

S Rauch, K Schenk, G Strapazzon, T d Cappello, M Erckert, B Bliemsrieder, L Oberhuber, H Gatterer, H Brugger, P Paal

eurac
research

Suspension Syndrome



DEFINITION

- Pathophysiologic response of the human body being suspended **motionless** in a vertical position for an extended period of time
- Symptoms include pre-syncope and can lead to a loss of consciousness
- Potentially life-threatening disorder!

Roeggla G, Moser B, Roeggla M. Suspension trauma. Emerg Med J. 2008;25:59.

RELEVANCE

Climbing...



Courtesy of K. Grasegger

RELEVANCE

Workplace...

8699

BGI/GUV-I 8699



Information

Erste Hilfe

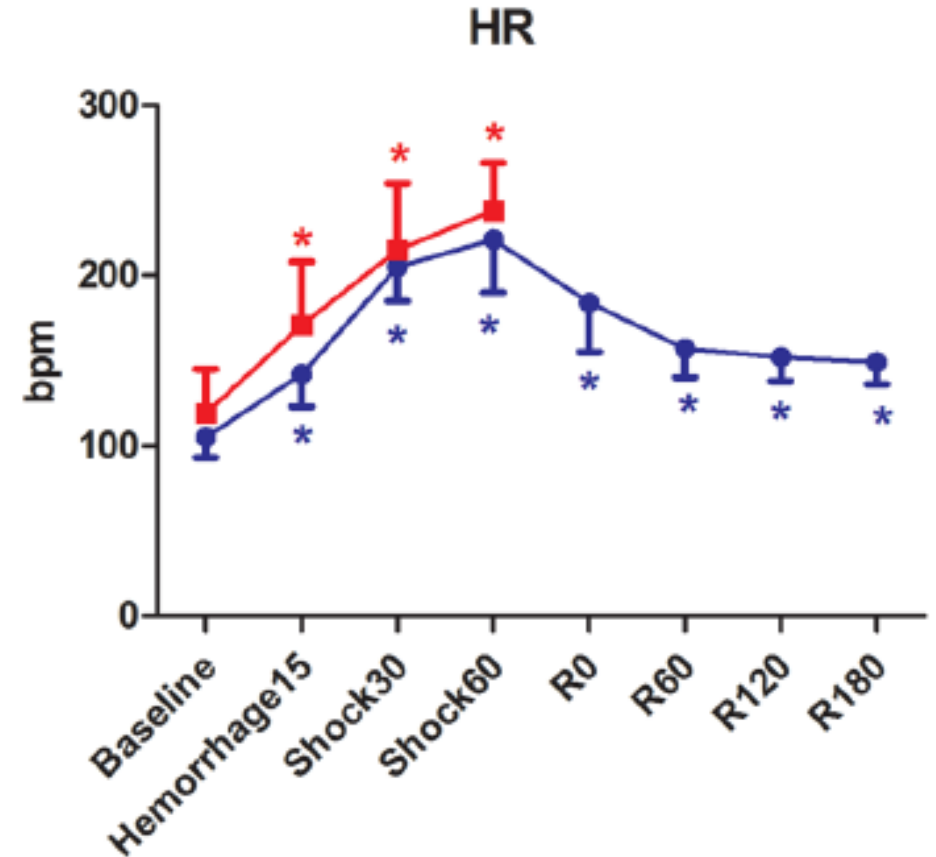
Notfallsituation: Hängetrauma

PATHOPHYSIOLOGY

Since the 1970s the exact pathophysiological mechanism is debated...

Hypovolemic shock??

Group

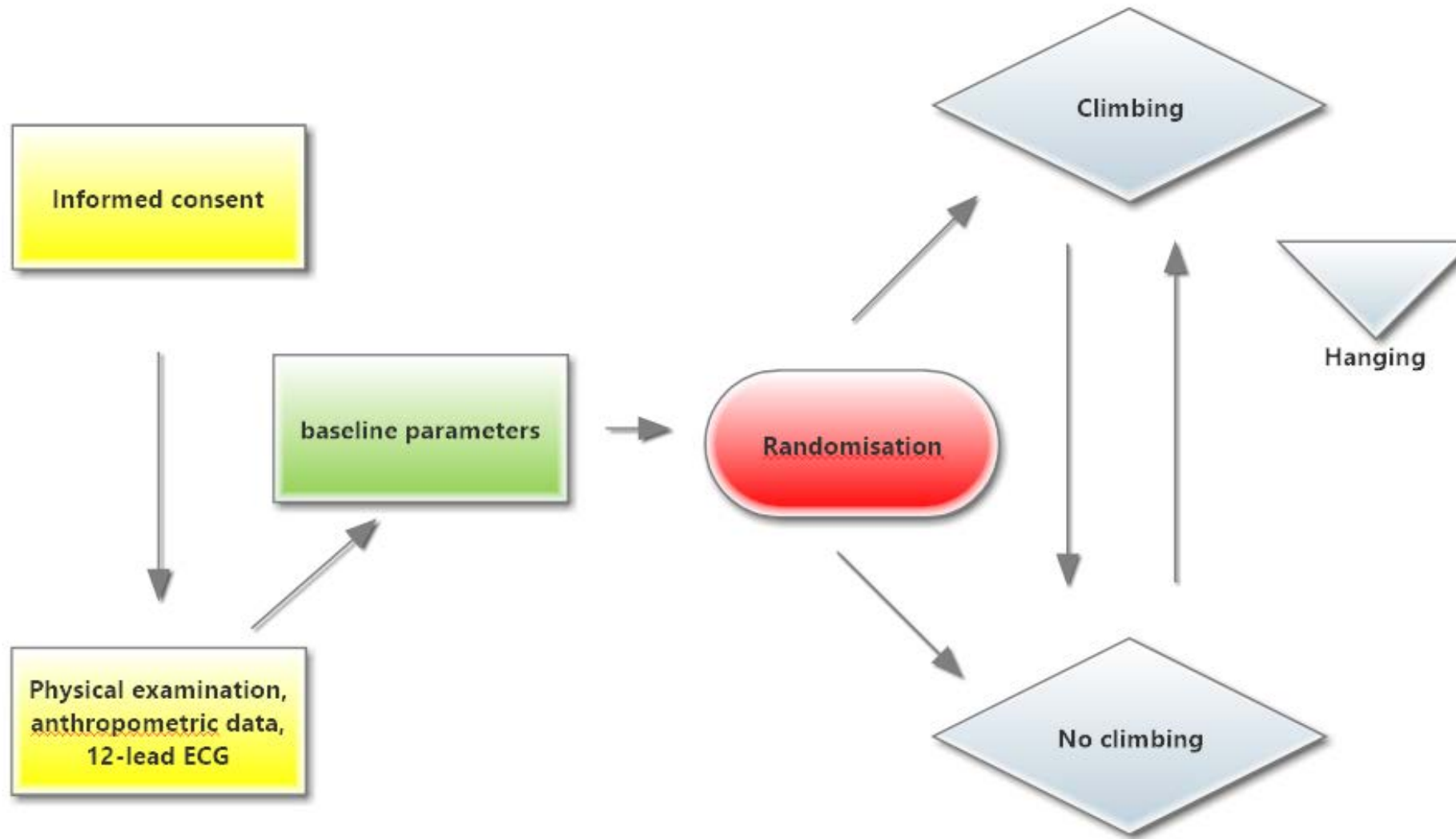




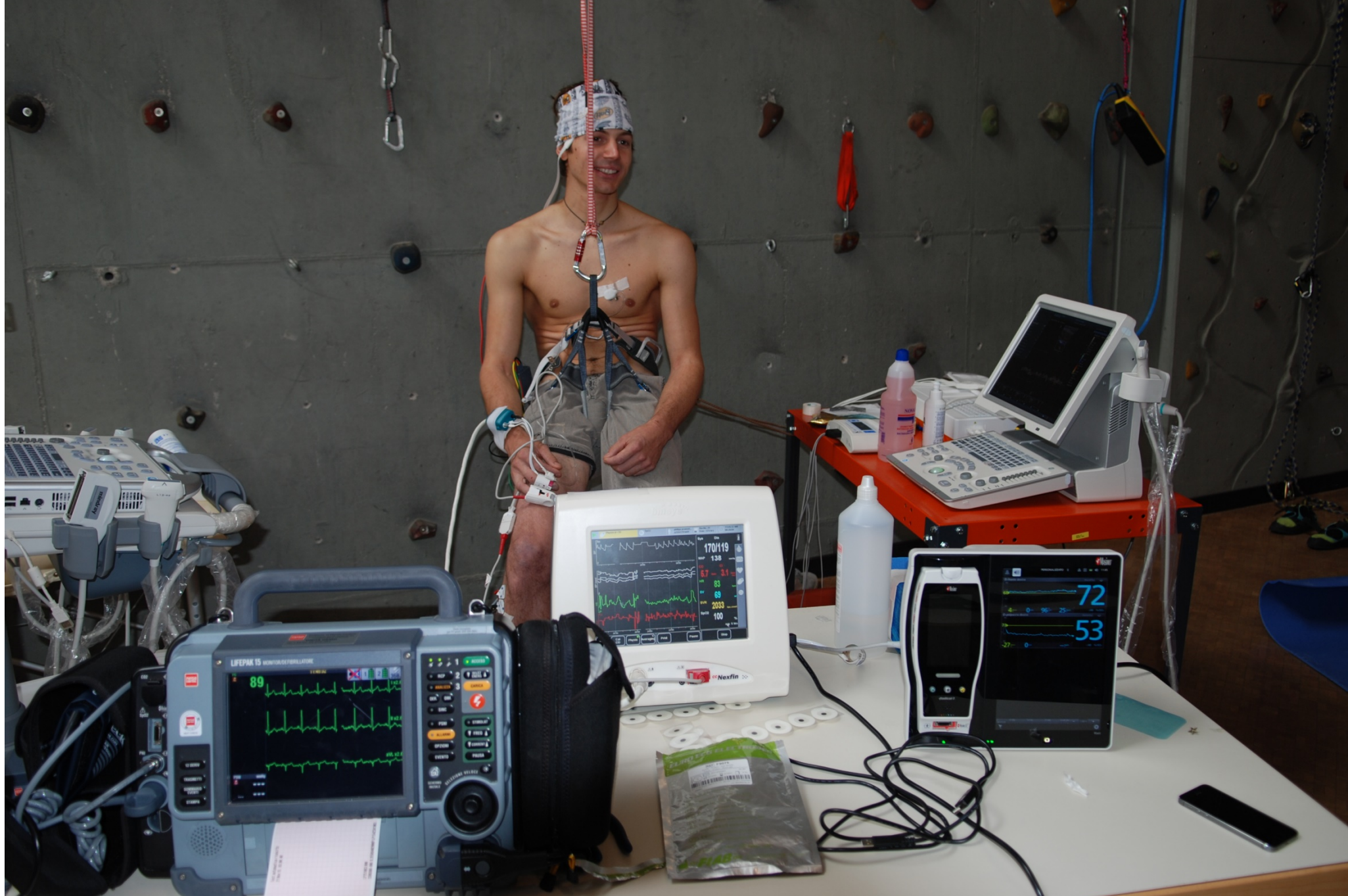
OBJECTIVE

To better understand the pathophysiological basis of suspension syndrome and to develop practical recommendations for prevention and treatment

STUDY DESIGN



Hanging



Climbing...



...& hanging



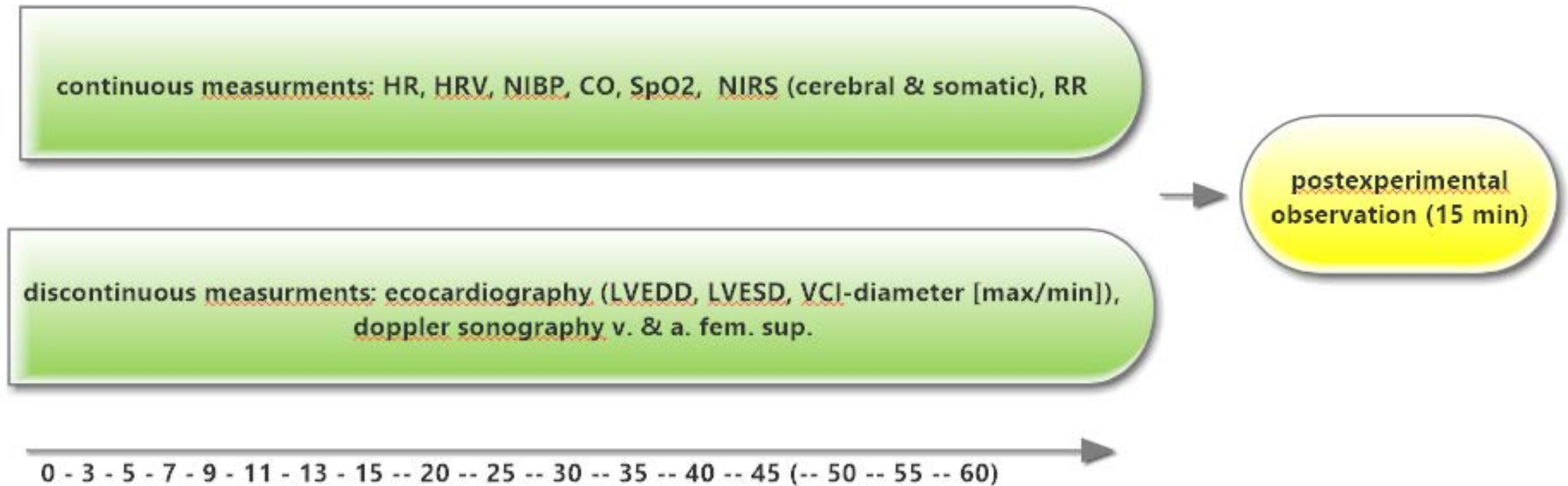
...& hanging



...& hanging



STUDY DESIGN



HAEMODYNAMICS

1. Nexfin[®]:

- Heart rate
- Heart rate variability
- Blood pressure (SAP, DAP, MAP)
- Stroke volume
- SpO2



HAEMODYNAMICS

2. Echocardiography:

LVEDD, LVESD



VENOUS POOLING

1. Ultrasound:

Superficial femoral vein (SFV)



VENOUS POOLING

2. Somatic NIRS



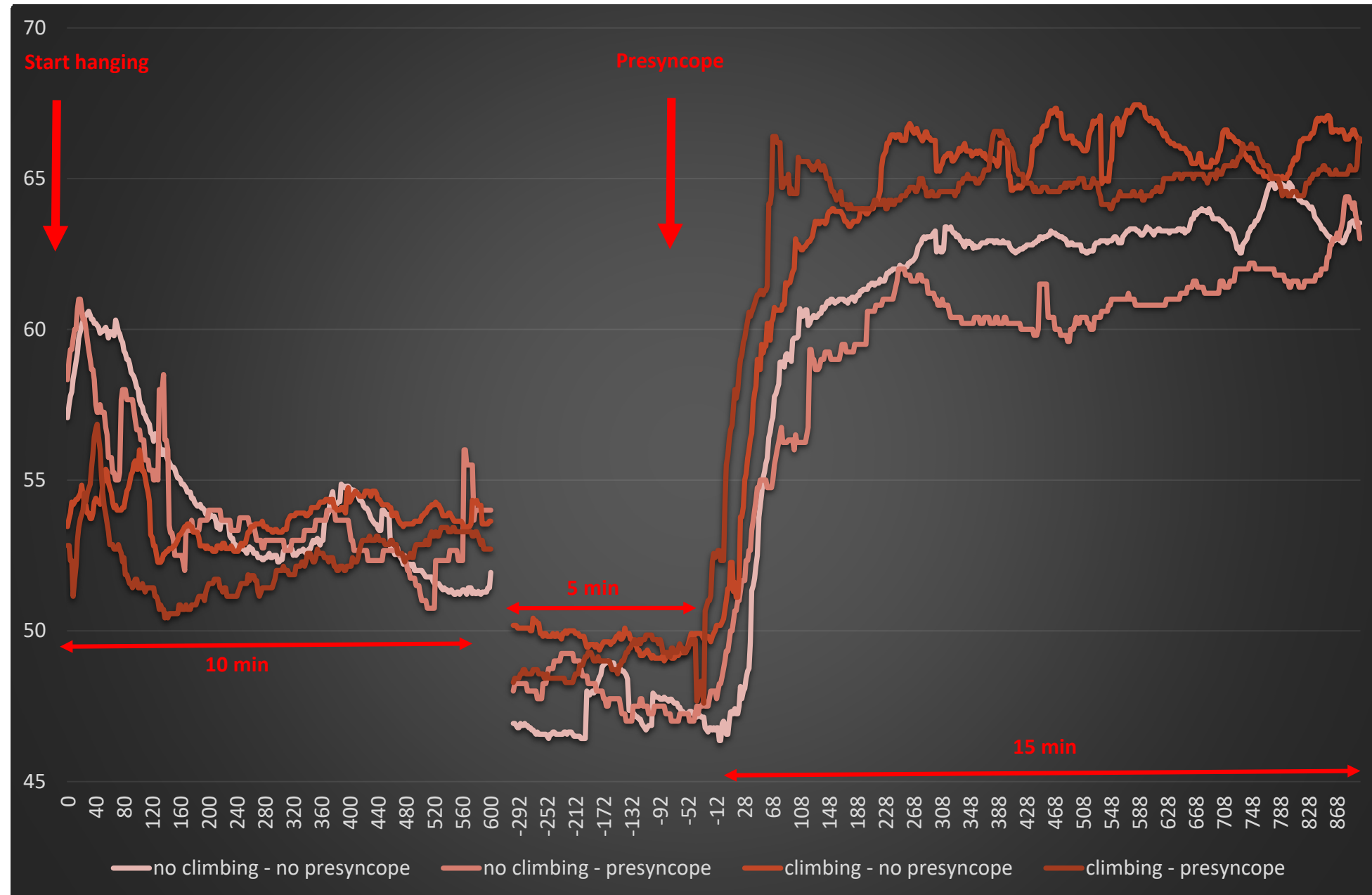


RESULTS

Number of participants	20
Number of tests	40
Mean age	31.1
Range of age	21-46
Mean BMI	22.18
Mean duration of hanging (min)	46.45
Minimal duration of hanging (min)	14
n presyncope	12 (30%)

VENOUS POOLING?

...regional SO2



VENOUS

POOLING?

SFV ultrasound



VENOUS

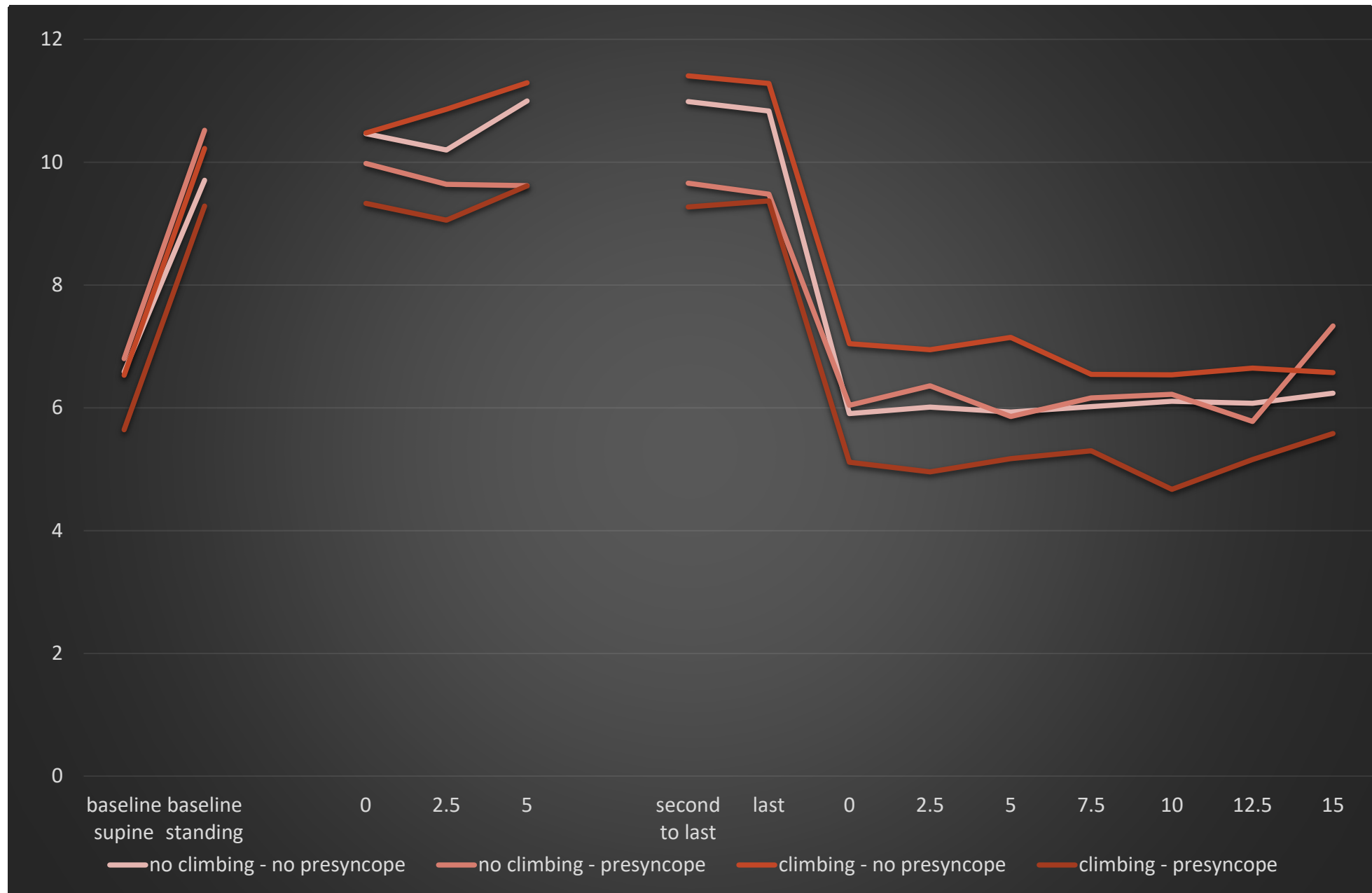
POOLING?

SFV ultrasound



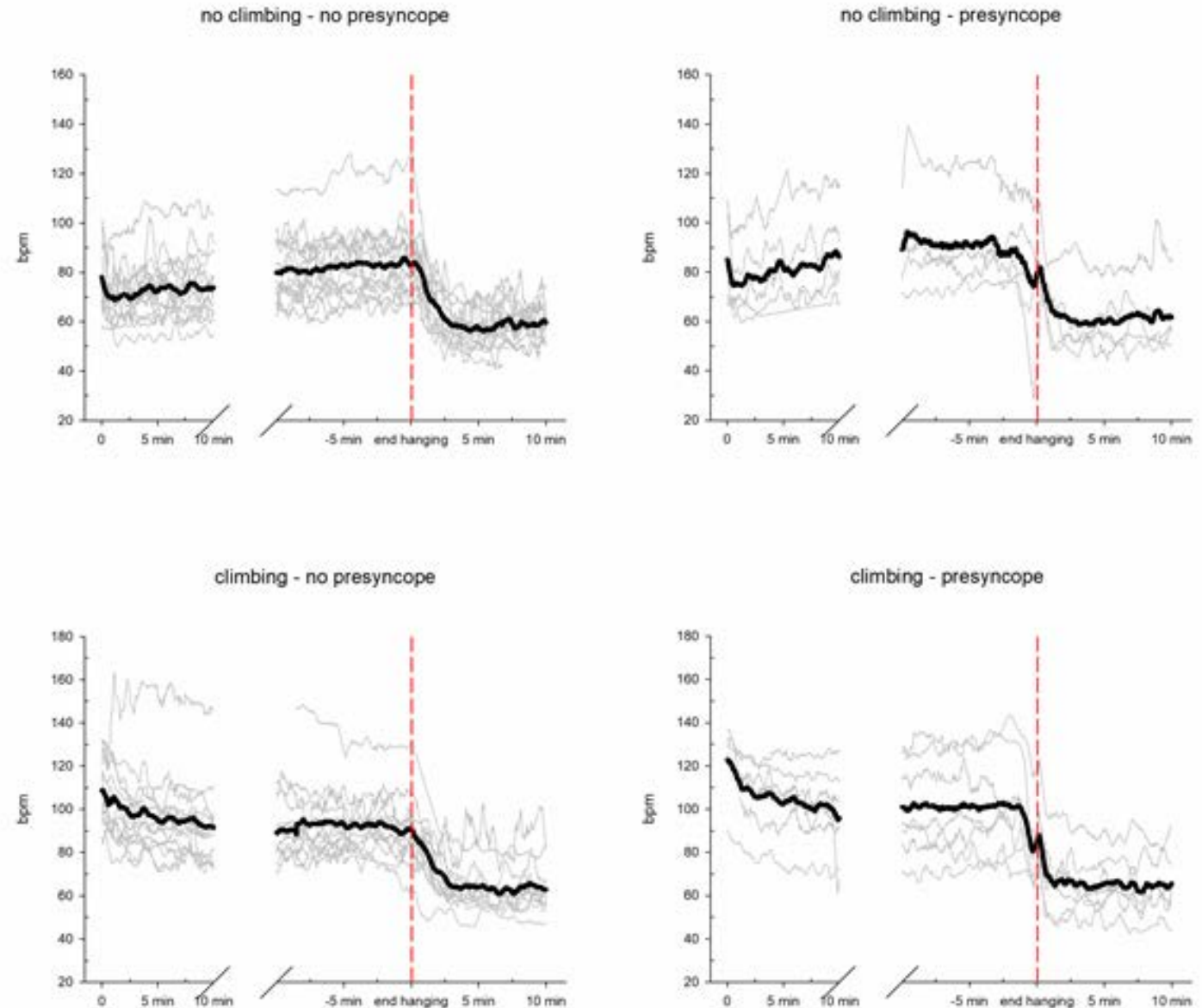
VENOUS POOLING?

SFV ultrasound



Haemodynamics

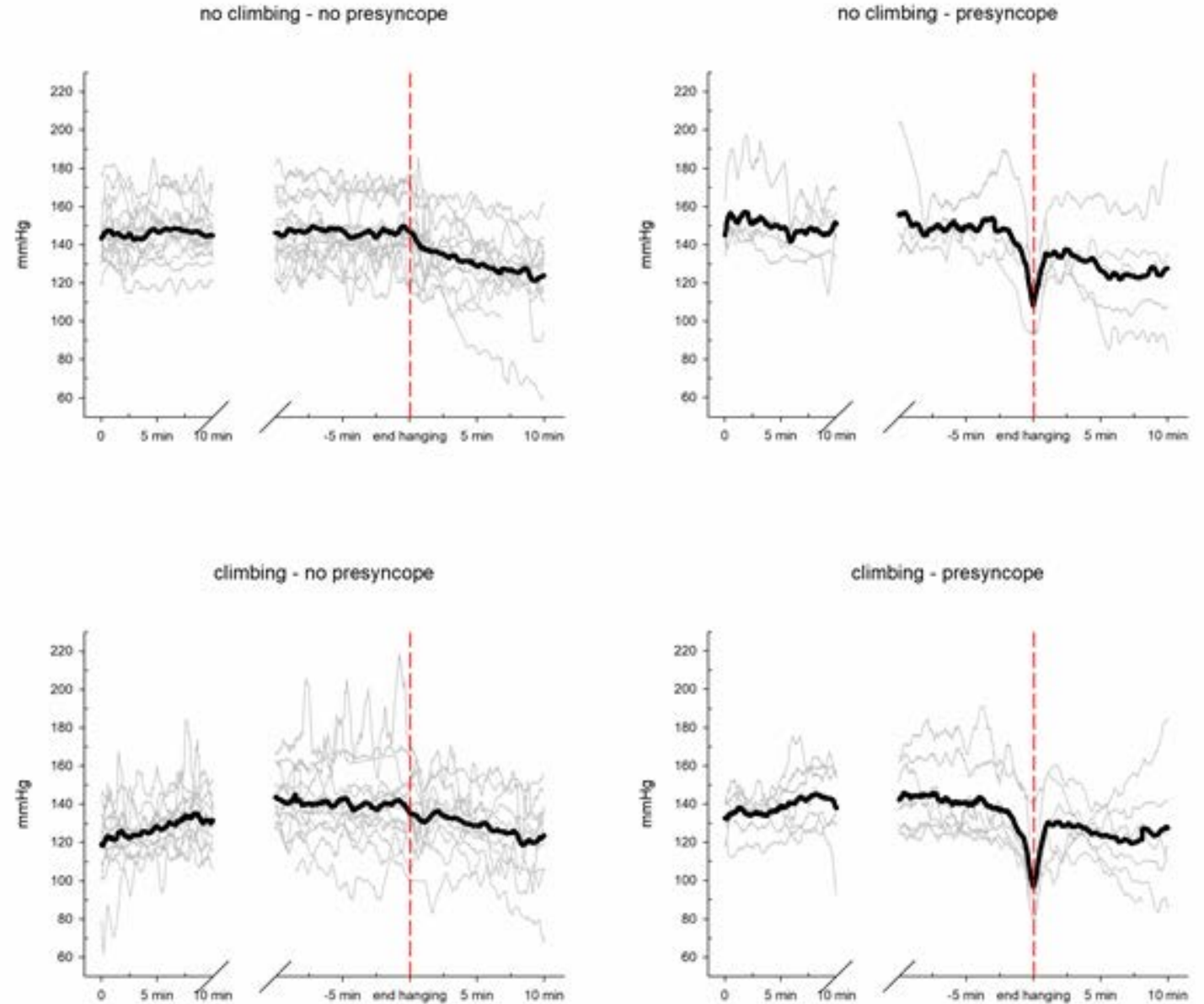
Heart rate



Haemodynamics

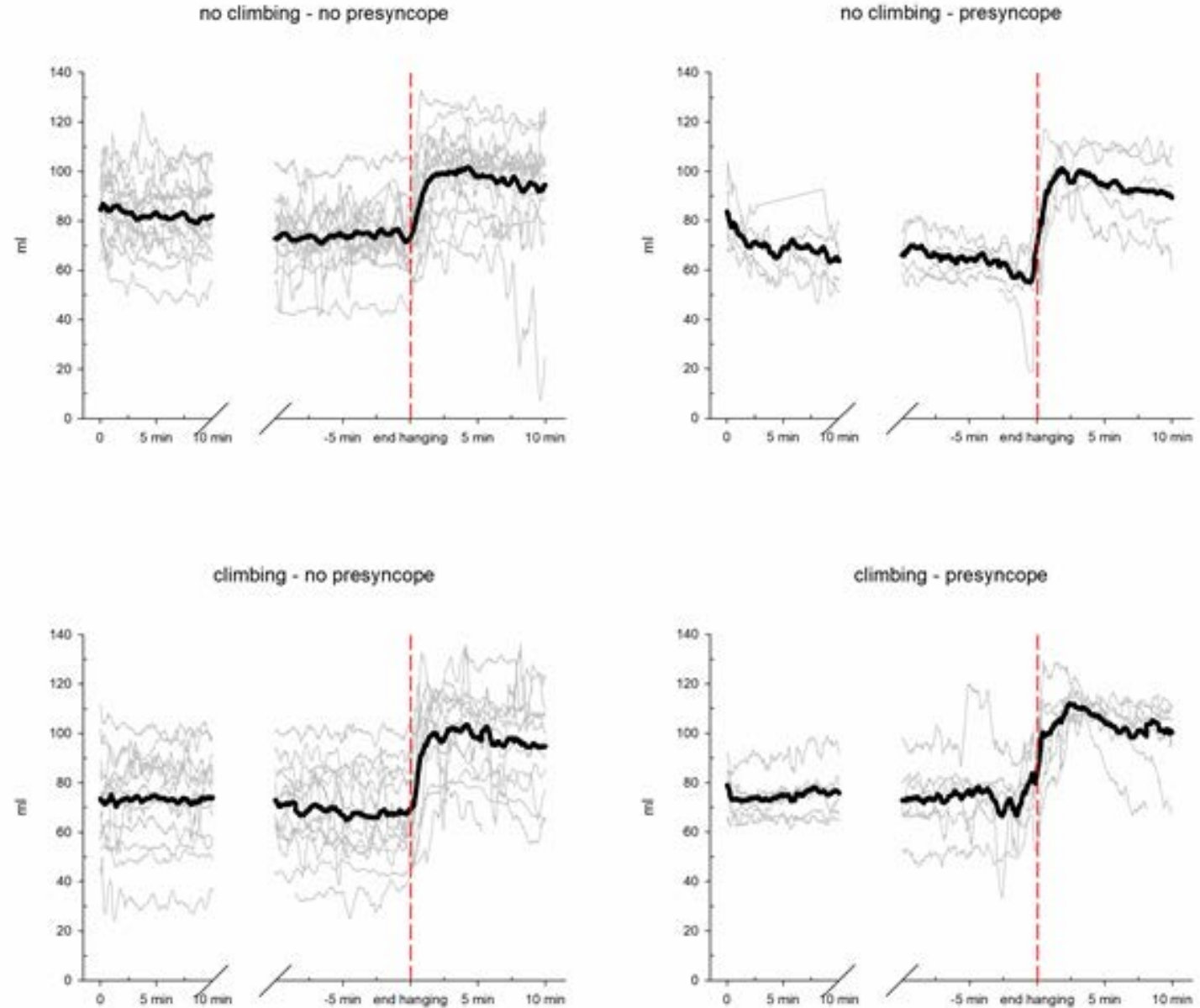
Blood pressure

Systolic pressure



Haemodynamics

Stroke volume



CONCLUSION

Venous pooling (& orthostatic stress) ✓



Neurally mediated loss of consciousness



THANK YOU

Eurac Research
Drususallee/Viale
Druso 1
39100 Bozen/Bolzano
T +39 0471 055 055
info@eurac.edu
www.eurac.edu

