

Client details

| | |
|----------------------------|---------------------|
| Name: | Date of assessment: |
| Weight: | Height: |
| Assessment type: Treadmill | Age: |
| Assessor: Clare Marsh | Test details: |

About the Lactate Test

Lactic acid is a waste product that rises when you exercise above a certain intensity. At low exercise intensity, lactic acid concentration remains low. However, during higher intensity exercise, lactic acid rises and this causes feelings of muscle 'soreness' or 'tiredness'. Consequently, lactic acid accumulation is considered to be a limiting factor to sports performance. We can make conclusions about aspects of your fitness by making observations relating to your lactate profile, and we can set training using the two lactate thresholds described below.

Lactate thresholds explained

The first threshold occurs at the exercise intensity at which blood lactate begins to rise above resting levels, termed Lactate Threshold (LT1). It marks the shift from purely aerobic (low intensity) exercise to exercise that requires some anaerobic contribution (moderate intensity) that produces lactic acid.

The second lactate threshold (LT2) occurs at a higher intensity than LT1 and estimates the highest intensity (power output or running speed) that one can maintain for 30 minutes or so. At intensities above this, lactic acid would accumulate quickly to levels that would limit your ability to continue exercising because of fatigue.

Your blood Lactate profile

Table 1. Your blood lactate and heart rate response during running test

| Running speed (km/h) | Blood lactate (mmol/l) | Heart rate (bpm) | Ratings of perceived exertion (RPE) |
|----------------------|------------------------|------------------|-------------------------------------|
| Rest | 1.1 | 71 | |
| 10 | 0.9 | 120 | 6 |
| 10.5 | 1.0 | 124 | 6 |
| 11 | 1.2 | 131 | 8 |
| 11.5 | 1.2 | 142 | 10 |
| 12 | 1.4 | 151 | 11 |
| 12.5 | 1.9 | 156 | 12 |
| 13 | 2.8 | 170 | 13 |
| 13.5 | 4.9 | 174 | 15 |
| 14 | 6.4 | 182 | 16 |

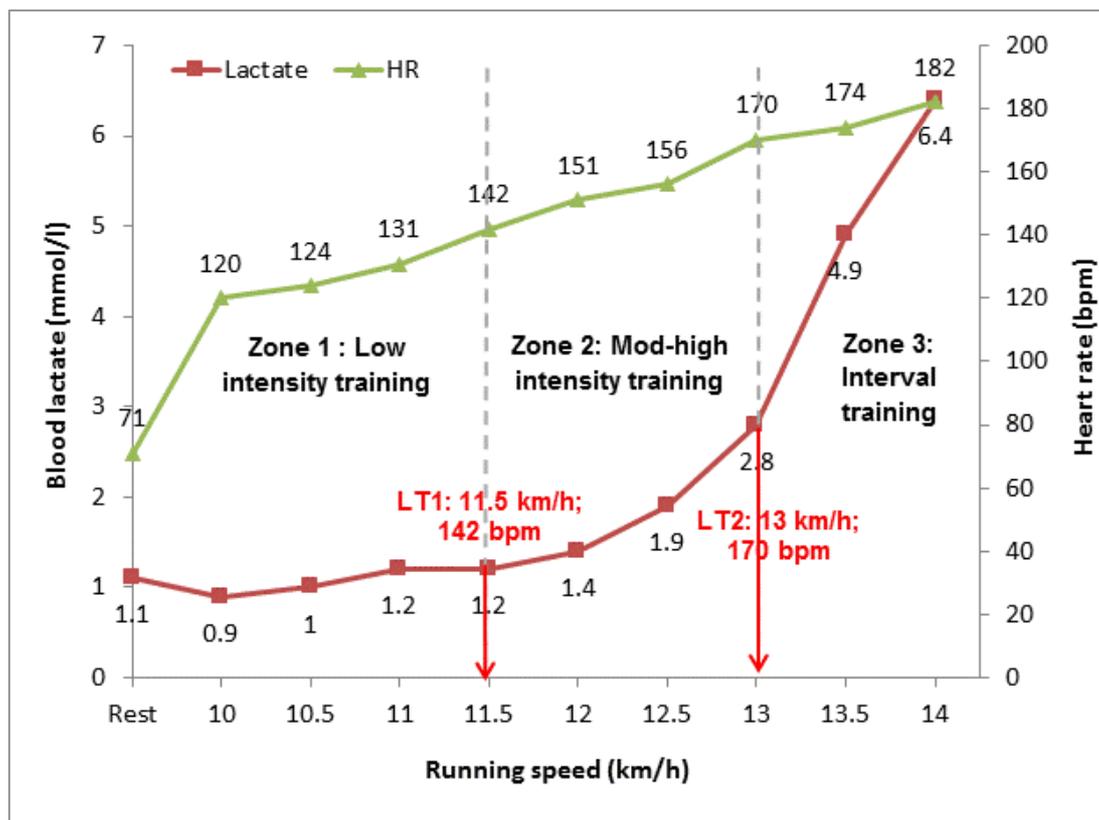


Fig 1: Running speed and heart rate shown at each of the two lactate thresholds (LT1 and LT2), and recommended training zones

Interpretation of your data

Fig 1 (the red line is blood lactate and the green line is heart rate) indicates that your first lactate threshold (LT1) was recorded at a running speed of **11.5 km/h** and a heart rate of **142 beats per minute** and second threshold (LT2) was recorded at a speed of **13 km/h** and a heart rate of **170 beats per minute**. These form that basis of identifying your training zones.

Training zones

Your training intensity zones as described below can be set using your lactate thresholds. As a marathon runner you need to do some training in all three zones.

- Zone 1: Exercise intensities at or below LT1 which are considered low and/or recovery intensity and can be maintained for prolonged periods of time (hours).

Recovery runs at or below 11.5 km/hr or a HR of less than 142 bpm

- Zone 2: Exercise intensities between LT1 and LT2 which are considered moderate to high intensity. Training slightly above LT1 results in elevated but constant blood lactate which can be maintained during continuous exercise for relatively prolonged periods (several hours) but for much shorter durations (30-45 minutes) as you approach LT2.

As your current marathon pace is around 8 min mile pace, with a marathon time of 3 hrs 30 mins, you should include some training at an intensity equivalent to this race pace – this coincides with a running pace slightly above LT1 (e.g. 12 km/h, 151 bpm). To work on improving your pace, you would benefit from some training at the higher end of this zone too.

- Zone 3: Exercise intensities above LT2 are in the interval training zone. This allows you to train at a higher intensity than you'd be able to maintain during continuous training.

Interval training: it's recommended that you perform this type of training just once a week. Work at a speeds above 13 km/hr at a HR of at least 170bpm.

The Borg Ratings of Perceived Exertion (RPE) Scale

| | |
|----|--------------------|
| 6 | No exertion at all |
| 7 | Extremely light |
| 8 | |
| 9 | Very light |
| 10 | |
| 11 | Light |
| 12 | |
| 13 | Somewhat hard |
| 14 | |
| 15 | Hard (heavy) |
| 16 | |
| 17 | Very hard |
| 18 | |
| 19 | Extremely hard |
| 20 | Maximal exercise |

The greater the exertion felt the greater the number reported by the individual being tested. As exercise intensity increases, this scale increases with physiological measures such as heart rate, oxygen consumption, pulmonary ventilation and lactate accumulation