We cordially invite you to the public defence of the doctoral dissertation of:

DIRK AERENHOUTS

Which will take place on Friday, May 27 at 14:30 in room "L.2.210" located on the campus in Etterbeek

A LONGITUDINAL STUDY ON ADOLESCENT SPRINT ATHLETES COVERING PHYSICAL DEVELOPMENT, SPECIFIC PHYSICAL PERFORMANCE AND NUTRITIONAL HABITS

Promoter: Prof. dr. P. Clarys
Co-promoters: Em. prof. dr. B. Van Gheluwe
              Em. Prof. dr. J. R. Poortmans

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Dean of the Faculty of Physical Education and Physiotherapy

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Presentation of the dissertation

Adolescent athletes undergo the processes of growth, development and maturation. It is clear that adolescent athletes have different performance capacities and need different training strategies compared to adults. To date it is unclear what the effects of the physical and physiological changes during adolescence on sprint performance are. Because nutrition is a key component in health, growth and performance, specific research on the dietary habits and needs of adolescent athletes is required to increase the limited evidence currently available on this topic.

In this doctoral thesis longitudinal data on physical characteristics, sprint start and vertical jump performance parameters, and dietary habits were collected from a sample of adolescent sprint athletes.

It was the aim to gain insight on the influence of physical changes during adolescence on sprint start, early acceleration and vertical jump performance. As such, this study assessed the interactions between physical changes throughout adolescence and performance. The use of maximal vertical jumps as a sprint-specific test was evaluated. Secondly, the study aimed at estimating energy and protein requirements for this specific population by studying their energy and protein balance. Dietary habits in function of growth, health and performance were evaluated, questioning whether these habits were in accordance with the current guidelines for this specific athletic population.

The participants in this study, selected on their ranking in different sprint disciplines, were generally early mature. This confirms the advantage of advanced maturity in this type of sport. Moreover, a ‘relative age effect’ or ‘birthdate discrimination’ was observed. Therefore, it is of uttermost importance that coaches and those people involved in selection policies are aware of the effects of age, growth and maturation to prevent a ‘premature’ drop out of later mature but equally or even more talented athletes. This study clearly showed different physical characteristics and performance capacities in girls versus boys of the same calendar age which should be taken into account when setting up a training program.

Linear growth and muscular development were only moderately related to sprint start performance. On the other hand, muscular development clearly contributed to the acceleration after leaving the blocks. Clearly, sprint start performance depends on technical skills which should receive sufficient attention when training adolescent athletes. Only with good technical skills an adolescent athlete can efficiently apply an increased strength and muscularity during the sprint start and acceleration phase. The implementation of sprint specific resistance training may improve an optimal transfer to sprint performance. Male athletes, in contrast to their female counterparts, can still expect considerable performance improvement due to an increase in muscularity and strength when entering the seniors category.

Maximal vertical jumps are far from an exclusive predictor for sprint start performance, and the results in this study indicate that only in male adolescents, counter movement jump height and power were related to sprint start performance and acceleration. Future kinematical research on the block and initial acceleration phase can offer more insight into the contribution of technical skills and the progress an athlete can expect in this area.

The dietary analyses and the normal increases in height and weight indicated that the diet supports normal growth in these adolescent athletes, but with margin for dietary improvement. This study showed that the nutrient intake of the adolescent sprint athletes was relatively stable. A higher consumption of nutrient-dense foods offered a dietary based solution to reach the RDI for specific nutrients. It is advised that dietary supplementation should be done with care and with qualified guidance only. This follow-up study showed that the sprint athletes tend to stick to their dietary habits and that achieving dietary improvements is difficult, despite the fact that the athletes and their parents received bi-annually nutritional feedback in combination with current recommendations. It should be mentioned that external influences from media, peers at school or the sports environment etc. were not controlled for in this study. The cooperation between, and the education of both athletics coaches and diéticians, may be required to achieve permanent improvements towards a healthy sports diet.

Curriculum Vitae

Dirk Aerenhouts graduated in 2005 from the Vrije Universiteit Brussel as Licentiaat in Physical Education. Thereafter he started as an assistant at the department of Human Biometry and Biomechanics from the faculty of Physical Education and Physiotherapy at the Vrije Universiteit Brussel. His main areas of interest are nutrition, sports biomechanics, anthropometry and biochemistry of exercise.