

Research Article

The Medical Observer in American Football: A Survey of the 2015 -2016 Atlantic Coast Conference Football Season

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Keywords

• Sport-related concussion; NCAA football; ATC spotter; Medical observer; Eye in the Sky

Abstract

Objectives: Growing concern over player safety and long-term health effects of sport-related concussion (SRC) led the Atlantic Coast Conference (ACC) to implement the medical observer (MO), whose primary job is to identify concussions not seen by sideline medical staff. Currently, there is no data assessing the effectiveness of the MO. The primary aim of this survey was to determine if the MO identifies SRCs that sideline medical staff missed during game play.

Methods: The authors distributed a 19-item questionnaire to all 15 ACC athletic departments that both quantitatively and qualitatively assessed for any SRCs or non-concussion injuries that were detected by the MO during the 2015-2016 ACC football season.

Results: Nineteen MOs completed the 19-item survey which accounted for coverage of 56% of the total halves played by all ACC teams in the 2015-2016 season. Four SRCs and seven non-concussion injuries were identified by an MO that were not seen by the sideline medical staff. None of the respondents failed to call down to the sideline in spite of an obvious injury or SRC that went unnoticed by the sideline medical staff.

Conclusions: The MO does indeed detect SRCs that are not seen by the sideline medical staff. The survey also showed that many ACC teams used the MO as a secondary injury observer, further increasing the value of this new position. To further promote efficacy, each MO should be provided with the best available tools, communication, and viewing angles. The development of a formalized MO training curriculum should also be considered.

INTRODUCTION

The growing concern over player safety and long-term health effects of sport-related concussion (SRC) have led the National Football League (NFL), National Collegiate Athletic Association (NCAA), and healthcare organizations to investigate ways to decrease the burden of SRCs in football [1-6]. Foremost in the minds of medical providers is detecting a SRC as soon as it occurs and consequently not allowing the player to play once diagnosed [7-10]. Early SRC detection limits further insult to the brain, prevents a prolonged recovery, mental health illness, and avoids more severe conditions such as post-concussion syndrome and second impact syndrome [11-19]. Further complicating the picture, high-level athletes are not dependable reporters of SRC symptoms [5,20]. In response to player safety concerns, the NFL instituted the Certified Athletic Trainer (ATC) spotter, or "Eye in the Sky". In collegiate football, this position is titled medical observer (MO).

The MO is a relatively new role on the medical team during American football games. The NFL first implemented the position in a 2012 wild card playoff game in response to a missed SRC that occurred earlier in the season against Cleveland Brown's

quarterback Colt McCoy [21]. Following the lead of the NFL, the Power Five conferences (ACC, BIG 10, PAC 12, SEC, Big 12) introduced the MO role in the ensuing years [22-25].

The primary job of the MO is to identify head trauma and SRC-type behavior not seen by the sideline medical staff. The function of the MO is variable among NCAA conferences and the NFL. The two main differences are whether the MO has any communication with the sideline medical staff to alert for a potential SRC and/or if the MO has direct communication with the referee booth to stop game play over concerns for a suspected SRC.

The Atlantic Coast Conference (ACC) started the MO position at the beginning of the 2015-2016 football season. The guidelines sent to each ACC school for execution were broad in stating that each school should provide a MO for their respective games and that each MO was to be positioned above the field of play and observe for SRCs. The ACC policy for the 2015-2016 season gave the MO the ability to communicate with the sideline medical staff in order to notify them of a potential SRC. The policy did not give the MO the authority to stop game play [26, 27]. During the 2015-2016 football season, the MO was either an athletic trainer or a licensed independent provider (i.e. physician, physician assistant,

etc). Because of these broad guidelines with no reference for best practices, there were a variety of ways ACC schools carried out the MO role.

Several challenges have led to controversy about the MO role. Unanswered questions include how to handle missed SRCs in spite of the MO, if the MO has the power to stop game play, and how to maintain consistent MO performance to ensure reliability [28-31]. Unfortunately, there is no data to assess how effective the MO is as a secondary prevention tool. Furthermore, no data exists on how to standardize or improve this role.

The authors conducted a survey among MOs for the 2015-2016 ACC football season. The primary aim of the survey was to determine if the MO witnessed head/neck injuries or SRC-type behavior that was not seen by sideline medical staff. The survey also investigated MO best practices and methods for improvement.

MATERIALS AND METHODS

Participants

The survey participants were MOs that staffed ACC football games during the 2015-2016 season. Each athletic department (AD) hired their own MO who worked exclusively for their institution. Some ADs utilized multiple MOs per game and/or per season. Inclusion criteria included MOs who served at least one football game half in official ACC play and responded to our email survey. The authors used no other specific inclusion or exclusion criteria.

Materials

The school's institutional review board approved the protocol.

The authors distributed a 19-item questionnaire via email to all 15 ACC ADs including Notre Dame in December 2015. At their own discretion, the ADs distributed the survey to their designated observers. As a result, we had limited knowledge of total number of observers who received the survey, which limited our ability to calculate a response rate. Instead, we determined game coverage rate. Coverage rate equals the total number of game halves that all MOs reported as staffing divided by the total number of halves played by all ACC teams during the season. The total number of halves during the season was a known number that we could compare the responses on the survey. The survey instrument utilized the online website, Question Pro.com (Question Pro Inc., Pune, India). The survey was open for 3 months. The authors sent one subsequent follow-up email.

Procedures: MOs reported training level (i.e. highest level of education), years of experience as health care provider, number of ACC half games they completed, number of calls to sideline made for any type of injury, and number of calls to sideline made for SRC. The survey subjects were queried on their specific calls to the sideline. Since the MO's main role was to identify SRCs, questions pertaining to detecting SRCs were specifically asked in the survey. The survey delineated between SRCs identified by both the MO and the sideline medical team and made them distinct from SRCs identified by only the MO and missed by the sideline medical team. The respondents also answered questions

regarding best practices comparing stadium seating location, communication devices to sideline, and other tools on a Likert scale. The survey specifically queried the 2015-2016 football season and included all ACC and Notre Dame regular season games, conference championship games, bowl games, and NCAA tournament championship games. The surveys were anonymously submitted and reviewed.

Statistical Analysis

The authors conducted analysis using IBM SPSS software version 23.0 Windows (SPSS Inc., Chicago, Illinois).

RESULTS

The ACC, including Notre Dame, competed in 192 football games (384 halves) for the 2015-2016 season. There were 19 MO respondents who completed the survey, which accounted for 216 football halves for a total coverage rate of 56% of the total halves in which ACC schools participated.

Table 1 shows demographics of the responders. The respondents worked a mean of 11.3 halves and a range of 2 to 26 halves (95% CI 7.5, 15.1). Table 2 details SRCs detected by both the MO and sideline medical team over the entire season. Of the 19 respondents, three different MOs each made one call to the sideline that resulted in a SRC diagnosis, two MOs each made two calls to the sideline that resulted in a SRC diagnosis, and one MO made four calls to the sideline that resulted in a diagnosis of a SRC. Twelve MOs made zero calls to the sideline that resulted in a concussion diagnosis. Table 3 details the reporting of SRCs detected by only the MO and missed by the sideline medical team. Over the entire season, there were four calls to the sideline that resulted in a SRC diagnosis that was not seen by the sideline medical staff. Some MOs also called down to the sideline for other unspecified injuries not related to the SRCs. Table 4 displays the number of unspecified injuries witnessed by the MO but not initially witnessed by the sideline medical team.

While the role of the MO is to contact the sideline medical staff when he or she has concerns of a player concussion, this contact carries a certain level of responsibility and pressure on the MO. This call to the field often triggers a medical evaluation that may potentially pull the player temporarily or permanently. To assess for any perceived stigma that MOs may have felt prevented them from contacting the sideline medical staff, the survey queried the MOs in regards to failing to call the sideline. The results showed that none of the respondents neglected to call down to the sideline after they witnessed an obvious injury or SRC that went unnoticed by the sideline medical staff.

The respondents also answered questions regarding best practices comparing stadium seating location, communication devices to sideline, and other tools. Not all respondents had experience with each tool or device provided by various teams and venues. As an example, some venues had access to instant replay or a pager while others did not. As illustrated in Figure 1, the respondents reported that the 50-yard line was the most ideal viewing angle to perform their job with 47% and 37% reporting "very easy" and "easy", respectively. The end zone was viewed the least effective (21% "easy" and 10.5% "difficult"). Figure 2 reports the most effective communication devices to the sideline. The team radio was voted most effective (79%

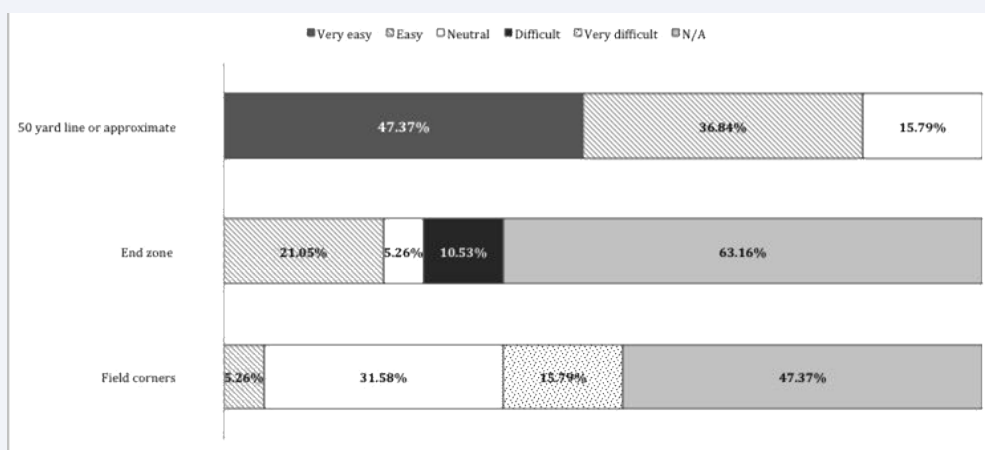


Figure 1 Medical Observer Location in Stadium at Press Box Level: Graph illustrating that the 50-yard line was the most ideal viewing angle as reported by MOs. The end zone was viewed the least effective.

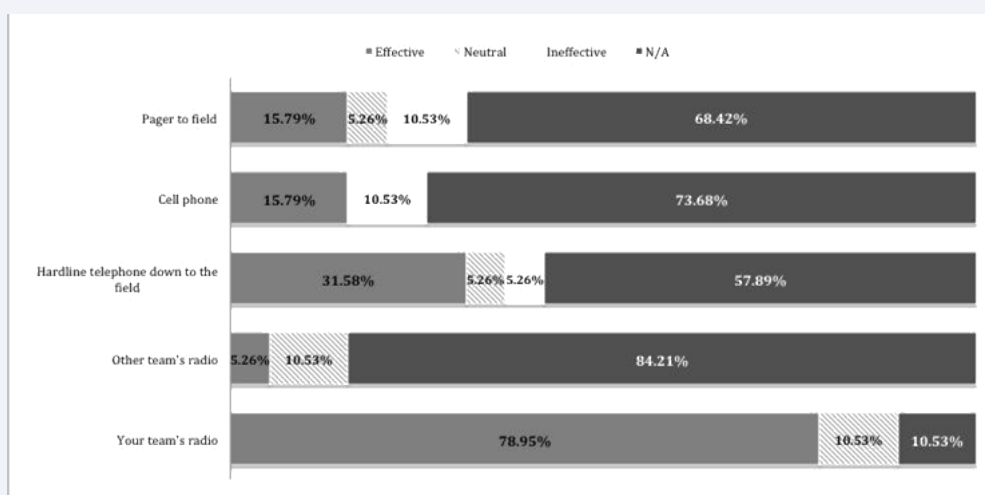


Figure 2 Effectiveness in Communicating with Sideline: This graph reports the most effective communication devices to the sideline. The team radio was voted most effective; another effective device included a hard telephone line to the field. Less effective devices included a cell phone, pager, and other team's radio.

“effective”); another effective device included a hard telephone line to the field (31% “effective”). Less effective devices included a cell phone (16% “effective”, 10.5% “ineffective”), pager (16% “effective”, 10.5% “ineffective”), and other team’s radio (10.5% “neutral”). Figure 3 shows specific tools that the respondents felt were most effective to carry out their MO duties. Instant replay (DV Sport, Pittsburgh, PA) was voted most effective (61 % “very useful” and 33 % “useful”). Other effective tools included a live TV feed (37% “very useful”, 42% “useful”) and binoculars (21% “very useful”, 42% “useful”). All respondents felt either “very prepared” (68%) or “somewhat prepared” (32%) to perform their job duties. Most respondents had no formal MO training although some equated their professional training as training that would suffice. The respondents felt the MO was “very useful” or “useful” (58%), “not useful” (21%), or “unsure” (21%).

DISCUSSION

The MO role is a new position on the medical team of a

football game. At this time, there is little data to determine if the MO is making collegiate football safer. This survey supported the primary aim and showed that the MO witnesses SRCs that are not seen by the sideline medical staff. The survey also showed that many teams, in addition to utilizing the MO as a SRC spotter, also used the MO as a secondary injury observer.

The survey suggests that best practices should include a view from approximately the 50-yard line and have access to instant replay. If the MO is to communicate with the sideline, radios with the sideline medical staff are the most effective communication out of the methods used. The authors contend that a secondary means of communication should also be available in case the first line fails, such as a hardline to each sideline communication hub.

This survey is a starting point, but multiple limitations exist. The survey is limited by low response rate with both recall and response bias likely playing a part. Additionally, reporting bias is possible since MOs, as survey respondents, may have over- or

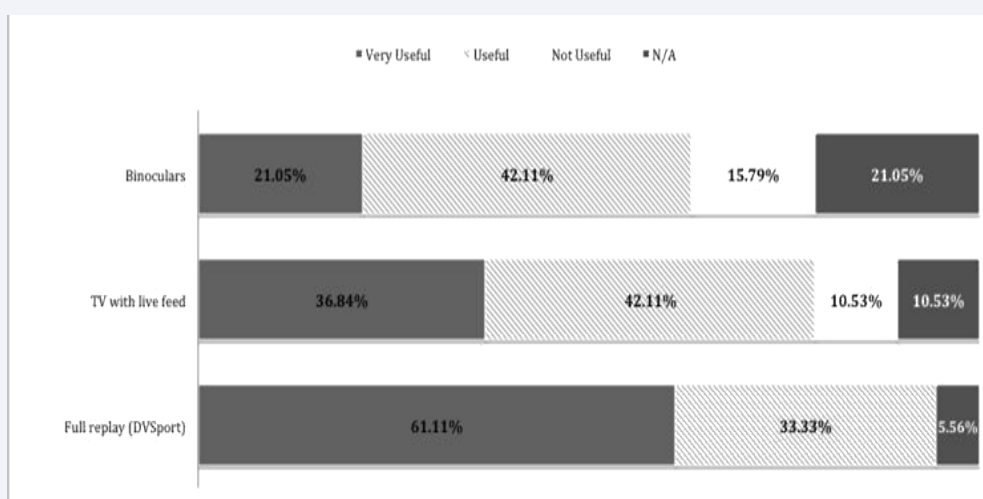


Figure 3 Usefulness of Tool: This graph displays specific tools that the respondents felt were most effective to carry out their MO duties. Instant replay was voted most effective. Other effective tools included a live TV feed and binoculars.

Table 1: Demographics of the MO survey respondents: Most respondents were athletic trainers or Staff Primary care physicians. Half of respondents had less than 6 years experience, and half had more than 6 years experience.

Demographics	Responses
Professional Occupation	
Graduate Assistant Certified Athletic Trainer	5.3% (1)
Certified Athletic Trainer	47.4%(9)
Staff Orthopedic Physician	5.3%(1)
Staff Primary Care Physician	26.3%(5)
Fellow Orthopedic Physician	0%
Fellow Primary Care Physician	10.5%(2)
Resident Physician	0%
Other	5.3%(1)
Years of Experience as Health Care Provider	
Less than 3 years	6.25%(1)
3-5 years	43.75%(7)
6-10 years	6.25%(1)
Greater than 10 years	43.75(7)
Active Athletic Department Affiliation	
Yes	57.9%(11)
No	42.1(8)

under-reported SRC calls for the sake of personal secondary gain (i.e. job satisfaction or security). Communication between the MO and their sideline medical team also affected survey answers. As one respondent explained, they did not know the final diagnosis and outcome of their calls to the field. Furthermore, two of the authors also worked as a MO, which may have introduced bias into the study. These two authors accounted for 14 of the total halves (216), and neither author witnessed a concussion during their time as the observer. Following the 2015-2016 season, these two authors stopped working as MOs. Since the survey was only

conducted among ACC MOs, we do not have a true comparison against an MO that was independent of their team or against a NCAA program that did not employ MOs.

Since the MO role is novel and data is limited, very little can be concluded currently on its strength as a screening tool; regardless, the MO role can improve. None of the MOs in the ACC had formal MO training and instead utilized their credentialed

Table 2: Total Calls that Resulted in a Diagnosis of a Concussion: The total number of calls made among all ACC medical observers over the entire season that resulted in a diagnosis of a concussion. Example, 12 medical observers made zero calls to the sideline that resulted in a diagnosis of a concussion.

Total # of Calls	# of Medical Observers
0	12
1	3
2	2
3	1
4	1
5	0
Unsure	0
Other	0

Table 3: Total calls per MO for season that lead to a SRC diagnosis not first witnessed by sideline medical staff: The total number of calls made per medical observer over the entire season that resulted in a diagnosis of a SRC that was not first witnessed by the sideline medical staff. Example, 2 medical observers each made one call to the field that resulted in a diagnosis of a concussion that was not witnessed by the sideline medical staff.

Total # of Calls per MO	# of Medical Observers
0	16
1	2
2	1
3	0
4	0
5	0
Other	0

Table 4: Total calls for season that led to an injury diagnosis not witnessed by sideline medical staff: The total number of calls made among all ACC medical observers over the entire season that resulted in an injury diagnosis that was not witnessed by the sideline medical staff. *MO unable to determine.

Total # of calls	# of Medical Observers
0	14
1	4
2	1
3	0
4	0
5	1
Other*	1

training. In the future, development of a standardized training program that highlights scenarios of high-risk concussive exposures and details the tradecraft of the MO may improve its role as a screening tool. Augmenting instant replay feeds with the coach's video feed may also improve the MO's ability to witness concussions. Coach's video is taken by each team and offers a broader view of the play than live TV; the latter often zooms in on the ball carrier. Incorporating other technology such as a video-synced head impact telemetry system with real-time data analysis may further improve the MO's ability to detect SRC.

There are best practices that all teams should consider, which include implementing instant replay for the MO, sideline communication using team radios, and positioning of the MO near the 50-yard line for optimum viewing. Again, specific training for the MO role should be considered.

CONCLUSION/SUMMARY

The MO role is a new position on the medical team at collegiate football games. At this time, there is little data to determine if the MO is making collegiate football safer. Through the use of a 19-item survey, we demonstrated that the MO does indeed detect SRCs that are not seen by the sideline medical staff. The survey also showed that many ACC teams used the MO as a secondary injury observer, further increasing the value of this new position. To further promote the efficacy of their role, each MO should be provided with the best available tools, communication, and viewing angles.

REFERENCES

- Patricios JS, Ardern CL, Hislop MD, Aubry M, Bloomfield P, Broderick C, et al. Implementation of the 2017 Berlin Concussion in Sport Group Consensus Statement in contact and collision sports: a joint position statement from 11 national and international sports organisations. *Br J Sports Med.* 2018; 52: 635-641.
- Ellenbogen RG, Batjer H, Cardenas J, Berger M, Bailes J, Pieroth E, Heyer R, Theodore N, Hsu W, Nabel E, Maroon J, Cantu R, Barnes R, Collins J, Putukian M, Lonser R, Solomon G, Sills A. National Football League Head, Neck and Spine Committee's Concussion Diagnosis and Management Protocol: 2017-18 season. *Br J Sports Med.* 2018; 52: 894-902.
- Cochrane GD, Owen M, Ackerson JD, Hale MH, Gould S. Exploration of US men's professional sport organization concussion policies. *Phys Sports med.* 2017; 45: 178-183.
- Asplund CA, Best TM. Brain damage in american football inevitable consequence or avoidable risk? *Br J Sports Med.* 2015; 49:1015-1016.
- Kerr ZY, Register-Mihalik JK, Kay MC, De Freese JD, Marshall SW, Guskiewicz KM. Concussion Nondisclosure During Professional Career Among a Cohort of Former National Football League Athletes. *Am J Sports Med.* 2018; 46: 22-29.
- Baugh CM, Kroshus E. Concussion management in US college football: progress and pitfalls. *Concussion.* 2016; 1: CNC6.
- McCrory P, Meeuwisse W, Dvořák J, Aubry M, Bailes J, et al. Consensus statement on concussion in sport-the 5(th) international conference on concussion in sport held in Berlin, October 2016. *Br J Sports Med.* 2017; 51: 838-847.
- King D, Brughelli M, Hume P, Gissane C. Assessment, management and knowledge of sport-related concussion: systematic review. *Sports Med.* 2014; 44: 449-471.
- Emery CA, Black AM, Kolstad A, Martinez G, Nettel-Aguirre A, Engebretsen L, Johnston K, Kissick J, Maddocks D, Tator C, Aubry M, Dvořák J, Nagahiro S, Schneider K. What strategies can be used to effectively reduce the risk of concussion in sport? A systematic review. *Br J Sports Med.* 2017; 51: 978-984.
- Teel EF, Marshall SW, Shankar V, McCrean M, Guskiewicz KM. Predicting Recovery Patterns After Sport-Related Concussion. *J Athl Train.* 2017; 52: 288-298.
- Harmon KG, Drezner JA, Gammons M, et al. American medical society for sports medicine position statement: Concussion in sport. *Br J Sports Med.* 2013; 47: 15-26.
- Cantu RC, Gean AD. Second-impact syndrome and a small subdural hematoma: An uncommon catastrophic result of repetitive head injury with a characteristic imaging appearance. *J Neurotrauma.* 2010; 27: 1557-1564.
- Hebert O, Schlueter K, Hornsby M, Van Gorder S, Snodgrass S, Cook C. The diagnostic credibility of second impact syndrome: A systematic literature review. *J Sci Med Sport.* 2016.
- Broglio SP, Cantu RC, Gioia GA, et al. National Athletic Trainers Association Position Statement: Management of Sport Concussion. *J Athl Train.* 2014; 49: 245-265.
- Navarro SM, Sokunbi OF, Haeberle HS, Schickendantz MS, Mont MA, Figler RA, et al. Short-term Outcomes Following Concussion in the NFL: A Study of Player Longevity, Performance, and Financial Loss. *Orthop J Sports Med.* 2017; 5: 2325967117740847.
- Iverson GL, Gardner AJ, Terry DP, Ponsford JL, Sills AK, Broshek DK, Solomon GS. Predictors of clinical recovery from concussion: a systematic review. *Br J Sports Med.* 2017; 51: 941-948.
- Kamins J, Bigler E, Covassin T, Henry L, Kemp S, Leddy JJ, et al. What is the physiological time to recovery after concussion? A systematic review. *Br J Sports Med.* 2017; 51: 935-940.
- Manley G, Gardner AJ, Schneider KJ, Guskiewicz KM, Bailes J, Cantu RC, et al. A systematic review of potential long-term effects of sport-related concussion. *Br J Sports Med.* 2017; 51: 969-977.
- Kerr ZY, Marshall SW, Harding HP Jr, Guskiewicz KM. Nine-year risk of depression diagnosis increases with increasing self-reported concussions in retired professional football players. *Am J Sports Med.* 2012; 40: 2206-2212.
- Kerr ZY, Register-Mihalik JK, Kroshus E, Baugh CM, Marshall SW. Motivations Associated With Nondisclosure of Self-Reported Concussions in Former Collegiate Athletes. *Am J Sports Med.* 2016; 44: 220-225.
- NFL Operations, ATC Spotters. NFL, 2017.
- Carollo, B. 2015 Big Ten Football Media Days. Caption Northwest, Inc, 2015.

23. ACC football games will include medical observers. The ACC, 2015.
24. SEC outlines medical observer process. SEC sports, Aug 2015.
25. Buckley TA, Baugh CM, Meehan WP 3rd, Di Fabio MS. Concussion Management Plan Compliance: A Study of NCAA Power 5 Conference Schools. *Orthop J Sports Med.* 2017; 25; 5.
26. Decock, L. ACC's eyes from above a step toward better player safety. *The Charlotte Observer*, July 2015.
27. Teel D. Virginia Tech trainer welcomes ACC mandate of medical observer in press box. *Daily Press*, July 2015.
28. Florio M. ATC spotter failed to call medical timeout to remove Case Keenum. *NBC Sports*, Nov 2015.
29. Johnson, G. NCAA approves experimental rule allowing medical observers for football. *NCAA*, July 2015.
30. New J. A different perspective on concussions. *Inside Higher Ed*, July 2015.
31. Kekis J. ACC's medical observers another set of eyes to spot injury. *AP Sports*. 2015.

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