

The Impact of Sleep on Youth Athletic Performance

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The life of a modern student athlete is increasingly becoming busier and putting more mental and physical demands on the body. The attempt to balance school, family, friends, and sports leaves little free time and keeps their daily schedules full. To meet these demands, student athletes are often late to bed and early to rise, sacrificing valuable sleep time in the process. Early morning training or practices as well as late night travel schedules put a student athlete at a sleep disadvantage compared to their peers who are not participating in athletics. This can affect them both physically and cognitively. Not only is the amount of time sleeping being affected, but poor sleep hygiene such as the prevalence of electronic devices in the bedroom may also be affecting the quality of sleep. Sleep is critical in the recovery and repair process of the body, and it is even more important for athletes who put their bodies through rigorous physical activity each day.

Adults are setting a poor example for their children, and the importance of sleep is being neglected in today's fast-paced society. The use of sleep aids at night and stimulants during the day are on the rise, as well as the prevalence of sleep-related disorders. Overscheduled and hectic lifestyles leave little in the way for relaxation, and much like the student athlete; adults in the professional world are pushing aside the importance of sleep. It is important that the critical roles that sleep plays in our overall health be emphasized to parents, coaches, and administrators so they can in turn make it a priority for their children and make scheduling decisions based on what is best for the child.

The purpose of this paper is to detail how critical of a role that sleep plays in the development and recovery of an athlete, and to be a resource for coaches and parents in determining practice times, training times, and general sleep hygiene. It will also help identify

signs of sleep deprivation, some of the risks involved, and what coaches and parents can do to create a schedule for their athletes to ensure a proper night's sleep for recovery.

Causes for Concern

Teenagers are not getting enough sleep, and there are many reasons for this trend. They generally require 8.5 to 9.5 hours of sleep per night (Carskadon, Harvey, Duke, Anders, Litt, Dement, 1980). The National Sleep Foundation revealed that students in grades 9-12 are sleeping an average of 7.2 hours per night, with the amount of time decreasing each year the student progresses through high school (National Sleep Foundation, 2006). Only 9% of high school students reported getting an optimal amount of sleep (National Sleep Foundation, 2006). These statistics should raise some serious concerns, especially for coaches and parents of athletes. Not only are teenagers sleeping less, but the quality of their sleep may be compromised as well. There are many reasons for this trend, caffeine consumption and electronic devices being the primary offenders. Soda consumption among teens has been a longtime problem, and in recent years there has been an increase of energy drink consumption. Thirty-one percent of adolescents drink more than two cups of caffeinated beverages each day, and subsequently are more likely to get an insufficient amount of sleep (National Sleep Foundation, 2006). Increased caffeine consumption has been correlated with a later bedtime, more disturbed sleep, and daytime sleepiness (Pollak & Bright, 2003). Also affecting sleep quality is the prevalence of electronic devices in the bedroom. In a 2006 poll, 60% of high school students had a television in their bedroom, and 57% had a cell phone (National Sleep Foundation, 2006). Nine years after this study, due to the increased popularity and usage of cell phones, it would be safe to assume that today this number is much higher. This same study revealed that 76% of adolescents watched television before bed, and over 50% were on the Internet. The blue light from these

backlit screens suppress melatonin production (Harvard Health Publications, 2012), which in turn makes it more difficult to fall asleep. Aside from the problematic blue lights, excessive mobile phone use has been associated with sleep problems (Jenaro, Flores, Gomez-Vela, Gonzalez-Gil, & Caballo, 2007). Having a cell phone next to the bed could disturb sleep in many ways, including calls from friends, text messages, and social media alerts that are constantly beeping or buzzing late into the night. Children who slept near a small screen have less sleep and a higher prevalence of perceived insufficient rest or sleep (Falbe, Davison, Franckle, Ganter, Gortmaker, Smith, Land, & Taveras, 2015). Another factor contributing to the decreasing sleep times for students is early school start times. Studies have shown that times going to bed does not change regardless of school start times, earning students who start school an hour later an extra hour of sleep (Owens, 2014). This would hold true for a student athlete who has an early morning practice or weight training session to attend before school starts, even further reducing sleep time. It is irrational for a coach to expect athletes to “just go to bed sooner” to accommodate an early morning practice. Teenagers fall asleep between 10:30 and 11:00 PM (National Sleep Foundation, 2006), which would require a wake up time between 7:00 and 8:00 for them to meet their sleep requirements. Demanding a much earlier wake up time to practice or train appears to go against the biology of the student athlete and is perhaps setting them up for a host of physical and mental problems.

Effects on Athletic Performance

Sleep is critical to the body’s repair process for an athlete subjected to daily physical stress. Some of the negative effects of sleep deprivation include a decrease in reaction times (Scott, McNaughton, & Polman, 2006), and decreased strength (Riley & Piercy, 1994). During sleep, growth hormone is released and leads to muscle development. The impairments to the

immune and endocrine systems (Reilly & Edwards, 2007) that result from sleep deprivation may impair the recovery process and adaptation to training (Halson, 2008). Sleep plays an important role in the repair process following an injury, and lack of sleep impairs injury recovery (Schwarz, Graham, Li, Locke, & Peever, 2013). Sleep deprivation can also cause a higher body mass index, leading to a greater risk of becoming obese (Ferrie, Shipley, Cappuccio, Brunner, Miller, Kumari, & Marmot, 2007). Due to these factors, coaches may be dealing with athletes who are moody, slower, weaker, slower to recover, overweight, and more susceptible to illness and injury. This is not an optimal condition for an athlete, making the importance of proper sleep important to recognize and emphasize by coaches, parents, and the athletes themselves. Alternatively, extended sleep for an athlete contributes to improved athletic performance, reaction time, daytime sleepiness, and mood (Mah, Mah, Kezirian & Dement, 2011). Setting an athlete up for sufficient and quality sleep should be viewed as important for athlete development as any other aspect of their training.

Effects on Mental Performance

Coupled with physical effects of sleep deprivation, is the decline in cognitive function. This could not just affect their performance in athletics, but also in school, and their relationships with peers and family. Coaches often deal with athletes who have an extraordinary amount of athletic talent, but never seem to have their head in the right place. A lack of sleep leads to adverse changes in cognitive performance including attention, working memory, long-term memory, and decision-making (Alhola & Polo-Kantola, 2007). Sleep disturbances are also associated with anxiety and depression (Neckelmann, Mykletun & Dahl, 2007). Regardless of the physical abilities and talents of athletes, if they are suffering from any of these symptoms, their ability to perform athletically will certainly be compromised. This could lead into a tailspin

of depression resulting from increased pressures to perform, as well as managing the stressors of daily life. Due to demanding schedules, participating in athletics may put a student at risk for suffering from anxiety, and it is important that coaches allow periods of reduced workloads so their student athletes are able to achieve balance in their lives.

Recommendations

It is critical for coaches to emphasize the importance of sleep to their athletes, and if possible create schedules that facilitate a proper night's sleep. As stated earlier, it is not prudent to expect an athlete to wake up before 7:00 with an adequate amount of sleep. Scheduling practices or training earlier than this puts the athletes in jeopardy of the negative consequences associated with sleep deprivation. If athletes are aware of the consequences of a poor sleep, and the benefits of a good sleep, they will be more likely to give it a higher priority (Bakotic, Radosevic-Vidacek & Koscec 2009). Travel schedules should be arranged so that the long distance trips occur on the weekends, allowing the athletes to sleep in as long as they need to recover. It is important that the coaches not only preach good sleeping habits, but also create practice and competition schedules that are consistent with the message.

In addition to emphasizing sleep to athletes, it is also critical that coaches communicate the importance of sleep to parents, who have a greater influence over their child's sleep habits. If the parents have a greater understanding of the role that sleep plays in their child's life, they will be more likely to reinforce proper sleep hygiene and have a bedroom for their child that promotes effective sleeping. If parents have a greater understanding of the circadian clock of a teenager, there may be less conflict regarding sleep and waking times. Parents need to help the child establish a nighttime routine. Ideally, there should not be a television, computer, or any backlit screen in the bedroom. This will not tempt the child to stare at melatonin-suppressing

blue light before going to bed. All screen time should be completed an hour before bedtime. If a child must use a computer later into the night, installing a blue-light blocking program onto the computer such as f.lux will reduce the harmful effects. Using light emitting e-readers should be avoided at night as they prolong the time it takes to fall asleep, suppress melatonin production, reduce and delay timing of REM sleep, and reduce alertness the following morning (Changa, Aeschbach, Duffya & Czeisler, 2015). Wearing glasses with an amber or orange lens will counter this effect and help reduce blue light exposure (van der Lely, Frey, Wirz-Justice, Jenni, Steiner, Wolf, Cajochen, Bromundt, & Schmidt, 2015). Children should reduce overall exposure to light before bedtime; even the bright lights of a room can suppress melatonin production (Gooley, Chamberlain, Smith, Khalsa, Rajaratnam, Reen, Zeitzer, Czeisler & Lockley, 2011). This can be done by installing a dimmer in the bedroom, or having a nightstand lamp with an amber light bulb. Also, make sure the bedroom is completely darkened, with no lighting coming from clocks, or other electronic devices. Cell phones should be turned off or silenced, to avoid disturbances from alerts. Alternatively, the phone could be set to “airplane mode”, eliminating incoming messages but still maintaining the phone’s alarm clock function. These guidelines are important for adults to follow as well. Parents who establish healthy sleeping routines are sending a powerful message to their children about the importance of sleep (Buxton, Chang, Spilsbury, Bos, Emsellem & Knutson, 2015).

Sometimes the coach has very little control of practice times due to facility conflicts and other teams needing to use the same space. If this is the case, coaches may appeal to their athletic director to rotate the practice times with all of the teams using the facility, so no teams are subjected to chronic sleep loss over the course of an entire season. Coaches should also talk to their players about effective napping, such as when and how long to take a nap. If the practice

is held in the morning, the athlete should be encouraged to take a nap in the afternoon, ideally between 1:00 and 4:00. A 20-minute nap can improve the subjective sleepiness, performance level, and self-confidence of their task performance (Hayashi, Watanabe & Hori, 1999). This will help them feel refreshed for their evening activities, be in a better mood around their families, and enable each student to have a clear and focused mind while studying.

If athletes are practicing proper sleep hygiene and still having sleep problems at night, they should see their doctor so they can resolve the problem as soon as possible. They may be suffering from a sleep disorder, which can lead to many health problems. Studies have shown that up to 25% of adolescents have shown symptoms of a sleep disorder (Ohayon, Roberts, Zulley, Smirne & Priest, 2000). Some signs of sleep deprivation in teens are (Better Health Channel, 2014):

- Concentration difficulties
- Mentally ‘drifting off’ in class
- Shortened attention span
- Memory impairment
- Poor decision making
- Lack of enthusiasm
- Moodiness and aggression
- Depression
- Risk-taking behavior
- Slower physical reflexes
- Clumsiness, which may result in physical injuries
- Reduced sporting performance
- Reduced academic performance
- Increased number of ‘sick days’ from school because of tiredness
- Truancy

If these symptoms are prevalent and causing a lack of performance athletically or academically, it is possible that the child is suffering from a sleep disorder. Coaches and teachers need to report these symptoms back to the parents of the child, so proper measures can be taken to find the root cause of the problem. Adolescents may be slow to report a lack of sleep

due to their own poor decisions, or may not realize the significance of the problem. If symptoms cannot be corrected through improved sleep hygiene, seeing a doctor or sleep specialist is recommended. It is important that they work together find the root cause of the problem, rather than just relying on over the counter or prescription drugs. Use of sleep aids reduces the restorative benefits of sleep (Hall-Porter, Schweitzer, Eisenstein, Ahmed, & Walsh, 2014). In these situations, it is in the best interest of the child to work towards restoring a natural sleep-wake cycle in order to reap the benefits of sleep, as well as create habits that will carry on into adulthood.

Conclusion

Young athletes are training harder than ever, making sleep even more critical for recovery. Coaches, parents, and athletes must prioritize its importance, and create schedules and habits that help facilitate adequate sleeping time and quality. If sleep is optimized, it places the student-athlete in a greater position to succeed on the field and in the classroom. Sleep is a basic need for human health, and it has been put on the back burner in today's overscheduled society. Many of today's sleep problems are technology-based. It is important that parents, coaches, and teachers educate our youth to realize how these emerging technologies can be detrimental to our basic need of sleep. Sleep deprivation is a health concern that is becoming more prevalent in today's society, and can lead to preventable health consequences. Adults should be at the forefront of this pandemic, and be facilitators and role models for sleep hygiene. Teaching and emphasizing the importance of sleep should play an important role in every coach's plan for optimal development of their athletes.

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