

**Research on
Sleep, Health &
Learning**

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Overview

- ▶ Health impact of sleep
 - ▶ Sport injury & healing
 - ▶ Illness prevention
 - ▶ Weight management
- ▶ The brain on sleep
 - ▶ Cognitive implications
 - ▶ Impact on academic performance

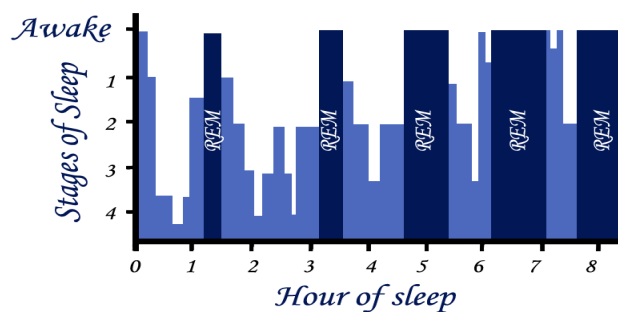
Sleeping Strong Prevents Injury

- ▶ Sleep is one way to prevent injury
- ▶ Lack of sleep → loss of biomechanical functioning, coordination and alertness



Better Sleep Relates to Faster Recovery from Surgery, Illness, and Injury

- ▶ For TU athletes, better sleep quality related to fewer days in treatment
- ▶ More REM = more anti-inflammatories naturally released by brain



Athletes Build Muscle While Sleeping

- ▶ When building muscle → need more REM for muscle repair & growth
- ▶ Less sleep → decreased strength
- ▶ E.g., Experiment: restricted to 3 hours of sleep (3 nights):
 - ▶ Significant decreases in maximal bench press, leg press, and dead lift
 - ▶ Also noticed cognitive confusion and fatigue



(Reilly & Piercy, 1994)

Sleep Prevents Contracting the Common Cold

- ▶ Averaging fewer than 7 hours of sleep a night
 - ▶ **3X** more likely to get cold
- ▶ Plus, if less quality sleep
 - ▶ **5.5X** more likely to get cold



(Cohen et. al, 2009)

Good Sleep Aids Weight Control Disrupted Sleep → Hormone Imbalance



- + hormone that makes you hungry (ghrelin)
- hormone that tells your brain you're not hungry (leptin)

Insufficient Sleep is Related to Mental Health Problems

- Higher rates of mood disorders, particularly depression and anxiety
 - Less than 8 hours sleep/night = adolescents have 3x risk of a suicide *ATTEMPT*
- More difficulty regulating emotions
- Engagement in high risk behaviors

(American Academy of Pediatrics [AAP], 2014, Lui, 2004)

One night of sleep deprivation impacts mood regulation...



Sleep Impacts Brains

- ❖ Attention
- ❖ Motivation to learn
- ❖ Learning and memory



Ellenbogen, Payne, Stickgold.,
2006

5 hours of sleep/night ~ 1 beer
An all-nighter ~ 4 beers



Optimal Sleep by School Age

Circadian
rhythm
change

	Elementary School (Age: 6-11)	Middle School (Age: 11-13)	High School (Age: 14-18)
Hours of Sleep	9-11 hours	9-11 hours	8-10 hours
When to sleep	Variable: Early as 7 PM	Variable: Early as 7 P.M.	11:00 P.M.
When to wake	Variable: 6 A.M.	Variable 6 A.M.	8:00 A.M.

Note: Variation of 11 hours of sleep for children 6-13 years old

(National Sleep Foundation, 2006)

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