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original research

Policies, Procedures, and Practices Regarding Sport-Related Concussion in Community College Athletes

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Context: College sport organizations and associations endorse concussion-management protocols and policies. To date, little information is available on concussion policies and practices at community college institutions.

Objective: To assess and describe current practices and policies regarding the assessment, management, and return-to-play criteria for sport-related concussion (SRC) among member institutions of the California Community College Athletic Association (CCCAA).

Design: Cross-sectional study.

Setting: Web-based survey.

Patients or Other Participants: A total of 55 head athletic trainers (ATs) at CCCAA institutions.

Main Outcome Measure(s): Data about policies, procedures, and practices regarding SRC were collected over a 3-week period in March 2012 and analyzed using descriptive statistics, the Fisher exact test, and the Spearman test.

Results: Almost half (47%) of ATs stated they had a policy for SRC assessment, management, and return to play at their institution. They reported being in compliance with baseline testing guidelines (25%), management guidelines (34.5%), and return-to-play guidelines (30%). Nearly 31% of ATs described having an SRC policy in place for academic accommodations. Conference attendance was positively correlated with institutional use of academic accommodations after SRC ($r = 0.44$, $P = .01$). The number of meetings ATs attended and their use of baseline testing were also positively correlated ($r = 0.38$, $P = .01$).

Conclusions: At the time of this study, nearly half of CCCAA institutions had concussion policies and 31% had academic-accommodation policies. However, only 18% of ATs at CCCAA institutions were in compliance with all of their concussion policies. Our findings demonstrate improvements in the management of SRCs by ATs at California community colleges compared with previous research but a need for better compliance with SRC policies.

Key Words: academic accommodations, return to play, athletic trainers, continuing education

Key Points

- Compared with past research findings, athletic trainers at California community colleges showed continued support of overall improvement in concussion assessments, management, and return-to-play decision making for their athletes.
- Athletic trainers' pursuit of continuing education on sport-related concussion was associated with updated clinical practices.
- Institutions with more student-athletes and more athletic trainers were more likely to administer baseline testing and to have academic-accommodations policies.

Evaluation, management, and return-to-play (RTP) criteria for sport-related concussions (SRCs) continue to evolve among sports medicine professionals. Over the past decade, numerous policies, procedures, and position statements for SRC have been developed.[1–5] The goal of these position statements was to create multidisciplinary consensus recommendations for the assessment and management of SRC.[1–5] Based on the work of these groups and others, collegiate institutions have developed and implemented policies and procedures regarding SRC. Increased focus and effort have been aimed at creating and putting in place a consistent, consensus-based standard of practice for health care professionals in regard to assessment, management, and RTP guidelines for athletes with SRC. Formal collegiate policies for SRC were instituted in 2010 when the National Collegiate Athletic Association (NCAA) developed a best-practices policy for its institutional members.[6] The NCAA policies included (1) a recommendation for preparticipation examination tools that assess baseline neuropsychological function and balance, (2) management strategies including cognitive and physical rest until the athlete is symptom free and has returned to baseline, and (3) an RTP protocol that includes staged incremental increases in activity for approximately 1 week.[1–6] However, little is known about concussions and the nature of concussion policies in practice at the community college level of athletics.

An estimated 3753 concussions occur at the collegiate level per year,[7,8] accounting for approximately 5.8% to 6.2% of all athletic injuries reported,[9,10] yet to our knowledge, no data have been published regarding the number of concussions in community college sports. The majority of properly managed concussions at the collegiate level resolve within 7 to 10 days.[11] Properly managed

concussions may reduce the risk of prolonged recoveries and additional long-term consequences.[12] Researchers[12] suggested that athletes who have sustained 3 or more concussions are 5 times more likely to suffer from mild cognitive impairments and 3 times more likely to have significant memory problems and higher rates of dementia than those in the general population. Recently, several class-action lawsuits pertaining to the potential long-term effects of concussion in collegiate athletes have been filed against the NCAA. The combined medical and legal ramifications of mismanaging SRCs warrant that collegiate institutions implement consistent, standard policies and procedures that follow the most recent consensus statements for managing this injury. In doing so, these institutions can help ensure that athletes with SRC are properly managed and safely returned to activity by their sports medicine staff.

In 2001, Ferrara et al[13] reported that 17% of athletic trainers (ATs) used the Standardized Assessment of Concussion (SAC). This study focused on the methods ATs used to assess and manage SRCs; however, baseline testing and RTP protocols were not mentioned. In 2005, soon after the National Athletic Trainers' Association (NATA) concussion position statement was released advocating baseline cognitive testing, balance assessments, and symptoms reports,[4] Notebaert and Guskiewicz[14] conducted a follow-up to the Ferrara study. They reported that approximately 3% of ATs followed all 3 NATA guidelines, 24% followed at least 2 of the 3 guidelines, and 80% followed at least 1 guideline.

In 2009, Covassin et al[15] examined concussion-management guidelines and protocols taught and used in the athletic training classroom and clinical setting. The researchers reported that the NATA position statement[4] was taught by 80% of instructors and the Vienna Guidelines[1] were taught by only 12%. More than half of the respondents (61%) used the NATA guidelines for RTP decisions, and only 11% used the Vienna guidelines. These findings raise the question of how information regarding concussion management is being disseminated to professionals in the sports medicine field. Specifically, noncompliance with professional position statements might result from lack of information about and awareness of those statements. In 2011, Miller et al[16] surveyed head football ATs from a variety of large Division I programs. A total of 46% indicated that football players at their institutions were allowed to participate without undergoing a neurologic pretest before the start of each season.

In 2010, Chinn and Porter[17] investigated concussion-assessment practices among California Community College Athletic Association (CCCAA) football programs. Their purpose was to compare the management of concussions in CCCAA football programs with the guidelines set forth in the 2004 NATA position statement.[4] Of those surveyed, 71% were not conducting baseline assessments, and there was a negative correlation between the number of years practicing as an AT and how often cognitive baselines were obtained. Overall, the longer ATs were in practice, the less likely they were to perform these baseline tests. Except for Chinn and Porter,[17] who looked only at football programs, researchers have focused on NCAA institutions at the Division I, II, and III levels. However, we know little about SRC practices and policies at community colleges, where sports medicine coverage may be limited. Moreover, some states, such as California, do not require certification for ATs, which may also influence practices related to SRC.

The CCCAA represents the largest community college system in the United States, with more than 2.6 million students among 110 campuses. A total of 72 of the CCCAA programs have an intercollegiate football team.[18] Approximately 26 000 students (17 000 men, 9000 women) participate in CCCAA athletics each year.[18] At the time of our study, the CCCAA provided no guidelines for ATs practicing at member institutions regarding the evaluation, management, and RTP criteria for athletes with SRC.[18] Therefore, the purpose of our study was to describe and examine factors related to current practices and policies regarding the assessment, management, and RTP of athletes with SRCs at CCCAA member institutions. Specifically, we sought to identify if policies on concussion assessment, management, and RTP criteria were in place at CCCAA institutions; if policies existed, did they comply with the NATA and NCAA best-practice guidelines? We also examined the specific practices used by ATs at these institutions for baseline, on-field, and postinjury assessments. We hypothesized that the reported use of concussion-assessment tools (eg, neurocognitive and balance testing) would have increased compared with published studies. We also proposed a relationship between certain factors (eg, attendance at conferences, SRC education, years of experience) and policies and practices among ATs at CCCAA institutions.

METHODS

Participants

In March 2012, all head ATs working at each of the 103 CCCAA institutions were invited via e-mail and follow-up phone call to participate in this study. Potential recruits were identified using the CCCAA Web site and the 2011–2012 CCCAA handbook.[18] A total of 57 of 103 (55%) of the ATs agreed to participate in the study. The remaining 48 ATs declined to participate because of reasons such as the amount of time required, disinterest, and concern about how the data would be used in regard to their institution. Given the anonymous nature of the survey, we did not ask the ATs to report sex or age as a condition of survey completion.

Instrument

The survey contained 60 questions in a variety of formats: multiple choice, *yes/no* or *I don't know*, *check all that apply*, and open-ended numerical response items (eg, number of concussions managed, number of years employed). Overall, the survey comprised 5 sections: demographics, information on education and training, concussion assessment and management, RTP practices, and institutional policies and procedures (ie, accommodations). To determine readability, clarity of items, and approximate time of completion, we designed and piloted the survey items using the input of NCAA-institution ATs who were research and clinical experts in SRC. The survey was modeled after a survey developed and used by Chinn and Porter.[17] Because the survey includes items representing numerous aspects of concussion in the community

Table 1. Methods Participants Used for Baseline Concussion Testing[a]

Method	%
Balance Error Scoring System (BESS)	56
Standardized Assessment of Concussion (SAC)	48
Immediate Post-concussion Assessment and Cognitive Testing (ImPACT)	44
Sport Concussion Assessment Tool 2 (SCAT2)	24
Concussion grading scales	8
Other	8
Clinical examination	4
Postconcussion Symptom Scale (PCSS)	4

[a] Participants (n = 25) were asked to check all methods that applied.

college setting that we needed to cover (ie, the number of ATs at each school, baseline testing practices, whether an institution had a concussion policy), it was not statistically feasible to assess the reliability of the individual items in the survey. Participants completed the survey via a secure Web-based program (SurveyMonkey, Palo Alto, CA); a unique identifier allowed them to complete the survey only once. The survey required approximately 20 minutes to complete.

Procedures

The university's institutional review board approved the study under an exempt research protocol. After identifying potential participants and searching the Web, we sent an initial contact and introduction e-mail to each recruit inviting participation in the study. A subsequent e-mail was sent at the end of each week for 3 weeks to remind potential participants to complete the survey. Each e-mail contained a description of the purpose of the study and a link to the online survey and assured the participant that any information provided would be confidential and anonymous. Participants provided implied consent through a checkbox on the first page of the survey and completion and submission of the survey. The survey was closed at the end of 4 weeks. To increase participation response rates, we gave ten $100 gift cards to randomly selected participants who completed the survey and provided separate (unconnected to the survey) e-mail contact information.

Data Analysis

Data were analyzed using descriptive and inferential statistics. We assessed the internal consistency of the survey with the Cronbach α. The Fisher exact test was used to examine the relationships among the categorical variables, and the Spearman test was administered to examine the relationships among the continuous and categorical variables. All statistical analyses were conducted using the statistical software program Minitab 15 (Minitab Inc, State College, PA). A significance level of $P < .05$ was set for all analyses.

RESULTS

Response Rate

A total of 57 of 103 ATs agreed to participate in the survey. Of the 57 participants who agreed to participate, 55 completed the entire survey, for a total response rate of 53%. Answers from the 2 partially completed surveys were included in the calculations when appropriate but were not included in the overall response rate.

Participant Demographic Data

A total of 96.5% (n = 55) of individuals in the study were ATs. Two respondents (3.5%) self-identified as "health care providers." The 57 participants reported a mean of 16.9 ± 10.05 years of experience in this setting. A total of 28.1% (n = 16) had earned up to a bachelor's degree: 12.5% (n = 2) each were in athletic training and sports medicine, and 75% (n = 12) were in physical education or kinesiology. Individuals with master's degrees made up 70.7% (n = 40) of the sample: 20% (n = 8) were in athletic training, 22.5% (n = 9) were in sports medicine, and 47.5% (n = 19) were in physical education or kinesiology; the rest were unspecified or in general studies or liberal arts. One participant had received a doctoral degree but did not specify the field of study.

Institutional Demographics

Overall, 49.1% (n = 27) of schools employed 1 AT, 43.6% (n = 24) had 1.5–2 ATs, and 7.3% (n = 4) had 2.5–3 ATs (0.5 AT represents a part-time position). The ATs reported covering 11.4 ± 4.5 sports per institution and managing 9.4 ± 7.4 concussions per year. Fewer than 100 student-athletes were attended by 14.0% (n = 8) of participants, 101–250 student-athletes by 35.1% (n = 20), 251–400 student-athletes by 40.4% (n = 23), and more than 400 student-athletes by 10.5% (n = 6). We observed significant positive correlations between the number of sports supported by an institution and the number of ATs employed by that institution ($r = 0.68$, $P < .01$) and between the number of ATs employed by an institution and the number of concussions managed by those ATs ($r = 0.53$, $P < .01$).

Baseline Testing, Concussion Testing, and RTP Testing

Of the ATs surveyed, 43.9% (n = 25) administered baseline testing, whereas 56.1% (n = 32) did not administer baseline testing. For the 25 who administered baseline testing, the most common baseline concussion-assessment tools were the Balance Error Scoring System (BESS; 56%, n = 14), SAC (48%, n = 12), Immediate Post-concussion Assessment and Cognitive Testing (ImPACT; ImPACT Applications, Inc, Pittsburgh, PA; 44%, n = 11), and Sport Concussion Assessment Tool 2 (SCAT2; 24%, n = 6). The variety of tools used for baseline concussion testing is shown in Table 1. Of those who conducted baseline testing, 60% (n = 15) did so only once in an athlete's community college career, 20% (n = 5) tested every year, and 20% (n = 5) tested every 2 years. Of the 56% (n = 32) of ATs not administering baseline testing, only 6.3% (n = 2) were unfamiliar with the tests. The remainder of the respondents did not employ baseline testing because they lacked time (46.9%, n = 15), staff (71.9%, n = 23), resources (37.5%, n = 12), or funding (84.4%, n = 25) or because of other factors (12.5%, n = 4). Significant positive correlations were noted between the use of baseline testing and the number of sports offered by

Table 2. Methods Used to Evaluate Concussion, %

Method	Ferrara et al, 2001[13]	Notebaert and Guskiewicz, 2005[14]	Covassin et al, 2009[15]	Chinn and Porter, 2010[17]	Current Study[a]
Clinical examination	33	95	91	50	28.6
Symptom checklist	35.7	85	78.2	81	82.1
Standardized Assessment of Concussion (SAC)	10.6	48	54.3	32	42.9
Sport Concussion Assessment Tool 2 (SCAT2)					32.1
Balance Error Scoring System (BESS)	5	16	28.4	10	41.1
Neuropsychological testing	15.3	18	33.3	10	
Grading scale		70	55.3	21	14.3
Preset questions				21	10.7
Concussion cards					16.1
Glasgow Coma Scale					30.4
Central nervous system vital signs					10.7
Brief Sport Concussion Assessment Tool 2 (SCAT2)					23.2
Other			6.5		5.4

[a] Participants (n = 56) were asked to check all that applied.

an institution ($r = 0.42$, $P < .01$) and the number of concussions managed by ATs ($r = 0.31$, $P < .05$).

For the initial concussion assessment, the ATs (n = 56) most often used symptoms (82.1%, n = 46), SAC (42.9%, n = 24), BESS (41.1%, n = 23), clinical examination (28.6%, n = 16), and SCAT2 (32.1%, n = 18). The concussion assessments performed during the initial evaluation are shown in Table 2.

To make RTP decisions, the ATs used a symptom evaluation or postconcussion symptom scale (96.3%, n = 53), 5-stage extended protocol (49.1%, n = 27), BESS (45.5%, n = 25), SCAT2 (41.8%, n = 23), clinical examination (32.1%, n = 18), SAC (30.9%, n = 17), ImPACT (25.5%, n = 14), Glasgow Coma Scale (10.9%, n = 6), concussion-grading scale (9.1%, n = 4), Maddocks questions (3.6%, n = 2), concussion card (3.6%, n = 2), central nervous system vital signs (3.6%, n = 2), and brief SCAT2 (1.8%, n = 1). The complete list is available in Table 3.

Graded RTP Protocol

Most participants (85.5%, n = 47) were aware of the NATA position statement guidelines, but only 61.8% (n = 34) followed them. Of the two-thirds of ATs who were familiar with the NATA graded RTP protocol, nearly 62% (n = 34) followed the protocol and 38.2% (n = 21) did not follow the protocol. Among the 34 respondents who followed the NATA RTP guidelines and the 33 who indicated the assessments used, 97% (n = 32) evaluated symptoms, 72.7% (n = 24) evaluated neurocognitive function, and 66.7% (n = 22) evaluated postural stability before beginning the graded RTP protocol. A total of 57.6% (n = 19) used all 3 tests, 21.2% (n = 7) used 2 tests, and 21.2% (n = 7) used 1 test. When we analyzed these data as a group of 55 respondents, we found that 34.5% used all 3 suggested RTP guidelines, 12.7% used 2 guidelines, and 12.7% used 1 guideline. When the same group was asked if they assessed symptoms, neurocognitive function, and postural stability after the athlete successfully completed the NATA graded RTP protocol, 91.2% (n = 31) assessed

Table 3. Methods Used to Guide Return-to-Play Decisions After Concussion, %

Method	Ferrara et al, 2001[13]	Notebaert and Guskiewicz, 2005[14]	Covassin et al, 2009[15]	Chinn and Porter, 2010[17]	Current Study[a]
Clinical examination	24	80	92.7	42	32.1
Symptom checklist	16	80	72.3	85	96.3
Standardized Assessment of Concussion (SAC)	3.5	31	44	32	30.9
Sport Concussion Assessment Tool 2 (SCAT2)					41.8
Balance Error Scoring System (BESS)			23		45.5
Neuropsychological testing	1.9	10	33.4	10	25.5[b]
Grading scale		60	40.9	26	9.1
Maddocks questions				9	3.6
Concussion card					3.6
Glasgow Coma Scale					10.9
Central nervous system vital signs					3.6
Brief Sport Concussion Assessment Tool 2 (SCAT2)					1.8
Physician clearance	28.5	92	89.7	57	9
5-Stage extended protocol					49.1
Return-to-play guidelines	18.6		73.3		
Player self-report	2.6		43.8		
Other	4.8		5.9		

[a] Participants (n = 56) were asked to check all that applied.
[b] Immediate Post-concussion Assessment and Cognitive Testing (ImPACT).

Table 4. Number of Continuing Education Meetings Attended in the Last Year and Baseline Concussion Testing Conducted at Each School

Continuing Education Meetings Attended in Last Year, No.	Do You Perform Baseline Testing on Your Athletes?		
	Yes	No	Total[a]
0	0	2	2
1–3	7	20	27
4–6	13	7	20
7–9	4	1	5
>10	1	2	3
Total	25	32	57

[a] Spearman $\rho = 0.383$, Fisher $P < .01$, degrees of freedom = 4.

Table 5. Recency of Concussion Conference or Meeting and Academic-Accommodations Policies

Last Concussion Conference or Meeting Attended	Do You Have a Policy in Place for Academic Accommodations?		
	Yes	No	Total[a]
Never	0	2	2
≥5 y ago	0	1	1
2–4 y ago	2	12	14
Within last year	15	12	27
Total	17	27	44

[a] Spearman $\rho = 0.443$, Fisher $P < .01$, degrees of freedom = 3.

symptoms, 58.8% (n = 20) assessed neurocognitive function, and 61.8% (n = 21) assessed postural stability. Half (17 of 34, 50%) assessed all 3, demonstrating a multifaceted approach to concussion assessment and RTP as described in current consensus and position statements.

Continuing Education Meetings

Regarding continuing education on concussion management, nearly 60% (n = 34) of ATs participated within the last year and 31.6% (n = 18) within the last 2–4 years, 3.5% (n = 2) reported that it had been 5 or more years, and 5.3% (n = 3) had never attended any such seminars. Over the last 5 years, 47.4% (n = 27) attended 1–3 meetings, 35.1% (n = 20) attended 4–6 meetings, 8.8% (n = 5) attended 7–9 meetings, and 5.2% (n = 3) attended more than 10 meetings. A total of 3.4% (n = 2) had not attended any meetings on concussion management in the previous 5 years (Table 4). We found a significant positive correlation between the number of professional meetings an individual attended and the use of baseline testing ($r = 0.383$, $P = .01$). However, baseline testing, knowledge of NATA RTP guidelines, and conference attendance were not correlated.

Institutional Policies and Academic Accommodations

Nearly half (47.4%, n = 27) of the ATs stated that their institution or conference had a written policy regarding concussion management, 40.4% (n = 23) did not have a written policy, and 12.3% (n = 7) did not know if a written policy existed. Of the 27 respondents with a concussion-management policy, 88.9% (n = 24) believed that their policy was in compliance with the NATA best-practice guidelines and 11.1% (n = 3) did not know if their policy was in compliance. A total of 77.8% (n = 21) believed that their policy was in compliance with the NCAA guidelines, and 22.2% (n = 6) did not know. Of the participants, 86% (n = 49) were familiar with the NCAA and NATA best-practice guidelines, and 14% (n = 8) were not.

With regard to academic accommodations, fewer than one-third (30.9%, n = 17) of respondents reported academic-accommodations policies for concussed athletes at their institutions. Among those, the most common accommodations were time modifications for assignments (93.8%, n = 15), excused absences from class (87.5%, n = 14), use of note takers (68.8%, n = 11), and use of tutors (50%, n = 8). We noted a significant positive correlation between the number of ATs employed in an institution and an institutional policy of academic accommodations for athletes with SRCs ($r = 0.35$, $P = .04$). Those institutions with more ATs were more likely to implement academic accommodations for injured athletes. A significant positive correlation was observed between how recently an AT had attended a professional meeting or seminar on the topic of SRC and having an institutional policy in place for academic accommodations ($r = 0.44$, $P = .01$; Table 5). The more recently a participant had attended meetings or seminars in the area of concussion management, the more likely academic accommodations were being made for injured athletes at that institution.

DISCUSSION

Over the past decade, researchers[13–15] have shown increases in the use of practices and assessment tools among collegiate ATs involved in the care of patients with SRC. In 2001, Ferrara et al[13] reported that 33% of ATs used a clinical assessment, 35% used a symptom checklist, 10% used the SAC, 5% used the BESS, and 15% used neuropsychological testing for concussion assessment (Table 2). Tools used to assist with concussion RTP decision making included clinical assessment (24%), symptom checklist (16%), SAC (3.5%), and neuropsychological testing (2%; Table 3).[17] In 2005, Notebaert and Guskiewicz[14] demonstrated a further increase in the use of appropriate practices and assessment tools by collegiate ATs. Specifically, 95% used a clinical examination, 85% used a symptom checklist, 48% used the SAC, 16% used the BESS, and 18% used neuropsychological testing (Table 2). Similarly, increases were reported in the use of concussion-assessment tools for RTP decisions: 80% used a clinical examination, 80% used a symptom checklist, 31% used the SAC, and 10% used neuropsychological testing (Table 3).[16] Our survey revealed an emphasis on the use of concussion-assessment tools during the initial evaluation and RTP, providing further evidence that collegiate ATs continue to enhance their clinical approach to SRC. The decrease in the use of a clinical examination over time may be associated with an increase in the use of concussion-assessment tools. However, the increased number of concussion-assessment tools available has resulted in ATs using a variety of tools for initial concussion evaluation and RTP decision making (Tables 2 and 3). The decrease in the use of clinical examinations could also reflect the possibility that concussion-assessment tools have become a part of ATs' everyday practice. It is important for clinicians to continue to use both a well-developed clinical examination and concussion-assessment tools.

With regard to awareness of SRC guidelines and education, Covassin et al[15] reported that the NATA position statement was being taught in 80.2% of accredited AT programs, but only 61.2% used those guidelines during clinical practice. Further, of the 80.2%, only 46.9% followed the NATA RTP guidelines. Our survey revealed a nearly 30% increase in compliance with the NATA position statement during clinical practice. As we hypothesized, these findings represent an increase in awareness and a slight increase in implementation of the NATA guidelines. This positive trend in the use of the NATA guidelines and tools demonstrates an improvement from 2005 to 2009[14,15]; however, more than a third of ATs at CCCAA schools were not following the guidelines. Given the discrepancy between awareness of concussion policies and procedures and implementation of these policies, additional efforts aimed at both education and oversight or enforcement of policies are warranted. We recommend that the CCCAA and other community college athletic associations develop and implement concussion policies and procedures that are enforced consistently across all institutions.

Academic accommodations after a concussion have become an emerging trend in the clinical setting despite limited research[19,20] advocating such items as reduced workload, limited attendance, and academic assistance as part of a student-athlete's RTP protocol. Currently, there is inadequate empirical evidence regarding the effectiveness of academic accommodations. In 2012, Moser et al[20] evaluated the effectiveness of cognitive and physical rest for the treatment of concussion. They found that cognitive and physical rest resulted in decreased symptoms and improved cognition, regardless of the time between injury and the onset of rest, and concluded that a period of cognitive and physical rest might be useful in treating concussions. Integral to the success of these strategies are institutional policies and procedures that support academic accommodations, including cognitive and physical rest, for student-athletes who have sustained concussions. Despite recommendations for academic accommodations,[19,20] previous researchers had yet to examine empirically the use of institutional policies and procedures for academic accommodations in community college athletes after SRC. In 2015, Williams et al[21] reported that 97% of secondary school ATs surveyed strongly agreed or agreed that a concussion can affect school performance. However, only 44.3% of the secondary schools had an academic-support team for concussed athletes. In our study, 30.9% of respondents stated that academic accommodations were available at their colleges. Student-athletes who sustain a concussion may be less likely to experience academic difficulties if their institution uses academic accommodations to help facilitate recovery, yet after this study was completed, California amended the existing concussion law and enacted a mandatory graduated RTP protocol of no less than 7 days under the supervision of a licensed health care provider.[22] The California Interscholastic Federation is urged to work in consultation with the American Academy of Pediatrics and the American Medical Society for Sports Medicine concussion protocols.[23] These concussion protocols indicate that student-athletes may require academic accommodations such as a reduced work load or modified testing and assignments.[23,24]

The number of recent professional meetings attended by an AT increased the likelihood of using baseline testing and implementing academic accommodations for concussed athletes. Up-to-date supplementary concussion courses may help ATs develop and implement the current recommended policies and trends in concussion care. This suggestion was supported by the correlations between baseline testing and both the number of student-athletes in the program and the number of ATs employed by the institution. However, depending on staff size and the number of student-athletes served per AT, development and implementation of current recommended policies and trends may be difficult. Those institutions with more student-athletes and more ATs were more likely to administer baseline testing. Therefore, smaller institutions with fewer ATs may be less likely to support recommended concussion-care strategies due to limited resources. Not only were institutions with more student-athletes and ATs more likely to administer baseline testing, but they were also more likely to have academic-accommodations policies for athletes with SRCs. These findings may reflect current levels of athletic department funding and access to concussion-assessment tools at community colleges. Regardless, these results point to the importance of institutional resources to support the policies and procedures necessary to provide the standard of care for athletes with SRCs.

Limitations

Limitations of our study included the assumption that participants would respond openly, honestly, and accurately to the survey. We also believed that the questions were reliable and interpreted by each participant as we intended. The study sample did not represent the population of ATs at all institutions, as not every institution was represented. As such, the findings are limited by the cross-sectional nature of the survey and its generalizability to only CCCAA institutions or to community colleges outside of California. Of particular importance in generalizing the findings from this study is the fact that ATs at CCCAA colleges and high schools in California were not bound by state regulations. This fact may further limit the generalizability of our findings to the current sample.

CONCLUSIONS

Compared with previous surveys, ATs at community colleges in California have made positive strides regarding concussion assessment, management, and RTP. Although the results support overall improvements in SRC policies and practices, they also demonstrate discrepancies in policies and procedures for student-athletes with SRCs. In contrast, attendance at professional meetings and continuing education were positively associated with current concussion practices. To our knowledge, we are the first to demonstrate the use of academic accommodations in the collegiate setting. Future researchers should focus on the ratio of student-athletes to ATs and ATs' workloads in different collegiate settings to identify differences in managing SRC; studies comparing the SRC policies and practices in high schools and colleges are warranted. Also, ATs need to pursue ongoing concussion education, as concussion practices continue to evolve rapidly.

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