

“IS MY KID DOING TOO MUCH SPORT?”  
HOW TO REDUCE THE RISK OF OVERTRAINING SYNDROME AND  
OVERUSE INJURY IN YOUNG ATHLETES

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Participation in sport offers many benefits to children and adolescents, including enhanced physical fitness, improved self-confidence and self-esteem, while also providing an opportunity to foster friendships with their peers. However, children who are deemed to possess ‘talent’ for a particular sport are often encouraged to specialise in a single sport by coaches and parents from early childhood. In such circumstances, success is typically measured by competitive accomplishments either externally by parents/coaches, or internally by the child themselves. Often, aspiring young athletes who are attempting to make selection for regional or national squads, or who are seeking to secure professional contracts are encouraged to start highly intensive, sport-specific training for a single sport from a young age. Additionally, these young athletes are often required to play in a number of high-level competitions in a bid to ‘overtake’ their peers. Unfortunately, data is now emerging that highlights the risks associated with this approach, whereby a focus on high levels of training for

a single sport can lead to an increased risk of overuse injury, overtraining and even burnout (1).

### **Early sport specialisation**

Early specialisation refers to the concept of a child participating in year-round intensive training within a single sport or physical activity at the exclusion of others. Unfortunately, literature now suggests that this approach, which aims to further the development of talent, carries an increased risk of injury, a potential ‘blunting’ of a child’s motor skill development that can lead to reduced performance later in life, and an increased risk of overtraining or burnout (8). Additionally, specialising at an early age in a single sport does not guarantee the achievement of elite level performance later in life (11). Early sport specialisation has been somewhat driven by the refuted 10,000 hour rule, which suggests that an individual seeking to acquire expertise in a given activity needs to engage in 10,000 hours (or 10 years) of deliberate practice. However, it is now accepted that this rule is a misnomer in the development of sporting talent, due to the highly individual nature of talent development (7).

### **What are overuse injuries?**

Overuse injuries are defined as injuries that occur as a result of repetitive submaximal loading of the musculoskeletal system in the absence of sufficient rest, which can blunt adaptive responses (1). These injuries typically involve repetitive trauma to the muscle, tendon and/or bone, and appear to be more prevalent in those individuals who specialise early in a single sport.

### **How prevalent are overuse injuries in youth athletes?**

Existing data shows that a relatively high proportion of all sports-related injuries are overuse in nature and emerging evidence suggests that overuse injuries are increasing in youth populations (1). Recently, data on 1,190 individuals showed that after accounting for age and time spent playing sport, sports-specialized training was a significant independent risk factor for acute and serious overuse injury (4). The study concluded that youth were at a heightened risk of injury when they participated in more hours of sports practice per week than their number of years in age, or whereby the ratio of organised sports to free play time was in excess of 2:1 (4). While another study showed that within a sample of female youth athletes, those who had specialized at an earlier age had a 1.5-fold greater risk of knee-related injury (2).

### **Spotting the signs of potential overuse injury**

In a bid to identify young athletes that may be starting to show symptoms of overuse injury, coaches and parents should be aware of the following symptoms (*table 1*).

**Table 1.** Symptoms of Overuse Injury

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Gradual onset of pain
Pain presenting as an ache
Pain not a result of direct injury
Stiffness or aching during, or after, competitions/training
Pain persisting for gradually longer periods
Point tenderness, especially when palpated
Swelling
Missed training session due to pain/injury
Recurring problem

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### **What is overtraining syndrome?**

Training is a process that prepares a young athlete for the demands of their chosen sport(s). Specifically, the training programme should help prepare the young athlete from a technical, tactical, physiological and psychosocial perspective. Practitioners should be aware that following exposure to training, young athletes must be afforded the opportunity to rest and recover. Different to adults, youth need time not only to adapt to the training stimulus, but also to allow for natural growth processes to take place (14). While some degree of training stress is required to promote physical adaptation and improve physical performance, excessive training loads can lead to tissue breakdown, injury, suppression of the immune system, persistent fatigue and performance decrements. The European College of Sport Science and American College of Sports Medicine define the term “overtraining” as a process of intensified training with possible outcomes of functional overreaching, non-functional overreaching or overtraining syndrome (10). These terms are individually characterised in *table 2*. It is accepted that functional overreaching will generally result in improvements in performance with sufficient recovery. However, when youth are continually exposed to excessive training volumes with insufficient time for rest and recovery, they are at increased risk of experiencing non-functional overreaching or possibly overtraining syndrome.

**Table 2.** Different outcomes of training

Outcome of training	Typical recovery period	Effect on performance?
Typical acute fatigue	Hours-day(s)	Increase
Functional overreaching	Days-week(s)	Temporary decrement
Non-functional	Weeks-month(s)	Plateau or moderate-term

overreaching		decrease
Overtraining syndrome	Months-year(s)	Long-term decrease

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### **How prevalent is overtraining in youth athletes?**

Despite a growing concern around the training workloads of modern-day young athletes, limited evidence exists for the prevalence of non-functional overreaching and overtraining. Of the available data, one study which included 376 young athletes within the UK showed that approximately 30% had experienced non-functional overreaching and/or overtraining at least once during their careers (9). A similar occurrence of overtraining syndrome was reported in a study of 272 Swedish high school junior national athletes (37%) and amongst 231 age-group swimmers (35%) from Greece, Japan, Sweden and the United States (10). Some evidence also exists which shows that those athletes who experience overtraining syndrome are more prone to relapse (10). While not specific cases of non-functional overreaching or overtraining syndrome per se, recent evidence shows that young elite footballers experienced reduced perceptions of wellbeing throughout the course of a season (13), which highlights the potential negative impact of continual exposure to single sport activities.

### **Spotting the signs of overtraining**

In a bid to identify young athletes that may be starting to show signs of overtraining, coaches and parents should be aware of the following symptoms (*table 3*).

**Table 3.** Symptoms of Overtraining Syndrome

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Fatigue	Decreased self-confidence
Depression	Anxiety
Bradycardia or tachycardia	Nausea
Loss of motivation or interest	Loss of appetite
Hypertension	Weight loss
Sleep disturbances	Lack of mental concentration
Insomnia	Heavy, sore, stiff muscles
Irritability	Restlessness
Agitation	Recurring illness

**How can we reduce the risk of overuse injury and overtraining syndrome in young athletes?**

The following recommendations for reducing the risk of overuse injury are based on recent literature.

*(i) Manage Workload (3, 4, 8, 12)*

- Avoid training/competing in a single sport for more than 8 months per year and encourage participation in a variety of sports
- Avoid children participating in a single sport for more hours per week than their chronological age
- Weekly participation in a single sport should not exceed 16 hours
- Ensure that youth have time to practice and are not only competing
- Programme for periods of rest to enable recovery, regeneration and growth

*(ii) Strength and conditioning (5-7)*

- Children should participate in a varied, quality technique driven, and age appropriate strength and conditioning program, comprised of exercises to enhance fundamental movement skills, muscular power, lower body and core strength to facilitate athletic development
- Strength and conditioning programmes should include general (e.g., fundamental movements) and specific (e.g., exercises targeted to motor control deficits) training activities
- Strength and conditioning should not be viewed as simply a desirable “add-on” to an overall sports programme for a child or adolescent, but rather as a compulsory central pillar of long-term athletic development

*(iii) Equipment (1)*

- Youth should be encouraged to use a variety of pieces of training equipment to further develop their motor skills
- Youth should use equipment that is properly sized for testing, training and competing
- Growth and development may result in equipment needing to be resized, therefore any equipment should be regularly evaluated for its suitability

**Summary**

In young athletes it would seem that success at a young age does not predict long-term success, and in some cases, early sport specialisation may increase the risk of overuse injury, heighten susceptibility to overtraining syndromes, and limit the potential to achieve elite status. Existing data provide support to the concept of early

sport diversification. Research also recognises that while deliberate play and practice and formalised sports training is certainly necessary for success in sports, in isolation it is not likely sufficient to achieve maximum performance. There is also an increased injury risk associated without the integration of appropriate long-term athletic training programmes to enhance athletic development.

## References

1. DiFiori JP, Benjamin HJ, Brenner J, Gregory A, Jayanthi N, Landry GL, and Luke A. Overuse injuries and burnout in youth sports: a position statement from the American Medical Society for Sports Medicine. *Clin J Sport Med* 24: 3-20, 2014.
2. Hall R, Barber Foss K, Hewett TE, and Myer GD. Sport specialization's association with an increased risk of developing anterior knee pain in adolescent female athletes. *J Sport Rehabil* 24: 31-35, 2015.
3. Jayanthi N, Pinkham C, Dugas L, Patrick B, and Labella C. Sports specialization in young athletes: evidence-based recommendations. *Sports Health* 5: 251-257, 2013.
4. Jayanthi NA, LaBella CR, Fischer D, Pasulka J, and Dugas LR. Sports-specialized intensive training and the risk of injury in young athletes: a clinical case-control study. *Am J Sports Med* 43: 794-801, 2015.
5. Lloyd RS, Faigenbaum AD, Stone MH, Oliver JL, Jeffreys I, Moody JA, Brewer C, Pierce KC, McCambridge TM, Howard R, Herrington L, Hainline B, Micheli LJ, Jaques R, Kraemer WJ, McBride MG, Best TM, Chu DA, Alvar BA, and Myer GD. Position statement on youth resistance training: the 2014 International Consensus. *Br J Sports Med* 48: 498-505, 2014.
6. Lloyd RS and Oliver JL. The youth physical development model: a new approach to long-term athletic development. *Strength Cond J* 34: 61-72, 2012.
7. Lloyd RS, Oliver JL, Faigenbaum AD, Howard R, De Ste Croix MB, Williams CA, Best TM, Alvar BA, Micheli LJ, Thomas DP, Hatfield DL, Cronin JB, and Myer GD. Long-term athletic development- part 1: a pathway for all youth. *J Strength Cond Res* 29: 1439-1450, 2015.
8. Lloyd RS, Oliver JL, Faigenbaum AD, Howard R, De Ste Croix MB, Williams CA, Best TM, Alvar BA, Micheli LJ, Thomas DP, Hatfield DL, Cronin JB, and Myer GD. Long-term athletic development, part 2: barriers to success and potential solutions. *J Strength Cond Res* 29: 1451-1464, 2015.
9. Matos NF, Winsley RJ, and Williams CA. Prevalence of nonfunctional overreaching/overtraining in young English athletes. *Med Sci Sports Exerc* 43: 1287-1294, 2011.
10. Meeusen R, Duclos M, Foster C, Fry A, Gleeson M, Nieman D, Raglin J, Rietjens G, Steinacker J, Urhausen A, European College of Sport S, and American College of Sports M. Prevention, diagnosis, and treatment of the overtraining syndrome: joint consensus statement of the European

- College of Sport Science and the American College of Sports Medicine. *Med Sci Sports Exerc* 45: 186-205, 2013.
11. Moesch K, Elbe AM, Hauge ML, and Wikman JM. Late specialization: the key to success in centimeters, grams, or seconds (cgs) sports. *Scand J Med Sci Sports* 21: e282-290, 2011.
  12. Myer GD, Jayanthi N, DiFiori JP, Faigenbaum AD, Kiefer AW, Logerstedt D, and Micheli LJ. Sports Specialization, Part II: Alternative Solutions to Early Sport Specialization in Youth Athletes. *Sports Health* 8: 65-73, 2016.
  13. Noon MR, James RS, Clarke ND, Akubat I, and Thake CD. Perceptions of well-being and physical performance in English elite youth footballers across a season. *J Sports Sci* 33: 2106-2115, 2015.
  14. Oliver JL, Lloyd RS, and Meyers RW. Training elite child athletes: promoting welfare and well-being. *Strength Cond J* 33: 73-79, 2011.