

Contributing Factors to Overtraining in the Adolescent Multi-Season/Sport Athlete

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SUMMARY

TODAY'S ATHLETES ARE RUNNING FASTER, JUMPING HIGHER, THROWING FARTHER, AND LIFTING HEAVIER. THIS IMPROVEMENT IN PERFORMANCE IS A TESTAMENT TO THE DEDICATION AND HARD WORK OF ATHLETES, COACHES, ATHLETIC TRAINERS, STRENGTH COACHES, AND OTHERS WHO INVEST SO MUCH INTO THE SPORTS TRAINING PROCESS. WITH A GROWING EMPHASIS ON COMPETITION AND WINNING, THERE IS AN ASSOCIATED RISK OF OVERTRAINING, ESPECIALLY WITH ATHLETES IN HIGH SCHOOLS WHO PARTICIPATE IN MULTIPLE SPORTS OR IN BACK-TO-BACK SEASONS. PLAYING MULTIPLE SPORTS IS NOT IN ITSELF A RISK; HOWEVER, ELIMINATING OR REDUCING RECOVERY CYCLES CAN INCREASE AN ATHLETE'S RISK OF OVERTRAINING.

Today's athletes are running faster, jumping higher, throwing farther, and lifting heavier. This improvement in performance is a testament to the dedication and hard

work of athletes, coaches, athletic trainers, strength coaches, and others who invest so much into the sports training process. However, with a growing emphasis on competition and winning, there is an associated risk of injury and overtraining (5,9,22), especially with younger athletes (1,4,16). Often, younger athletes are "coaxed" and "cajoled" by coaches and parents to train at higher levels than may be necessary (10). Younger athletes are beginning to compete and train in multiple sports and in back-to-back sports at higher intensities (1,3,4). Participating in multiple sports is not in itself a risk; however, eliminating or reducing recovery or rest cycles increases the risk of overtraining. The American Academy of Pediatrics Committee on Sports Medicine and Fitness (1) states that it is important to make efforts to assist young athletes in avoiding potential risks associated with "excessive training and competition."

Prepubescent athletes are often involved in multiple sports and may participate in several activities, which can help develop general athletic ability, motor control, and coordination (2). However, many of these young athletes are now being asked to complete and train at higher

intensities and many of them have difficulty adjusting to these higher demands (1,4). It is important to keep in mind that adolescent athletes are not "small adults" (5). Higher-intensity training coupled with greater expectations creates conditions conducive to behaviors that foster overtraining. Such behaviors include reducing or eliminating rest cycles and training at higher intensities for longer durations. Furthermore, these young athletes often ignore or simply do not know the psychological or physical signs of stress due to training, which further increases any risk of injury or overtraining (13).

As training intensity increases for these young athletes, it is important that the same level of participation in multiple sports not be presumed. Awareness of athlete's intensity is especially critical when you add to the equation the physical changes and emotional demands of puberty combined with increases in the volume of schoolwork and social pressure often associated with this stage of life. It is left to parents, coaches, and physicians to

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monitor their activity and if necessary “enforce” periods of “relative rest” (13).

Therefore, the purpose of this article is 2-fold: to present the concept of a multi-sport/season dilemma in adolescent athletes and to make coaches aware of the potential for overtraining as a result of multi-sport/season participation. Our hope is that this will increase awareness of the potential stress on young athletes and make coaches and parents begin to look for signs of increased risk of overtraining and overuse injuries associated with adolescent athletes who concede rest or recovery to train at high intensities for long durations or participate in multiple sports simultaneously.

In an article of this type, it is tempting to prescribe interventions for the multi-sport/season dilemma. However, prescribing specific protocols or making detailed recommendations geared toward manipulating these stresses is beyond the scope and intent of this article. Therefore, prescribing specific interventions in light of our purpose defeats our intent of drawing attention to a multi-sport/season dilemma. It is our contention that presenting specific interventions at this time (i.e., length of off-season, age-appropriate rest to work ratios, etc.) might imply that in spite of the multi-sport/season dilemma, these practices negate the risk of the dilemma or overtraining. Furthermore, proposing detailed “safer-

training” recommendations may detract from a coach reflecting in his or her practice requirements or recognizing a multi-sport/season dilemma may exist, which negates the intended outcome of this article.

THE MULTI-SEASON DILEMMA

The multi-sport/season dilemma occurs when athletes participate in multiple sports simultaneously. Typically, this occurs when sport seasons overlap (i.e., end of football extends into the beginning of basketball or wrestling). Often, athletes leave one practice early in order to report to the next practice on time or vice versa, forcing them to skip meals and forgo much needed rest. Figure 1 is a depiction of the multi-sport/season dilemma. This dilemma can also exist when a single sport has back-to-back seasons, in that they often fail to provide an off-season or adequate recovery before the next competition phase begins. In either case, it is the decrease in rest, recovery, and the apparent lack of an off-season that may increase the risk of overtraining and overuse injuries.

Today’s culture gives a high level of honor to successful athletes. Many young athletes (or their parents) often succumb to the lure of sports fame (1). The adolescent athletes who “initiate participation too vigorously” or are overly “ambitious” and end up “chronically overtraining” are at greater risk (16).

Results of early competition are often longer practices, higher intensities, greater volume, and hypercompetitiveness. Pressure from peers, parents, coaches, and media coupled with the athletes’, or their parents’, desire to “go pro” or win a college scholarship encourages adolescents to compete and train at higher levels much earlier (1).

Training harder and longer may not always be associated with desire to “go pro” or winning a scholarship. Athletes at schools with a limited student body may, out of necessity, that is, lack of human resources, need to compete in back-to-back seasons or in multiple sports simultaneously. Although we have found no literature to support the claim that athletes at “smaller” schools are at an increased risk for overtraining, it is plausible to assume this risk is present to a greater extent. One of the issues that research in sports medicine needs to address is the incidence of overtraining or overuse injuries in this demographic. Whether driven to prove something, dubbed with “superstar” athletic ability, or needed to fill a roster, the multi-sport/season athletes may be at a greater risk for overtraining.

WHAT IS OVERTRAINING?

Overtraining is an accumulation of training and/or nontraining stress resulting in long-term decrement in performance capacity with or without related physiological and psychological

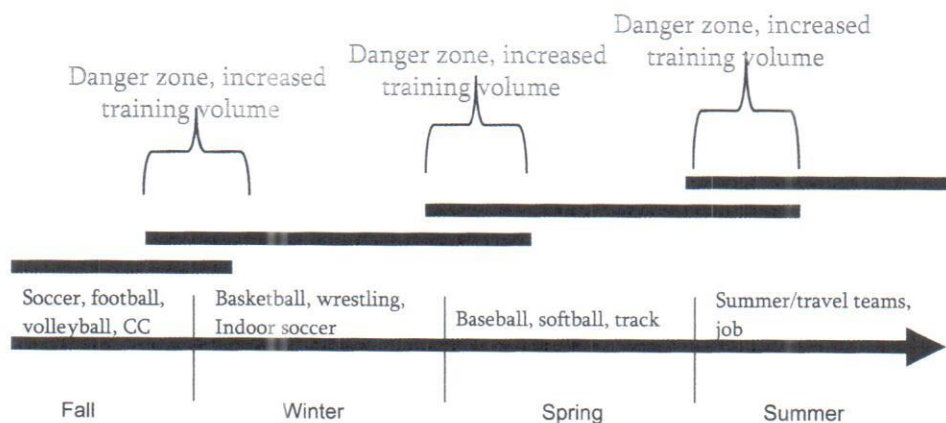


Figure 1. The multi-sport/season dilemma.

signs and symptoms (12,19). Recovery from overtraining or the restoration of performance may take several weeks or months (12,19). Simplistically, overtraining is a negative process or pattern of behavior as a result of sport-related stress (25).

In many cases overtraining is preceded by overreaching. Overreaching, although similar in terms of the stress accumulation and the impending decrease in performance, deals more specifically with the short-term effect and may take anywhere from several days to several weeks for performance return (12,17,19). Overreaching is essentially short-term overtraining and is detrimental to acute performance (19,25). Because overreaching is often induced intentionally, recovery requires careful monitoring and expert coaching intervention to achieve any long-term performance improvements. Overreaching itself is not the problem with multi-sport/season athletes. The problem is the potential failure of the athlete, coach, or parent to recognize and intervene during overreaching, which increases the risk of overtraining.

As few as 10 days of increased training (i.e., volume or intensity) may result in nonfunctional overreaching (6). As long as overreaching is coupled with sufficient recovery, performance will likely be enhanced; however, if that relationship is disrupted and shifts toward an increased amount of

training, overreaching could ultimately lead to overtraining (12).

STALENESS AND BURNOUT: PRECURSORS TO OVERTRAINING

In addition to any medical and psychological concerns, overtraining can lead to staleness, burnout, or even dropout. Staleness is a negative outcome of overtraining, resulting from the athlete's failure to adapt to the designated training routine (23). Raglin and Wilson (23) also note that staleness "is an unexpected and long-term loss of performance that cannot be attributed to factors such as illness or injury." As a whole, most will agree that staleness is an undesirable response, which is a consequence or end product of overtraining (24).

Athletic burnout can be thought of as both emotional and physical exhaustion from the psychological and physiological demands of the athlete's sport (17). At times, burnout can even extend beyond fatigue to cause the physical withdrawal or dropout from a previously enjoyable activity (26). Burnout tends to operate more at the cognitive and emotional level, whereas overtraining has an essential physiological component with respect to hard physical training (18). Although burnout and overtraining share several characteristics, the primary difference is motivation; presumably, an overtrained athlete is still motivated to compete, whereas an athlete experiencing

burnout is "demotivated" (17). Therefore, the overtrained athlete may begin with feelings of staleness, which in turn, may lead to burnout, which in turn, may ultimately lead to dropout (11). With respect to the multi-sport/season athlete, the conditions conducive to overtraining are higher, warranting caution and closer monitoring of staleness or burnout.

Athletes who do not experience burnout and are experiencing staleness or other signs and symptoms of overtraining often continue to train and may even be tempted to increase intensity further, hoping to break out of their slump or prove they are mentally tough. This may occur because, as Lemyre et al. (18) states, many athletes in an overtrained state are still motivated. Pushing through training regimens when overtraining likely increases the risk of injury. It has been reported that up to 50% of all pediatric sports injury are due to too much training (3,21). Furthermore, young competitors are at greater risk because of inability to cognitively connect symptoms such as decreased performance or increased fatigue as a warning (3,21). The signs and symptoms of overtraining are listed in Table 1.

Up to 80% of athletes suffering from overtraining syndrome have significantly elevated levels of psychological depression (20). In fact, overtraining syndrome is often characterized by

Table 1
Symptoms of overtraining

Symptoms during training	Physical symptoms	Nonphysical symptoms
Usual workouts feel more difficult	Persistent fatigue	Difficulty sleeping
Early fatigue during workouts	Ongoing muscle soreness	Feelings of irritation or anger
Faster heart rate with less effort	Loss of appetite	Feelings of depression
Decreased strength	Increased aches and pains	Lack of motivation
Decreased coordination	Increase in overuse injuries	Fear of competition
Physical challenges seem too hard	Frequent colds or infections	Difficulty concentrating
Decreased performance on strength, speed, or endurance testing	Lower resistance to common illnesses	Increased sensitivity to emotional stress

psychological disturbances (19). Other risks associated with overtraining include increased risk to the immune system (19). One of the most common illnesses associated with overtraining is upper respiratory tract infections, requiring medical intervention (8). With all these risks associated with overtraining, it is important to recognize it early.

RECOGNIZING OVERTRAINING

Recognizing overtraining syndrome involves being aware of both physiological and psychological signs and symptoms. To prevent overtraining, the most important thing to recognize is a faulty or poorly designed training program. Often, one critical sign of a poorly designed training program is the lack or absence of adequate rest and recovery. Dalton (7) states that the number one risk factor for injuries to adolescent athletes is the "training program," which he adds can be easily modified or controlled. This implies that if their training programs were modified or controlled (i.e., adjusted for volume and intensity), then the risk of injury might be reduced. The failure to recognize poor or improper training regimens can be a significant blind spot in failing to recognize the risk of overtraining for multi-sport/season athletes. Proper training must avoid "excessive overload" and "inadequate recovery" (19). Poorly designed training programs often have the following characteristics:

- Rapid increases in training volume and intensity
- Extended schedules of high-volume training
- Inadequate recovery and rest.

Programs exhibiting these characteristics are often contributors to the multi-sport/season dilemma. Hogan and Gross (13) advocate that pediatric athletes "should be asked if they are participating in more than one team or sport simultaneously." This statement implies that if they are competing in more than 1 sport simultaneously, then training should be closely monitored or altered to accommodate their age and maturity.

Due to a litany of contributing factors and possible symptoms, overtraining is difficult to identify. Identifying overtraining requires a medical diagnosis, which should rule out all other possible causes for any associated symptoms, such as infections, diseases, or poor nutrition (19). Therefore, any suspicion of overtraining should be referred to a physician. To facilitate necessary referrals to physicians, athletes, coaches, parents, strength coaches, athletic trainers, and friends should be aware of some common signs associated with overtraining. Fortunately, there are several warning signs of overtraining. Some of those warning signs include (14,15,17,19):

- under or impaired performance
- fatigue or exhaustion
- mood disturbances
- apathy
- disturbed sleep
- loss of appetite
- irritability

For a more detailed list of specific signs and symptoms, refer to Table 1. Furthermore, preexisting medical conditions such as colds or allergies increase vulnerability to overtraining.

PREVENTION AND MANAGEMENT

Rest is the primary treatment for overtraining (16). Prepubescent athletes should avoid "monotonous repetitions and intensive conditioning" (5). The American Academy of Pediatrics Committee on Sports Medicine and Fitness (1) suggests that young athletes should avoid "excessive training and competition" and states that "the necessary commitment and intensity of training raises concerns about the sensibility and safety of high-level athletics for any young person." Therefore, it is important to increase rest and reduce training duration and volume in young athletes at risk for overtraining or who are experiencing overreaching.

Watching for the multi-sport/season dilemma and allowing these athletes to have adequate recovery between seasons and as they progress to higher levels of competition can also be an important prevention and management technique. However, recovery

does not mean total inactivity. Active recreation can be effective as a recovery aid and to help deter monotony.

Record keeping and close monitoring (i.e., injury data, periodization tables) by an athletic trainer, strength coach, sport coach, or parents can also help recognize overreaching and deter overtraining. It is also important to facilitate a relationship where the athlete feels free to disclose any symptoms to the coach without the fear of being labeled as "lazy." Other prevention and management techniques include familiarization with the athletes. This cannot be stressed enough because significant individual differences in the ability to tolerate hard training do exist, even when physical or emotional characteristics appear similar.

Thoughtful periodization of training can also help to prevent overtraining. Periodization is a complex process, especially for younger athletes with varying levels of physical and emotional maturity and is beyond the scope of this article. However, it is important that athletes be allowed adequate rest and recovery, especially during the heaviest training periods. Because many of these young athletes might not recognize their own symptoms (3,21), "adequate recovery" must be considered on a case-by-case basis. Coaches may have to enforce rest (13) because some athletes (or parents) are unwilling to reduce training for fear of becoming detrained or fear of losing a starting position. Finally, teach athletes to "listen to their bodies" and be alert to signs of overreaching. Combining these prevention and management strategies with regular medical checkups can significantly reduce the risk of overtraining in young athletes who compete in multiple sports or in back-to-back seasons.

SUMMARY

Younger athletes who progress from sport to sport or season to season or who participate in multiple sports simultaneously may be at an increased risk for overtraining. This risk is primarily a result of high volume and

intensity of training with little or no rest or recovery. Coaches, parents, and peers should be alert to the presence of poor training programs, as well as the signs and symptoms of overtraining. If the multi-sport/season dilemma is observed by coaches or parents, be alert to nonfunctional overreaching and make appropriate adjustments, such as increased recovery and rest to training routines. As soon as overtraining is suspected, the athlete should be referred to a physician.

As stated in the introduction, the purpose of this article was to draw attention to the multi-sport/season dilemma and not necessarily to discuss adolescent periodization. However, that is not to say age-appropriate periodization is not warranted, on the contrary it is essential. Hopefully, future articles will address the issue of periodization for young athletes at risk for overtraining. To facilitate critical reflection and identification of the multi-sport/season dilemma, the following list is provided for coaches, parents, and athletes:

- Be aware of athletes leaving one practice in order to report to another.
- Be aware of and watch for the signs and symptoms of overtraining.
- Be aware of athletes who are participating in multiple sports simultaneously.
- Be aware of how long an athlete has participated in competition and training without a time off or break in training intensity.
- Consider individual athlete's needs in terms of rest, relative to other social stressors in their lives.
- Understand that chronological age is less important in determining physical maturity than biological age.
- Know that young athletes require different amounts of rest, regardless of any physical or emotional similarities.
- Know that social and emotional factors also contribute to stress that can contribute to overtraining.
- Be aware of overly ambitious or "hard-driving" parents or coaches.
- Know that young athletes are not "miniadults."



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