

## What is sports physiology?



The strategic review of sport science services within Northern Ireland (2004), commissioned by Sports Council and produced by the University of Ulster, identified the need to create greater awareness of the range of sports science services available to the sporting community.

Sports physiology is one of those services, and although it is not a “relatively new” concept, questions such as, what is sports physiology and how can it impact on athlete programmes are often asked? Within the Sports Institute Northern Ireland, physiology support has been provided to high performance athletes and coaches as part of the integrated programme of services since October 2002. The following summary encompasses a brief overview of this specific service.

In essence, sports physiology is essentially concerned with the assessment of how the body responds to single or repeated bouts of exercise. In its simplest form, physiology is associated with the collection of objective data upon which subsequent evaluations and decisions are made (e.g. fitness tests).

At SINI, team sport athletes (Gaelic football, hockey and rugby) and games players (squash) participate in sports-specific fitness tests, which include assessments such as body composition, strength, power, speed, endurance and repeated-sprint capacity.

This process allows fitness to be determined in a controlled environment and specific strengths, weaknesses and/or positional differences within a squad to be identified. Issues that have been highlighted can then be addressed by the individual strength and conditioning programmes that are developed for the athletes. On the other hand endurance athletes, from sports such as athletics, and cycling, participate in more advanced physiological assessments, involving heart rate monitoring, blood lactate (by-product of carbohydrate metabolism) profiling and expired-air collection (changes in oxygen and carbon dioxide concentrations). This detailed assessment allows the physiologist to pinpoint correct training levels and intensities and to assist the coach in prescribing individual training programmes. Depending on the sport and athlete concerned, time between tests can range from six to twelve weeks. Importantly, physiological assessments need to be continuous and scheduled during critical phases of the training cycle (e.g. pre and post the general preparation stage). Moreover, this process allows fitness changes to be determined and training needs to be re-evaluated in conjunction with physiological monitoring (e.g. heart rate).

Physiological assessment can also involve the evaluation of hydration status, respiratory function and blood profiling. Appropriate hydration is important for athletes engaging in training and competitions to offset the possibility of dehydration, which can significantly impair performance. Poor respiratory function is often associated with the diagnosis and sometimes misdiagnosis of asthma in athletes and specific tests can be used to determine whether this is the case. If evident, sub-optimal lung function can be addressed by training the respiratory system using devices such as the Powerbreathe®.

Blood profiling is particularly important because the results provide an indication of the athlete's current health status and iron levels. This screening process helps to minimise the risk of contracting upper respiratory tract infections (e.g. coughs, colds and flu) and to ensure that the body can maximise adaptation from high intensity training and perform at optimum levels. In summary, physiological assessments, in conjunction with the musculoskeletal screening process, provide the foundation upon which decisions are made in relation to training prescription and facilitate the evaluation of the effectiveness of a training programme.

Following the physiological assessments, training interventions such as heart rate monitoring and lactate profiling, can then be used to determine whether or not the athletes are training at the desired training intensities. This process often involves daily and/or weekly interactions with the athletes and coaches and this facilitates communication of immediate feedback. Time motion analysis observations, using Global Positioning Satellites (GPS), can also be employed to develop sport specific and movement specific training practices. For example, information on the incidence and duration of sprints, total distance covered and exercise intensity during a game can be obtained. Another role of a physiologist is to develop specific investigations to assess the efficacy of ergogenic aids and popular nutritional supplements (e.g. creatine, caffeine and sodium bicarbonate) and to determine their potential to enhance performance. Further, the establishment of an environmental chamber at UUJ will also necessitate the development of acclimatisation strategies for athletes competing in adverse environmental conditions such as those experienced at altitude or in warm-weather countries. In conclusion, a greater understanding and insight into the role of sports physiology by athletes and coaches will facilitate the integration of this valuable service into their programmes. Subsequent newsletters will include specific examples of how physiology is being integrated into the programmes at the SINI.

Declan Gamble - Physiologist

