Managing acute concussions: Role of sleep and physical activity on symptom burden in young adults

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In compliance with continuing education requirements, all presenters must disclose any financial or other associations with companies to which they have a direct link and/or financial relationship that is related to the topic/content of their presentation.

- Nothing relevant to disclose
At the end of this presentation, participants will be able to:

• Recognize the importance of sleep and physical activity in healthy individuals.

• Analyze the prevalence of sleep/wake disturbances following concussion and examine early benefits of physical activity on symptom burden in the literature.

• Interpret how findings are being utilized in concussion management.
In young adults with a concussion, do sleep and mild aerobic exercise decrease symptoms more than strict rest during the acute stages of recovery?
SLEEP: Why Do We Care?

The science of how much sleep you actually need

THE SECRETS OF SLEEP
Why do we need it, and are we getting enough?

NCAA convenes sleep and wellness summit
Sport Science Institute gathers task force to recommend methods for improving sleep
**Sleep and College Students**

- Erratic sleep patterns, poor sleep hygiene, and poor sleep quality = inadequate sleep and daytime sleepiness
- Sleep deprivation is associated with poor decision making and impaired cognitive function
- Prolonged disturbances → increased risk of depression, diabetes, obesity, and cardiovascular disorders

Lund et al., 2010; Gipson et al., 2019
College students who experience multiple nights of sleep deprivation commonly exhibit:

- Increase in self-reported daily symptoms
- Poorer balance performance
- Poorer overall neurocognitive function restriction

(Lund et al., 2010)
Benefits of Physical Activity

• Higher quality diet, better sleep habits, healthier weight status
  (Dinger et al., 2014)

• Acute and regular exercise has small to moderate effects on sleep
  (Kredlow et al., 2015)

• 10-50% of college students meet moderate-intensity aerobic guidelines → one study at a large university showing ~96%
  (Frederick et al., 2020)
If this is what it looks like for healthy young adults...what about concussed individuals?
Symptom Burden Following Concussion

- Predictor of concussion recovery = **number and severity** of acute and subacute symptoms
  (Iverson et al., 2017; Harmon et al., 2019)

- Greater symptom severity post-injury $\Rightarrow$ increased odds of prolonged symptoms
  (Meehan et al., 2016)
  - By attenuating these symptoms $\Rightarrow$ we may decrease symptom burden
Concussion Management – What are We Doing Now?

Academic Modifications
Limit Physical Exertion
Cognitive Rest
Sleep?
Sleep: Overall of What We Know

Changes in sleep quality and quantity are common during recovery.
Sleep Disturbances in the Literature

• Up to 70% of concussed young adults report:
  • Short and long-term sleep problems
  • Fatigue
  • Daytime sleepiness
  • Vigilance disturbances (e.g. insomnia)

• Greater acute sleep variation in total sleep time and sleep fragmentation post-injury
  (Raikes et al. 2016; Hoffman et al., 2019)
  • Sleep variation may be associated with prolonged symptom duration
Sleep Disturbances in the Literature

Sleep After Concussion
• Concussed individuals took longer to fall asleep and greater night-to-night variation 2-3 days post-concussion (Hoffman et al., 2019)

Sleep Before Concussion
• Poor sleep quality prior to concussion → greater symptom burden at 2 days, 5 to 7 days, and 10-14 days post-injury compared to healthy controls (Sufrinko et al., 2015)
Influence of Postconcussion Sleep Duration on Concussion Recovery in Collegiate Athletes

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Total Symptom Severity Scores and Recovery
• A RCT showed a decrease in symptoms with 1-2 days of rest followed by a gradual return to activity compared with strict rest of 5 days (Thomas et al., 2015)
Recent studies are challenging the utility of prolonged rest as treatment for concussion → may result in:

Physical Deconditioning

Decline in Mental Health

Absence from Normal Life Activities

...growing evidence on early activity engagement post-injury

(Leddy et al., 2018; Harmon et al., 2019)
• Aerobic exercise within the first week post-injury does not appear to be associated with detrimental clinical outcomes
  • Lower symptom severity within 2-7 days post-injury than no exercise group (Howell et al., 2020)

Question to keep in mind though → would individuals with a higher symptom burden be able to exercise without provoking symptoms?
Concussion Management

What can we consider moving forward?

Symptom-limited physical activity

Sleep
• No clear guidelines for how much rest is beneficial
• “Cocoon therapy” is not the way to go!
• Sleep may decrease symptom burden acutely post-injury
• Early active interventions may prevent prolonged recovery

Ok...so what should we do?
• Future research needed to determine optimal interventions for sleep disturbances post-injury:
  • Sleep hygiene → tips on keeping healthy sleep patterns
  • Capture sleep objectively and subjectively

• Future research needed to address optimal timing and intensity of aerobic physical activity
  • Preliminary evidence that some amount of activity is beneficial to contribute to decreased symptom burden
    • Activities of daily living
    • Non-contact aerobic exercise
    *Must be physician directed
How do you practice good sleep hygiene?

https://www.sleepfoundation.org/articles/sleep-hygiene
Concussion Management: Validated Protocols

Sample sub-symptom threshold graded exercise protocols for persistent symptoms:

- Buffalo Concussion Treadmill test
- Balke Protocol Treadmill test
- Borg RPE (measures physical exertion)

(Leddy et al., 2011)
Clinical Bottom Line

- Current consensus guidelines recommend that an initial period of rest is beneficial.

However...
- Growing evidence suggests sleep and symptom-limited physical activity may decrease symptom burden in young adults acutely following concussion.
References

Thank You!

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