



# Impact of an Ascent to High Altitude on Rescuers' Heart Rate during BLS CPR

Niederer Maximilian<sup>1,2,3</sup>, Egger Alexander<sup>2,3</sup>, Tscherny Katharina<sup>3</sup>, Fuhrmann Verena<sup>1</sup>, Grafeneder Jürgen<sup>1</sup>, Kienbacher Calvin<sup>1</sup>, Schreiber Wolfgang<sup>1</sup>, Herkner Harald<sup>1</sup> and Roth Dominik<sup>1</sup>

1) Department of Emergency Medicine, Hospital of Vienna

2) Mountain Rescue Service Austria

3) Department of Anaesthesia and Intensive Care, Hospital of Scheibbs

## Objective

In this study we analysed the impact of an ascent (1,213 metres of height) to high altitude (3,454m) on rescuers heart rate during basic life support (BLS) cardiopulmonary resuscitation (CPR). Our aim was to find out more about the effects of an exhausting ascent to high altitude on the heart rates of the rescue service team members.

## Methods

20 participants of the Austrian Mountain Rescue Service were split up into ten groups. Each group had to perform 16 minutes of BLS CPR on a training mannikin according to ERC Guidelines 2015 at base level. Afterwards they performed an ascent over 1,213 metres of height to 3,454m. Immediately after the ascent to high altitude, they again had to perform 16-minutes of BLS CPR. After each group was back at moderate altitude (2,241 m) they had to repeat the previously performed exercise unit once again. During the whole testing period, the participants wore a pulse watch, which measured and saved the heart rate at every second. In addition to that, right before and right after every BLS CPR cycle, the participants vital signs were measured, and neurocognitive test was conducted.



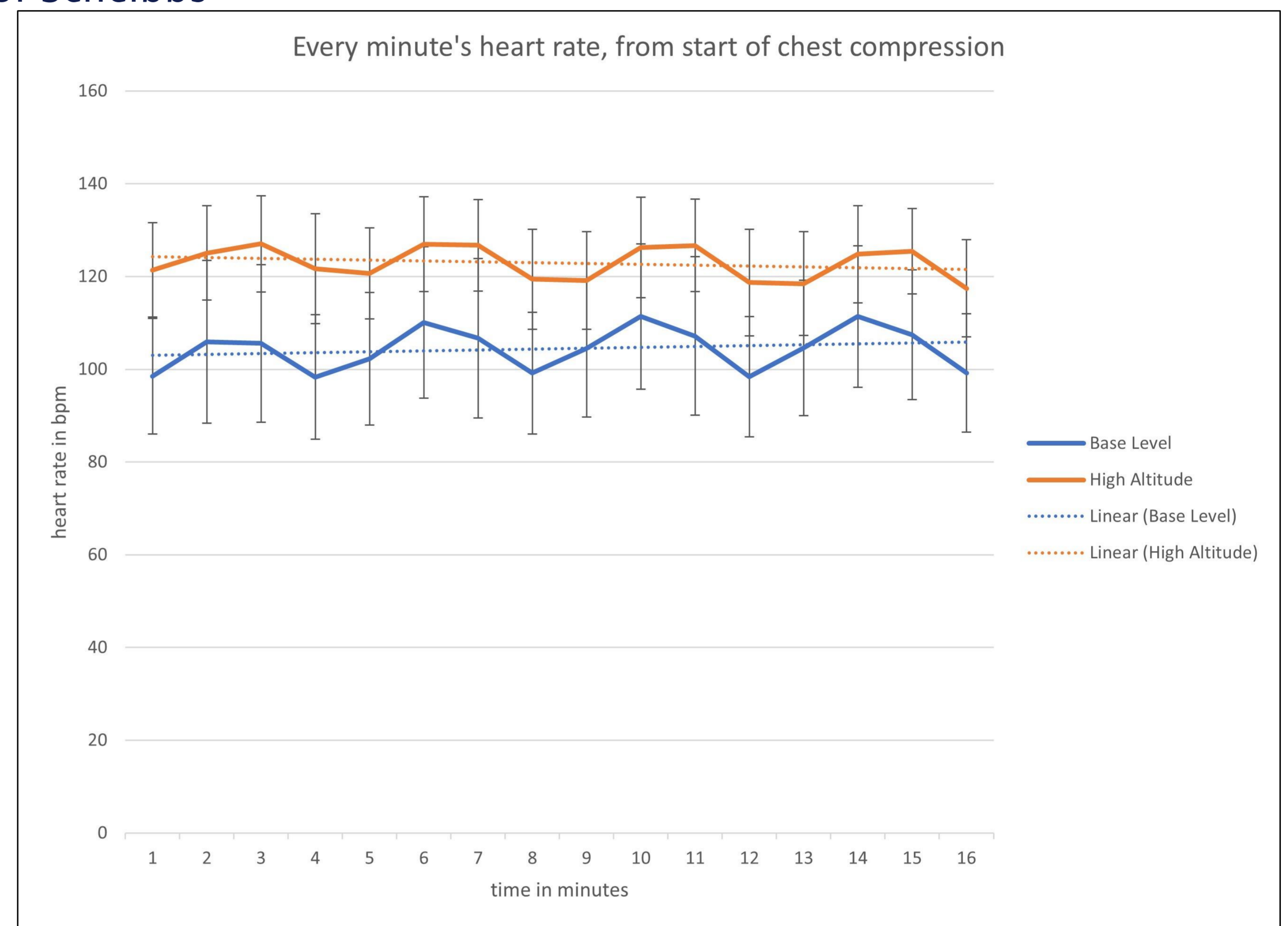
A team performing BLS-CPR at High altitude, own work

## Results

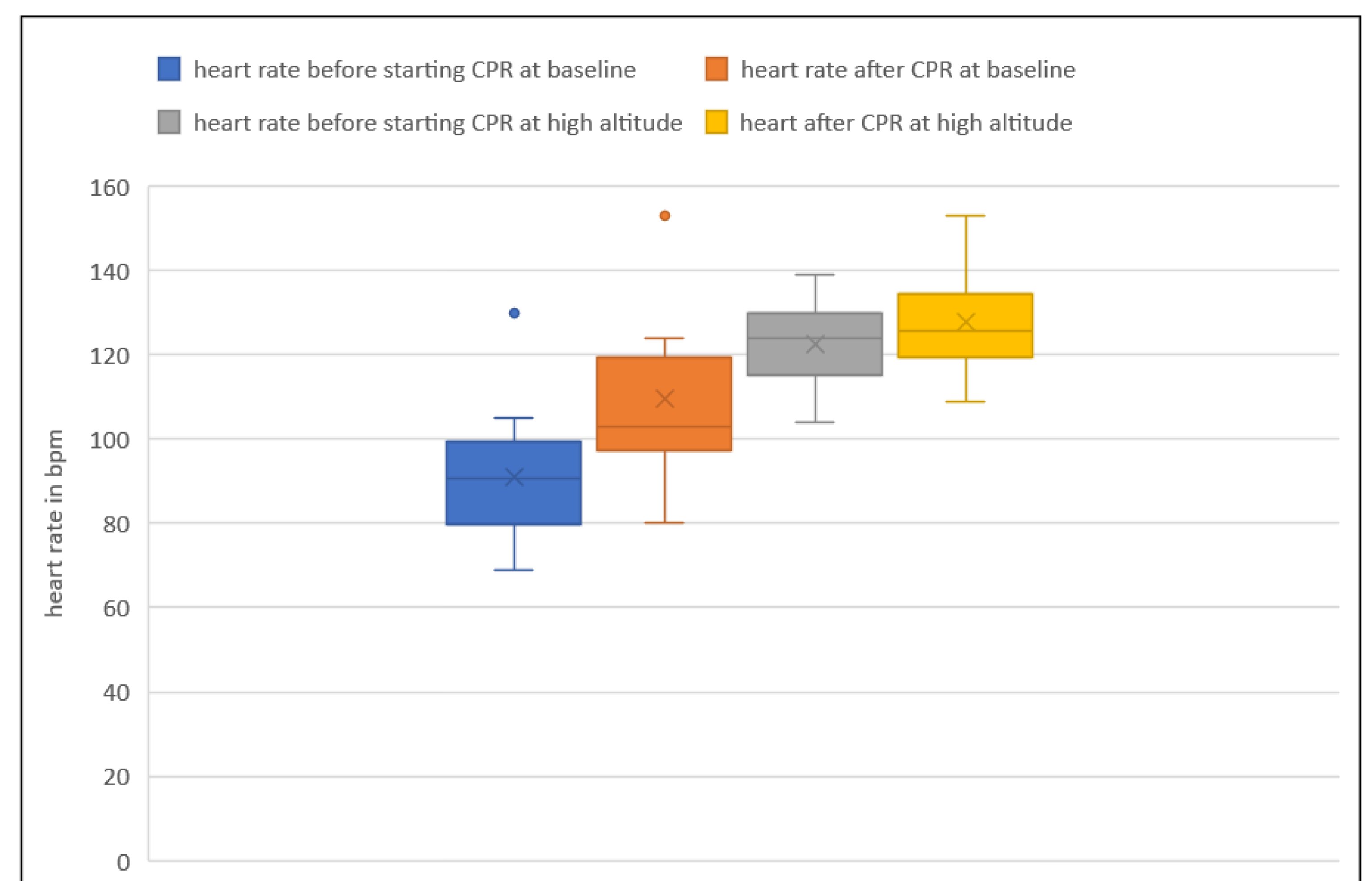
At any time during the 16-minutes lasting BLS CPR cycle, the average heart rate at high altitude was significantly higher than at base level, overall about +19.3bpm ( $p < 0.01$ ).

At high altitude (-44bpm) as well as at base level (-5bpm), the heart rate decreased during ventilation phases, when chest compressions were paused.

Heart rate was also higher after a 16-minutes BLS CPR unit compared to the initial heart rate, this was only significant at base level (+17bpm,  $p < 0.05$ ), not at high altitude (+5bpm,  $p = 0.12$ ).



Heart rates for 16 minutes BLS CPR



pre-post comparison of the rescuers heart rate

## Conclusion

Performing BLS CPR is causing exhaustion at base level and at a high-altitude level. Compared to the already elevated heart rate during ascent, the heart rate increased even more during BLS CPR performed at high altitude.

## References

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