CONCUSSION INCREASES ODDS OF LOWER EXTREMITY INJURY IN NATIONAL BASKETBALL ASSOCIATION PLAYERS

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DISCLOSURES

• I (and my co-authors) have no disclosures as it pertains to this research.
WHAT WE KNOW

• Research indicates athletes have changes in gait pattern, reaction time, and postural stability following concussion
• Neuromuscular impairment can lead to increased risk for musculoskeletal injury, and more specifically lower extremity injury
• Little is known to what extent concussions affect professional basketball players’ risk for lower extremity injury.
PURPOSE

• Determine if NBA athletes have greater odds of sustaining an acute lower extremity musculoskeletal injury during the 90-day period following return to play (RTP) from concussion.
• Hypothesis: Individuals who have sustained a concussion are at greater risk of subsequent lower extremity injury.
METHODS

- Retrospective review
- All concussions sustained by professional athletes in the NBA from the 1999-00 season to the 2017-18 season.
- Player demographics, performance, and RTP.
- A control group of NBA players that did not sustain a documented concussion in their NBA career from the 1999-00 to 2017-18 seasons was compiled.
  - Age-, body mass index (BMI)-, and experience-matched
RESULTS – DEMOGRAPHICS

- **Average age** at the time of concussion for all concussed players was 26.2 ± 5.4 years.
- Among those athletes who sustained a lower extremity injury after concussion, the most commonly injured **position**:
  - Point guard (33%) followed by Power forward (19%).
- The most common **location** of lower extremity injury for concussed athletes:
  - Ankle (43%), followed by the knee (20%) or foot (18%).
- A preponderance of athletes sustained **ligament strains or tears** (64%)
RESULTS – CONCUSSION

- A total of 36 players sustained a lower extremity injury within 90 days of returning from a concussion.
- The incidence of acute noncontact lower extremity musculoskeletal injury during the 90-day period after RTP period was higher in concussed athletes compared to controls (26% vs. 7%, p<0.001)
- The odds of sustaining a lower extremity musculoskeletal injury in the acute 90-day period was 4.69 (95% CI 1.96-11.23, p<0.001) times higher in concussed athletes than in controls.
Results – Return to Play

• There was no significant difference in time/games required for RTP after lower extremity injury among athletes who sustained a concussion as compared to those who did not
  • 18.5 ± 39.1 days vs. 10.9 ± 10.6 days, p=0.912
  • 4.2 ± 5.0 games vs. 4.7 ± 4.7 games, p=0.566
**Discussion – Concussion and Lower Extremity Injury**

- **High rate** of lower extremity injury in the acute period among concussed NBA players as compared to controls.
- This phenomenon is thought to be due to changes in *gait pattern, reaction time, and postural stability* following concussion even after clinical resolution.
- Is there a role for modifying concussion RTP protocols in order to include *measures of neuromotor control and proprioception*?
DISCUSSION – RETURN TO PLAY

- Time lost after lower extremity musculoskeletal injury did not differ significantly between concussed and non-concussed athletes.
  - Concussions result in neurologic aberrations; which lasts well beyond symptomatic resolution.
- These physiologic changes likely lead to suboptimal muscle force production and activation, thus decreasing the severity of injury and leading to equivalent RTP times between concussed and non-concussed athletes sustaining lower extremity injury.
**DISCUSSION – INJURY TYPE**

- Preponderance of injuries following concussion were **ligament sprains or tears**.
- This phenomenon has been **demonstrated** by previous studies.
- Likely due to alterations in **motor cortex function** and **differential activation of musculature**, predisposing to these types of injuries.
CONCLUSION

- Concussed athletes have an increased risk for sustaining an acute lower extremity injury following RTP compared to non-concussed controls.
- The most common injuries were ligament sprain or tears.
- Changes in neuromotor control and proprioception following a concussion should be evaluated in high level basketball players returning to sport.