Journal of Athletic Training 2018;53(10):990–1003
doi: 10.4085/1062-6050-234-17

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Return to Learn After Sport-Related Concussion: A Survey of Secondary School and Collegiate Athletic Trainers

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Context: Recent recommendations have emphasized return-to-learn (RTL) protocols to aid athletes in recovery from sport-related concussion (SRC) but have been based primarily on anecdotal evidence.

Objective: To investigate the RTL practices of certified athletic trainers (ATs) after an SRC.

Design: Cross-sectional study.

Setting: Online survey.

Patients or Other Participants: A total of 1083 individuals (27%) from a random sample of 4000 ATs in the National Athletic Trainers' Association membership database completed an electronic survey. Participants consisted of 729 self-identified secondary school ATs (SSATs; 67.3%; experience = 14.0 ± 9.7 years) and 354 self-identified collegiate ATs (CATs; 32.7%; experience = 13.4 ± 9.7 years).

Main Outcome Measure(s): We used χ^2 analyses to assess respondent differences related to current knowledge, current practices, and available resources. Independent *t* tests were used to compare SSATs and CATs on years of certification and annual number of SRCs evaluated.

Results: Of our total respondents, 41.2% (n = 446) correctly indicated the absence of evidence-based RTL guidelines. Whereas most (73.9%, n = 800) respondents had an established RTL policy, only 38.1% (n = 413) used such guidelines in their clinical practice. Most (97.1%, n = 708) SSATs and 82.2% (n = 291) of CATs had access to (a) mental health professional(s); however, minorities of SSATs (21.4%, n = 156) and CATs (37.0%, n = 131) never accessed these resources to care for concussed student-athletes.

Conclusions: Our results suggested that, despite the absence of empirical evidence, most surveyed ATs incorporated some form of RTL protocol in their SRC management policy. The varying AT knowledge, clinical practices, and resources highlighted by our results should be considered when creating or refining an RTL protocol.

Key Words: academic accommodations, concussion management, student-athletes

Key Points

- Regardless of academic setting, athletic trainers understood the importance of including a return-to-learn protocol or policy in a concussion-management paradigm.
- Most respondents identified themselves as leaders in creating and implementing a return-to-learn protocol or policy.
- Despite the absence of empirical evidence, most athletic trainers incorporated some form of cognitive rest in their concussion-management protocol based on anecdotal evidence and clinical expertise.
- Athletic trainers should investigate potentially accessible resources (eg, school counselors, school nurses, neuropsychologists) to establish an interdisciplinary approach for managing student-athletes with sport-related concussion.
- Athletic trainers should work to effectively communicate with and educate all stakeholders associated with reintegrating student-athletes into the classroom after concussion.

The management of patients with sport-related concussion (SRC) has been grounded in a consensus-based, stepwise return-to-play (RTP) progression, which starts with rest or limited physical activity and concludes with unrestricted RTP.[1] Recent recommendations have emphasized cognitive rest to supplement RTP protocols; however, the suggested protocols have been based on limited empirical data,[2] and their effectiveness and clinical implementation in a management protocol during an athlete's recovery from an SRC remain controversial. Cognitive dysfunction, including slowed reaction time and processing speed, is well documented among concussed individuals[1,3] and may hinder performance in school and prolong recovery. Moreover, postconcussive symptoms (eg, sleep or emotional disturbances [or both], poor concentration, or fatigue) may further complicate the academic and clinical management of a concussed student-athlete. The noted cognitive impairments

support the need for return-to-learn (RTL), in addition to RTP, guidelines. Given the increased emphasis on cognitive recovery in concussion management, certified athletic trainers (ATs) have been tasked with facilitating cognitive rest for concussed student-athletes.

Student-athletes with an SRC may experience a myriad of symptoms, which are highly variable based on several factors, including sex, age, and number of previous concussions.[4–6] For example, concussed secondary school and collegiate student-athletes have been reported to be symptom free within 7 days of injury,[5] but conflicting evidence has suggested that secondary school student-athletes, specifically females, may experience symptoms for up to 21 days.[5] Whereas SRCs have been related to increased absenteeism (3 days to 3 months) after a diagnosed injury, limited evidence[7] has suggested a relationship with diminished academic performance based on grade-point average and national examination scores. The minority of concussions result in symptoms lasting more than 7 to 10 days, but the presence of postconcussive symptoms may negatively affect the recovery of student-athletes and potentially their academic activities.[1,8]

The presence and severity of postconcussive symptoms have been directly linked to adverse academic outcomes.[9] In a previous study,[10] data from student-athletes diagnosed with an SRC and their parents or guardians were surveyed during the recovery and compared with data from students who had recovered from their SRCs. Currently concussed respondents indicated greater difficulty with learning, grades, and subsequent anxiety in school. Findings such as these emphasize the need for RTL policies. Williams et al[11] administered a survey to secondary school ATs (SSATs) to assess their opinions regarding RTL policies and practice. Respondents largely agreed that an SRC can affect school performance and that ATs should be part of the team established to assist student-athletes with academic accommodations throughout their recovery from SRC.[11] These findings highlight the need for RTL policies and the incorporation of academic accommodations, such as temporary adjustments to a student's environment to avoid exacerbation of symptoms, modifications that may include individualized education plans (IEPs), or both.

The 2017 Concussion in Sport Group[1] described a stepwise RTP progression based on physical exertion after an SRC. This consensus-based protocol has been adopted and recommended by several health care organizations, including the National Athletic Trainers' Association (NATA).[12] Cognitive exertion, similar to physical exertion, ranges from limited cognitive activity (eg, cognitive rest) to full cognitive activity (eg, completing a full day of school).[13] When cognitive exertion does not provoke an increased symptom burden, the student can continue to increase cognitive activities and reduce periods of cognitive rest.[2,13] To date, limited evidence is available to support an evidence-based, standardized RTL protocol that details the appropriate types and amounts (eg, 1 day versus multiple days) of cognitive rest or academic adjustments.[13] Given the increased recognition and diagnosis of SRCs during the last decade,[14] an evidence-based RTL protocol would be a potentially viable means of improving student-athlete outcomes after an SRC.

Current RTL protocols are based on anecdotal rather than empirical evidence.[1,2,13,15,16] In 2010, McGrath[8] introduced a 5-step RTL protocol that was designed for secondary school student-athletes and complemented the widely accepted RTP protocol based on physical activity. The protocol consisted of an interdisciplinary effort to provide SRC education, preinjury (baseline) and postinjury (eg, sideline and neurocognitive) assessments, academic support after a diagnosed concussion, and an RTP decision.[8] More recently, recommendations specific to collegiate student-athletes that were adopted from previous research have been introduced.[14] These updated recommendations built on previous models by including specific time frames (eg, $<$10 days or $>$10 days after injury) to provide specified academic adjustments based on symptom phenotype.[14] For example, the National Collegiate Athletic Association (NCAA)[17] recommended a graduated RTL protocol predicated on concussion-related symptoms. As evidence continues to emerge regarding cognitive rest and the potential benefits of RTL progressions, these recommendations will be further refined.

Regardless of academic setting, academic support throughout SRC recovery may be based on a letter from a health care provider recommending academic adjustments or implementation of a formal 504 plan or IEP.[15] Academic adjustments should be individualized based on the presence of 1 or more symptoms and may include excused absences, rest periods throughout the class or day, extensions on assignments or postponement or staggering of examinations, negating of tests or assignments (eg, to be replaced at a later time with an academically equivalent activity), extra time to complete an assignment or test, adjustment of lighting or noise, use of a note taker or reader, and preferential seating.[8] Unfortunately, requests for academic accommodations via a health care provider's letter are not legally binding,[15] and facilitating or implementing such requests may become the responsibility of the AT, educator, or administrator. For symptoms persisting 14 to 28 days, an academic accommodation, such as a 504 plan or IEP, may be necessary.[2,15,18] A 504 plan is legally binding and is designed to give any person with a disability equal opportunity to that of his or her peers.[15] An IEP is also legally binding, requiring a formal evaluation by a psychologist or other qualified health care provider, and is intended to provide the student with educational resources (eg, notes in advance of class) exceeding those in the regular curriculum.[15]

Athletic trainers are often positioned as primary health care providers responsible for managing athletes with SRCs. According to the High School Reporting Information Online injury-surveillance system, ATs were responsible for assessing 94.4% of all recorded concussions, which accounted for 46.2% of RTP decisions.[19] More recently, Williams et al[11] sought to determine AT familiarity with, and perceptions of, academic accommodations specific to the secondary school setting. Most surveyed ATs agreed (23.9%) or strongly agreed (71.9%) that the AT should be part of the academic support team in the event of an SRC. Whereas this study provided insight into the attitudes and beliefs about cognitive recovery among practicing SSATs, the cohort consisted of both full-time and clinic-outreach ATs in the secondary school setting, which may have influenced familiarity with academic accommodations at an institutional level. Currently, no researchers have compared RTL practices of SSATs and collegiate ATs (CATs).

Therefore, the purpose of our study was to compare RTL management knowledge, current clinical practices, and available resources of SSATs and CATs. We hypothesized that CATs, regardless of setting, would have similar levels of knowledge regarding concepts related to returning a student-athlete to the classroom after an SRC and that they would have greater access to resources to assist with their RTL policies than SSATs. We also hypothesized that, regardless of academic setting, ATs would believe they play a valuable role in the RTL process for concussed student-athletes.

METHODS

Instrument Development

To address the hypotheses of this study, we developed a novel survey instrument that consisted of 4 RTL domains: demographics, current knowledge, current practice, and available resources. The survey instrument consisted of structured items within each domain (eg, *true* or *false*, *yes* or *no*, multiple choice, Likert scale). For Likert-scale items, responses were reweighted to ensure the validity of each response. For example, within the current practices domain, an item ranking of 5 indicated *strongly agree*, whereas in a different domain, 5 represented *strongly disagree*.

Where appropriate, individual items were created, modified, or both to specifically address the secondary school or collegiate setting. Therefore, we created 2 surveys, which consisted of 40 and 41 items, with 7 modified items specific to the secondary school or collegiate setting, respectively. For example, the secondary school version asked about the AT's access to a school counselor, whereas the collegiate version asked about the AT's access to a learning specialist. To assess item construction, comprehension, and ease of completion, a convenience sample of 16 ATs (5 SSATs, 11 CATs) completed a paper-and-pencil version of the survey instrument. The survey was modified based on their written and oral feedback to increase item clarity. Next, the revised survey instrument was sent to an external expert committee comprising a neuropsychologist, a neurologist, and an AT who had expertise in SRC related to RTL and cognitive rest. The expert committee reviewed the survey for content (face) validity and provided written feedback. Based on the expert committee's comments, additional survey modifications were made. After revision, the survey instrument was formatted within SurveyMonkey (Palo Alto, CA) and administered via e-mail link to a small convenience sample ($n = 16$) of ATs so that we could further refine either the content or SurveyMonkey format if needed. Approximately 68.8% ($n = 11$) of the ATs worked in the collegiate setting, whereas 31.3% ($n = 5$) worked in the secondary school setting. Internal consistency was assessed for all Likert-scale items using the Cronbach α and deemed acceptable for the secondary school ($\alpha = 0.49$) and collegiate ($\alpha = 0.63$) versions of the survey. The analyzed items were largely subjective; therefore, the lower values of internal consistency observed were deemed acceptable. The final version of the survey took approximately 15 minutes to complete and consisted of demographic (11 items), current knowledge (6 items), current practice (18 items), and available resources (6 items) domains (Tables 1 through 3).

Procedures

A convenience sample of ATs employed in the secondary school or collegiate setting ($n = 4000$) was requested from and selected at random by the NATA. The randomly selected participants represented all 10 NATA districts. Participant anonymity was maintained via the NATA's withholding participants' e-mail addresses. In addition, any participants who had the same e-mail domain as another participant (eg, @virginia.edu) were not selected. This selection process was used to avoid multiple responses from clinicians at the same institution to limit bias. The final survey was distributed online through SurveyMonkey. A cover letter was sent to ATs via e-mail explaining the purpose, importance, and estimated time to complete the survey. They also had the option to enter a drawing for one of two $50 Amazon gift cards upon survey completion. The ATs were allotted 6 weeks to respond (March–April 2015) and were provided with weekly reminders sent by the NATA, which also sent biweekly follow-up e-mails to eligible participants to encourage survey completion. We assumed completion of the survey was acknowledgment of consent. The University of Virginia's Institutional Review Board for Social and Behavioral Sciences approved the study.

Data Processing

Data were exported from SurveyMonkey to an Excel (version 2013; Microsoft Corp, Redmond, WA) spreadsheet and assessed for valid responses. We considered responses valid if all domains of the survey instrument were fully completed. Therefore, respondents who exited early or did not complete the demographics domain (the final domain) were excluded from the final analysis.

Statistical Analysis

Descriptive statistics were reported for each item in the 4 survey domains. When appropriate, we performed χ^2 tests to analyze Likert and dichotomous response items in each domain and compare responses from SSATs and CATs. The Cramér V was used to calculate effect sizes, which were interpreted as *small* (0–0.29), *medium* (0.30–0.49), or *large* ($\geq$0.50).[20] Means and standard deviations were reported for respondent demographics. Additional analyses were performed using independent-samples *t* tests to assess the number of years since certification of respondents and the number of concussions evaluated each year. These analyses were conducted to ensure that respondents were indeed evaluating SRCs in their clinical practices and that, if differences were observed in responses related to knowledge or current practices, they were not because of time since certification. We used descriptive statistics to calculate response rates (%) for each domain for the SSATs and CATs, as well as the overall response rate for each item. The α level was set at $\leq$.05. All statistical analyses were conducted using SPSS (version 20.0; IBM Corp, Armonk, NY).

RESULTS

Response Rate

A total of 801 SSATs, 435 CATs, and 27 *other* ATs responded, for an initial response rate of 31.6% ($n = 1263$).

Table 1. Respondent Demographics (Domain 1)[a]

Item	ATs, No. (%)[b]		
	Secondary School (n = 729)	Collegiate (n = 354)	Total (n = 1083)
What best describes your current position/job title?			
Assistant AT	52 (7.1)	146 (41.2)	198 (18.3)
Associate AT	23 (3.2)	28 (7.9)	51 (4.7)
Clinical assistant AT	2 (0.3)	2 (0.6)	4 (0.4)
Graduate assistant AT	4 (0.5)	13 (3.7)	17 (1.6)
Head athletic AT	619 (84.9)	153 (43.2)	772 (71.3)
Intern athletic AT	29 (4.0)	4 (1.1)	33 (3.0)
Other	0 (0.0)	8 (2.3)	8 (0.7)
Based on your last response, which best describes your setting?[c]			
College			
Division I	NA	97 (27.4)	NA
Division II	NA	68 (19.2)	NA
Division III	NA	82 (23.2)	NA
National Association of Intercollegiate Athletics	NA	42 (11.9)	NA
Community/junior college	NA	62 (17.5)	NA
Other	NA	3 (0.8)	NA
Which best describes your setting?[d]			
Private high school and clinic	10 (1.4)	NA	NA
Private high school, full time	108 (14.8)	NA	NA
Private high school, part time	19 (2.6)	NA	NA
Public high school and clinic	48 (6.6)	NA	NA
Public high school, full time	459 (63.0)	NA	NA
Public high school, part time	84 (11.5)	NA	NA
Other	1 (0.1)	NA	NA
What is your highest completed level of education?			
Bachelor's degree	234 (32.1)	39 (11.0)	272 (25.1)
Graduate degree	487 (66.8)	300 (84.7)	787 (72.7)
PhD	4 (0.5)	11 (3.1)	15 (1.4)
Other	4 (0.5)	4 (1.1)	8 (0.7)

Abbreviation: AT, athletic trainer; NA, not applicable.

[a] All valid responses were analyzed, and only completed surveys were considered valid.
[b] Percentages were rounded, so totals may not equal 100%.
[c] This item was included on the collegiate version of the survey.
[d] This item was included on the secondary school version of the survey.

Participant responses from those who did not meet the inclusion criteria, provided incomplete responses, or exited the survey prematurely were excluded (Figure 1). A total of 1083 (27.1%) completed surveys were analyzed; respondents consisted of 729 SSATs (67.3%) and 354 CATs (32.7%) representing all 50 states, the District of Columbia, and each NATA district.

Demographics

Data for the demographics domain are presented in Table 1. Most SSATs were primarily employed as head ATs (84.9%, n = 619) in a full-time public school position (63.0%, n = 459) and had been certified for an average of 14.0 ± 9.7 years. The CATs were most often employed as head (43.2%, n = 153) or assistant (41.2%, n = 146) ATs in an NCAA Division I setting (27.4%, n = 97) and had been certified for an average of 13.4 ± 9.7 years. We did not observe a difference in years certified between SSATs and CATs ($t_{1080} = -0.97$, $P = .33$). Men and women composed similar proportions of the sample for SSATs (men = 47.9%, n = 349; women = 51.4%, n = 375) and CATs (men = 49.7%, n = 176; women = 48.9%, n = 173). Overall, SSATs reported evaluating more SRCs than CATs ($\chi^2_4 = 159.96$, $P < .001$, Cramér V = 0.38; Figure 2).

Most SSATs (59.5%, n = 434) and CATs (65.8%, n = 233) had been certified through an accredited undergraduate-level athletic training program. The majority of respondents also held a graduate degree (SSATs = 66.8%, n = 487; CATs = 84.7%, n = 300). Most respondents reported providing clinical coverage for high- and low-risk sports.

Current Knowledge

Complete results for the current knowledge domain are reported in Figure 3. For this domain, 41.2% (n = 446) of total respondents correctly indicated the absence of evidence-based guidelines for RTL after a concussion. More specifically, a higher percentage of CATs than SSATs correctly identified the absence of evidence-based RTL guidelines (n = 1083, $\chi^2_1 = 6.40$, $P = .01$, Cramér V = 0.08). No differences were found between SSATs and CATs (Cramér V = 0.05, $P = .10$) for correctly recognizing that ATs were allowed to recommend academic adjustments for

Table 2. Current Practice (Domain 3)[a] Continued on Next Page

Item	ATs, No. (%)[b] Secondary School (n = 729)	Collegiate (n = 354)	Total (n = 1083)	χ^2 Value	*P* Value	Cramér V Value
Does your current concussion-management plan have an established return-to-learn policy or protocol?				18.92	<.001[c]	0.06
Yes	568 (77.9)	232 (65.5)	800 (73.9)			
No	161 (22.1)	122 (35.4)	283 (26.1)			
Does your current concussion-management plan include the mention of academic adjustments or modifications?				4.19	.04[c]	0.06
Yes	628 (86.1)	288 (81.4)	916 (84.6)			
No	101 (13.9)	66 (18.6)	167 (15.4)			
Have you ever provided academic accommodations for a student-athlete following a concussion?				13.02	<.001[c]	0.11
Yes	619 (84.9)	328 (92.7)	947 (87.4)			
No	110 (15.1)	26 (7.3)	136 (12.6)			
Who makes up your sports medicine team?[d]				NA	NA	NA
AT	729 (100.0)	354 (100.0)	1083 (100.0)			
Counselor	342 (46.9)	98 (27.7)	440 (40.6)			
Learning specialist	74 (10.2)	67 (18.9)	141 (13.0)			
Neurologist/neurosurgeon	119 (16.3)	76 (21.5)	195 (18.0)			
Neuropsychologist	103 (14.1)	46 (13.0)	149 (13.8)			
Nutritionist	19 (2.6)	57 (16.1)	76 (7.0)			
Orthopaedic surgeon	314 (43.1)	226 (63.8)	540 (49.9)			
Pediatrician/family medicine	315 (43.2)	123 (34.7)	438 (40.4)			
School nurse[e]	484 (66.4)	NA	NA			
School psychologist	110 (15.1)	76 (21.5)	186 (17.2)			
Team physician	529 (72.6)	312 (88.1)	841 (77.7)			
Does someone on your sports medicine team provide academic accommodations?				13.57	<.001[c]	0.11
Yes	579 (79.4)	245 (69.2)	824 (76.1)			
No	150 (20.6)	109 (30.8)	259 (23.9)			
Following a concussion, has a student-athlete ever requested academic accommodations?				20.86	<.001[c]	0.14
Yes	562 (77.1)	314 (88.7)	876 (80.9)			
No	167 (22.9)	40 (11.3)	207 (19.1)			
Does your sports medicine team have a relationship with any department similar to the disability resources department?				129.13	<.001[c]	0.35
Yes	248 (34.0)	250 (70.6)	498 (46.0)			
No	481 (66.0)	104 (29.4)	585 (54.0)			
Do you personally feel, as the AT, you should be involved in the return-to-learn process?				0.77	.38	0.03
Yes	644 (88.3)	319 (90.1)	963 (88.9)			
No	85 (11.7)	35 (9.9)	120 (11.1)			
Managing the return-to-learn process for all student-athletes who have sustained a concussion is one of your roles as an AT.				6.52	.01[c]	0.08
Strongly agree	268 (36.8)	116 (32.8)	384 (35.5)			
Agree	277 (38.0)	171 (48.3)	448 (41.4)			
Neutral	87 (11.9)	38 (10.7)	125 (11.5)			
Disagree	74 (10.2)	21 (5.9)	95 (8.8)			
Strongly disagree	23 (3.2)	8 (2.3)	31 (2.9)			
Prior to starting the exercise component of a return-to-play protocol following a concussion, student-athletes must be able to participate in the classroom without restrictions.				4.00	.05	0.06
Strongly agree	380 (52.1)	137 (38.7)	517 (47.7)			
Agree	229 (31.4)	133 (37.6)	362 (33.4)			
Neutral	65 (8.9)	46 (13.0)	111 (10.2)			
Disagree	42 (5.8)	35 (9.9)	77 (7.1)			
Strongly disagree	13 (1.8)	3 (0.8)	16 (1.5)			
I follow the NCAA[17] return-to-learn guidelines.				41.89	<.001[c]	0.28
Strongly agree	70 (9.6)	79 (22.3)	149 (13.8)			
Agree	140 (19.2)	124 (35.0)	264 (24.4)			
Neutral	407 (55.8)	127 (35.9)	534 (49.3)			
Disagree	71 (9.7)	17 (4.8)	88 (8.1)			
Strongly disagree	41 (5.6)	7 (2.0)	48 (4.4)			
Who has a say in the student-athlete returning to the classroom after a concussion?[d]				NA	NA	NA
Student-athlete	389 (53.4)	248 (70.1)	637 (58.8)			
Parent	490 (67.2)	30 (8.5)	520 (48.0)			
Academic advisor[f]/teacher[e]	219 (30.0)	109 (30.8)	328 (30.3)			
AT	442 (60.6)	271 (76.6)	713 (65.8)			
Physician	668 (91.6)	306 (86.4)	974 (89.9)			
Other	136 (18.7)	41 (11.6)	177 (16.3)			

Table 2. Continued From Previous Page

Item	ATs, No. (%)[b] Secondary School (n = 729)	Collegiate (n = 354)	Total (n = 1083)	χ^2 Value	*P* Value	Cramér V Value
Who has a say in the student-athlete returning to physical activity after a concussion?[d]				NA	NA	NA
Student-athlete	193 (26.4)	110 (31.1)	303 (28.0)			
Parent	223 (30.6)	13 (3.7)	236 (21.8)			
Academic advisor[f]/teacher[e]	33 (4.5)	3 (0.8)	36 (3.3)			
AT	672 (92.2)	334 (94.4)	1006 (92.9)			
Physician	700 (96.0)	337 (95.2)	1037 (95.8)			
Other	47 (6.4)	14 (4.0)	61 (5.6)			
Following a concussion, a student-athlete should have access to academic accommodations.				NA	NA	NA
Strongly agree	474 (65.0)	209 (59.0)	683 (63.1)			
Agree	238 (32.6)	141 (39.8)	379 (35.0)			
Neutral	17 (2.3)	4 (1.1)	21 (1.9)			
Disagree	0 (0.0)	0 (0.0)	0 (0.0)			
Strongly disagree	0 (0.0)	0 (0.0)	0 (0.0)			
A student-athlete with a musculoskeletal injury (eg, casted dominant arm) should have access to academic accommodations.				7.46	.006[c]	0.09
Strongly agree	276 (37.9)	153 (43.2)	429 (39.6)			
Agree	366 (50.2)	170 (48.0)	536 (49.5)			
Neutral	56 (7.7)	27 (7.6)	83 (7.7)			
Disagree	25 (3.4)	4 (1.1)	29 (2.7)			
Strongly disagree	6 (0.8)	0 (0.0)	6 (0.6)			
A student-athlete with a concussion should have the same access to academic accommodations as a student with any other musculoskeletal injury.				2.61	.11	0.05
Strongly agree	368 (50.5)	185 (52.3)	553 (51.1)			
Agree	247 (33.9)	125 (35.3)	372 (34.3)			
Neutral	36 (4.9)	17 (4.8)	53 (4.9)			
Disagree	60 (8.2)	23 (6.5)	83 (7.7)			
Strongly disagree	18 (2.5)	4 (1.1)	22 (2.0)			
There is no need to follow a stepwise progression in returning a student-athlete to the classroom following a concussion.				4.95	.03[c]	0.07
Strongly agree	9 (1.2)	5 (1.4)	14 (1.3)			
Agree	10 (1.4)	13 (3.7)	23 (2.1)			
Neutral	57 (7.8)	39 (11.0)	96 (8.9)			
Disagree	277 (38.0)	166 (46.9)	443 (40.9)			
Strongly disagree	376 (51.6)	131 (37.0)	507 (46.8)			
I am comfortable delaying the return-to-play progression until a student-athlete with a concussion is completely symptom free.				0.06	.81	0.01
Strongly agree	571 (78.3)	253 (71.5)	824 (76.1)			
Agree	130 (17.8)	83 (23.4)	213 (19.7)			
Neutral	15 (2.1)	11 (3.1)	26 (2.4)			
Disagree	8 (1.1)	5 (1.4)	13 (1.2)			
Strongly disagree	5 (0.7)	2 (0.6)	7 (0.6)			
I am comfortable delaying the return-to-play progression until a student athlete with a concussion is completely symptom free following an unrestricted, full day of classroom activities.				5.60	.02[c]	0.08
Strongly agree	453 (62.1)	161 (45.5)	614 (56.7)			
Agree	218 (29.9)	138 (39.0)	356 (32.9)			
Neutral	41 (5.6)	38 (10.7)	79 (7.3)			
Disagree	17 (2.3)	15 (4.2)	32 (3.0)			
Strongly disagree	0 (0.0)	2 (0.6)	2 (0.2)			

Abbreviations: AT, athletic trainer; NA, not applicable; NCAA, National Collegiate Athletic Association.

[a] The instrument is presented in its original form. All valid responses were analyzed, and only completed surveys were considered valid.

[b] Percentages were rounded, so totals may not equal 100%.

[c] Different ($P < .05$).

[d] Percentages for this item may be >100% because participants could select all that applied.

[e] This item was included on the secondary school version of the survey.

[f] This item was included on the collegiate version of the survey.

concussed student-athletes during acute recovery. Most respondents (92.0%, n = 996) correctly agreed that NCAA[17] RTL guidelines were posted online. Most SSATs (86.6%, n = 631) correctly noted that the acute concussion evaluation care plan for returning injured athletes to school was available online.[21] A higher percentage of CATs than SSATs correctly observed that letters of academic accommodations were not legally binding (n = 1083, $\chi^2_1 = 45.19$, $P < .001$, Cramér V = .20). Only 30.6% (n = 331) of total ATs responded correctly to this item.

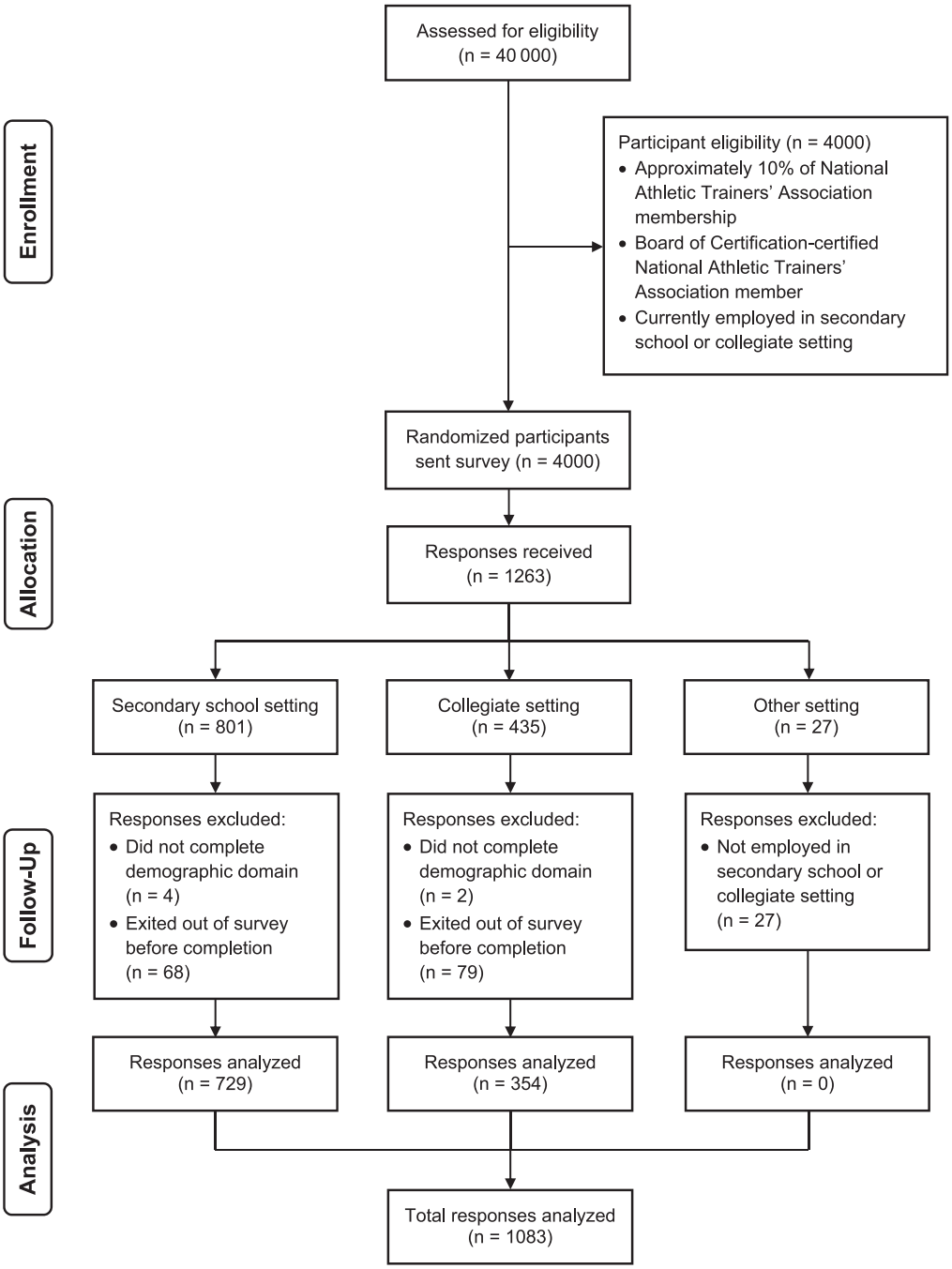

Figure 1. Consolidated Standards of Reporting Trials (CONSORT) diagram.

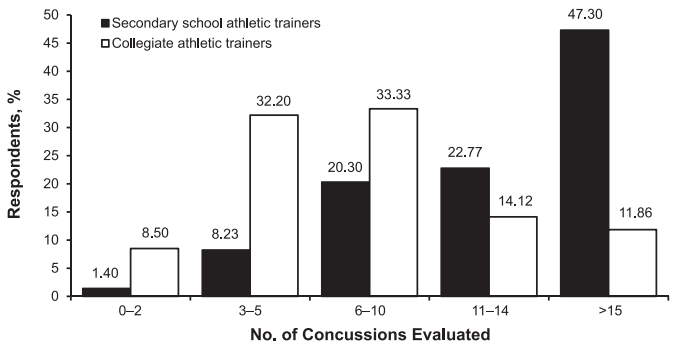

Figure 2. The number of concussions assessed by secondary school and collegiate athletic trainers.

Current Practice

For the current practices domain, 76.8% (n = 832) of all respondents agreed or strongly agreed that managing the RTL process was one of their roles as an AT (Table 2). Similarly, equal proportions of SSATs (88.3%, n = 644) and CATs (90.1%, n = 319) believed they should be involved in the RTL process ($P = .38$). A total of 73.9% (n = 800) of respondents had an RTL protocol in their current concussion-management plan. However, only 38.1% (n = 413) of total respondents followed the NCAA RTL guidelines. A higher percentage of CATs (57.3%, n = 203) than SSATs (28.8%, n = 210) agreed or strongly agreed with adhering to the NCAA[17] RTL guidelines (n =

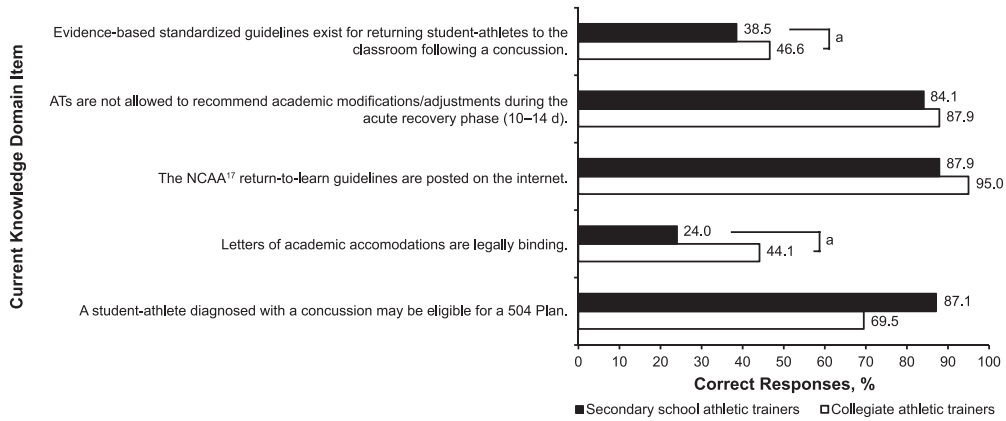

Figure 3. Current knowledge of secondary school and collegiate athletic trainers (ATs) as indicated by the percentage of correct responses (*true* or *false*) in the knowledge domain. Abbreviation: NCAA, National Collegiate Athletic Association. [a] $P < .05$.

Table 3. Available Resources (Domain 4)[a]

Item	Athletic Trainers, No. (%)[b]			χ^2	*P* Value	Cramér V
	Secondary School (n = 729)	Collegiate (n = 354)	Total Response (n = 1083)			
Is there an office where student-athletes who have learning disabilities can go?				NA	NA	NA
Yes	557 (76.4)	291 (82.2)	848 (78.3)			
No	66 (9.1)	16 (4.5)	82 (7.6)			
Unsure	106 (14.5)	47 (13.3)	153 (14.1)			
Do you have access to a learning specialist?[c]				NA	NA	NA
Yes	NA	194 (54.8)	NA			
No	NA	57 (16.1)	NA			
Unsure	NA	103 (29.1)	NA			
Do you have access to a school counselor?[d]				NA	NA	NA
Yes	708 (97.1)	NA	NA			
No	11 (1.5)	NA	NA			
Unsure	10 (1.4)	NA	NA			
Do you have access to a neuropsychologist?				4.42	.11	0.06
Yes	265 (36.4)	152 (42.9)	417 (38.5)			
No	347 (47.6)	154 (43.5)	501 (46.3)			
Unsure	117 (16.0)	48 (13.6)	165 (15.2)			
Do you have access to a school[d] psychologist?[c]				51.58	<.001[e]	0.22
Yes	404 (55.4)	275 (77.7)	679 (62.7)			
No	198 (27.2)	55 (15.5)	253 (23.4)			
Unsure	127 (17.4)	24 (6.8)	151 (13.9)			
If you have accessed any of these professionals for a student-athlete with a concussion, please select all of which you have used previously.[f]				NA	NA	NA
School counselor[d]	519 (71.2)	NA	NA			
Learning specialist[c]	NA	106 (29.9)	NA			
Neuropsychologist	233 (32.0)	133 (37.6)	NA			
(School[d]) psychologist[c]	195 (26.7)	127 (35.9)	322 (29.7)			
I have never accessed any of these professionals for a student-athlete with a concussion.	156 (21.4)	131 (37.0)	287 (26.5)			

Abbreviation: NA, not applicable.

[a] The instrument is presented in its original form. All valid responses were analyzed, and only completed surveys were considered valid.

[b] Percentages were rounded, so totals may not equal 100%.

[c] This item was included on the collegiate version of the survey.

[d] This item was included on the secondary school version of the survey.

[e] Different ($P < .05$).

[f] Percentages for this item may be >100% because participants could select all that applied.

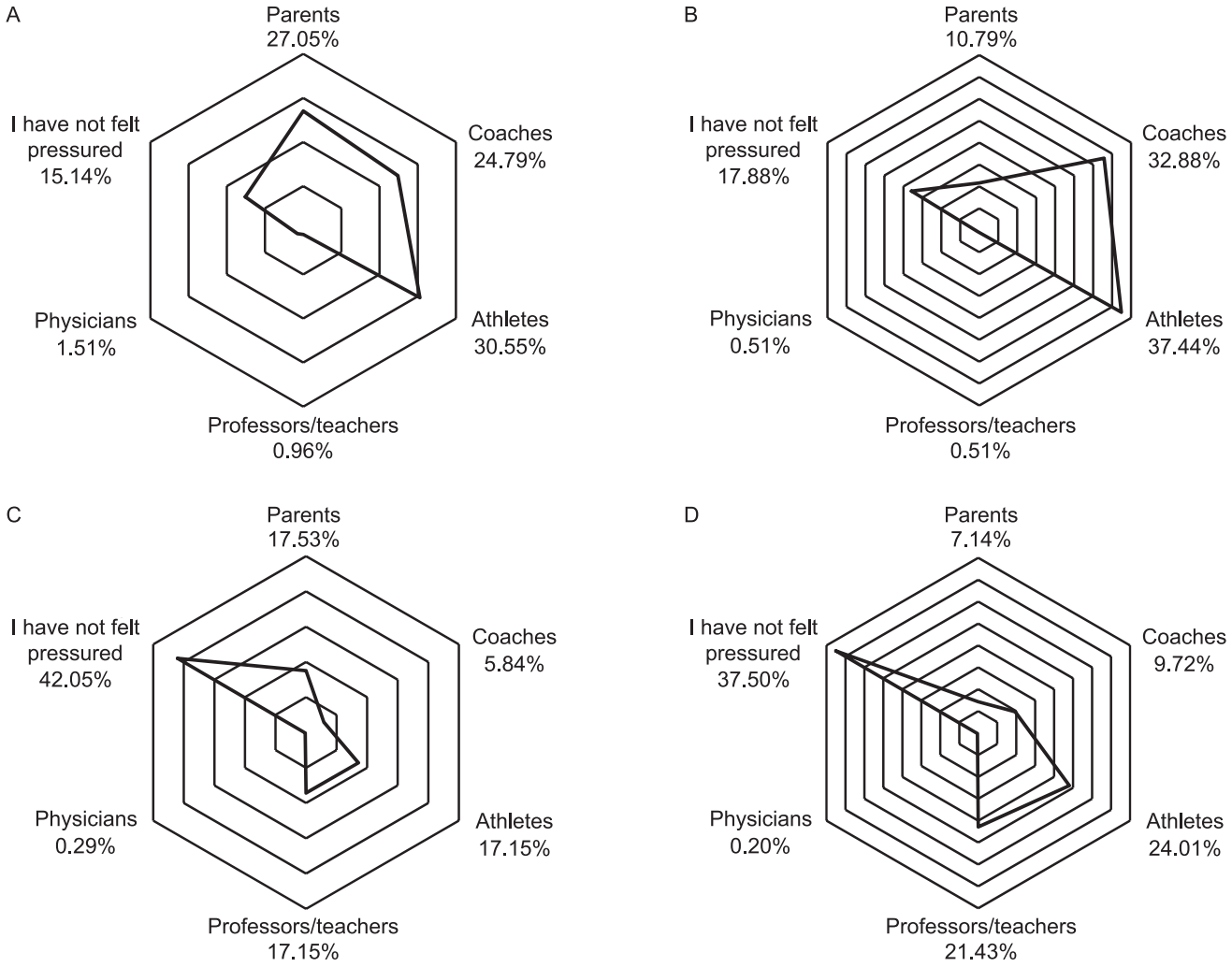

Figure 4. Pressure perceived by secondary school and collegiate athletic trainers. A, Perceived pressure to return secondary school student-athletes to physical activity. Graph range = 0%–40%. B, Perceived pressure to return collegiate student-athletes to physical activity. Graph range = 0%–40%. C, Perceived pressure to return secondary school student-athletes to the classroom. Graph range = 0%–50%. D, Perceived pressure to return collegiate student-athletes to the classroom. Graph range = 0%–40%.

549, $\chi^2_1 = 41.9$, $P < .001$, Cramér V = 0.28). Whereas nearly one-third of total respondents did not include an RTL protocol, most (84.6%, n = 916) did address academic adjustments after an SRC in their concussion-management plan, and a greater percentage of SSATs (86.1%, n = 628) did so than CATs (81.4%, n = 288, $\chi^2 = 4.19$, $P = .04$, Cramér V = 0.06). A similar proportion of the total number of surveyed ATs (87.4%, n = 947) had provided academic accommodations for a concussed student-athlete in their clinical practice. Interestingly, a higher percentage of CATs (88.7%, n = 314) than SSATs (77.1%, n = 562) had had a student-athlete request academic accommodations after a diagnosed SRC ($\chi^2 = 20.86$, $P < .001$, Cramér V = 0.14). The complete item responses for the current practice domain are reported in Table 2.

Of the total respondents, 98.1% (n = 1062) indicated that concussed student-athletes should have access to academic accommodations, and 81.2% (n = 879) noted that full participation in classroom activities should precede a physical progression when recovering from SRC. Most respondents (89.6%, n = 970) were comfortable delaying the RTP progression until a concussed student-athlete was symptom free after a full day of unrestricted classroom activity. Most SSATs (60.2%, n = 439) reported not feeling pressured to return student-athletes to classroom activities. The most commonly reported sources of pressure are presented in Figure 4.

Available Resources

Complete item responses for the available resources domain are reported in Table 3. Most SSATs (76.4%, n = 557) and CATs (82.2%, n = 291) had a disability resource center or secondary school equivalent located on campus. Nearly all SSATs (97.1%, n = 708) had access to a school counselor, whereas more than half (54.8%, n = 194) of CATs had access to a learning specialist to assist concussed student-athletes with academic adjustments or accommodations after an SRC. A minority of respondents (38.5%, n = 417) had access to a neuropsychologist, which was similar between employment settings ($\chi^2 = 4.42$, $P = .11$, Cramér V = 0.06). In contrast, fewer SSATs (55.4%, n = 404) than CATs (77.7%, n = 275) had access to a school psychologist to whom they could refer student-athletes experiencing

academic difficulty after an SRC ($\chi^2 = 51.58$, $P < .001$, Cramér V = 0.22). Despite their reported availability, 21.4% (n = 156) of SSATs and 37.0% (n = 131) of CATs had never accessed a school counselor, learning specialist, neuropsychologist, or psychologist when managing a student-athlete with an SRC. When seeking assistance in managing a concussed student-athlete, SSATs most commonly accessed school counselors (71.2%, n = 519), neuropsychologists (32.0%, n = 233), or school psychologists (26.7%, n = 195). In contrast, CATs most commonly accessed neuropsychologists (37.6%, n = 133), psychologists (35.9%, n = 127), or learning specialists (29.9%, n = 106).

DISCUSSION

As of 2016, 6 survey-based studies in which researchers had investigated concussion assessment and management for student-athletes, ATs, Commission on Accreditation of Athletic Training Education program directors, and school nurses had been published.[11,22–26] We addressed multiple factors in RTL management, including current knowledge, current practices, and available resources of practicing SSATs and CATs. Most surveyed ATs agreed that RTL management was in the scope of their practice and recognized their roles in implementing academic adjustments for concussed student-athletes. When compared with CATs, a higher percentage of SSATs reported implementing an RTL policy to assist concussed student-athletes in their recovery. However, we identified a notable knowledge gap in the existence of evidence-based RTL guidelines and legal considerations associated with academic adjustments for secondary school and collegiate student-athletes with SRC.

Current Knowledge

Our participants self-identified as being knowledgeable about academic accommodations after SRC. However, our results suggested that respondents were not fully aware of the concepts associated with academic accommodations. Yet most agreed that concussed student-athletes should have access to such accommodations. Williams et al[11] surveyed SSATs to assess familiarity, beliefs, and attitudes about academic accommodations for student-athletes after SRC. When referencing the Americans with Disabilities Act, the authors[11] reported that 82% of SSATs believed concussed student-athletes were eligible for academic accommodations after an SRC, consistent with our findings. Most surveyed SSATs were also aware of existing RTL guidelines and correctly identified their role in facilitating academic accommodations, such as via a 504 plan or IEP. Our results were similar to those of Williams et al,[11] as 81.3% of our respondents correctly identified a concussed student-athlete as eligible for a 504 plan. Nevertheless, up to approximately 30% of respondents were unaware that this academic accommodation was an option available to assist injured student-athletes.

Approximately one-third of surveyed SSATs and CATs incorrectly identified academic-accommodations letters as legally binding. According to the Children's Healthcare of Atlanta concussion consensus statement,[15] letters of academic accommodations from a physician are merely a tool intended to prompt the use of established recommendations and are not legally binding. Whereas a letter from a treating physician may help facilitate academic accommodations for a concussed student-athlete, ATs should not rely on this documentation alone. A survey[27] of secondary school nurses indicated that letters requesting academic accommodations were received primarily from parents. A minority of letters were received from physicians, coaches, and teachers.[27] This finding emphasizes that ATs should not rely solely on a physician's request to make academic accommodations for a concussed student-athlete. In the absence of a physician's note, ATs may rely on a variety of resources, including letter templates from the American Academy of Pediatrics,[28] the Centers for Disease Control and Prevention,[29] and others,[30] to facilitate education and communication with teachers or professors, counselors, psychologists, nurses, social workers, school administrators or physicians (or both), neuropsychologists, faculty athletics representatives, college administrators, office of disability services representatives, and coaches.[2,31]

More than half of surveyed ATs, regardless of setting, incorrectly thought standardized, evidence-based RTL guidelines existed. To date, standardized, evidence-based protocols or guidelines that detail the management of cognitive recovery and reintegration into the classroom of a concussed athlete do not exist.[1,13,15,18,32] *Evidence-based practice* has been defined as the "integration of the best research evidence with clinical expertise and patient values to make clinical decisions."[33] Whereas evidence-based cognitive recovery guidelines are lacking and their implementation is highly variable,[34] a 5-step RTL plan based on clinical experience is available to assist ATs at all levels of sport.[8] Given that most SSATs and CATs agreed or strongly agreed that a stepwise cognitive progression should be followed when returning a student-athlete to the classroom after SRC, this 5-step RTL plan may be an appropriate starting point for ATs to develop an RTL plan as empirical evidence continues to emerge.[26]

Current Practices

Our results suggested that substantial progress has been made in RTL clinical practices compared with previously published studies. Most respondents (73.9%) had an established RTL policy or protocol. For approximately 84.6% of participants, regardless of setting, academic modifications (eg, IEPs) or accommodations (eg, modification to the classroom environment or homework assignments) were a part of this plan. More specifically, 79.9% of SSATs had an established RTL policy or protocol in their concussion-management plan. In a similar 2016 survey,[26] 43.7% of SSATs reported having an RTL policy. These data demonstrate an increased emphasis on RTL concepts after SRC despite a limited number of available resources to help ATs develop protocols. The existence of a template or sample RTL protocol may facilitate the development of an RTL policy. The NCAA's[17] RTL guidelines provide a sample RTL protocol. Despite these recommendations, two-thirds of our total sample were neutral, disagreed, or strongly disagreed with adhering to the NCAA's[17] RTL guidelines. When isolating our results to CATs, more than half (57.3%) agreed or strongly agreed with adhering to the NCAA's[17] RTL recommendations. The remaining respondents (42.7%) were neutral about or disagreed with adhering to the NCAA's[17] recommendations. Whereas a limitation of our study was excluding

open-ended responses to address items such as this, one plausible explanation for CATs not adhering to the NCAA's[17] RTL recommendations is access to a greater variety of health care team members.

Regarding additional support, 20.6% of SSATs and 30.8% of CATs reported the absence of a health care team member to assist in providing academic accommodations. In the absence of an additional health care team member, most SSATs (84.9%) and CATs (92.7%) were responsible for making return-to-classroom decisions, which was consistent with the literature.[26] Additional health care team members would most likely benefit the CAT in designing an RTL policy and facilitating academic modifications based on available resources. Related to this point, up to 17.4% of SSATs and 29.1% of CATs were unsure of the presence of 1 or more additional support personnel on their respective campuses to assist with an RTL policy. In agreement with this finding, fewer SSATs than CATs reported not having accessed a health care professional or department similar to a disability resource department. These CATs and SSATs should explore their available resources, such as a disability resource department or similar option, to potentially expand their RTL team and provide better care for concussed student-athletes. In addition to supplementary professional items, letter templates, videos, and other resources can help ATs communicate with and educate stakeholders about SRC and better facilitate RTL guidelines. Even when ATs have the appropriate health care team support, they may perceive a lack of authority to implement the changes related to recommended guidelines.[24] This may be especially true within the collegiate setting, where ATs may perceive they have limited authority or control, or both, to institute academic adjustments. Given that incorporation of RTL policies into a concussion-management protocol is now commonly recommended,[1,12] ATs who self-identified in our study as leaders of RTL protocol and policy development should use this evidence to advocate for their concussed secondary school or collegiate student-athletes.

Whereas SSATs and CATs described being primarily responsible for RTL decision making, respondents also identified a variety of other individuals (eg, the student-athlete, parents, academic advisor, teachers or faculty, other ATs, physicians, neuropsychologists, school psychologists) who assisted in returning students to the classroom. Creating and implementing an RTL policy or protocol is critical for managing concussed student-athletes and facilitating communication among all stakeholders. McGrath[8] suggested that academic support during a concussed student-athlete's recovery was necessary to balance rest with academics and encouraged an individualized plan for each injured athlete using a team-based approach. In a retrospective study, Baker et al[35] investigated factors likely to be associated with difficulty in reintegrating concussed pediatric student-athletes into the classroom. The authors observed that symptom burden, which varies highly from one student-athlete to another, was weighted heavily as being problematic when returning to the classroom. An increased awareness of a student's specific symptom phenotype by those involved in his or her recovery (eg, school nurse, staff, guidance counselors, teachers, and parents) may facilitate a more rapid and full recovery. As with any medical care, to improve patient outcomes, the RTL and RTP teams should consider a team "huddle"[36,37] or "time-out"[38] to facilitate effective communication about athletes who experience prolonged symptoms after their injuries. Team huddles or time-outs are designed to increase communication among stakeholders before or in response to patient care and have been demonstrated to improve patient outcomes.[36,37] A meeting of the RTL team before and after implementing academic modifications, accommodations, or both may help ATs refine the RTL policy and improve patient outcomes.

Unique to our study was that most of the surveyed ATs (80.9%) noted that student-athletes had requested academic accommodations (eg, temporary classroom environment or coursework alterations) after an SRC. This finding suggests a cultural change in the expectations of concussed student-athletes. These different expectations may result from increased concussion education and awareness of the injury and potential consequences (eg, prolonged recovery) associated with mismanagement.[39–41] Ransom et al[10] proposed that student-athletes with a higher scholastic load (eg, academic credit hours) need more support than those with a lower academic load. This may explain the observed 11.6% difference between the requests for academic accommodations in the secondary and collegiate settings. Student-athletes with a greater number of symptoms after an SRC are also most likely to need additional support to facilitate recovery from their injury.[35] Again, this finding emphasizes a potential disconnect between creating and implementing an RTL policy. For example, whereas student-athletes may start an RTL progression that has been suggested by multiple governing bodies,[17,28] they may face challenges when asking educators for academic accommodations. Our results indicated that student-athletes were limited in obtaining academic accommodations via communication with their educators; therefore, they requested assistance from ATs to facilitate the adjustments, regardless of the academic setting. Athletic trainers may consider writing a letter (Figure 5) to each of the injured student's faculty members to facilitate an individualized approach to reintegration into the classroom. Because the SSAT or CAT may be considered the "point person" for developing and implementing a concussion policy that includes the parent or guardian, student-athlete, and stakeholder education, ATs should theoretically be able to provide written communication requesting academic accommodations on the concussed student-athlete's behalf. This practice is also in line with more recent supplementary recommendations for complementing state legislation.[20] Furthermore, ATs should explore various mechanisms for educating school staff and faculty about concussion with an emphasis on RTL guidelines. Future researchers should examine the use of AT-recommended academic adjustments in the classroom by secondary school and collegiate faculty.

Most (88.9%) of our surveyed ATs believed they should be involved in the RTL process. With regard to making academic adjustments, Kasamatsu et al[26] reported that SSATs more often (28.9%) identified themselves as the "academic point person" than school counselors (17.2%) or school nurses or health clerks (11.9%). However, the manner in which they acted varied from published recommendations. For example, only 18.8% of respondents were neutral or disagreed that "a student-athlete must complete a full day within the classroom with no restrictions prior to beginning the exercise component of

Concussion Awareness Letter

The University of _____ Sports Medicine Department would like to inform you that _____ sustained a concussion during _____on __/__/__. He/she was evaluated by_____, team physician. _____ will undergo additional concussion testing. A concussion or mild traumatic brain injury can cause a variety of physical, cognitive, and emotional symptoms. Concussions range in significance from minor to major, but they all share one common factor — they temporarily interfere with the way your brain works. The majority of athletes diagnosed with a concussion will take up to 14 days to recover from their injury. We would like to inform you that during this time student-athletes diagnosed with a concussion may experience one or more of the following signs and symptoms and we would appreciate your consideration of any academic adjustments (such as those in parentheses below) to assist in your student in their recovery.

Highlight all that apply:

Headache (*e.g. dim lights, post notes on a shared academic website*)

Memory Problems (*e.g. postpone assignments/tests*)

Nausea (*e.g. allow student to arrive late/leave early*)

Difficulty Concentrating (*e.g. post-pone assignments/tests*)

Balance Problems (*e.g. excuse from class early*)

Noise Sensitivity (*e.g. allow the use of ear plugs*)

Dizziness (*e.g. excuse from class early*)

Difficulty Sleeping (*e.g. allow students to arrive late to class*)

Blurred vision (*e.g. post notes on shared academic website*)

Confusion (*e.g. postpone assignments/tests*)

Photophobia – Light Sensitivity (*e.g. dim lights, post notes on shared academic website*)

Feeling Sluggish or Groggy (*e.g. provide extra time to complete assignments/tests*)

As a medical team, we wanted to make you aware of this injury and the related symptoms that the student athlete may experience. Although the student is attending class, please be aware that the side effects of the concussion may adversely impact his/her academic performance for up to 14 days. Any considerations you may be able to provide academically during this time would be greatly appreciated. We will continue to monitor the progress of this student-athlete and anticipate a full recovery. Should you have any questions or require further information, please do not hesitate to contact us.

Thank you in advance for your time, understanding and any academic adjustment(s) you may provide.

Sincerely,

_____ _____

Team Physician or Athletic Health Care Provider — Date

_____ _____

Certified Athletic Trainer — Date

** Adapted from the University of Georgia and Virginia Concussion Awareness Letters

Figure 5. An example of a return-to-learn concussion-awareness letter. Letter presented in original format.

a[n] RTP protocol." This finding contradicts RTP progression recommendations after an SRC, which suggest an athlete must be symptom free before completing the latter stages of a graded exercise protocol.[1] If a student-athlete reports SRC symptoms after a full day at school, then he or she should not progress to the next step in the RTP protocol. Thus, standardized, evidence-based guidelines are needed. However, our study was conducted before the 5th International Conference on Concussion in Sport,[1] which expanded on this recommendation by suggesting that symptomatic student-athletes should not be engaged in active practice or returned to competition but may participate in activities specified in the earlier stages of an RTP protocol.

Another interesting result of our study was that ATs believed they received less pressure to return student-athletes to the classroom than to physical activity. This finding may reflect the relatively recent implementation of state legislation mandating the care of secondary school student-athletes suspected of having an SRC. It may also be associated with negative media coverage associated with premature RTP decisions. Our SSATs and CATs perceived

pressure primarily from the student-athletes to make RTP decisions. Whereas this finding was not entirely unexpected based on previous literature[42] addressing the rationale for the underreporting of concussions, it emphasizes the need for education and cultural change related to the expectations associated with SRC management. As with the aforementioned survey items, this result highlights the need for the AT and the entire RTL team to work with all stakeholders (via communication and education) to reduce any anxiety associated with time missed from the classroom and participation, which has been demonstrated to negatively affect recovery.[35]

Available Resources

The SSATs and CATs had varying degrees of access to supporting health care team members for assistance in managing RTL protocols for concussed student-athletes. Our results demonstrated that 38.5% of ATs had access to a neuropsychologist, which was consistent with the findings of similar studies.[22] Approximately one-third of CATs had accessed a learning specialist, a neuropsychologist, or a psychologist to assist in managing a concussed student-athlete. However, an additional one-third of CATs had never sought the services of these professionals to care for a student-athlete with an SRC. Buckley et al[24] investigated concussion-management–practice patterns of NCAA Division II and III ATs and reported major differences between Division I and Division II and III ATs that reflected staffing and budget variations. Our SSATs reported less access to various health care professionals, which most likely was due to budgetary concerns and limited resources. Most surveyed SSATs (71.2%) had accessed a school counselor; a minority stated they had accessed a neuropsychologist (32.0%) or school psychologist (26.7%). Given that school counselors are typical staff members in the secondary school setting, they theoretically would be the most likely candidates to assist an AT with an RTL protocol. In addition, approximately 10% fewer SSATs than CATs commented that they had not accessed these professionals to assist in managing SRC specific to the RTL process. Athletic trainers, regardless of academic setting, should investigate their access to all potential resources (eg, neuropsychologists, school counselors, and others) to assist in creating and implementing an RTL protocol.

Limitations

Our study had limitations. Whereas our respondents represented the entire United States and the District of Columbia, equal representation per state was not achieved. Therefore, geographic bias may have been introduced to obtain a greater total sample. Because ATs self-reported their roles and training, we assumed participants were familiar with the concept of RTL. If unfamiliar, respondents may have answered items based on their own definitions rather than established definitions from the literature. Given that 1 aspect of our study was to investigate ATs' knowledge related to RTL protocols, we believed that providing definitions of concepts, such as cognitive rest, might have skewed participant responses. Future researchers should aim to identify the most efficient mode and duration of cognitive rest and its interaction with physical activity during recovery. Finally, whereas several differences were observed between SSATs and CATs, most of our significant findings had small effect sizes. However, small effect sizes did not decrease the clinical relevance of our results because we identified several areas related to RTL policy development and implementation that should be considered by SSATs and CATs alike. By understanding the current state of RTL in the context of concussion management, clinicians and investigators can make strides toward implementing strategies to improve best practices. Taking these steps will inherently lead to creating evidence-based RTL consensus statements to be used by ATs and other health care professionals.

CONCLUSIONS

Overall and regardless of academic setting, the majority of ATs understood the importance of RTL as part of a concussion-management paradigm. Most respondents also identified themselves as leaders in creating and implementing RTL protocols or policies. Despite the absence of empirical evidence, most surveyed ATs, regardless of practice setting, incorporated some form of cognitive rest in their concussion-management protocol based on anecdotal evidence and clinical expertise. Our findings suggest that ATs should explore potentially accessible resources (eg, school counselors, school nurses, neuropsychologists) to establish an interdisciplinary approach to SRC management and improve the quality of care provided to concussed student-athletes. Our results also indicate that ATs should work to effectively communicate with and educate all stakeholders associated with reintegrating student-athletes into the classroom after SRC. Future study is needed to substantiate the best practices for developing and implementing RTL protocols to guide the clinical practice of ATs at the secondary school and collegiate levels of sport.

REFERENCES

1. McCrory P, Meeuwisse W, Dvorak J, et al. Consensus statement on concussion in sport: the 5th International Conference on Concussion in Sport held in Berlin, October 2016. *Br J Sports Med*. 2017;5(11):838–847.
2. Halstead ME, McAvoy K, Devore CD, et al. Returning to learning following a concussion. *Pediatrics*. 2013;132(5):948–957.
3. McCrory P, Meeuwisse WH, Echemendia RJ, Iverson GL, Dvorak J, Kutcher JS. What is the lowest threshold to make a diagnosis of concussion? *Br J Sports Med*. 2013;47(5):268–271.
4. Covassin T, Elbin RJ, Harris W, Parker T, Kontos A. The role of age and sex in symptoms, neurocognitive performance, and postural stability in athletes after concussion. *Am J Sports Med*. 2012;40(6):1303–1312.
5. Covassin T, Bay E. Are there gender differences in cognitive function, chronic stress, and neurobehavioral symptoms after mild-to-moderate traumatic brain injury? *J Neurosci Nurs*. 2012;44(3):124–133.
6. Collins MW, Lovell MR, Iverson GL, Cantu RC, Maroon JC, Field M. Cumulative effects of concussion in high school athletes. *Neurosurgery*. 2002;51(5):1175–1181.
7. Rozbacher A, Selci E, Leiter J, Ellis M, Russell K. The effect of concussion or mild traumatic brain injury on school grades, national examination scores, and school attendance: a systematic review. *J Neurotrauma*. 2017;34(14):2195–2203.
8. McGrath N. Supporting the student-athlete's return to the classroom after a sport-related concussion. *J Athl Train*. 2010;45(5):492–498.

9. Iverson GL, Gardner AJ, Terry DP, et al. Predictors of clinical recovery from concussion: a systematic review. *Br J Sports Med*. 2017;51(12):941–948.
10. Ransom DM, Vaughan CG, Pratson L, Sady MD, McGill CA, Gioia GA. Academic effects of concussion in children and adolescents. *Pediatrics*. 2015;135(6):1043–1050.
11. Williams RM, Welch CE, Parsons JT, McLeod TC. Athletic trainers' familiarity with and perceptions of academic accommodations in secondary school athletes after sport-related concussion. *J Athl Train*. 2015;50(3):262–269.
12. Broglio SP, Cantu RC, Gioia GA, et al. National Athletic Trainers' Association position statement: management of sport concussion. *J Athl Train*. 2014;49(2):245–265.
13. Valovich McLeod TC, Gioia GA. Cognitive rest: the often neglected aspect of concussion management. *Athl Ther Today*. 2010;15(2):1–3.
14. Hall EE, Ketcham CJ, Crenshaw CR, Baker MH, McConnell JM, Patel K. Concussion management in collegiate student-athletes: return-to-academics recommendations. *Clin J Sport Med*. 2015;25(3):291–296.
15. Popoli DM, Burns TG, Meehan WP III, Reisner A; Children's Healthcare of Atlanta. CHOA concussion consensus: establishing a uniform policy for academic accommodations. *Clin Pediatr (Phila)*. 2014;53(3):217–224.
16. 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(1):15–26.
17. Concussion diagnosis and management best practices. National Collegiate Athletic Association Web site. http://www.ncaa.org/sport-science-institute/concussion-diagnosis-and-management-best-practices. Accessed August 4, 2017.
18. Harmon KG, Drezner J, Gammons M, et al. American Medical Society for Sports Medicine position statement: concussion in sport. *Clin J Sport Med*. 2013;23(1):1–18.
19. Meehan WP III, d'Hemecourt P, Collins CL, Comstock RD. Assessment and management of sport-related concussions in United States high schools. *Am J Sports Med*. 2011;39(11):2304–2310.
20. Virginia Board of Education guidelines for policies on concussions in students. Virginia Board of Education Web site. http://www.doe.virginia.gov/boe/guidance/health/2016-guidelines-for-policies-on-concussions-in-students.pdf. Accessed March 25, 2018.
21. Gioia G, Collins M. Head-up concussions: acute concussion evaluation (ACE) care plan. Centers for Disease Control and Prevention Web site. https://www.cdc.gov/headsup/pdfs/providers/ace_care_plan_school_version_a.pdf. Published 2006. Accessed May 10, 2018.
22. Lynall RC, Laudner KG, Mihalik JP, Stanek JM. Concussion-assessment and -management techniques used by athletic trainers. *J Athl Train*. 2013;48(6):844–850.
23. Covassin T, Elbin R III, Stiller-Ostrowski JL. Current sport-related concussion teaching and clinical practices of sports medicine professionals. *J Athl Train*. 2009;44(4):400–404.
24. Buckley TA, Burdette G, Kelly K. Concussion-management practice patterns of National Collegiate Athletic Association Division II and III athletic trainers: how the other half lives. *J Athl Train*. 2015;50(8):879–888.
25. Weber ML, Welch CE, Parsons JT, Valovich McLeod TC. School nurses' familiarity and perceptions of academic accommodations for student-athletes following sport-related concussion. *J Sch Nurs*. 2015;31(2):146–154.
26. Kasamatsu T, Cleary M, Bennett J, Howard K, McLeod TV. Examining academic support after concussion for the adolescent student-athlete: perspectives of the athletic trainer. *J Athl Train*. 2016;51(2):153–161.
27. Wing R, Amanullah S, Jacobs E, Clark MA, Merritt C. Heads up: communication is key in school nurses' preparedness for facilitating "return to learn" following concussion. *Clin Pediatr (Phila)*. 2016;55(3):228–235.
28. School recommendations following concussion. American Academy of Pediatrics Web site. https://www.aap.org/en-us/about-the-aap/Committees-Councils-Sections/Council-on-sports-medicine-and-fitness/Documents/returntoschool.pdf. Accessed March 25, 2018.
29. Managing return to activities: information for health care professionals. Centers for Disease Control and Prevention Web site. https://www.cdc.gov/headsup/providers/return_to_activities.html. Updated February 8, 2016. Accessed August 21, 2017.
30. McNeal L, Selekmen J. Guidance for return to learn after a concussion. *NASN Sch Nurse*. 2017;32(5):310–316.
31. National Collegiate Athletic Association Sport Science Institute. Concussion safety protocol checklist. National Collegiate Athletic Association Web site. https://www.ncaa.org/sites/default/files/2017SSI_ConcussionSafetyProtocolChecklist_20170322.pdf. Accessed August 21, 2017.
32. Halstead ME, Walter KD; Council on Sports Medicine and Fitness. American Academy of Pediatrics: clinical sport-related concussion in children and adolescents. *Pediatrics*. 2010;126(3):597–615.
33. Sackett DL, Rosenberg DM, Gray JA, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. *BMJ*. 1996;312(7023):71–72.
34. Valovich McLeod T, Lewis JH, Whelihan K, Welch Bacon CE. Rest and return to activity after sport-related concussion: a systematic review of the literature. *J Athl Train*. 2017;52(3):262–287.
35. Baker JG, Leddy JJ, Darling SR, et al. Factors associated with problems for adolescents returning to the classroom after sport-related concussion. *Clin Pediatr (Phila)*. 2015;54(10):961–968.
36. Picciano A, Winter RO. Benefits of huddle implementation in the family medicine center. *Fam Med*. 2013;45(7):501–504.
37. Chan AY, Vadera S. Implementation of interdisciplinary neurosurgery morning huddle: cost-effectiveness and increased patient satisfaction. *J Neurosurg*. 2018;128(1):258–261.
38. National Athletic Trainers' Association official statement on athletic health care provider "time outs" before athletic events. National Athletic Trainers' Association Web site. https://www.nata.org/sites/default/files/timeout.pdf. Published August 1, 2012. Accessed March 25, 2018.
39. Miyashita TL, Diakogeorgiou E, Hellstrom B, Kuchwara N, Tafoya E, Young L. High school athletes' perceptions of concussion. *Orthop J Sports Med*. 2014;2(11):2325967114554549.
40. Carson JD, Lawrence DW, Kraft SA, et al. Premature return to play and return to learn after a sport-related concussion: physician's chart review. *Can Fam Physician*. 2014;60(6):e310, e312–e315.
41. Murray IR, Murray AD, Robson J. Sports concussion: time for a culture change. *Clin J Sport Med*. 2015;25(2):75–77.
42. McCrea M, Hammeke T, Olsen G, Leo P, Guskiewicz K. Unreported concussion in high school football players: implications for prevention. *Clin J Sport Med*. 2004;14(1):13–17.

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