

Predictors of Prolonged Recovery Following Sports Related Concussion: A Systematic Review

Mitch Therriault, SPT, Sarabeth Ford, SPT, Andrew Grant, SPT, Steven Higbie, SPT, Shawn Hoffman, SPT, Adam Goode, PT, DPT, PhD, Leila Ledbetter, MLIS, Peter Friesen, PT, SCS, OCS, ATC, CAT, PES, CSCS, MT, Michel Landry, BScPT, PhD

Background

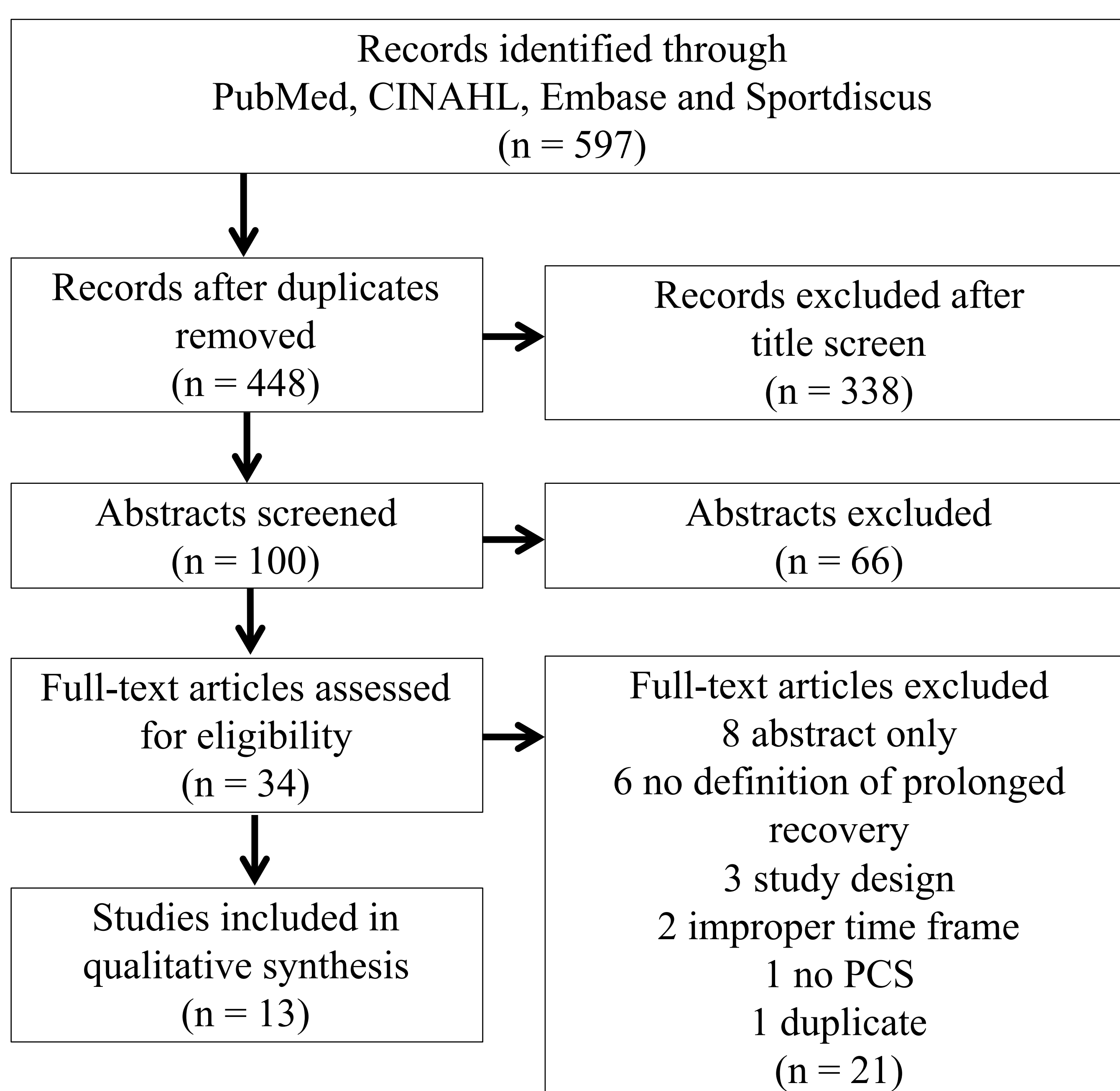
- The incidence of sports related concussions (SRC) is estimated at 1.6-3.8 million annually in the United States
- Approximately 80-90% of athletes who sustain a SRC will fully recover and return to sport within 7-10 days
- Symptoms may persist in those with protracted recovery, resulting in greater time lost to sport, decreased quality of life and increased medical burden
- Previous studies have suggested potential risk factors that may be predictive of prolonged recovery including age, gender, loss of consciousness (LOC), migraine symptoms, amnesia, and poor performance on ImPACT testing

Purpose

- To systematically review the literature to identify predictors of prolonged recovery following SRC
- Provide a greater understanding of potential predictors of prolonged recovery following SRC to help guide clinical decision making and better anticipate recovery time

Methods

Fig. 1 Flow of identification, screening, eligibility and inclusion



Methods

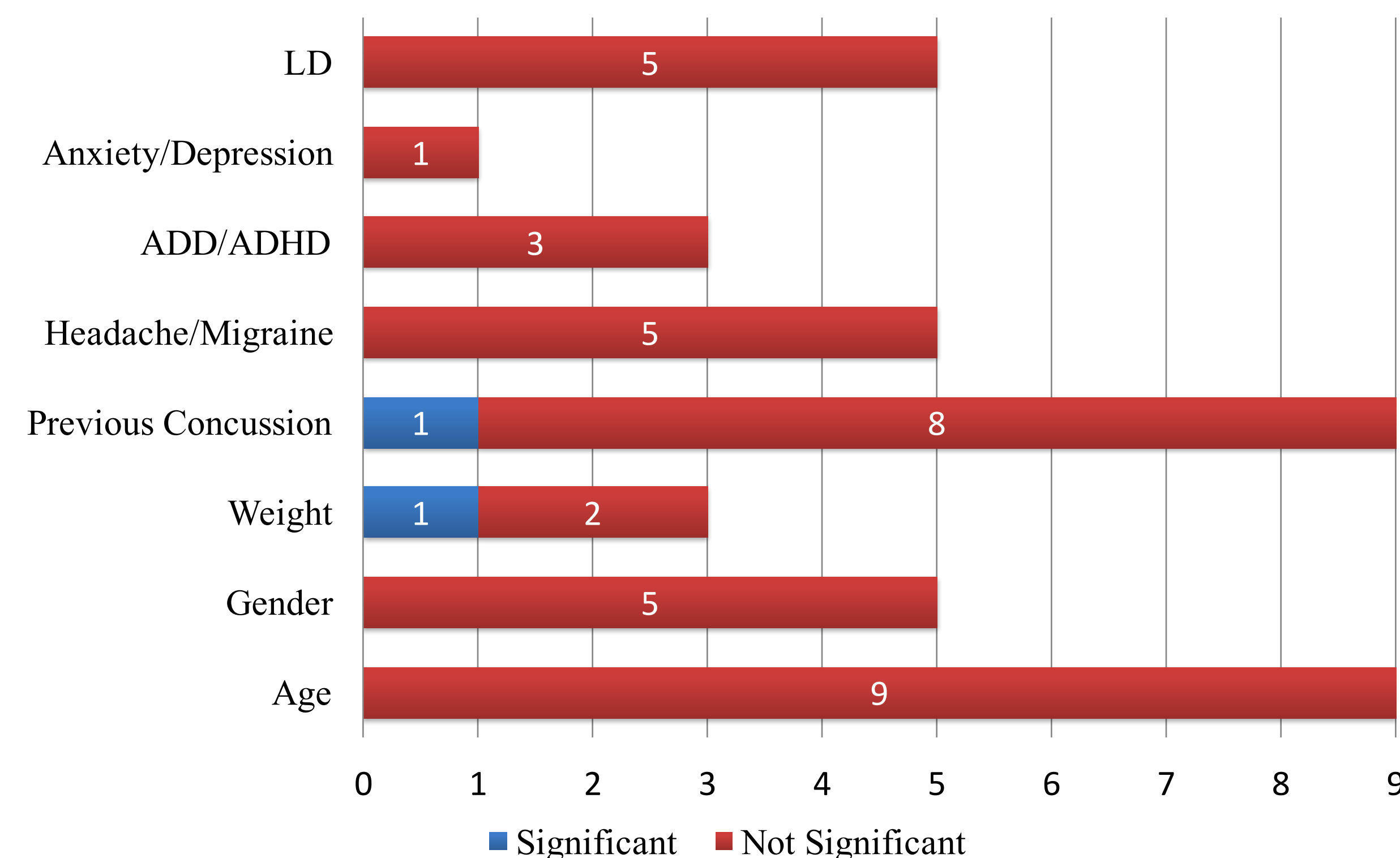
- Three stage selection process including duplicate screening, eligibility and inclusion
- Quality assessment conducted by duplicate reviewers using the revised RTI Item Bank
- Quality scores stratified by selection, information, confounding and reporting bias
- Statistical significance determined by each individual study

Results

Table 1. Included Articles

Author	Prolonged Recovery	Population
Asplund et al. 2004	>7days	N = 101, Athletes ranging from 14 – 23 years old
Casson et al. 2011	≥7 days	N = 854, Players in the National Football League
Chrisman et al. 2013	≥7 days	N = 1412, High school athletes
Corwin et al. 2014	>28 days	N = 247, Patients age 5 – 18 years
Field et al. 2003	≥7 days	N = 371 College Athletes, N = 183 High School Athletes
Kontos et al. 2013	>21 days	N = 138, Male high school football players
Lau/Collins et al. 2011	>14 days	N = 108, Male high school football players
Lau/Kontos et al. 2011	≥21 days	N = 107, Male high school football players
Lee et al. 2013	≥14 days	N = 740, High school and college athletes
McCrea et al. 2013	>7 days	N = 18,531, High school and college athletes
Meehan et al. 2013	>28 days	N = 531, Sports related concussions between the ages of 7- 26 years.
Meehan et al. 2014	>28 days	N = 182, Athletes
Pellman et al. 2004	≥7 days	N = 887, Players in the National Football League

Fig. 2 Demographic Risk Factors



Results

Fig. 3 Post Concussive Risk Factors

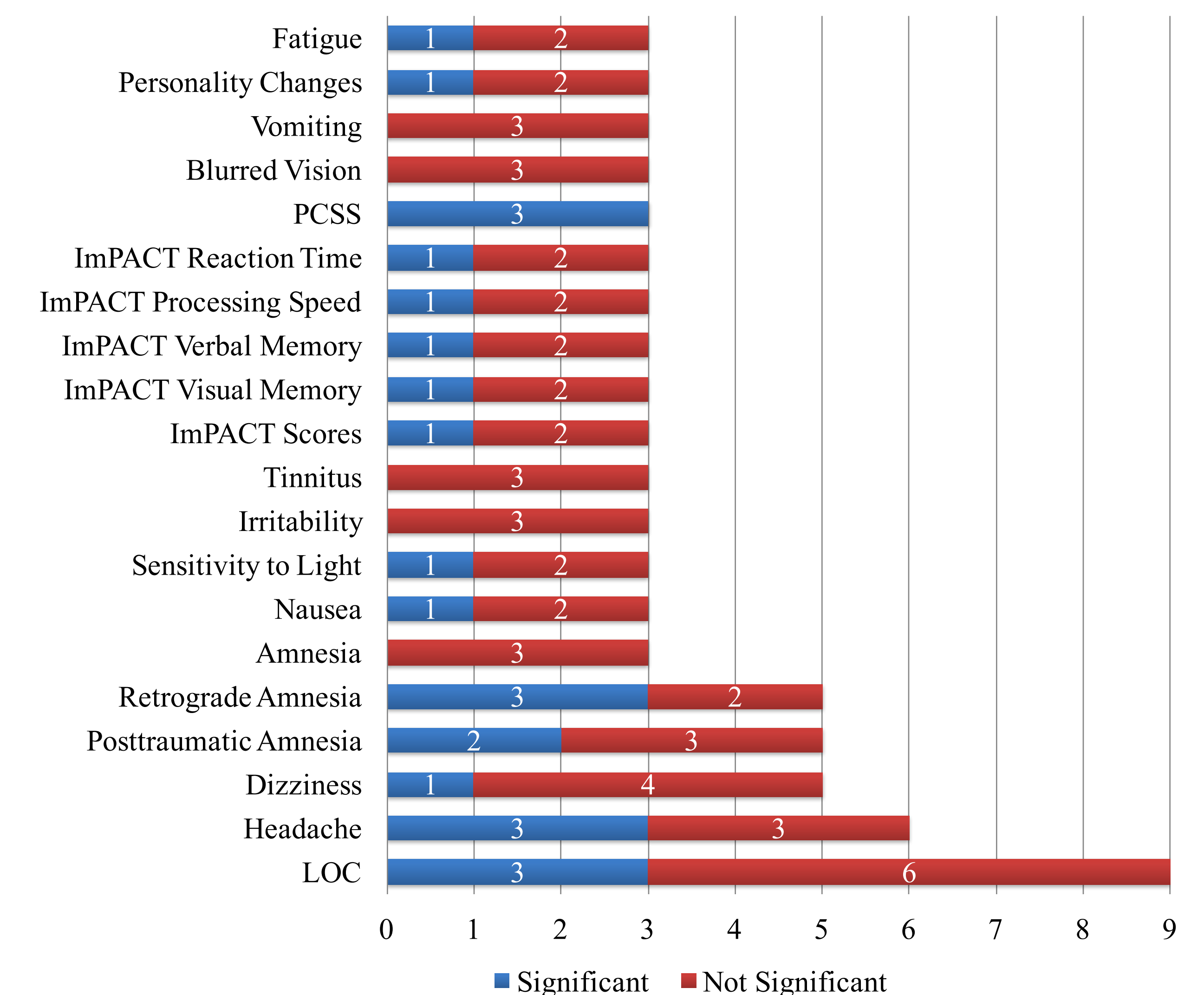
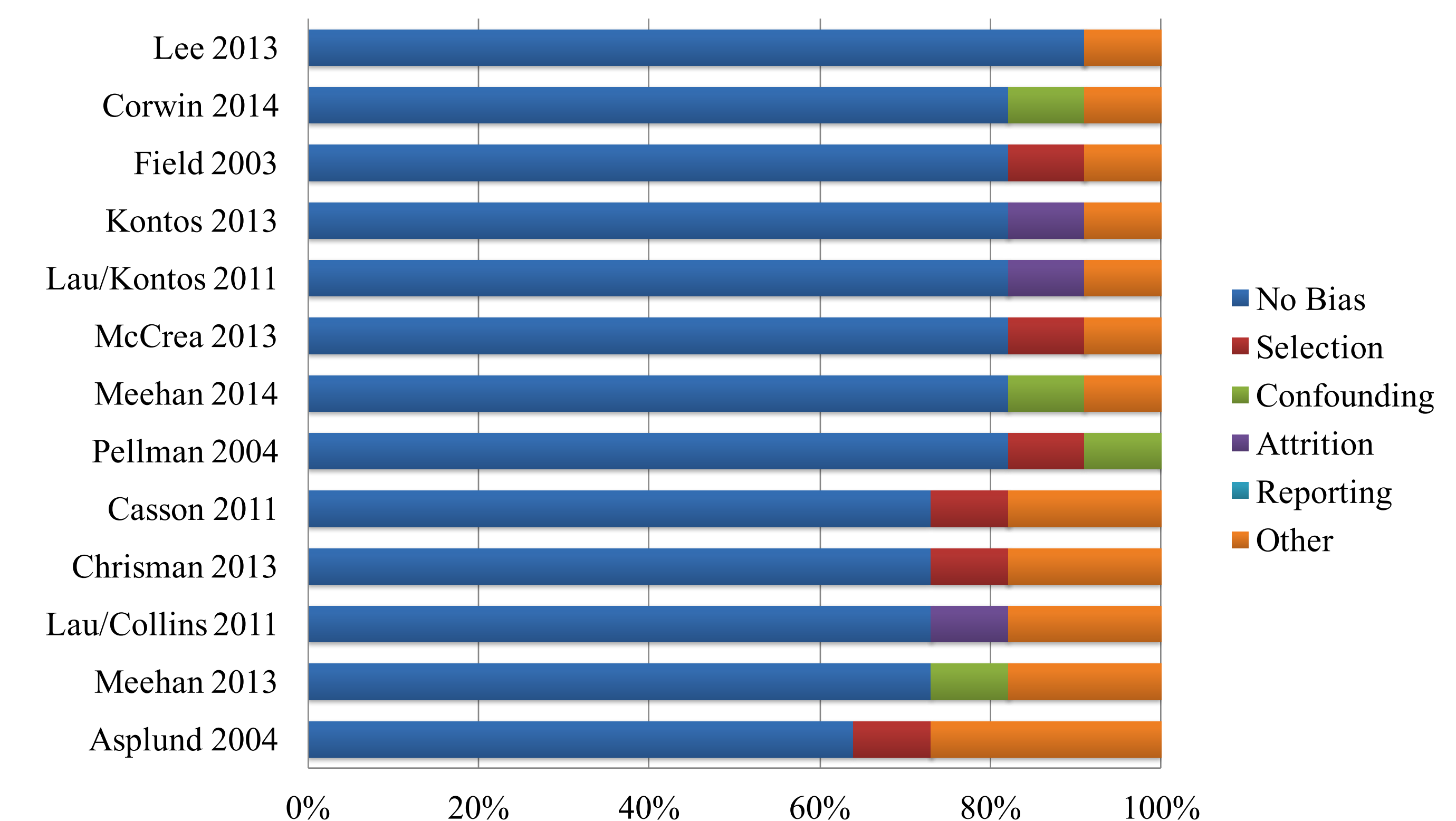


Fig. 4 Quality Assessment



Conclusions

- Lack of homogeneity regarding study design and definition of prolonged recovery make it difficult to draw a definitive conclusion on predictors of prolonged recovery following SRC
- Patient demographics are not significant predictors of prolonged recovery following SRC
- Total symptom burden on the PCSS and retrograde amnesia may have predictive qualities. However, further studies are needed for a definitive conclusion