# A Systematic Review: Do Concussion Education Protocols Improve Reporting and Return-to-Play Guideline Adherence in Athletes?

Keaton McCoy, Kinsey Shouse, Micah S. Smith, Steven G. Lesh  
Southwest Baptist University, Bolivar, Missouri

## Purpose

The purpose of this systematic review is to determine the role that concussion education protocols have on both athlete reporting and return-to-play adherence.

## Background

Concussion education protocols are being implemented to manage the growing crisis in concussed athletes. A challenge with concussion management is athlete adherence related to reporting and return-to-play guidelines. A common belief is that athlete education on concussions will enhance their understanding of the topic and will improve the rate at which athletes report symptoms and follow prescribed return-to-play guidelines.

## Methods

A systematic review of recent literature was completed to identify evidence related to the clinical question. The search was completed by utilizing EBSCOHost. A PRISMA strategy utilized key words identified 4,409 articles. After applying screening criteria 7 articles were included for data extraction and analyses. Two reviewers assessed quality of evidence using the checklist developed by Downs and Black. A neutral third reviewer was utilized to resolve disagreements leading to a consensus quality rating of good, fair, or poor.

## Summary of Findings

**Table 1: Summary of Findings**

<table>
<thead>
<tr>
<th>Year and Lead Author</th>
<th>Downes &amp; Black Score</th>
<th>Quality of Article</th>
<th>Research Type</th>
<th>Subjects (n)</th>
<th>Age of Subjects</th>
<th>Gender of Subjects</th>
<th>Sport</th>
<th>Level</th>
<th>Geographic Location</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015 Krisheus</td>
<td>23</td>
<td>Good</td>
<td>Prospective</td>
<td>146 initially, 118 for follow-up survey</td>
<td>20.6 y/o (sd = 1.26)</td>
<td>Male Ice Hockey</td>
<td>NCAA Division I</td>
<td>Various</td>
<td>Perceived reporting norms and athletic identity may be a key component in reducing concussion symptom under-reporting in athletes.</td>
<td></td>
</tr>
<tr>
<td>2014 Rivera</td>
<td>18</td>
<td>Fair</td>
<td>Prospective</td>
<td>778</td>
<td>14-19 y/o</td>
<td>Male and Female</td>
<td>Football (M) and Soccer (F)</td>
<td>High School</td>
<td>Washington</td>
<td>The majority of athletes continued to practice or play while symptomatic. More objective and accurate concussion measures are needed, and it is unlikely that athlete attitudes on concussion reporting will be improved through legislation alone.</td>
</tr>
<tr>
<td>2012 Bramley</td>
<td>19</td>
<td>Fair</td>
<td>Survey</td>
<td>183</td>
<td>14-19 y/o</td>
<td>Male and Female</td>
<td>Soccer</td>
<td>High School</td>
<td>Ohio and Pennsylvania</td>
<td>High school soccer players who have received concussion education are more likely to notify their coach or athletic trainer of a suspected concussion, as compared with athletes with no education.</td>
</tr>
<tr>
<td>2014 Baugh</td>
<td>20</td>
<td>Good</td>
<td>Pilot/Analysis</td>
<td>513</td>
<td>19.8 y/o (sd = 1.49)</td>
<td>Male Football</td>
<td>NCAA Division I</td>
<td>FCS</td>
<td>Various</td>
<td>The required acknowledged component of the NCAA's concussion policy is being inconsistently implemented at member institutions. Additionally, concussion mandates are variably implemented across the country. Concussion mandates should be more specific and more strictly enforced.</td>
</tr>
<tr>
<td>2014 Chisam</td>
<td>19</td>
<td>Fair</td>
<td>Survey</td>
<td>270</td>
<td>20-51 y/o</td>
<td>Male and Female</td>
<td>Football and Soccer</td>
<td>High School</td>
<td>Washington</td>
<td>Concussion education requirements for coaches are being closely followed by public high schools in Washington state. While coaches have received education, concussion education is not as extensive among athletes and parents.</td>
</tr>
<tr>
<td>2015 Krisheus, Baugh</td>
<td>23</td>
<td>Good</td>
<td>Prospective</td>
<td>146</td>
<td>20.7 y/o (sd = 1.30)</td>
<td>Male Ice Hockey</td>
<td>NCAA Division I</td>
<td>Various</td>
<td>Preseason concussion knowledge was not significantly associated with in-season reporting behavior. Reporting intention is more strongly associated with reporting behavior than with concussion knowledge.</td>
<td></td>
</tr>
<tr>
<td>2015 Register-Mihalk</td>
<td>17</td>
<td>Fair</td>
<td>Cross-sectional</td>
<td>167</td>
<td>15.7 y/o (sd = 1.40)</td>
<td>Male</td>
<td>Football, Soccer, Lacrosse, and Cheerleading</td>
<td>High School</td>
<td>States</td>
<td>Most recalled concussions sustained by high school athletes were not reported. Increased athlete knowledge of concussion topics was associated with increased reporting prevalence of concussion events.</td>
</tr>
</tbody>
</table>

## Results

Quality of articles were determined to be 3 good and 4 fair. 2230 subjects were included for high school and college age athletes across football, ice hockey and soccer. Through cohort investigations and survey tools, the effectiveness of compliance for reporting behavior and return-to-play guidelines was evaluated. It was identified that a wide variety of protocols and implementation strategies exist. Often, inconsistencies were identified in established reporting mechanisms. For collegiate athletes, there does not appear to be a positive relationship between the implementation of reporting protocols and actual reporting of suspected concussive and other similar norms may have a stronger impact on reporting compliance behaviors than the protocols for this population. For younger athletes, coach knowledge does not seem to impact reporting behaviors, but rather the younger athletes themselves may be challenging established norms and electing to report protocols more consistently.

## Conclusion

Weighted evidence from this investigation indicates that there is no positive relationship between the use of concussion education and athlete adherence to reporting and following return-to-play guidelines. A consensus is not reached across all analyzed articles as there appears to be an emerging trend that reporting is improved among younger athletes as compared to collegiate athletes. More studies should be done to evaluate the long term impact and cultural norms surrounding concussion education protocols.

## Clinical Relevance

The development and implementation of concussion management protocols should be founded in sound evidence. While it does not appear that such protocols are having a positive impact on collegiate athlete reporting and adherence, it is possible that reporting norms are shifting toward compliance in the young athlete.

## References