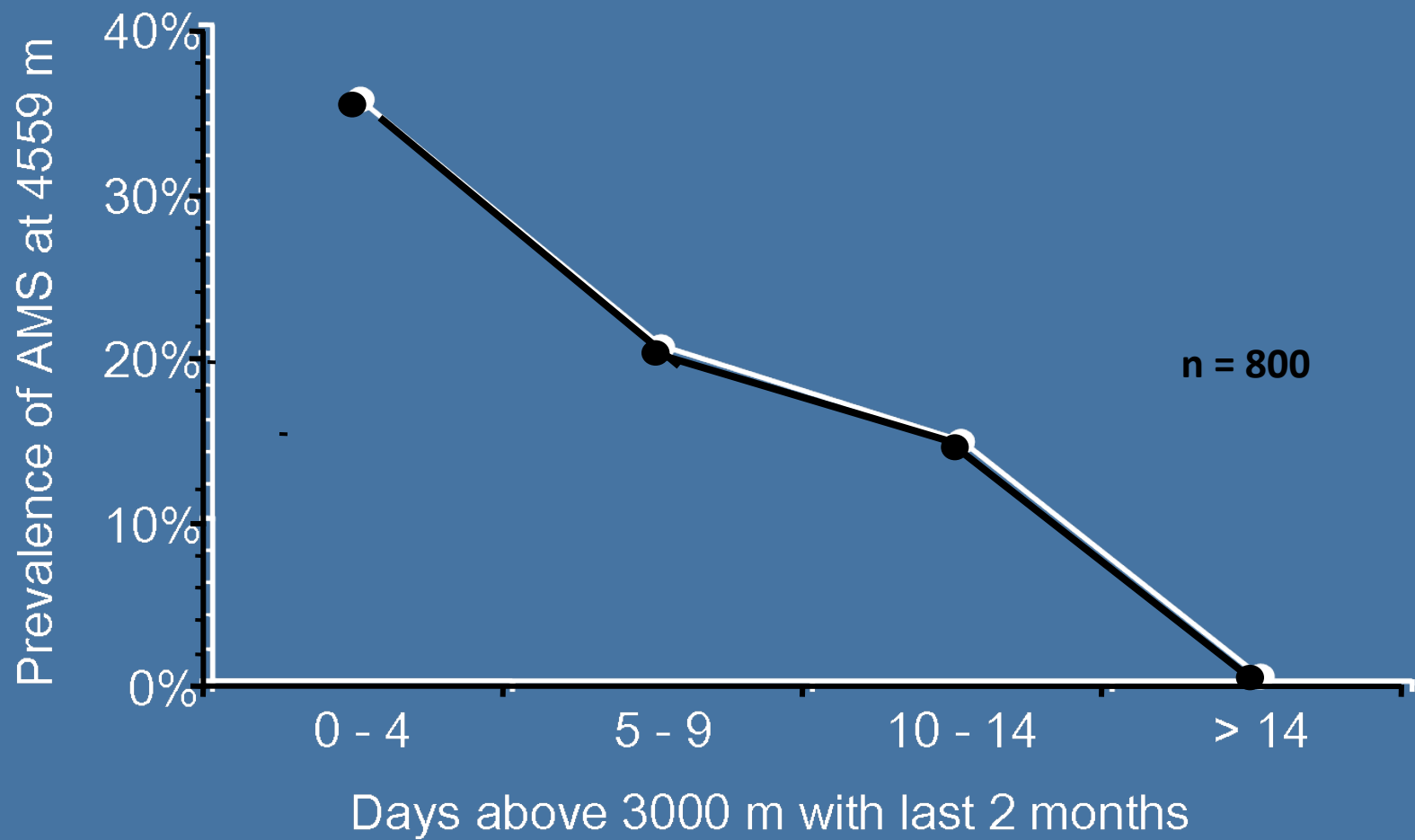
Everest Summit
 8848m
 1:07 PM



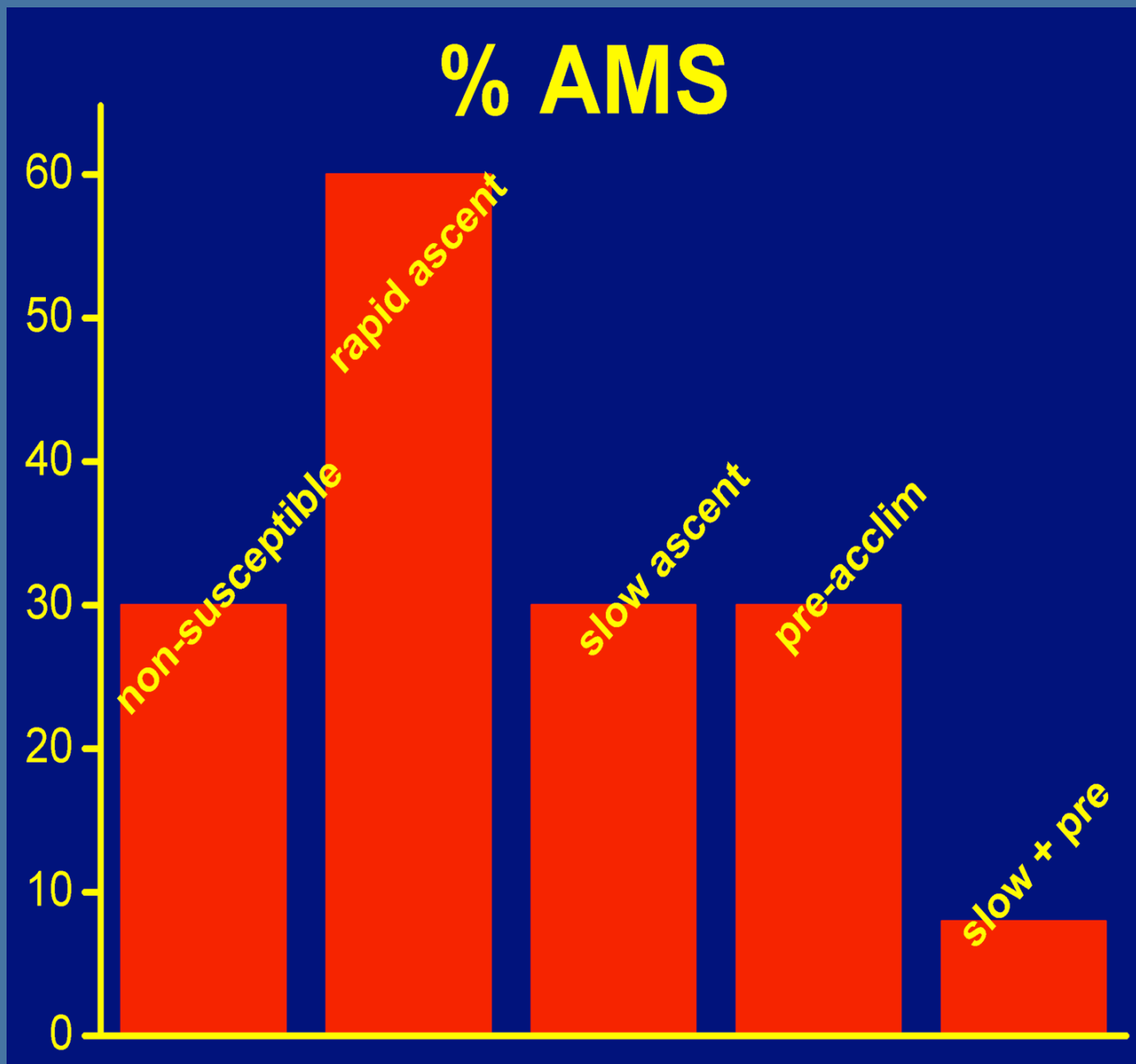
Acclimatization in „natural“ hypoxia



According to Bärtsch, MSSE 1999



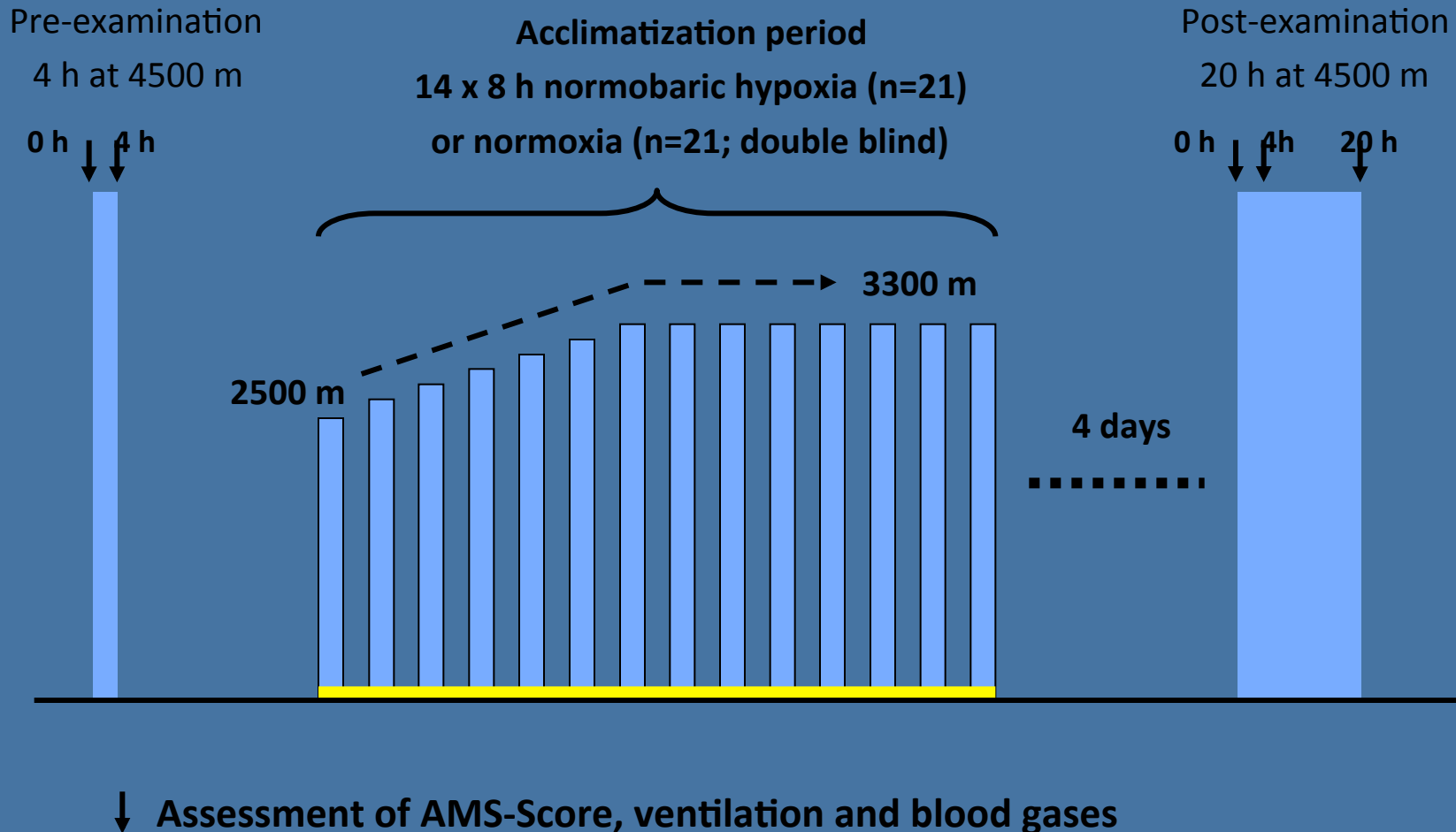
According to Schneider et al., MSSE 2002



Acclimatization by „artificial“ hypoxia

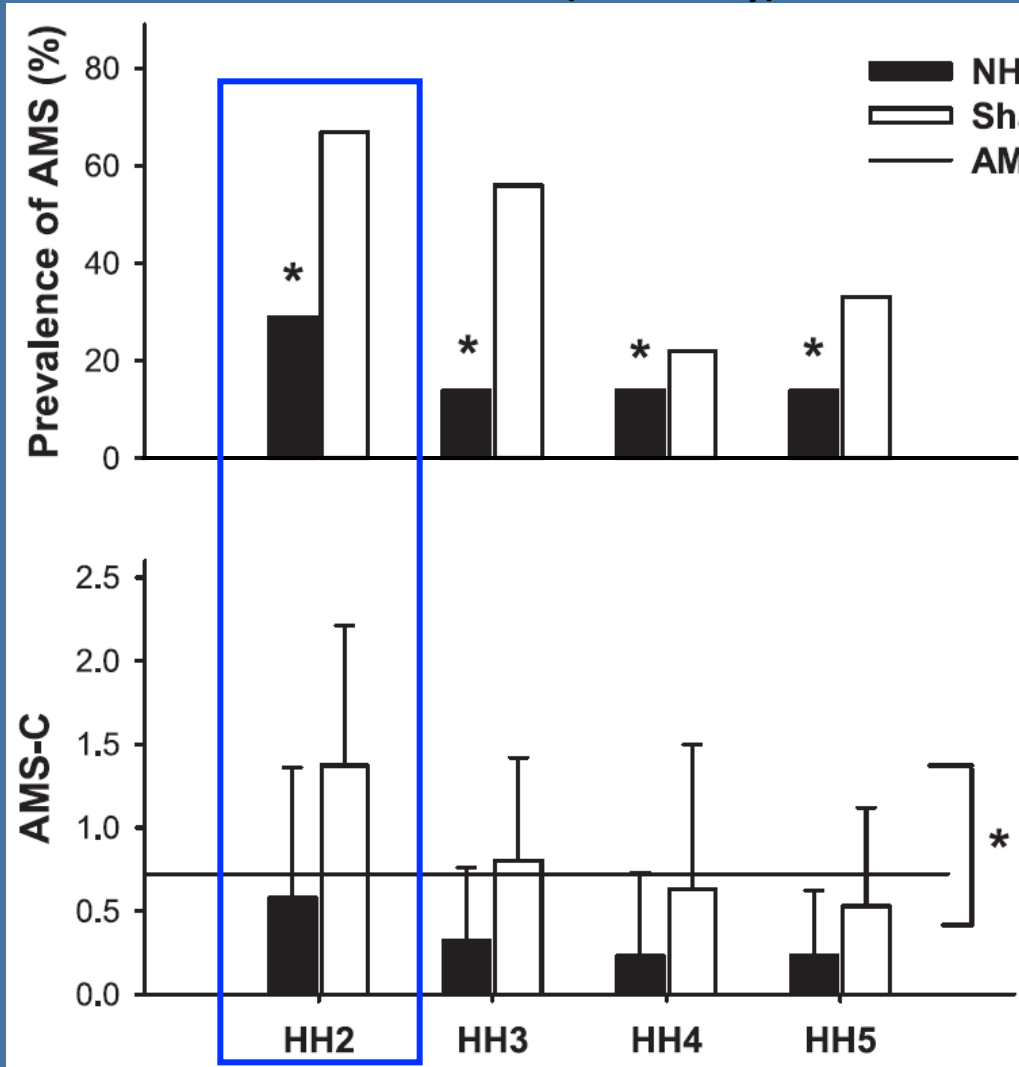
Daily duration	No. of sessions / trail period (d)	Altitude (m)	Subjects (n)	Study design	Testing Altitude	study outcome (AMS)
<i>Fulco C.S., Am J Physiol 2010</i> 7,5 h	7 / 7	2200→3100 (2650)	23	controlled double blinded	4300	AMS incidence ↓ AMS-C Score ↓
<i>Beidleman B.A., HAMB 2009</i> 24 h	6 / 6	2200	10	uncontrolled cross over	4300	AMS incidence ↓ AMS-C Score ↓
<i>Dehnert C., MSSE 2009 (Abstr.)</i> 8 h	14 / 14	2500 →3300 (2600)	42	controlled double blinded	4500	AMS incidence ↓ AMS-C Score ↓
<i>Beidleman B.A., Clin Sci 2004</i> 4 h	15 / 21	4300	6	uncontrolled not blinded	4300	AMS incidence ↓ from 3 / 6 to 0 / 6
<i>Burse R.L., Aviat Space Environ Med 1988</i> 7,4 h	10 / 10	3370	22	controlled single blinded	4500	AMS incidence ↓ (trend) no diff. in AMS-C score
<i>Lyons T.P., Aviat Space Environ Med 1995</i> 24 h	16 / 16	4300	6	uncontrolled not blinded	4300	AMS-C Score ↓
<i>Richalet J.-P., IJSM 1992</i> 1 week (continuously) at then 38 h within 4 d at		4350-4800 5000-8500	5	uncontrolled not blinded	Mt. Everest	no altitude related problems during ascent to 7800 m at Mt. Everest

Acclimatization by artificial hypoxia (intermittent hypoxic exposure during sleep)

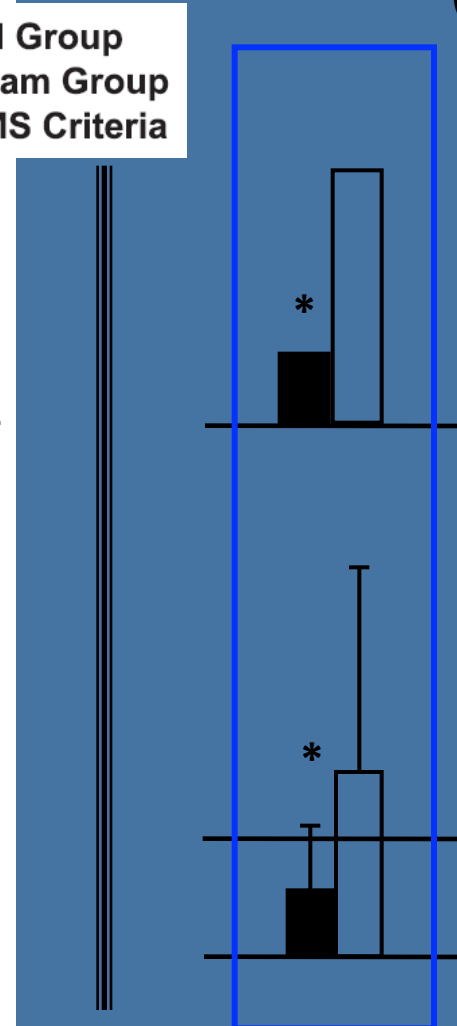


Acclimatization by artificial hypoxia (intermittent hypoxic exposure during sleep)

4300 m after 7 d @ 2650 m (7,5 h / day)



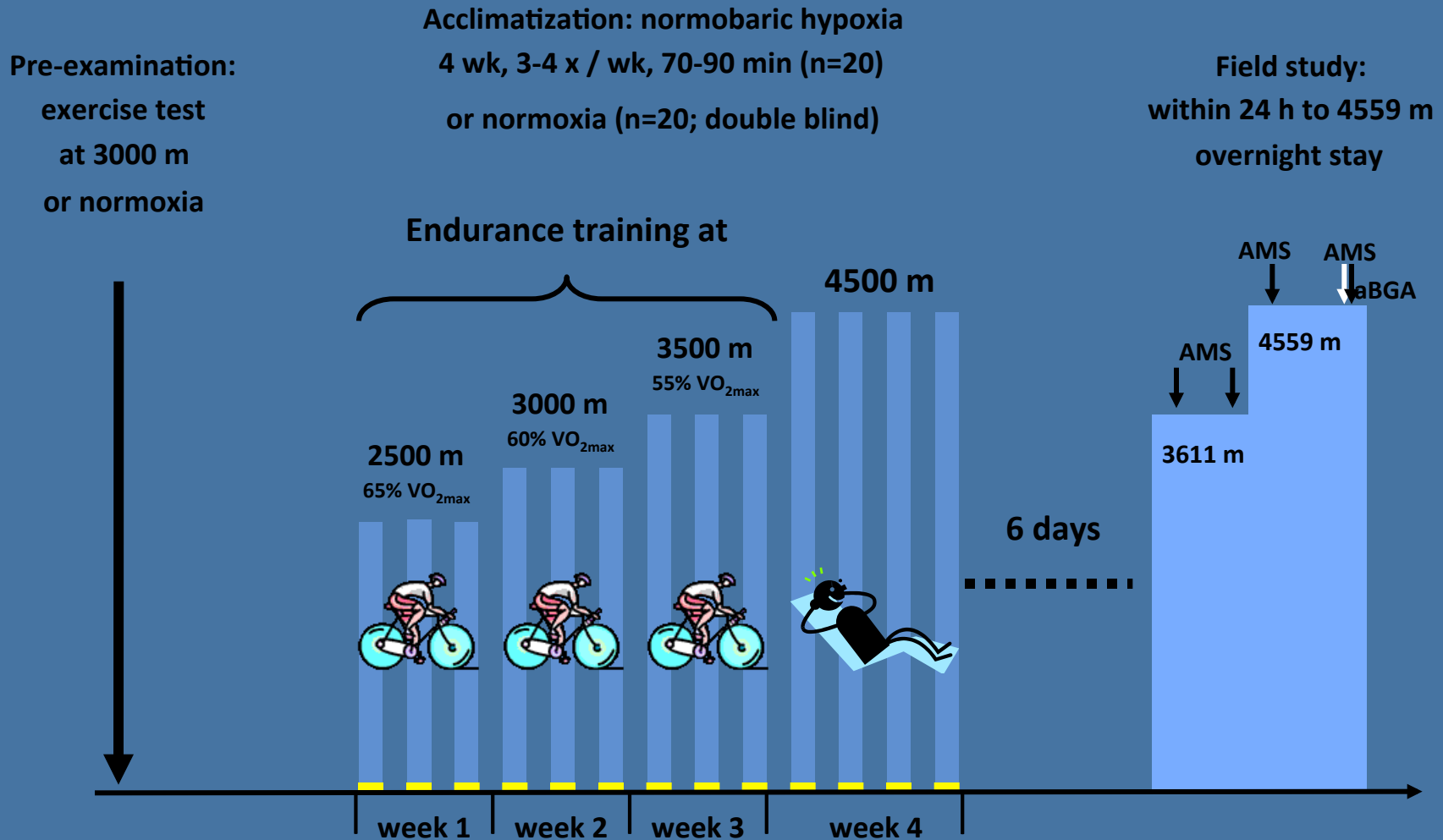
4500 m after 14 d @ 2600 m
(8 h / day)



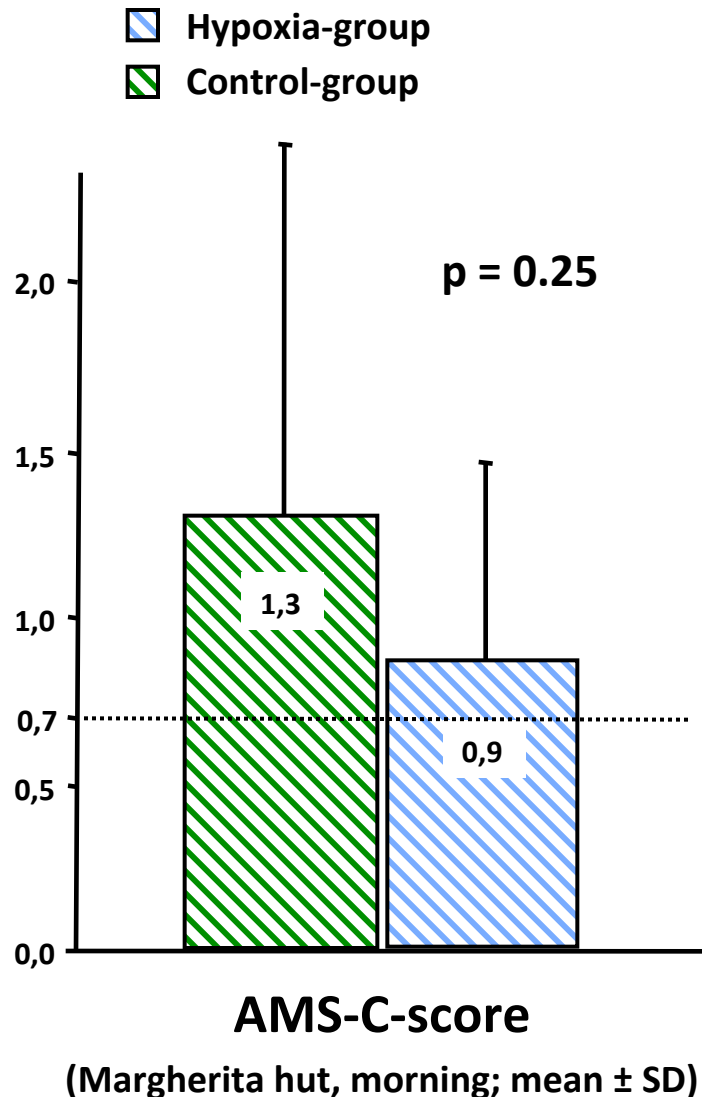
Short term „artificial“ hypoxia

Daily duration	No. of sessions / trail period (d)	Altitude (m)	Subjects (n)	Study design	Testing altitude	Study outcome (AMS)
<i>Wille M., Scand J Med Sci Sports 2012</i>						
60 Min	7 / 7	4500	26	controlled double blinded	5300	AMS incidence ↓ (trend) AMS-C score ↓
<i>Schommer K., HAMB 2010</i>						
70-90 Min	13 / 28	2500 → 4500	40	controlled double blinded	3611 4559	AMS incidence ↓ AMS incidence and score ↔

Acclimatization by artificial hypoxia (short term active exposure)



Acclimatization by artificial hypoxia (short active exposition)



AMS definition:
AMS-C-score > 0.7

	AMS +	AMS -
Hypoxia	50%	50%
Control	55%	45%

p = 0.98

Recommendations

Minimal requirements for prevention

- 7 sessions (1 week), 7 h per day
- altitude depending on target altitude:
 - min. effective altitude 2200 – 2500 m
 - not more than 1500 – 2000 m below target altitude
 - graded increase of altitude possible
- short term protocols may attenuate symptoms but not the incidence of AMS

Summary

- Screening can be useful to match client and trip
 - Care with evaluating responses
 - Medical advisor very useful
- Training not specific for high altitude
- Pre-acclimatization works
 - Altitude/hypoxic exposure diminishes AMS, improves performance
 - Some acclimatization lasts for 2-4 weeks