The Effect of Sport-Related Concussion on Early vs. Late Reaction Time: A Systematic Review and Meta-Analysis

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Background

• Incidence of sport-related concussion (SRC) continues to rise in the United States.
• Following a SRC, impairments, such as reaction time (RT), persist even after subjective symptom reports return to baseline.
• Further, athletes that suffer a SRC are at a greater risk of future SRC.

Purpose

• The purpose of this study is to systematically review the literature to examine early (0-3 days) and late (3-7 days) assessment of RT following SRC.
• The secondary aim of this study is to explore RT by number of previous concussions.

Methods

• 2-stage process including duplicate screening, eligibility, and inclusion
• Quality assessment conducted by two reviewers using the Quality Assessment Tool for Non-Randomized Studies of Interventions or Exposures
• Quality scores were stratified by selection, detection, attrition, reporting and confounding bias as well as overall quality of the study.

Results

• Age/Education Level:
  • 7 studies assessed high school and college athletes together but only 2 studies compared between ages
  • 3 studies included only collegiate athletes
  • 3 studies included only high school athlete
• Baseline to early (Day 0-3) assessment: Deterioration of reaction time across all studies except 1.
• Baseline to late (Day 5-10) assessment: Subjects did not return to baseline in all studies except 2.
• Reaction Time did improve toward baseline in all studies
• Baseline to Late, (Day 14) (2 studies): Reaction time returned to baseline
• Days until reaction time returned to baseline: 5-21 days

Conclusions

• RT scores were significantly lower from baseline at early and late assessments demonstrating that RT did not return to baseline by 7-10 days.
• When stratified by the number of previous SRCs, late RT averages decreased from baseline as the number of previous concussions increased.
• Results suggest that with the increase in the number of previous SRCs, an athlete will show greater RT impairment at late assessment.

Clinical Relevance

• Health professionals should be aware of the lingering neuropsychological deficits, especially in RT, that exist up to two weeks after sustaining a concussion before making a decision to return an athlete to their sport.
• Returning to play 7-10 days post-concussion may be too soon especially for athletes with a history of multiple concussions.

Acknowledgements / References

• Leila Ledbetter, Physical Therapy Liaison Librarian, for her guidance and oversight throughout the search process for this review.

