Sleep Quality, Depression Symptoms, Reaction Time, and Injury Risk in College Basketball Players
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BACKGROUND AND PURPOSE
- Reaction time (RT) appears to be a critical component of athletic performance and may relate to injury risk.
- Sleep deprivation can result in slower RT, while also having a negative effect on mood and neurocognition.
- Extended sleep time (> 8 hours) has been associated with faster RT, improved mood, and improved athletic performance.
- Poor sleep quality and depression appear to be interrelated, both of which may adversely affect sport performance.
- Limited evidence exists concerning the influence of poor sleep quality on visuomotor RT among college athletes.

PARTICIPANTS AND PROCEDURES
- 25 NCAA Division-I basketball players; 13 male (20.8 ± 1.7 years) and 12 female (19.9 ± 1.5 years) basketball players.
- Well-validated survey instruments used to quantify sleep quality and depression (total of 39 survey items).
- Pittsburgh Sleep Quality Index (PSQI) (and Center for Epidemiologic Studies Depression scale (CES-D))
- Dynamic D2™ System (Dynavision International, West Chester, OH) used to assess visuomotor RT.
- Board height adjusted to position tachistoscope (T-scope) at eye level (Figures 1 and 2).
- Participants instructed to maintain visual focus on T-scope and to hit targets when illuminated.

RESULTS
- 10 players sustained a Core/LE sprain or strain between initiation of pre-season practices and end of season.
- 5 ankle sprains, 3 knee sprains, 1 sacroiliac sprain, 1 quadiceps strain.
- Cross-tabulation analyses identified 2 factors strongly associated with Core/LE sprain or strain occurrence:
  1) Proactive RT ≥ 745 ms: 50% sensitivity, 60% specificity (Table 1)
  2) Reactive RT ≥ 715 ms: 60% sensitivity, 50% specificity (Table 2)
- Analysis of combined factors failed to yield better prediction than Proactive RT alone.
- Cross-tabulation analyses demonstrated that all 4 factors were strongly associated with Ankle sprain occurrence:
  1) Proactive RT ≥ 745 ms: 60% sensitivity, 60% specificity (Table 3)
  2) Reactive RT ≥ 715 ms: 60% sensitivity, 60% specificity (Table 4)
  3) PSQI ≥ 6: 60% sensitivity, 60% specificity (Table 5)
  4) CES-D ≥ 11: 60% sensitivity, 60% specificity (Table 6)
- Logistic regression analysis retained all 4 predictors for a multivariable Ankle sprain prediction model.

CLINICAL RELEVANCE
- Visuomotor RT appears to be an indicator of susceptibility to basketball-related Core/LE sprain or strain.
- 50% of players who sustained a Core/LE sprain or strain exhibited slow Proactive RT and slow Reactive RT.
- No association to Core/LE sprain or strain was found for depression or sleep quality.
- Visuomotor RT (both Proactive and Reactive), PSQI, and CES-D were all associated with Ankle sprain occurrence.
- Players who exhibited ≥ 3 of the 4 risk factors were 36 times more likely than others to sustain an ankle sprain.
- All of the identified risk factors are potentially modifiable, which may guide efforts to reduce injury susceptibility.
- More research will be needed to verify these findings and to establish the effectiveness of preventive measures.
- Both sport performance and injury risk appear to be affected by visuomotor RT, sleep quality, and mental health.
- Pre-participation screening may identify athletes who are likely to derive benefits from targeted interventions.

RESEARCH QUESTIONS
- Do sleep quality and depression symptoms predict injury risk in college basketball players?
- Do reaction times (RT) predict injury risk in college basketball players?

REFERENCES
2. Scott JP, McNaughton LR, Polman RC. Effects of sleep deprivation and exercise on cognitive, motor performance and mood. Physiol Behav. 2006;87:396-408.