

Youth athletic development: aiming high while keeping it healthy, balanced and fun!

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Sport is rich with remarkable stories of successful youth athletes: Wayne Gretzky, the 'Great One' of ice hockey, Alexandre Despastic, the Commonwealth Games diving gold medalist at the age of 13, and Janet Evans, the child prodigy in the swimming pool. But sadly, these legendary stories of success in youth sport do not always have such a storybook ending. All too often, youth athlete sport careers are ended prematurely by preventable sport-related injury from ill-informed training and competition regimens, or as a consequence of unrelenting undue psychological stress from unrealistic expectations and adult-induced pressures. An example—albeit hypothetical scenario—underscores a global concern in youth sports:

Sarah, like many young girls, is an aspiring elite gymnast who wanted to be just like Nadia Comaneci. At 14 years old, Sarah is training at a National Gymnastics Training Centre far from home while attending a special sports school. With the advent of her adolescent growth spurt, Sarah begins to recognize the new challenges that parallel her changing body shape and accompanying alteration in her centre of gravity. Sarah and her coach notice increasing shortcomings in her ability to perform previously mastered complex gymnastic skills in all of the four gymnastic events of floor, uneven bars, beam and vaulting. In a misguided effort to control her weight increase and recent change in body shape, her coach, put her on a restricted diet and imposed daily weigh-ins before practice, so that she could regain her 'ideal' body composition before the judges see her compete in the National Trials in 3 weeks' time. At the end of a 5-hour training session, while attempting to land a dismount from the bars, a very

fatigued Sarah under rotates and lands with her right foot planted and her knee in valgus position as she completes her twist. A loud popping noise was heard as Sarah's anterior cruciate ligament ruptures and she falls to the floor in pain.

Sarah's story is one of uninformed knowledge of normal growth and maturation coincident with adolescence, combined with inappropriately trying to manage body composition and natural new challenges in performance along with uneducated and unsuitable coaching and training loads. Unfortunately, her story is not unique. Other youth athlete careers are interrupted or prematurely ended by more seemingly benign scenarios—repeated excessive training and competition with insufficient regular recovery that, over time, excessively loads growing tendons, joints and bones surpassing the zone of healthy and desirable adaptation to and beyond the threshold of physiological overload and structural breakdown. These overuse injuries are often seen in swimming, athletics, tennis and other sports with characteristic repetitive movements.¹

While the success stories of Wayne, Alexandre and Janet are legendary, the story of Sarah also serves to remind us of the need for sport to nurture and protect our youth to ensure that we "develop healthy, capable, and resilient young athletes, while attaining widespread, inclusive, sustainable and enjoyable participation and success for all levels of individual athletic achievement."²

In 2008, the International Olympic Committee (IOC) published the Consensus Statement 'Training the Elite Child Athlete'³ which recommended that research needs to address training parameters in children; that sport organisations should protect the health and welfare of young athletes; that parents must ensure a balanced lifestyle; and that all involved in sport should limit the amount of training and competitive stress on the elite athlete. How have we done? In 2015, has the research advanced sufficiently, is coaching youth sports adequately supportive and nurturing of individual athlete development, have sport organisations done enough, and is the

sports experience a better, healthier and more sustainable and enjoyable one for our youth athletes? Are our young athletes of today better trained and more successful? Are we, in fact, providing sport organisations, coaches and parents with the tools that have been validated to identify, cultivate and support success for youth in sport at all levels of participation?

To examine the scientific advances that have occurred in the field since the IOC consensus meeting on Training the Elite Child Athlete was held in 2006, and to provide an updated analysis and resource of the issues around youth athletic development, IOC created a working group of international experts to comprehensively address current practices and present new evidence-informed perspective and guidelines. The featured outcome of the IOC working group is the publication of the 'International Olympic Committee Consensus Statement on Youth Athletic Development' appearing in this edition of the *BJSM*.

The IOC Youth Athletic Development project was predicated on the observed need to make changes to the youth sport culture and contributing elements to better address the athlete development process, and to fulfil the mandate of IOC to promote the health of the athlete.⁴ The Consensus Statement provides the scientific background of the biological and physiological maturation of youth athletes which establishes the base for all youth athlete sport programming. Several challenges to health and performance in this population are discussed, including those related to inappropriate early sport specialisation, sports-related injury risk, and psychological and environmental threats. The sensitive areas of youth athlete safeguarding in sport and the prevention of disordered eating and eating disorders in this unique cohort of athletes are also addressed. There is much folklore in sport around the methods for and value of early talent identification, and the challenges and efficacy of these practices are reviewed. Additionally, existing youth athlete development frameworks are critiqued, and recommendations for framework development are introduced. An integral component of the sport experience is the role of the coach in guiding athlete skill development, creating a positive sport milieu and inspiring personal growth. A review of the scientific background and recommendations for coaching effectiveness in youth sport is emphasised. This is followed by discussions on developing fitness and other related essential athletic qualities to meet the physical and functional demands of sport, and then the

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ethical valid methods and value of physiological monitoring and sport-specific testing of youth athletes. The Consensus Statement concludes with pointed recommendations of best practices and a call to action for coaches, parents, youth sport governing bodies, sport medicine organisations and other youth sports stakeholders.

Complementing the Consensus Statement, this special edition of the *BJSM* contains a number of supporting commentaries and articles. Bergeron⁵ provides a commentary on the changing challenges related to sweating, thermal strain and exertional heat illness risk as young athletes grow and mature, and Weissensteiner⁶ explains the importance of engaging and implementing the youth 'athlete's voice' in sport. Malina⁷ and Armstrong *et al*⁸ outline the science behind youth athlete maturation. These two papers underscore the essential foundational considerations for all youth athlete development frameworks. The systematic review on neuromuscular training by Emery and van Mechelen⁹ assesses the evidence on this training technique for youth athletes. Similarly, Evans *et al*¹⁰ outline the scientific evidence on coaching development programmes designed to improve interpersonal coaching behaviours in youth sport. A review by Suppiah *et al*¹¹ demystifies the science behind the intricacies of talent identification, and the sensitive topic of safeguarding children in sport is addressed by Mountjoy *et al*.¹²

The IOC Youth Athletic Development project fulfils IOC's expanded interest and support for a healthier and more sustainable, inclusive and effective holistic

pathway to elite sports performance. The 2008 IOC Consensus Statement on Training the Elite Child Athlete concluded with the epitaph "The entire sports process for the elite child athlete should be pleasurable and fulfilling."³ In 2015, we can see progress, but the goal has not been fully reached. We must continue our efforts with an unwavering commitment to every child who has an Olympic dream... or just wants to participate in sports in an environment that is not only challenging, but is also healthy, balanced and fun!

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