The Kinetics of Cardiopulmonary Dynamics during Recovery Following Maximal Exercise

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Abstract

The study was carried on 193 elite male sports person consisting of (a) Anaerobic group (n =43), (b) Mixed group (n=100): This group was further divided into two sub - groups i) Non-Combative (n=60) ii) Combative (n =40), (c) Aerobic group (n =50). Graded cardiopulmonary exercise testing was carried out till exhaustion and the selected cardiopulmonary transients were recorded every 15 seconds by a portable computerised metabolic analyzer for the entire duration of test and recovery. The results revealed that the long distance athletes (aerobic group) had significantly different recovery patterns so far as the oxygen uptake during recovery was concerned, and they were also found to posses the highest VO_2 max were able to recover much quicker than those who didn't ($P<0.01$). Further, the cardiopulmonary dynamics during recovery was found to be influenced by training. The study concluded that a strong emphasis needs to be given to adequately develop the aerobic component in games and sports where recovery is important, even in anaerobic sports.

Key Words: **VO_2 max, HR_{max}, VE_{max}, VCO_2, Anaerobic threshold**

Introduction:

The return of the muscle homeostasis to its pre-exercise state following exercise is known as recovery *(Tomlin and Wenger, 2001).* The process of recovery from exercise is perhaps just as important as exercise itself and the energy process at work during recovery from exercise are just as crucial as those at work during exercise.

A strong relationship between aerobic fitness and recovery from high intensity intermittent exercise has already been established *(Tomlin and Wenger, 2001);* although such a relationship following a graded maximal exercise is yet to be demonstrated. Further, it is also conjectured that a high level of aerobic fitness is a prerequisite even for superior performance in anaerobic sports *(Aziz et al, 2000)*, since phosphocreatine resynthesis has been found to be dependent on the availability of oxygen during recovery *(Harris et al, 1976).* It is therefore reasonable to assume that an individual with a higher VO_2 max will posses a greater capacity to deliver oxygen to the working muscle, which in turn will lead to a greater and quicker rephosphorylation of CP stores during recovery periods *(Balsom et al, 1994). Dawson et al, 1993*, also reported significant correlation between VO_2 max and anaerobic performance.

If an enhanced oxygen uptake does indeed facilitate recovery, it is pertinent and reasonable to hypothesize that the recovery patterns of the various cardiopulmonary transients will vary in athletes, depending on the volume of aerobic training a