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### LAPS WITH L.A.P.S. : THE SPORTS MEDICINE CORNER



#### Young Athletes' Secret to Success: Sleep! (Part 1 of 2)

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Athletes of all ages are always looking for that secret weapon to give them an edge in their performance. Now more and more research is affirming sleep may be that magic bullet. Sleep is essential to enable brain restoration and repair, yet 30-40% of youth experience inadequate sleep.<sup>1</sup>

So how much sleep should young athletes be getting?

- Young Children:  $\geq 10$  hours per night
- Adolescents: 8-9 hours per night

So, what's the evidence?

#### **Sleep and Injury**

Sleep deprivation in children and adolescents has been shown to be associated with increased risk of injury and increased risk of injury-prone behaviors.<sup>2</sup> When evaluating high school athletes for risk factors related to sports injuries, mean hours of sleep made a difference. This study found that hours of athletic participation per week, number of sports played, and use of a private coach did not affect injury rate, but 7-12<sup>th</sup> graders who slept  $\geq 8$  hours had  $\frac{1}{2}$  the number of sports injuries.<sup>3</sup> High school students who slept  $\leq 7$  hours/school night demonstrated significantly increased rate of injury-related risk behaviors (i.e. no seatbelt or bicycle helmet, driving drunk, etc.) vs students who slept 9 hours.<sup>4</sup> Sleep deprived adolescents were more likely to experience a bicycle accident or an accidental injury at school or home with adolescents sleeping  $< 5 \frac{1}{2}$  hours/night at the greatest risk.<sup>5</sup>

#### **Sleep and Performance**

##### **Sleep:**

- Improves performance in sport-specific tasks, such as shooting accuracy and sprint times.<sup>6</sup>

- Improved mood and recovery in rowers who underwent a 4-week training regimen with longer sleep and more time off exercise. <sup>7</sup>

### **Lack of Sleep:**

- Leads to faster time to exhaustion and decreased exercise ventilation in sleep-deprived 17-18-year-old male volleyball players and runners. <sup>8</sup>
- Associated with higher symptom scores on baseline ImPACT testing. <sup>9</sup>
- May masquerade as depression or other psychiatric illness <sup>10</sup>

### **Factors that affect sleep**

- Exercise improves sleep quality in children and adolescents. Adolescents with moderate physical activity levels fall asleep faster, wake less, demonstrate improved quality and quantity of sleep, improved mood and concentration and decreased daytime sleepiness. These favorable sleep patterns persist even on days without exercise. In contrast, over-reaching (excess training volumes or intensity that decrease performance) causes adverse sleep patterns. <sup>11</sup>
- Even late-night exercise does not affect sleep onset or quality, as long as sleep duration is not decreased. <sup>12</sup>
- Medications and Supplements: While there is little data evaluating medications and supplements. Performance enhancing substances such as anabolic androgenic steroids are associated with decreased sleep quality & efficiency. <sup>13</sup> Melatonin, often considered a benign sleep aid, must be used with caution in children and adolescents, due to theoretical concerns that exogenous intake of this pineal hormone may affect pubertal reproductive hormones. <sup>14</sup>
- Travel: Travel disrupts sleep and circadian rhythms, generates stress, causes strain and fatigue. Adolescents may be more significantly affected by travel due to developmental changes in their sleep cycles and disruption of natural circadian rhythms/sleep cycles. <sup>15</sup>
- Altitude: Symptoms of overtraining, poor performance, and reduced sleep quality occur at altitude. <sup>16</sup> The longer athletes are at altitude, the less they experience sleep disturbance. <sup>17</sup> One study looking at teen Australian football players showed a 14-day acclimation period in a new time zone and altitude provided adequate adaptation period for teen Australian football players. <sup>18</sup>
- Electronic Media: 4<sup>th</sup>-7<sup>th</sup> Graders demonstrated decreased sleep duration and perceived insufficient rest if sleeping near a small screen, sleeping with a TV in the room or greater screen time. <sup>19</sup>

Getting enough sleep is challenging for the young athlete. Athletes are often over-scheduled with after school activities, heavy workloads of homework and time commitment to training, in addition

to their school day. Sports participation often involves participation in travel teams requiring long-distance travel, crossing time zones and staying in unfamiliar settings. Additionally, athletes often experience pre-competition anxiety which interferes with quality sleep. And, sports-related injuries can interfere with sleep. Musculoskeletal injuries can cause pain and discomfort disturbing sleep; while concussions affect sleep quality and rhythms.

Please stay tuned for Part 2 of *Young Athletes' Secret to Success: Sleep!* in our next newsletter. Part 2 will discuss: Office Assessments, Treatment and Prevention Tips.

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