



# Tailoring Prophylaxis for Peak Performance



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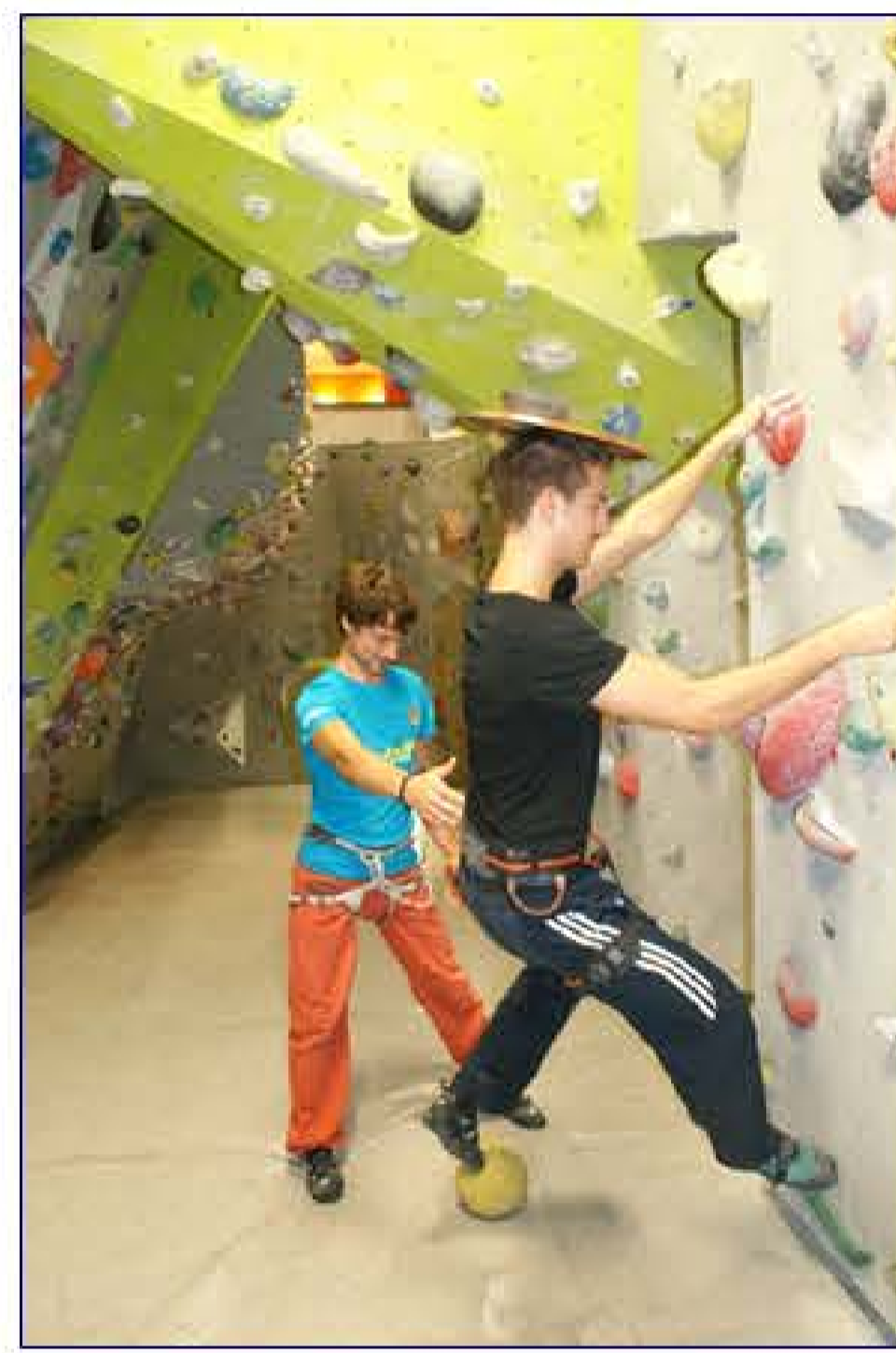
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## Objectives

Climbing has a low risk of injury. It strengthens the entire musculature and develops flexibility and coordination abilities. Due to its benefits in physical and mental health as well as its high fun factor climbing is an established way of therapy. A crucial requirement for active people with haemophilia (PWH) is consequent prophylaxis. As the patient's individual pharmacokinetic (PK) response varies significantly, personalized prophylaxis can significantly decrease bleeding frequency.

**The aim of the study** was the implementation of the concept of individualized prophylaxis for physically active PWH. Climbing therapy under tailored therapy shall be evaluated for PWH.



Climbing therapy

## Methods

7 patients with severe haemophilia A (HA) and 2 patients with severe haemophilia B (HB) in the 16-35 age group took part in a weekly climbing program (January-August 2013) and a three-day climbing camp. Adherence to therapy, bleeding frequency, joint health (HJHS), quality of life (Haemo-QoL-A) and climbing performance (UIAA scale) was assessed before and after the training. Bayesian model based PK (HA) was determined in dependence of the training state (VO2 max) and under extended sustained effort (during a high altitude hike). HB patients underwent repeated trough level measurements. Personalized prophylaxis was targeted to a lowest trough level of 1-3% and adapted to the individual bleeding phenotype. For high-impact activities a factor activity >15%, for low-impact activities a factor activity >5% was suggested.

PK-tailored prophylaxis profile

Name: XXXXX XXXX, Date of birth: XX.XX.1988  
Date of the examination: 21.02.2013  
Height: 169 cm, Weight: 67.5 kg  
Age: 25 years

PK results (based on Bayesian statistics):  
Elimination half-life (t<sub>1/2</sub>): 16.3 h  
Volume of Distribution (V<sub>D</sub>): 24.3 dL, Clearance (CL): 1.5 dL/h  
PK-Graph (prior to prophylaxis) after the infusion of 2000 IU of Advate

Recommended prophylaxis:  
Product: Advate  
Favored intervals: 0 fixed daily intervals, fixed weekdays: Tuesday and Friday, 2000 IU

Day	Prophylaxis (in IU)	Sports program	Extra Infusion (in IU)
Monday		Office day	≥ 3000
Tuesday	2000	Climbing	
Wednesday			
Thursday			≥ 500
Friday	2000	Squash	
Saturday			
Sunday		Swimming	≥ 500

Legend: green: safe, yellow: safe for low impact activities, red: not safe

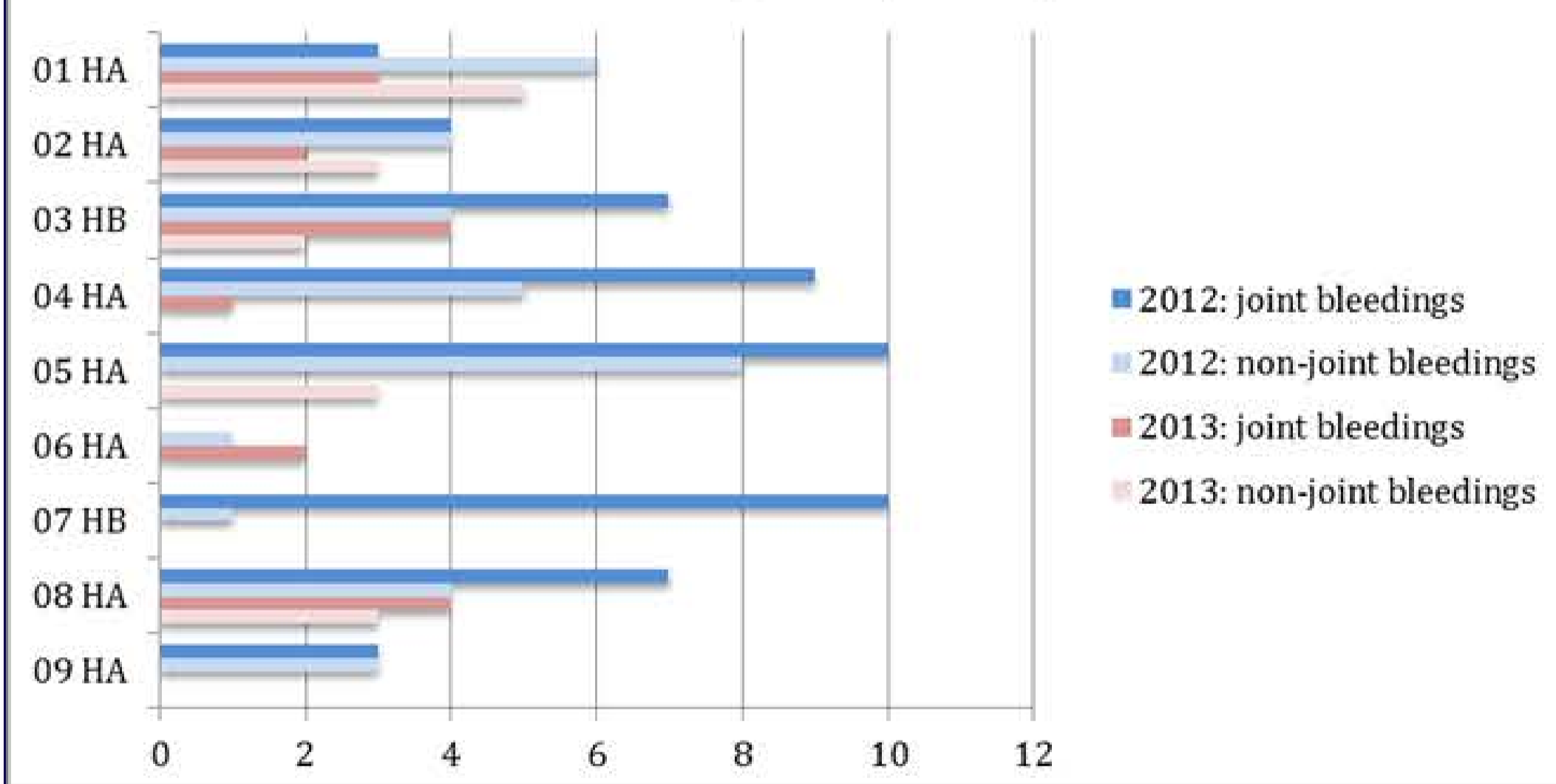
- Trough levels shall never fall < 1% and ideally not < 1% to avoid inapparent minor bleeds
- Factor levels > 15% (> 5%) are needed for high/low impact activities
- Ideally plan sports activities closely to peak levels - otherwise extra infusions may be needed as indicated

**Handout for the patient**

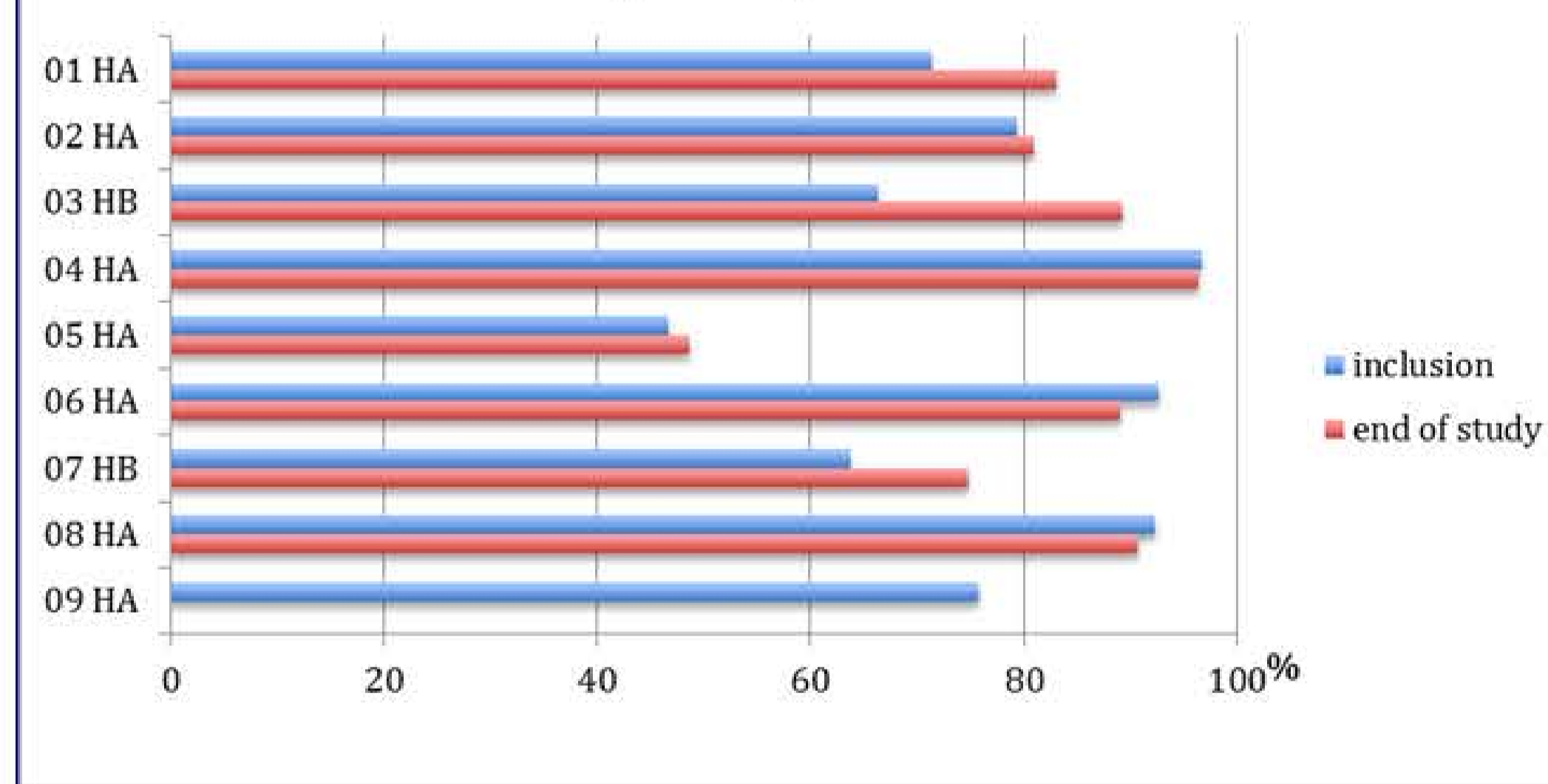
## Results

Climbing therapy was safe. The adherence to the program was high. Bleeding frequency decreased in most of the patients. Bleeding events were caused by missed infusions and were not triggered by physical activity. Joint health was particularly improved in the categories range of motion and swelling. Quality of life scores increased. Climbing performance improved by 0.5-1 grade. Half-lives ranged from 13.54h to 16.33h. PK was not influenced by the training state or extended sustained effort.

### Bleeding frequency

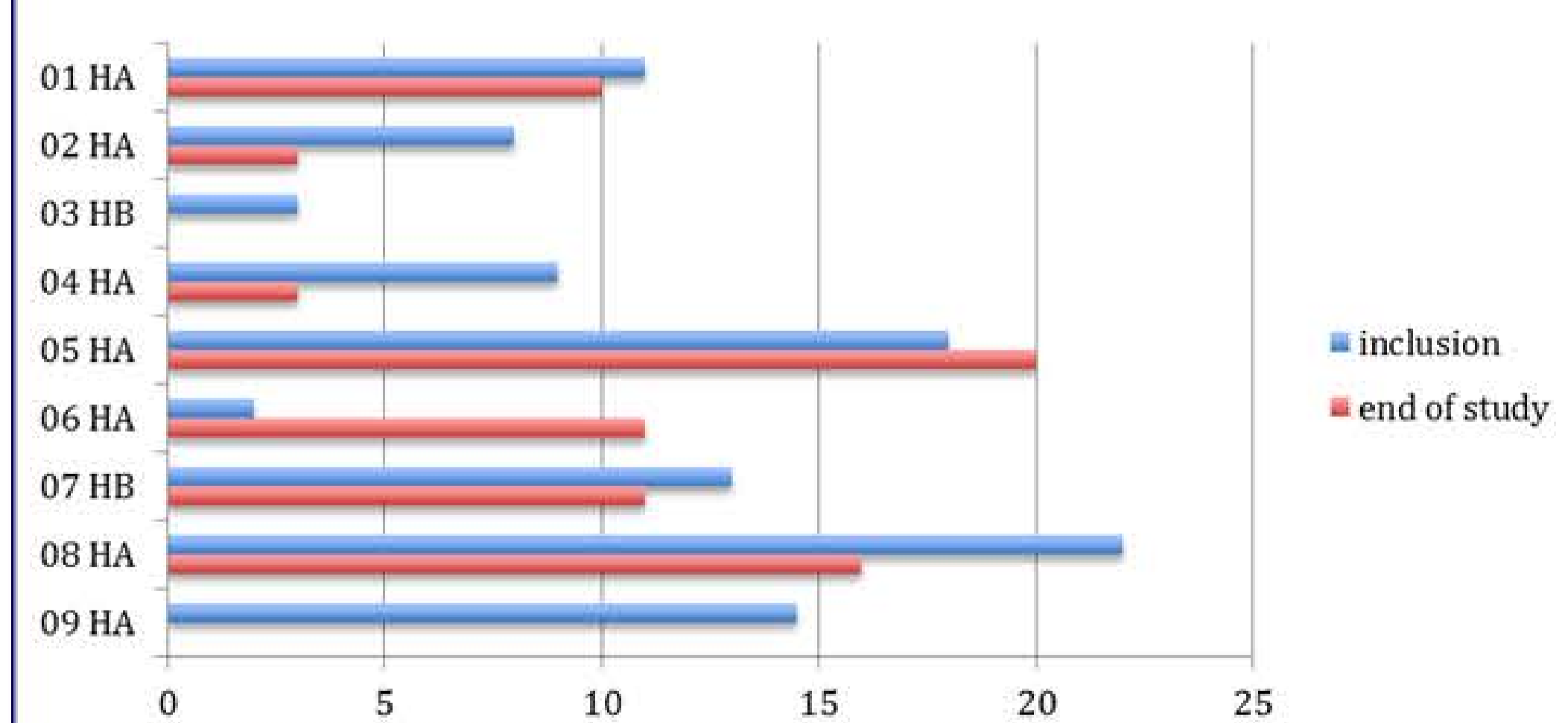


### Quality of life

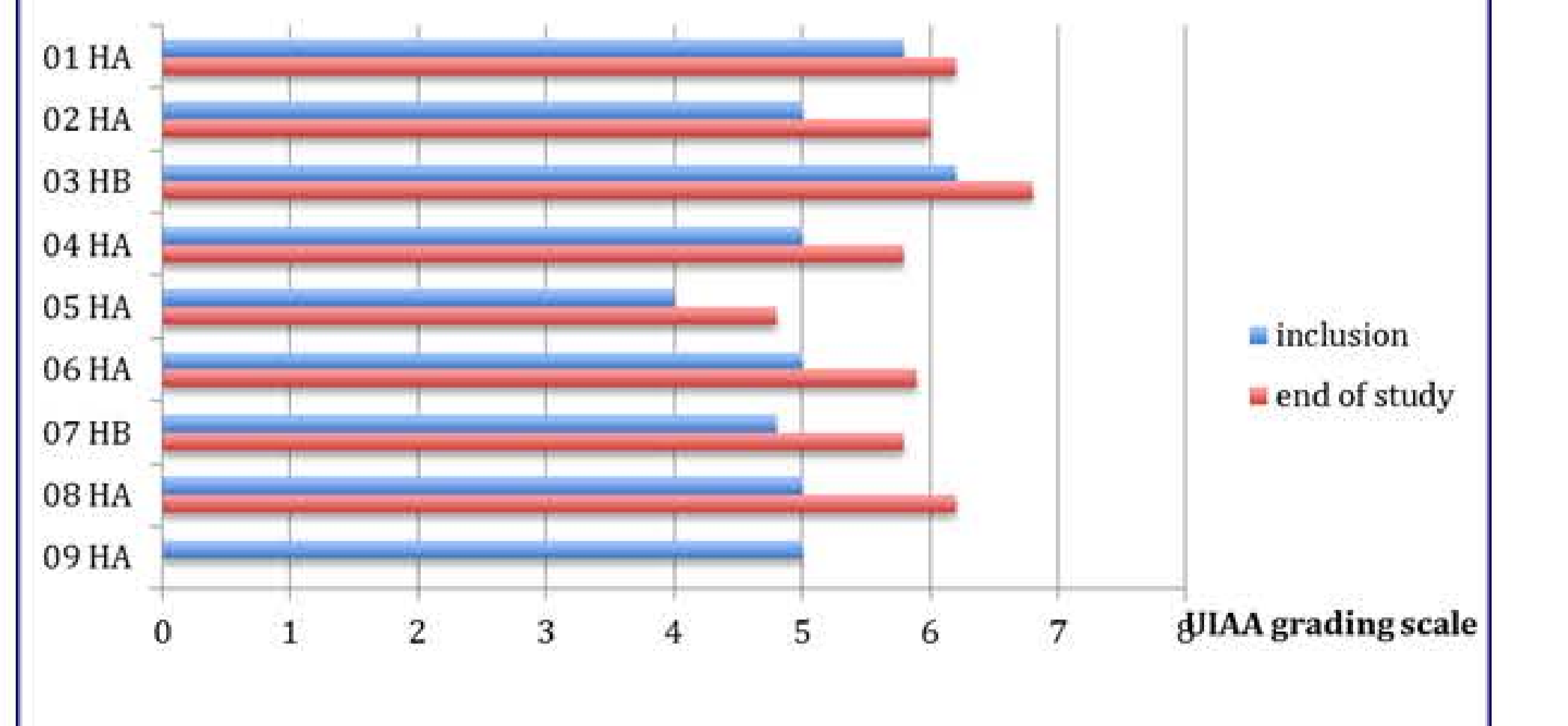


At inclusion: mild swelling, extension deficit +10°

### HJHS total score



### Climbing performance



End of the study: no swelling, flexibility was normal (extension: +2°)

## Conclusions

The combination of personalized prophylaxis with therapeutic climbing improved outcome for young adults with severe haemophilia. The tailored concept for high- and low-impact activities appeared to be safe. The study was supported by Bayer Health Care and Baxter Germany

