

### 3.1 Use of Drugs:

#### - Benefits & Limitations of Drug Testing

- **Drug-Testing (aka Doping Control or Sample Collection) is the process to detect the use of a prohibited substance or method by an athlete**
- It is an essential part of promoting and protecting doping-free sports
- Drug-testing consists of testing which is conducted by an anti-doping organisation e.g. Australian Sports Anti-Doping Authority (ASADA)
- Drug-testing is now quite expensive throughout the world, with many thousands of tests performed each year

Benefits of Drug-Testing	Limitations of Drug-Testing
<ul style="list-style-type: none"> <li>• Protects the right of athletes to compete in a sporting environment free from doping</li> <li>• Athletes should be rewarded on their natural ability and training outcomes, not chemical enhancement</li> <li>• Knowing that athletes can be tested anytime, anywhere, is a deterrent to athletes considering the use of doping</li> <li>• Doping is harmful to the health of athlete</li> <li>• Athletes like being tested because they like being able to prove that they are competing clean and their hard work is paying off</li> </ul>	<ul style="list-style-type: none"> <li>• On Jan 1<sup>st</sup> each year, a revised <u>World Anti-Doping Agency Prohibited List</u> is released, so athletes must be aware of what is prohibited and keep up-to-date with their information</li> <li>• Because athletes have previously tampered with samples, athletes must remove clothing from the knees to the mid-torso, and from the hands to the elbows, and a chaperone (same gender as athlete) must witness the urine sample leaving the athlete's body. This process can be confronting for athletes.</li> <li>• Testing is very costly, amounting to several millions of dollars annually worldwide</li> </ul>

### 3.2 Use of Technology:

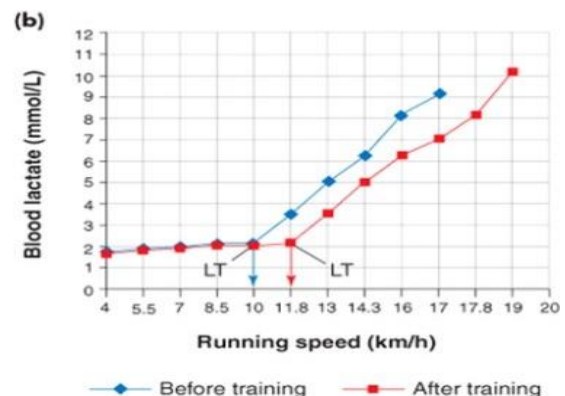
#### - Training Innovation e.g. Lactate Threshold Testing, Biomechanical Analysis

- Due to large public funding, institutes of sport and research centres have developed sophisticated methods of measuring and analysing physiological progress due to training
- Athletes attending sport academies now have access to lots of data that is used to monitor the pace of adaptations, together with machines and instruments to observe, analyse and evaluate techniques
- 2 areas where there have been considerable training innovation are in lactate threshold testing and biomechanical analysis

#### Lactate Threshold Testing:

- Athletes use heart rate monitors to establish their level of intensity relative to their target heart rate during exercise
- Elite athletes aim to train at levels of intensity close to the lactate threshold or level at which lactate begins to accumulate rapidly in the blood → this point is characterised by a burning sensation, increased ventilation rate and deteriorating performance

- Determining the point at which blood lactate starts to accumulate rapidly is important for athletes as training regimes are aimed to push back this point for as long as possible while still working at high levels of intensity (i.e. to reduce the onset of lactate acid)
- The most accurate and reliable method to establish lactate threshold is **testing blood samples during graded exercise tests in the laboratory** → in these tests, treadmills, bike ergometers or rowing machines are used with blood samples being taken at graded levels of intensity. Using data gathered, a lactate performance curve is generated, showing rises in lactate levels.
- Equipment to do this is expensive and limited in terms of availability
- A more convenient and less expensive technology is the **portable lactate analysers**. However these analysers require athletes to undergo periodic fitness tests that have a set of protocols so that measurement can be compared from one occasion to the next
- Simpler field tests require **athletes to perform work similar to what is required in competition** → with the aid of special heart-rate monitors that have a split-time facility, the lactate threshold can be established



### Biomechanical Analysis:

- **Biomechanical Analysis** is used to improve sporting performance, and aims to make execution of any movement more skilful, efficient and safe
- It explores the various techniques applied to skills e.g. throwing, catching, bowling
- Measures such as video analysis, photography, use of comparative images and slow motion replays allows performance of skills to be subjected to a high-degree of scrutiny
- Movements are thus explored in detail, problems identified and ways of making them more biomechanically efficient recommended
- **EXAMPLE:** Video analysis is used in a range of coaching, viewing and performance appraisal situations. Video allows analysis of player movements, strategies and techniques, with a view to:
  - ❖ **Improving Technique** → the way a player executes a movement can be observed repeatedly in slow motion to locate error (e.g. tennis serve, swimming stroke)
  - ❖ **Improving Visualisation** → by observing a skill performed repeatedly or in slow motion, a player's conceptualisation of what is required for proper execution is enhanced
  - ❖ **Establishing Biomechanical Efficiency** → by observing the movements of skilful players, coaches can gain an insight into how movements can be performed more efficiently and demonstrate these to their players
  - ❖ **Analysing Strategies** → coaches find video replays useful for analysing the effectiveness of strategies used both by their team and opponents