FORMAÇÃO AVANÇADA DE TREINADORES

11 de Abril de 2015
Faculdade de Desporto da Universidade do Porto

PLANEAMENTO DO TREINO

Novas tendências do planeamento do treino para atletas de elite

Horário

9:00	- Receção dos Participantes
9:30	- Cerimónia de Abertura
10:00	- A contribuição das ciências do desporto para o rendimento de elite
	- Planeamento a longo prazo (ciclo Olímpico) e a curto prazo (planeamento anual)
13:00	- Almoço Livre
15:00	- Treino de força para o rendimento de resistência
	- Taper
18:00	- Encerramento

Iñigo Mujika http://www.inigomujika.com/

Fisiologista do Treino Desportivo.
Professor Associado da Universidade do País Basco.
Investigador Associado na Universidade Finis Terrae.

Doutorado em Biologia do Exercício Muscular na Universidade de Saint-Étienne (França) e em Ciências da Atividade Física e do Desporto pela Universidade do País Basco.
Principais temas de investigação na área das ciências do desporto aplicada: métodos de treino e recuperação, taper, destreino e sobre treino.

Tem realizado investigação na Austrália, França e África do Sul, publicou cerca de 100 artigos em revistas científicas internacionais, 5 livros e 28 capítulos de livros. Participou em mais de 260 conferências, congressos e encontros internacionais.

Foi fisiologista do Instituto Australiano do Desporto em 2003 e 2004. Em 2005 e 2013 foi fisiologista e preparador da equipa profissional de ciclismo Euskaltel-Euskadi, entre 2006 e 2008 foi responsável pela investigação e desenvolvimento da equipa de futebol profissional do Atlético Club de Bilbao, e entre 2009 e 2012 foi fisiologista da equipa de natação de elite da Real Federação Espanhola de Natação.

OLIMPO newsletter

Aceda a http://comiteolimpicoportugal.pt/ e subscreva a *newsletter* do COP para receber informações e notícias no seu endereço eletrónico

Siga-nos em https://www.facebook.com/comiteolimpicoportugal

THE CONTRIBUTION OF SPORT SCIENCE TO ELITE PERFORMANCE

The outstanding performances of today’s elite athletes are the product of a complex interaction between physiological, biomechanical, nutritional, psychological and environmental factors. It is generally accepted that the most effective methods to prepare elite athletes for the demands of high level competition are those based on proven scientific principles. Elite sports performance is partly determined by the ability of coaches and sport scientists to identify individuals with special sport talent, and initiate the necessary programmes to foster the specific factors contributing to the development of that talent and achieve success in different sports. For elite athletes to reach their full potential, it is therefore necessary to search for the contributions of qualified sport scientists in close interaction with educated and creative coaches. It is likely that future innovations in training techniques will be reached as a result of a close interaction between coaches, athletes and sport scientists.

LONG- AND SHORT-TERM PLANNING

During the 1960's and early 70's, long-term planning of athletic training and performance became a pre-condition to achieve international sporting success. Studies done by the Eastern block countries underlined the importance of annual and quadrennial planning, and this greatly contributed to the theory of training. Because training to produce elite athletes is a long-term process, a well-established and monitored training plan must be in place early to best develop an athlete’s competitive talents. Sports training in a quadrennial cycle has particularities pertaining to the objectives of each year of the cycle, but also to the age and experience of each athlete. These particularities refer to the structure of the annual cycle, total training volume, training organization, recovery processes, use of training equipment and individual progress. Monocyclic and bi-cyclic quadrennial models have been described in the past, but alternative options can be considered for individual athletes.

Whatever the quadrennial model used, an Olympic cycle plan should include annual performance prediction, objectives for each training factor adapted to the world tendencies in the sport, a calendar of major competitions, tests and standards linked with performance prediction and training objectives, a chart of the Olympic cycle plan, a basic annual periodization model, and a preparation model.

In terms of transition from long- to short-term planning, annual periodization models within a quadrennial Olympic cycle should integrate single, double and multiple periodization, depending on the caliber and experience of the athletes. An annual training plan should consider the available planning options, the limitations of traditional periodization, the competition calendar, total training volumes and training intensity distributions, and implement a sensitive and responsive learning system that allows the early detection of emerging threats and opportunities to optimize athletic performance.

COMITÉ OLÍMPICO DE PORTUGAL

TAPERING FOR OPTIMAL PERFORMANCE

The training programs of high-level athletes usually include a reduction of the training load during the final days leading to a major competition, known as a taper. The aim of the taper is to diminish residual fatigue induced by intensive training, while maximizing physiological adaptations and performance. A meta-analysis on tapering strategies suggests that performance is maximized by a taper lasting two weeks, where the training volume is exponentially decreased by 41-60%, without any modification of either training intensity or frequency.

Mathematical models of the effects of training on performance predict that increasing the training load by 20% for four weeks prior to the taper could contribute to optimize performance, but would require a longer taper. They also predict that a 20-30% increase in the training load during the final three days of the taper would not compromise fatigue removal and could be beneficial by eliciting additional adaptations.

Tapering-induced performance gains, attributed to increased muscular force and power, improvements in neuromuscular, hematological, and hormonal function, and psychological status of the athletes, are usually in the range of 0.5-6.0%. These gains are independent of sex, event duration, technical and biomechanical aspects of competition, and the calibre of the athlete.

Environmental factors like travel across time zones, heat and altitude may interfere with an athlete's preparation for international level competition. Reducing the training load has been recommended as a means to cope with jet-lag, heat and altitude, and this training reduction should be integrated in an athlete's taper program.

With regards to tapering and peaking for team sports, two competitive situations can be considered: pre-season training to face a league format competitive season in the best possible condition; and peaking for a major international tournament such as the Olympic Games or World Championships.

STRENGTH TRAINING FOR ENDURANCE PERFORMANCE

Performance in most endurance events is determined by the maximal sustained power production for a given competition distance, and the energy cost of maintaining a given competition speed. In shorter endurance events and during accelerations and sprint situations, anaerobic capacity and maximal speed may also contribute to performance. Strength training could thus contribute to enhance endurance performance by improving the economy of movement, delaying fatigue, improving anaerobic capacity and enhancing maximal speed.

The above improvements are observed as a result of high-intensity strength and plyometric training in various endurance sports including male and female cross-country skiing, cycling, running, and triathlon. In most cases, strength training had no significant effect on determinants of endurance performance such as maximal oxygen uptake (VO_{2max}), and the gains in movement economy are often attributed to mechanisms residing within the skeletal muscles, such as increased lower leg musculotendinous stiffness and/or improvements in running mechanics.

Replacing a portion of endurance training with explosive strength training can contribute to performance of trained cyclists and runners. In terms of neuromuscular and anaerobic characteristics, concurrent explosive strength and endurance training can result in improved maximal anaerobic speed, and selective neuromuscular performance characteristics including concentric and isometric leg extension forces in runners.

A potential counterproductive outcome of strength training is that muscle hypertrophy could have a negative impact on weight-bearing endurance events. Also, an increase in myofiber cross-sectional area could reduce capillary to muscle fiber cross-sectional area ratio, thus increasing diffusion distance. In this respect supplemental strength training can improve determinants of performance in endurance events with little or no change in body mass and the muscle CSA in the muscles of endurance athletes. With regards to muscle capillarisation and perfusion, there is no reason to fear that they may be compromised by strength training.

In summary, recent research on highly trained athletes suggests that strength training can be successfully prescribed to enhance endurance performance. The mechanisms involved in the observed performance gains may include a conversion of fast-twitch type IIX fibers into more fatigue resistant type IIa fibers, increased muscle strength and rate of force development, and improved neuromuscular function and musculotendinous stiffness, without a change in muscle capillarization.

Boa formação!