Anaerobic capacity is defined as the maximal amount of ATP that can be supplied to the anaerobic energy system\textsuperscript{9}. This system and its understandings are very important to teams and individuals that use this system for their sport. To be able to measure the anaerobic system is of great importance in today’s society where the ability to predict, compare and use the data to improve athletes can make the difference between first and second place.

In the past one hundred years there have been different ways of measuring anaerobic capacity. This has been done mainly by measuring oxygen debt, blood lactate and oxygen deficit. In studies of the three methods, it has been found that there are accuracy problems when using oxygen debt and blood lactate measures for anaerobic capacity\textsuperscript{45}. Oxygen deficit whilst being the most accurate measure of anaerobic capacity\textsuperscript{25} still reports an unacceptable error rate.

The measurement of Oxygen deficit is done by calculating the difference between the estimated oxygen demand and the actual value that was obtained for oxygen uptake after supramaximal work\textsuperscript{11}. This is done by working out VO\textsubscript{2} maximum and also a number of submaximal performance values for oxygen uptake\textsuperscript{8}. The submaximal performance values are used to draw a line of regression so that estimated oxygen uptake can be worked out. Once this is done and the athlete performs the test at a supramaximal effort to exhaust the anaerobic system, the actual oxygen uptake is measured and taken away from the estimated value to get the oxygen deficit.

Different studies have been done in the last ten years to see how well oxygen deficit measures anaerobic capacity. Some of these studies have compared anaerobic capacity between short distance track events such as 100, 200 and 400, and long distance track events of 800, 1500 and 5000 metres\textsuperscript{10,11}. This has been shown to be successful in comparing the anaerobic capacity in different track events.

One problem that is common with laboratory testing is the lack of specificity involved when comparing it to the sport. This is also a problem for testing oxygen deficit as it is very rare in sport to give a supramaximal performance. Two recent articles,\textsuperscript{2,8} have tried using intensity exercises instead of supramaximal efforts to measure anaerobic capacity. This was found to be successfully but needs further work as their is limited information and testing on the use of intensity work as a measure of anaerobic capacity compared to supramaximal efforts.

Whilst tests for oxygen deficit date back to the 1920’s, questions have arisen to the reliability and validity of the current methods used to test oxygen deficit. For example how long should the test go for, does it compare to both non-trained athletes and trained-athletes and is the estimation of oxygen uptake an accurate measure. The first and most important question is the methodology behind oxygen deficit a reliable one.

The methodology for oxygen deficit is said to be reliable as long as the oxygen demand increasing linearly with the intensity of the exercise, and that if the oxygen demand is constant the exercise intensity is also constant\textsuperscript{9}. Studies that have tried
to show that oxygen deficit is a reliable measure of anaerobic capacity have varied in success rate. Some say that is an acceptable measure\textsuperscript{7,9}, while others say that their are a number of problems with the methodology\textsuperscript{1,6}.

Medbo (1996) has suggested that greater than 2 minutes is needed to obtain maximal anaerobic capacity\textsuperscript{9}. It has also been shown that anaerobic capacity can be measured by oxygen deficit at 60 and 90 seconds, if the intensity is high enough\textsuperscript{3}. This difference could be due to differences in test protocol levels of intensity and fitness levels of the subjects. The idea behind Medbo (1996) having the test time run up to 2 minutes is that the anaerobic capacity needs time to be exhausted so that an accurate capacity may be obtained. However it may be possible to exhaust the anaerobic system before 2 minutes. The measurements of the study at 60 and 90 seconds were low when compared to other studies, so this is another area that needs further research.

The use of oxygen deficit has been identified as the best way to measure anaerobic capacity by a number of researchers. The way this is measured is through simple laboratory tests, however testing protocols vary from test to test. Levels of intensity, duration of the test and fitness levels of the subjects may vary. More research needs to be done on the subjects to find a standard procedure.

**BIBLIOGRAPHY**


