
HIT Training - Case Study

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BMSS6011: Evidence Based Practice in Exercise Science



What is HIT Training

- High-Intensity Interval Training (HIT) is one of the most effective forms of training to improve physical performance (Bruchheit and Laursen, 2013).
 - The training consists of repeated long or short interval of high intensity exercise with recovery periods between (Foster *et al.*, 2015). It is recommended that the athlete should spend several minutes in the 'red zone' above 90% of their V02max during HIT sessions for the optimum beneficial adaptations (Bruchheit and Laursen, 2013).
 - HIT can be used to improve sprint performance and/or endurance performance by adjusting the work to rest time for specific training (Kelly *et al.*, 2021).
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Why is HIT Training Important

- Various studies show beneficial effects of HIT training to both aerobic and anaerobic capacity (Foster *et al.*, 2015).
 - Reduced time of HIIT workouts is attractive (Foster *et al.*, 2015).
 - Higher exercise intensities may be superior to moderate intensity for maximizing health outcomes (Karlsen *et al.*, 2017).
 - According to Girard, Feng and Chapman, (2018) HIT training can improve a variety of performance variables in multiple sports:
 - 3k and 5k track times.
 - Improvements in cycling time trial times.
 - Evidence of improvements to peak velocity in some sports.
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Client Information



Client

Gender: Male

Age: 22

Height: 172.7

Weight: 67.6kg

Recreational Athlete that engages in physical activity regularly.

Goal: To improve cardiovascular ability for endurance running.

Pre-Training Testing

- To measure whether the cardiovascular system has improved through HIT Training a VO₂max test was taken before beginning the training programme and after completing training.
- For a VO₂max test, the client cycled on a Wattbike (Wattbike, Nottingham, Uk) continuously as the test increased in power gradually until the client was cycling at maximum power and intensity that they could no longer continue the test, the final minute of breathing is collected to measure the clients VO₂max.

Weight	Power	HR	Atmos O ₂	Atmos CO ₂	Sample Time	C0 ₂	O ₂	Bag Volume	VO ₂ max
67.6kg	190w	214bpm	20.8	0.02	58sec	2.86	18.5	130.7L	38.7

Workout Plan

- As well as measuring the VO2max, the test revealed the maximum power and heart rate of the client to set a target power to aim for and to measure the heart rate during training sessions.

Work Time = 95% of 190watts = 180.5
Rest Time = 45% of 190watts = 85.5

Training Days

Warm up:
Pedal comfortable pace for 5 minutes on the bike,
2 mins of dynamic stretches.

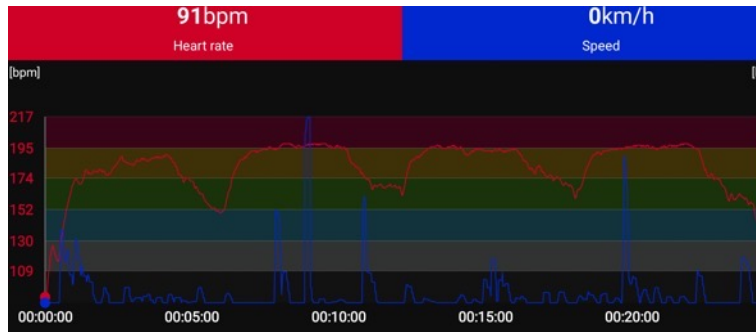
Main session:
4 minutes of pedaling at 180.5 Watts
2 mins of recovery pedaling at 85.5 Watts

Cool down:
Pedal at comfortable recovery pace, 2 mins of
static stretching.

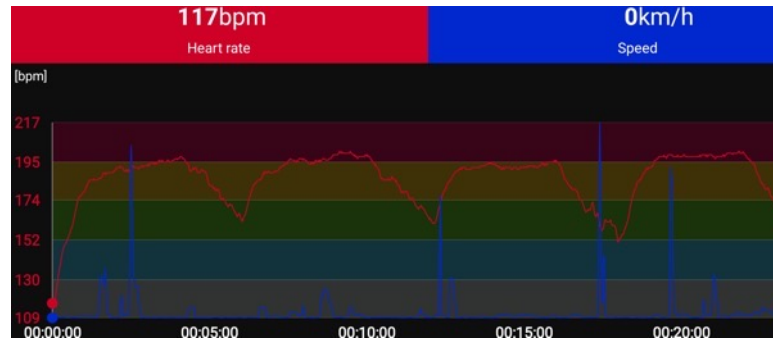
Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 1	Rest Day	Train	Rest Day	Train	Rest Day	Train	Rest Day
Week 2	Rest Day	Train	Rest Day	Train	Rest Day	Train	Rest Day
Week 3	Rest Day	Train	Rest Day	Train	Rest Day	Train	Rest Day
Week 4	Rest Day	Train	Rest Day	Train	Rest Day	Train	Rest Day
Week 5	Rest Day	Train	Rest Day	Train	Rest Day	Train	Rest Day

Training Progression

- The Heart Rate was recorded during the exercise session



Session 1



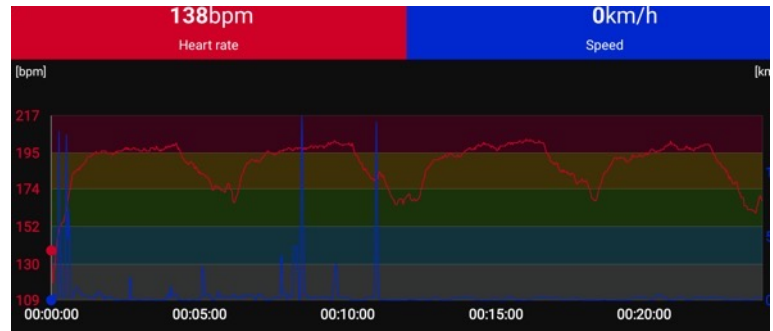
Session 3



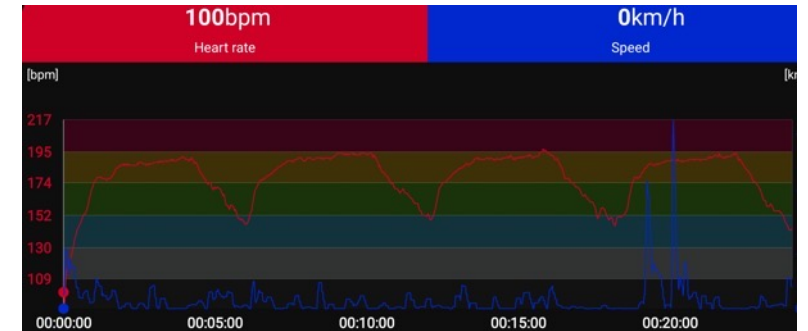
Session 5



Session 2



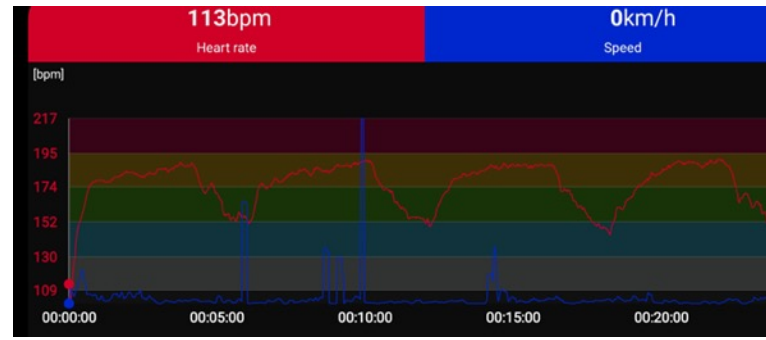
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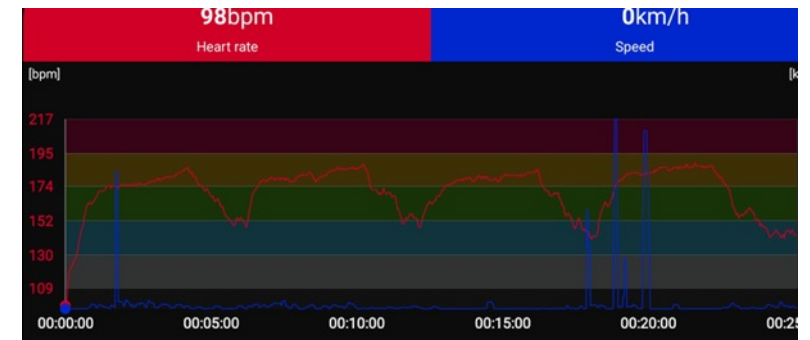
Session 6



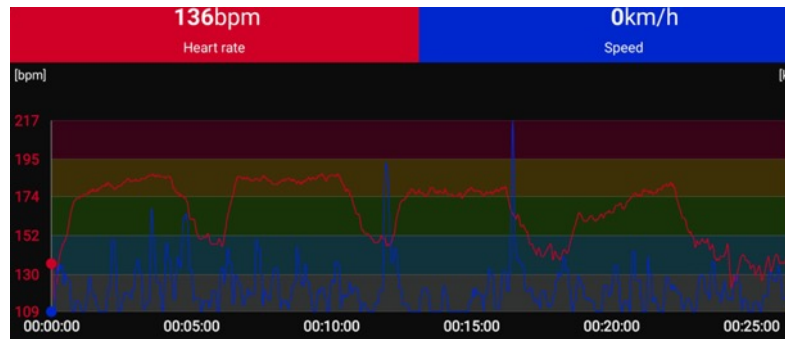
Session 7



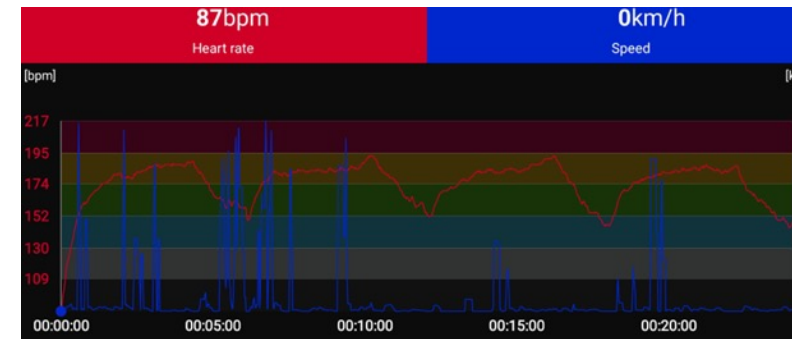
Session 9



Session 11



Session 8



Session 10

- The last 2 weeks of sessions did not reach a heart rate as high as the first 3 weeks. There could be multiple reasons for this, but it shows that the body is not working as hard as it was when the client started training.

Post-Training Testing

- After completing the 5-week training the VO2max test was repeated to see if the client had made improvements throughout the training programme.

- Test Results

Weight	Power	HR	Atmos O2	Atmos CO2	Sample Time	C02	02	Bag Volume	VO2max
68.4kg	205w	213bpm	20.7	0.08	60sec	2.95	18.4	117.2L	35.9

Improvements

	Before	After
Power	190	205
V02max	38.7	35.9

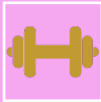
The client had an improvement in power.

The client did not improve the V02max result, therefore they did not achieve the set goal of improving the cardiovascular system.

Is HIT Training Effective?



After 5 weeks of a HIT session programme, the client did not have an improvement in their V02max result. Therefore, the training did not show effective for this athlete.



Many tests are done with untrained athletes showing good results in Vo2Max development over a period of training sessions, this client has experience and is athletic already so these benefits may have gone unnoticed due to this already enhanced capacity.



A more conclusive study would involve multiple clients both trained and untrained to explore whether novice sports people or beginners see more benefit from HIT training.



The timescale of 5 weeks may have been too short to notice any improvements, and a test done over a longer period would help to investigate the aerobic development of already trained athletes.

References

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