

# Effect of body weight support on physiological training thresholds

## Introduction

Running is a widely spread recreation activity. The occurring impacts can be reduced with an antigravity treadmill by exerting lower body positive pressure leading to body weight support (BWS). This is beneficial for early activity in rehabilitation as well as joint-protective training.

This study aimed to analyse how characteristic physiological training thresholds can be transferred from an incremental test without BWS to supported running.

## Materials and Methods

11 runners (7♂ and 4♀, 32.8±10.0 years) volunteered and gave written consent. They performed two lactate threshold tests on an antigravity treadmill with 100% and 75% of their body weight (BW) (Fig. 1). The discontinuous incremental test consisting of 3min stages was started at 7.2km/h and increasing by 1.4 or 1.8 km/h depending on fitness level and interrupted by 30s rests.

Heart rate (HR), blood lactate (LC) and speed were measured. Physiological training parameters such as maximal performance (MAX), anaerobic (ANS) and aerobic threshold (AES) were determined.

## Results

The speed at AES (9.9±1.5 to 12.8±1.9km/h), ANS (13.5±1.5 to 16.0±1.5km/h) and MAX (17.4±1.6 to 20.1±2.1km/h) were significantly higher with BWS ( $p<0.01$ ) (Fig.2). However, neither HR values differed at AES (141±10 vs.143±10/min BWS), ANS (166±9 vs.164±10/min BWS) and MAX (186±9 vs.187±9/min BWS) nor did LC deviate with values being within 5.5% at each training parameter between unsupported and BWS running.

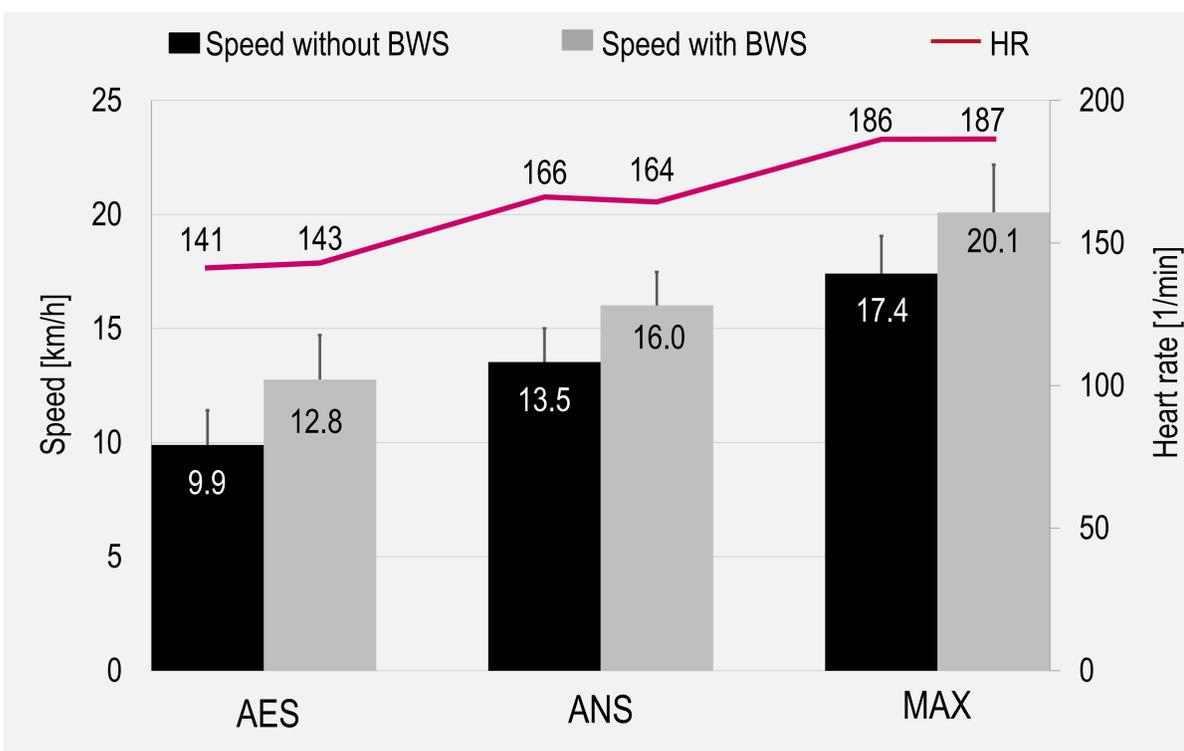


Fig.2: Speed and HR with and without BWS at physiological thresholds

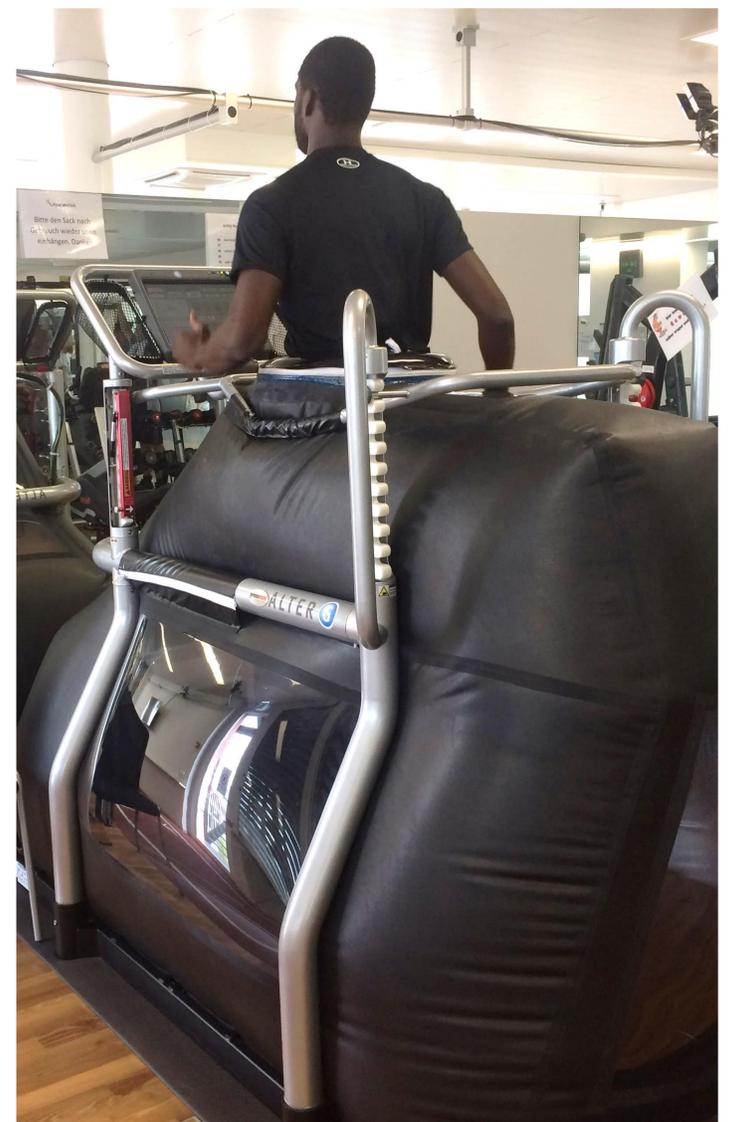


Fig. 1: Lactate threshold test on the antigravity treadmill Alter-G®

## Conclusions

The maximal LC and HR are similar with 75% and 100% BW which indicates that maximal exhaustion can be achieved with both conditions. While with BWS speed is higher at MAX, ANS and AES.

However, the HR is equal at the characteristic physiological training parameters AES, ANS and MAX. Consequently, trainings on an antigravity treadmill should be controlled with HR and not speed. Concluding that training zones and physiological threshold determined in an incremental test can be transferred from unsupported to BWS running.