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Collegiate and University Athletic Trainers' Use of Squat Based Gradable Movement Screens

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ABSTRACT

Topics in Exercise Science and Kinesiology Volume 4: Issue 1, Article 8, 2023. Squat Based Gradable Movement Screens (SBGMS) are orthopedic assessments used to detect and develop rehabilitation plans for patients with poor movement patterns. Reported to limit the effects of injury related factors, SBGMS have become common techniques identified among several professional domains of Athletic Training practice; however, there is limited descriptive data regarding the implementation and extent SBGMS are used by practicing Athletic Trainers (ATs) within the collegiate or university settings. The purpose was to explore the utility of SBGMS among ATs and to investigate the characteristics of athletic trainers who use SBGMS clinically. Four thousand BOC-certified NATA member athletic trainers self-designating employment in the university/collegiate setting were invited to participate in an electronic Qualtrics Survey. Of the 350 respondents, the data from 256 (6.4%) of those respondents were complete and utilized in data analysis. The majority of respondents, 142 (55%) reported not using SBGMS in clinical practice. Chi-Square tests were used to analyze most data, while ANOVA and Scheffe techniques were used in select analyses. Significant ($p<.05$) relationships existed between respondents' use of SBGMS clinical and respondents' gender ($p = 0.012$); gender of the respondents' athletes ($p = 0.016$); respondents' athletic division ($p = 0.001$); and in respondents who held professional credentials in addition to ATC ($p = 0.005$) from those data assessed using the Chi Square technique. Most respondents did not use SBGMs clinically. Respondents using SBGMS clinically were more likely to be male, work at the NCAA D1 setting, and work with single gender sport athletes. A more favorable clinician to athlete ratio and the presence of more resources, commonly found in the NCAA D1 setting, appear to influence the clinical use of SBGMS.

KEY WORDS: Athletic trainers, collegiate and/or university, movement screening, squat based gradable movement screens

INTRODUCTION

A Squat Based Gradable Movement Screen (SBGMS) is a physical assessment technique, incorporating a squatting movement, and involving human movement that is graded against a criterion based standard.[1] The squat pattern has been used within a variety of screening tools to

assess multiple criteria such as bilateral symmetry, mobility, strength, stability, and neuromuscular control throughout the kinetic chain in one specific and simple movement pattern.[2–5] Specifically, a squat based assessment has been found to expose movement faults such as a knee valgus collapse, asymmetrical body shifting, or foot pronation during the movement.[6] Additionally, the upper extremity also can be assessed via squat-based movement screen by including arms or a dowel being held overhead (e.g. Functional Movement System (FMS)-Deep Squat, Athletic Ability Assessment, Titleist Performance Institute Movement Screen, Golf Movement Screen, and the Overhead Squat Test).[6–10] Other similar screens utilize a more neutral arm position during the squatting movement (e.g. Back Squat Assessment, Bodyweight Squat/Movement Competency Screen, and the Single Leg Squat).[2,11,12] Collectively, SBGMS are characterized as such because of a similar foundation in a squatting type movement.

SBGMS are utilized to inform preventative and rehabilitative exercise choice by exposing biomechanical factors that may increase the likelihood of injury. Many different SBGMS exist and are currently in use; some utilize no equipment with different arm positions, while other SBGMS use a dowel in positions either overhead or behind the head.[1,2,6,11] Current evidence is varied concerning SBGMS, including ability to predict injuries.[6,7,12–20] Research supporting these techniques demonstrates that SBGMS findings can be predictive of injuries, used consistently between examiners (acceptable inter and intra-rater reliability), and are commonly used to screen athletes in premier soccer leagues.[6,7,12–17] Contrastingly, inaccuracies can exist with use of SBGMS, specifically in identifying dysfunctions, and evaluator accuracy can be altered by external factors such as previous experience, focus of attention, motivation, and understanding the grading criteria.[18–20]

Despite the increasing notoriety and clinical popularity of movement screens, there is limited information as to if and how clinicians, specifically certified athletic trainers, use SBGMS. Greater understanding of the contemporary use of SBGMS within strength and conditioning and healthcare professionals would aid in the aims of improving athletic performance and reducing risk of injury within the population of athletes they serve. More specifically, the focus on the prevention and treatment of injuries is of particular interest to athletic trainers as it represents Domain I of athletic training (AT) practice.[21] Additionally, SBGMS are used to evaluate movement dysfunctions and to inform therapeutic interventions as consistent with AT practice Domains II and IV.[21] Therefore, the purpose of this study was to 1) create a reliable survey instrument capable of measuring contemporary use of SBGMS and 2) then assessing these measures within a sample of ATs working clinically at the collegiate level. The initial hypothesis was that a majority of subjects would not use SBGMS in their clinical collegiate practices. A secondary hypothesis was the data would show the presence of various resources on the use of SBGMS by collegiate ATs.

METHODS

To answer these research questions, a descriptive cross-sectional survey was developed and utilized. This study was approved as an exempt study by the Institutional Review Boards (IRB) at two institutions where the authors were employed. Potentially sensitive information

that the subjects were asked included age, gender, work experiences, sports with which the ATs work clinically, current professional credentials, and the collegiate organizational level within which they work (e.g., NCAA, NAIA, NJCAA). The participants did not provide information about current employers nor home states. Additionally, the survey program (Qualtrics, LLC.) did not track the participants' email or IP addresses. Because this research used a survey to collect data, there were minimal risks for the participants.

Survey Tool Development

To gather information for this study, a survey tool, the SBGMS Utilization Survey (SUS), was developed and validated using traditional survey research methods, including establishing construct, content, and criterion related validity, as well as verifying the reliability of the tool in advance of using it for the actual data collection.[22] The instrument was developed with the following constructs: 1) SBGMS are useful and important screening tools that are being used by health care professionals, athletic trainers, and coaches; 2) the effective use of SBGMS allows for a more patient-specific corrective exercise program to be developed; and 3) health care costs associated with sport-related injury may be decreased if SBGMS are used. The early version of the survey tool was evaluated by a survey research expert who helped guide the development process and ensure criterion-related ability as delineated by the Table of Specification, which is commonly used to guide the creation of a valid survey (Appendix 1).[22] The survey was further evaluated for content validity by 3 movement screening content experts using the content validity index (CVI).[23] The survey was then pilot tested on a convenient sample of 9 athletic trainers (ATs) employed in the university/collegiate setting to further establish item reliability and face validity. Items found to have low reliability and/or low levels of face or content validity were identified and not included in the final data collection or analysis processes; however, 4 of these items (items 2, 3, 4, and 12b) were retained in the final survey for the investigators to use for contextual understanding of other valid and reliable items on the survey. The reliability of the survey was analyzed during pilot testing using the Pearson's r-coefficient. Interpreting reliability values follow the accepted rule of thumb for interpreting Pearson r; values between 0.68 and 1.00 demonstrate a strong relationship, values between 0.36 and 0.67 reflect a moderate relationship, values between 0.21 and 0.35 are considered to have a weak relationship, while values between 0.00 and 0.20 are considered negligible.[24]

The Pearson's r-coefficient values showed that most items are well written and clear to the respondents and had strong or moderate relationships (Table 1). Three items displayed poor reliability during pilot testing. In response, a descriptor was added to item 43 to add clarity to the question. Items 53 and 66-d were left in their current form, because both items were part of a collection of items that were answered consecutively. Therefore, the majority of the survey tool demonstrated good consistency and reliability and was used in its final form. The survey tool used to collect data for this study can be found in its entirety in Appendix 2.

Once data collection was complete, post-hoc testing of the tool using Cronbach's Alpha allowed for further assessment of the tool's reliability and internal consistency (Table 2).[25] To complete this post-hoc assessment, the items were separated by similar context, because using

all the items as a single data set resulted in too many items being excluded. Some groups of items (11-35) did not have enough data points to complete a Cronbach's Alpha assessment. Values that approached a practical value of 0.70 were considered reasonable.[26]

Table 1. Pearson r coefficient values.

	Item	Pearson	p value
Demographic	8- 1	0.96	0.000
	8- 2	0.96	0.000
	8- 3	0.97	0.000
	8- 4	n/a	n/a
	10	0.59	0.093
	11-1	0.95	0.000
	36	0.76	0.18
Education/ credentialing	42	0.55	0.125
	43	-0.26	0.742
	45	-1.00	0.000
	47	n/a	n/a
Current SBGMS Use	50	1.00	0.000
	51	0.83	0.039
	53	0.06	0.916
	54	0.54	0.266
	55	0.63	0.178
	56	0.53	0.275
	57	0.87	0.024
	58	0.49	0.326
	59	0.65	0.084
Attitudes concerning SBGMS	66- a	0.65	0.078
	66- b	0.44	0.239
	66- c	0.38	0.320
	66- d	-0.07	0.859
	66- e	0.53	0.140
	66- f	0.75	0.020
	66- g	0.75	0.034

Study setting

Data collection took place electronically using the Qualtrics Survey program to allow respondents to complete the survey in a location and at a time most convenient to them. The survey was initially emailed to potential participants on November 20, 2018, and data collection closed on January 2, 2019. The survey was opened for a second period of time between January 11, 2019 and January 29, 2019 to allow for additional respondents to improve the overall power of the analysis.

Study subjects

Four thousand BOC-certified athletic trainer members of the NATA who self-identified as practicing at a college or university setting were solicited as a sample of convenience for their participation in the study by the NATA's research survey service. A sample of 309 ATs agreed

to participate in the study. The data of respondents who did not answer Question 50 regarding use of SBGMS were excluded from participating.

Table 2. Cronbach's Alpha Values

Items	*Alpha Value*	*Valid Cases*
2, 3, 4, 5, 6, 7, 8(1-4), 42, 50	*0.674*	*250*
53, 54, 55, 56, 57, 58, 59	*0.718*	*108*
66a-g	*0.896*	*212*
11 - 35	*Too few to run*	*n/a*
10 (12 – 1)	*0.643*	*262*
60 (13 – 1)	*0.829*	*27*
62 (13 – 1)	*0.826*	*31*

RESULTS

Out of the 4000 self-identified collegiate ATs solicited for participation, 309 subjects responded to the survey over 3 months. Two-hundred and fifty-six of those responses (6.4%) were complete and deemed suitable for statistical analysis. The majority of the respondents, 55.7% (n= 142), identified as female. Of the responses that were not included in the statistical analysis, 19 respondents indicated that they did not work at the collegiate or university setting. Additionally, there were 34 respondents' data removed from this study, because they did not answer Item 50 that identified respondents' current use of SBGMS, and without that data, analysis could not occur.

The mean age of respondents was 35.95 years (median age = 32 years, standard deviation = 10.574). Two responses indicated that the respondents were younger than 20 years of age, and therefore were not included in the age-related analysis. The majority (48%) of respondents worked at the NCAA DI setting (n=122) while 61% (n= 157) respondents held only the ATC professional credential, no additional professional credentials earned. There were varying amounts of experience at the university/collegiate setting among the respondents; the mean years of experience was 10.97 years (median years = 8, standard deviation = 9.020), while 39% of the respondents (n=99) indicated that they had between 0–5 years of experience, when experience responses were categorized in 5-year increments (i.e., 0-5, 6-10 11-15, 16-20, and 20+; Table 3).

Most respondents, 55% (n= 142), reported that they did not use SBGMS in their clinical practices. This finding confirmed the study hypothesis that while SBGMS and other movement screening techniques are becoming better known, there is still a lack of use of SBGMS clinically by collegiate athletic trainers. Chi Square tests revealed significant differences in the use of SBGMS by gender of the athletic trainer ($p = 0.012$, Phi/Cramer's V = 0.158; Table 4). The largest group of respondents, who identified as female, did not use SBGMS in their clinical practices (89/255 respondents). The odds that a female respondent did not use SBGMS clinically were 1.901 higher compared to men (95%CI=1.151,3.141). More male respondents (n = 60) used SBGMS more in a clinical setting than did the female respondents (n = 53).

Table 3. Respondent Demographics

Demographic	Number	Percentage
Respondent's Gender [a]		
Male	113	0.44
Female	142	0.55
Athletes' Gender		
Male and Female Sports	175	0.68
Male only Sports	39	0.15
Female only Sports	42	0.16
AT Setting		
NCAA DI	122	0.48
NCAA DII	36	0.14
NCAA DIII	55	0.21
Other Setting	43	0.17
AT Experience College/University[b]		
0- 5 years	99	
6 - 10 years	55	
11 - 15 years	36	
16 - 20 years	27	
More than 20 years	38	
AT Age[c]		
20 - 29 year olds	87	
30 - 39 year olds	92	
40 - 49 year olds	36	
50+ year olds	37	

a = 1 prefer not to answer response; b = 1 no response; c = 2 no responses, 2 responses removed because indicated age under 20

Similarly, Chi Square analysis demonstrated statistically significant differences (p = 0.004, Phi/Cramer's V = 0.176, Table 4) between genders in previous instruction related to SBGMS. Specifically, female respondents reported that they received previous instruction in SBGMS (n= 90) less frequently compared to their male counterparts (n = 51). In this case, the odds that a female respondent did not received instruction in SBGMS were 2.104 higher compared to male respondents who reported receiving instruction in SBGMS (95%CI=1.271,3.482).

There also were significant differences for SBGMS use when the gender of the athletes was considered (Chi Square, p = 0.016, Phi/Cramer's V = 0.155; Table 4). Of the respondents who worked with both male and female athletes (n = 175), 106 did not use SBGMS clinically, and 69 did use SBGMS clinically. In comparison, of the 81 respondents who worked with male only or female only athletes, 36 did not use SBGMS clinically. Alternatively, 45 respondents who worked with only male or only female athletes used SBGMS in their clinical practice. The odds that a respondent that works with both male and female athletes and did not use SBGMS clinically were 1.902 greater compared to respondents who worked with only male or only female athletes (95%CI=1.127,3.272).

Table 4. Use of SBGMS in Clinical Practice and Demographic Variables

Item	Significance	Analysis Value	df	Effect Size
50 (SBGMS use) vs 4 (gender)*	p = 0.012	Chi = 6.344	1	Phi/Cramer's V = 0.158
42 (previous SBGMS instruction) vs. 4 (gender)*	P = 0.004	Chi = 8.476	1	Phi-Cramer's V = 0.182
50 (SBGMS use) vs. 9 (athlete gender)	p = 0.016	Chi = 6.186	2	Phi/Cramer's V = 0.155
50 (SBGMS use) vs. 5 (athletic division)	p = 0.001	Chi = 11.128	3	Phi/Cramer's V = 0.208
50 (SBGMS use) vs. 36 (Other professional credential)	p = 0.005	Chi = 7.943	1	Phi/Cramer's V = 0.176

*One case removed from analysis, only one response for (prefer not to answer)

Table 5. Use of SBGMS in Clinical Practice and Demographic Variables

Item	Significance	Analysis Value	df	Effect Size
50 (SBGMS use) vs. 5 (Athletic division)	p = 0.011	Chi = 11.128	3	Phi/Cramer's V = 0.208
5 (Athletic division) vs. 8 (total athletes)	p = 0.001	F =5.833 (ANOVA)	n/a	Eta squared = 0.064, Observed power = 0.951
NCAA DI vs. Other division	p = 0.005 (Scheffe)			
NCAA DI vs. NCAA DIII	p = 0.036 (Scheffe)			

There were significant differences in the use of SBGMS clinically when examined with consideration for the respondents' athletic division (NCAA DI, NCAA DII, NCAA DIII or other athletic divisions) (Chi Square, p = 0.001, Phi/Cramer's V = 0.208; Table 5). Most respondents, n=134, were employed at divisions other than NCAA DI, while 122 were employed at NCAA DI institutions. Respondents who used SBGMS clinically (n = 67) and were employed at the DI level outnumber respondents at NCAA DII, NCAA DIII, and other post-secondary settings (eg, Junior college, NAIA, Club sports) also use SBGMS clinically (n = 47). Respondents who did not use SBGMS clinically were more frequently employed at NCAA DII, NCAA DIII, and other settings (n = 87) as compared to the 55 NCAA DI respondents who did not use SBGMS in their clinical practices. The odds that an AT employed at a NCAA Division I institution did use SBGMS clinically were 2.255 greater compared to an AT who did not work at the NCAA Division I setting (95%CI= 1.364,3.729).

An ANOVA test revealed significant differences in the use of SBGMS between the ATs in different collegiate divisions (p = 0.001, Eta squared = 0.064, Observed power = 0.951). These results can be found in Table 4. The number of athletes which respondents provide AT services for shows significant differences during post-hoc analysis (Scheffe). These differences can be

observed when comparing numbers of athletes for DI ATs to athletes for DIII ATs (p = 0.036) and to athletes for Other ATs (p = 0.005, Table 5). Eighty five percent of DI AT respondents worked with less than 200 athletes; 15% worked with more than 200 athletes, while 54% of DII, DIII, and Other ATs worked with less than 200 athletes; 46% worked with more than 200 athletes (Table 6).

Table 6. Number of Athletes per College/University Setting

College/University Setting	Athletes (number)	Respondents (number)	Setting Responses (percentage)
NCAA DI	Less than 200	104	85% of DI
NCAA DI	More than 200	18	15% of DI
DII, DIII, and Other	Less than 200	73	54% of non-DI
DII, DIII, and Other	More than 200	61	46% of non-DI

Chi-Square tests revealed significant differences in SBGMS use for respondents who had professional credentials in addition to ATC (p = 0.005, Phi/Cramer's V = 0.176, Table 4). The majority (38%) of respondents who had no additional credential also did not use SBMGS clinically. The number of respondents who possessed credentials in addition to ATC who used and who did not use SBGMS clinically were similar (55 compared to 59 respondents). The remaining respondents who had additional credentials (n = 44) did not use SBGMS clinically. The odds that an AT with another professional credential will use SBGMS were 2.076 greater compared to an AT who had not earned another professional credential (95%CI= 1.245,3.462). In a related analysis, there was no relationship between respondents' clinical use of SBGMS and the specific professional credentials held by the respondents (eg, physical therapist, medical doctor, certified strength and conditioning specialist, paramedic).

DISCUSSION

The frequency analysis indicates that 114 (44.5%) of respondents in this study used SBGMS in their clinical practices, supporting the initial hypothesis. There were no relationships between the demographic variables of athletic division, additional professional credentials or SBGM certification/credentialing and gender. Thus, the differences in the data related to gender were not found and should be explored by future research.

Gender did have a relationship with the exposure and instruction of SBGMS. Female respondents indicated that they received less instruction in the use of SBGMS than male respondents. No information regarding the respondents' location or types of institution were collected; thus, no assumptions could be made about respondents' current institutions, institutions from which the respondents graduated, nor NATA district as related to respondents' previous exposure to and having learned about SBGMS. Future research may be able to identify the impact of these criteria on the use of SBGMS in clinical practice. It also would be beneficial that future research attempts to identify how SBGMS is taught, evaluated, and incorporated into students' clinical education and experiences.

The second hypothesis tested in this study was that ATs with more resources available to support their use of SBGMS clinically would increase their use of SBGMS clinically more than those who did not. This hypothesis was made based upon data that suggested that the availability of resources to support AT practice clinically may be directly related to the NCAA Division their institutions were affiliated.[27] It may be assumed that more resources are available to ATs in the NCAA Division I setting due to opportunities such as larger budgets and lower AT:athlete ratios thereby allowing for greater individualized care for athletes which results in greater opportunities to address faulty movement patterns. A larger budget also implies a greater ability to purchase specific tools, computer programs, electronic applications, and pursue specialized credentialing which could allow for more SBGMS use clinically when compared to other athletic divisions where budgets are more restricted.

The majority of respondents who worked as athletic trainers at the NCAA Division I level use SBGMS in their clinical practices, while only a minority of athletic trainers at all other NCAA/sport levels use SBGMS (Table 3). These data demonstrated that athletic trainers who work at the NCAA DI level used SBGMS more than ATs at any other level. One possible explanation for why NCAA Division I respondents tend to use SBGMS more frequently could be related to the number of athletes for whom these athletic trainers provide athletic training services.[28] These data bear out this assumption with the mean number of athletes cared for by the NCAA Division I respondents were fewer than those numbers reported by ATs from any other division (NCAA Division II, NCAA Division III, or other division: Table 6).

Another possible explanation for this difference in use of SBGMS by NCAA Division I respondents may be due to the lesser number of sports covered by ATs in this division compared to the number of sports teams covered by athletic trainers in other divisions. NCAA Division I athletic departments have a larger budget and clinical staff, which were identified in a previous study as an explanation for not using SBGMS clinically.[27] Anecdotally, the ability to concentrate on the needs of the athletes on one specific team as opposed to several teams could allow the AT to utilize SBGMS during the off-season. ATs working with athletes in other divisions typically transition from one sport to another with little to no off-season time, possibly related to smaller number of clinical staff and other resources.[29] A clinician who has more off-season or focused responsibility time theoretically could spend more time addressing injury prevention.

Table 7. SBGMS Use Compared to Gender of Athletes

	Use SBGMS Clinically (Item 50)	**Do Not Use SBMGS Clinically (Item 50)**
Male and Female Athletes (Item 9)	69	106
Male Only Athletes (Item 9)	23	16
Female Only Athletes (Item 9)	22	20

Athletic trainers also were more likely to use SBGMS when they worked with only male or female athletes as compared to those who worked with athletes from both genders (Table 7). These data suggest that ATs working single-gender sports may have a more favorable athlete to clinician ratio, allowing more opportunity to utilize SBGMS in their clinical practice.[7,28] These data also could also suggest that respondents who work at the NCAA DI level are more likely

to work with one specific team, allowing for more time to incorporate SBGMS during the off-season as compared to respondents from non-NCAA DI settings.

It is reasonable to conclude that a more favorable clinician to athlete ratio could promote more use of SBGMS and focus more on the injury susceptibility in the care provided by the AT.[7,20] Future research should further evaluate the interactions between use of SBGMS and division, number of athletes, and available resources.

The limitations to this study were gathering responses from respondents. Previous research using similar subject recruitment (NATA research survey service) reported a typical response rate of 14.7%.[30] Respondent involvement was an issue for this study necessitating that the initial date for closing the survey tool be extended in an effort to gain a higher response rate. After reopening the survey tool for data collection, the principal investigator was able to get more responses, but this number is still low when compared to the number of people who were sent the survey. One of the concerns about the survey is the length of time that it could take to complete the survey, possibly leading to a poor response rate or responses that were not fully usable. Additionally, the days that the survey tool was available was leading up to the Winter Holidays, potentially leading to less availability for respondents. Consideration of the length of the survey and when it is distributed could increase the response rate in future research.

Future research should focus on other methods of Gradable Movement Screens (GMS), not only the use of squatting movements, SBGMS, but also on GMS that utilize balance and jumping movements or a formal biomechanical analysis. Additionally, ATs that work in other settings should also be recruited to participate in similar projects (i.e., secondary school, professional athletics, and performing arts). It would also be helpful to focus on other healthcare providers that may or may not be implementing GMS in their clinical practices, especially physical therapists, occupational therapists, chiropractors, and other clinicians.

Additional demographic questions specific to previous education (i.e. size of institution respondents attending for entry level AT education, in which district the respondent attending entry level AT education, if entry level AT education was from a bachelor's or a master's program) and current occupation (i.e. in which district does the respondent currently work, the number of other clinical staff the respondent works) could help offer more insights into this data.

Based upon the result of this study, we found that most ATs employed at the collegiate and university setting do not use SBGMS in their clinical practices. Respondents who do use SBGMS clinically were more likely to be male, work at the NCAA D1 setting, and work with only male or only female gender athletes. The respondents' years of work experience, age, and specific professional credentialing (other than ATC) do not significantly impact use of SBGMS clinically. These data also suggested that a better clinician to athlete ratio and better access to resources could increase the use of SBGMS, and those with limited access to resources may have to use creative means to incorporate movement screening into their clinical practice.

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Appendix 1

Table of Specification

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Appendix 2

Survey Tool: Squat Based Gradable Movement Screen Utilization Survey (SUS)

Item	Question	Possible Responses
1	Introduction Statement	n/a
2	What is your current clinical practice setting?	Inter-collegiate athletics – Full-time (includes events/competitions)
		Inter-collegiate athletics – Part-time (includes events/competitions)
		Inter-collegiate clinic (no regular events/competitions)
		Other- Thank you for your participation, we appreciate your time
3	What is your current age in years?	Year
4	With which gender* do you currently identify?	Male
		Female
		Other
		Prefer not to answer
5	In which intercollegiate athletic division does the athletes/patients for whom you currently provide care competes? Check all that apply.	DI – NCAA
		DII – NCAA
		DIII – NCAA
		Other (Division or association not listed)
		Currently in transition from one division to another
6	If other, please specify in which division or association your athletes/patients compete.	Fill in
7	If transitioning, please provide the name of the division in which your athletes/patients will compete after fully transitioning	Currently compete
		After transitioning
8 (1-4)	Please specify the number of "in-season" athletes/patients for whom you are directly responsible during the following sport seasons in your AT collegiate clinical practice. If athletes are in-season for more than one season (e.g. Fall and Spring), then these should be counted in the number reported in each of those seasons. *Please include athletes that are active during their competitive season.	Fall Season
		Winter Season
		Spring Season
		Summer Season
9	What is/are the gender(s)* of the athletes/patients for whom you currently provide care?	Male
		Female
		Both male and female
10	Please indicate all of the practice settings listed below in which you have ever practiced as a BOC-certified AT. **Internship and graduate assistant	College/University
		Secondary School
		Clinic

	positions in which you were BOC-certified should be included in the appropriate practice setting category	Hospital
		Professional Sports
		Occupational health/Industrial
		Business/Sales/Marketing
		Health/Fitness/Sports/Performance Enhancement Clinic/Clubs
		Amateur/Recreational/Youth Sports
		Military/Law Enforcement/Government
		Independent Contractor
		Other
11	Please indicate the amount of time (in total completed years) you have ever practiced as a BOC-certified AT in the college/university setting. Please place a 0 if you have worked less than one complete year in this setting.	Year
12	Please indicate your experience in the college/university setting in months if less than one total year	Months
13	Please indicate the amount of time (in total completed years) you have ever practiced as a BOC-certified AT in the secondary school setting. Please place a 0 if you have worked less than one complete year in this setting.	Year
14	Please indicate your experience in the secondary school setting in months if less than one total year	Months
15	Please indicate the amount of time (in total completed years) you have ever practiced as a BOC-certified AT in the clinic setting. Please place a 0 if you have worked less than one complete year in this setting.	Year
16	Please indicate your experience in the clinic setting in months if less than one total year	Months
17	Please indicate the amount of time (in total completed years) that you have ever practiced as a BOC-certified AT in the hospital setting. Please place a 0 if you have worked less than one complete year in this setting.	Year
18	Please indicate your experience in the hospital setting in months if less than one total year	Months
19	Please indicate the amount of time (in total completed years) you have ever practiced as a BOC-certified AT in the professional sports setting. Please place a 0 if you have worked less than one complete year in this setting.	Year
20	Please indicate your experience in the professional sports setting in months if less than one total year	Months

21	Please indicate the amount of time (in total completed years) you have ever practiced as a BOC-certified AT in the occupational health/industrial setting. Please place a 0 if you have worked less than one complete year in this setting.	Year
22	Please indicate your experience in the occupational health/industrial setting in months if less than one total year	Months
23	Please indicate the amount of time (in total completed years) you have ever practiced as a BOC-certified AT in the business/sales/marketing setting. Please place a 0 if you have worked less than one complete year in this setting.	Year
24	Please indicate your experience in the business/sales/marketing setting in months if less than one total year	Months
25	Please indicate the amount of time (in total completed years) you have ever practiced as a BOC-certified AT in the health/fitness/sports/performance enhancement clinic/club setting. Please place a 0 if you have worked less than one complete year in this setting.	Year
26	Please indicate your experience in the health/fitness/sports/performance enhancement clinic/club setting in months if less than one total year	Months
27	Please indicate the amount of time (in total completed years) you have ever practiced as a BOC-certified AT in the amateur/recreational/youth sports setting. Please place a 0 if you have worked less than one complete year in this setting.	Year
28	Please indicate your experience in the amateur/recreational/youth sports setting in months if less than one total year	Months
29	Please indicate the amount of time (in total completed years) you have ever practiced as a BOC-certified AT in the military/law enforcement/government setting. Please place a 0 if you have worked less than one complete year in this setting.	Year
30	Please indicate your experience in the military/law enforcement/government setting in months if less than one total year	Months
31	Please indicate the amount of time (in total completed years) that you have ever practiced as a BOC-certified AT in the independent contractor setting. Please place a 0 if you have worked less than one complete year in this setting.	Year
32	Please indicate your experience in the independent contractor setting in months if less than one total year	Months
33	Please describe your clinical setting if you indicated that you work in the "other" setting classification.	Fill in

34	Please indicate the amount of time (in total completed years) you have ever practiced as a BOC-certified AT in the other setting. Please place a 0 if you have worked less than one complete year in this setting.	Year
35	Please indicate your experience in the other setting in months if less than one total year	Months
36	Have you ever held any other professional practice degree or credential (e.g., PT,CSCS, cPT, PES, MD, RN, CHT, EMT)?	Yes
		No
37	Please indicate all of your current professional practice or degree credentials you currently hold.	Physical Therapist, PT
		Certified Strength and Conditioning Specialist, CSCS
		Performance Enhancement Specialist, PES
		Certified Personal Trainer, cPT
		Occupational Therapist, OT
		Registered Nurse, RN
		Certified Massage Therapist, CMT
		Certified Hand Therapist, CHT
		Emergency Medical Technician, EMT
		Paramedic
		Medical Doctor, MD
		Doctor of Osteopathic Medicine, DO
		Other
38	Please describe what "other" professional practice of degree credentials you currently hold.	Fill in
39	Please indicate all of those professional practice or degree credentials you have held previously, but do not currently hold.	Physical Therapist, PT
		Certified Strength and Conditioning Specialist, CSCS
		Performance Enhancement Specialist, PES
		Certified Personal Trainer, cPT
		Occupational Therapist, OT
		Registered Nurse, RN
		Certified Massage Therapist, CMT
		Certified Hand Therapist, CHT
		Emergency Medical Technician, EMT
		Paramedic
		Medical Doctor, MD
		Doctor of Osteopathic Medicine, DO
		Other
40	Please describe what "other" professional practice of degree credentials you previously held.	Fill in

41	Clarifying statement that helps define GMS and SBGMS.	n/a
42	Have you ever received formal instruction (e.g. workshops, seminars, college classes, and continuing education sessions) on any of the Squat-Based Gradable Movement Screens (SBGMS)? *Formal instruction is defined as structured training with a specific objective that may or may not include skill practice sessions.	Yes
		No
43	Please mark all of the mode/methods by which you initially received formal instruction (e.g., workshops, seminars, college classes, and continuing education sessions) in SBGMS.	AT entry-level education
		Other professional entry-level education
		Advanced AT education, but not CEU education
		AT Continuing Education (CEU)
		Other formal continuing education:
44	Please list all of the other formal instructional modes/methods (not listed previously) through which you received formal instruction (e.g., workshops, seminars, college classes, and continuing education sessions) in SBGMS.	Fill In
45	Please mark all of the SBGMS formats on which you have been formally instructed (e.g., workshops, seminars, college classes, and continuing education sessions).	Functional Movement Screen (FMS)
		Selective Functional Movement Assessment (SFMA)
		National Academy of Sports Medicine – Corrective Exercise Specialist (NASM-CES)
		National Strength and Conditioning Association – Back Squat Assessment (NSCA-BSA)
		Gray Institute
		Total Motion Release
		American College of Sports Medicine (ACSM)
		Other: Please List
46	Please list all other SBGMS formats (not listed previously) through which you have been formally instructed (e.g., workshops, seminars, college classes, and continuing education sessions).	Fill in
47	Have you ever been credentialed in any SBGMS format?	Yes
		No
48	Please mark all SBGMS formats in which you have ever been credentialed.	Functional Movement Screen (FMS)
		Selective Functional Movement Assessment (SFMA)

		National Academy of Sports Medicine – Corrective Exercise Specialist (NASM-CES)
		National Strength and Conditioning Association – Back Squat Assessment (NSCA-BSA)
		Gray Institute
		Total Motion Release
		American College of Sports Medicine (ACSM)
		Other: Please List
49	Please list all other SBGMS formats (not listed previously) in which you have ever been credentialed.	Fill In
50	Do you use any type of SBGMS formats in your current AT clinical practice at the college/university setting?	Yes
		No
51	Please mark all of the SBGMS formats that you use in your current AT clinical practice at the college/university setting.	FMS
		SFMA
		NASM-CES
		NSCA-BSA
		Gray Institute
		Total Motion Release Format
		ACSM
		Other
52	Please list all other SBGMS formats (not listed previously) that you use in your current practice at the college/university setting	Fill in
53	How often do you typically use any SBGMS for the purpose of pre-participation Examination (PPE)?	Frequently
		Often
		Seldom
		Never
54	How often do you typically use any SBGMS for the purpose of injury evaluation?	Frequently
		Often
		Seldom
		Never
55	How often do you typically use any SBGMS for the purpose of planning rehabilitations?	Frequently
		Often
		Seldom
		Never
56	How often do you typically use any SBGMS for the purpose of return to activity decisions?	Frequently
		Often
		Seldom

		Never
57	How often do you typically use any SBGMS for the purpose of injury prevention/reduction?	Frequently
		Often
		Seldom
		Never
58	How often do you typically use any SBGMS for the purpose of enhancing performance?	Frequently
		Often
		Seldom
		Never
59	Please check below the statement that best reflects how you use SBGMS as a screening tool.	I use SBGMS to screen every athlete in my AT clinical practice at the university/college setting.
		I only use SBGMS to screen specific groups/teams of athletes in my AT clinical practice at the university/college setting.
		I only use SBGMS to screen individual athletes (as opposed to full groups/teams) in my AT clinical practice at the university/college setting.
		I use SBGMS to screen my athletes, but not specific groups/teams or only individuals
		I do not use SBGMS to screen athletes in my AT clinical practice at the university/college setting.
78	Please explain how you use SBGMS to screen your athletes, but not specific groups/teams or only individuals	Fill in
60	For which sports do you use SBGMS to screen every athlete in your AT clinical practice?	Football
		Soccer
		Baseball
		Athletics (running, track and field)
		Aquatics
		Gymnastics
		Softball
		Volleyball
		Basketball
		Lacrosse
		Golf
		Tennis
		Other
61	Please specify the types of "other" teams/groups of sport athletes on whom you use SBGMS as a screening tool.	Fill in

62	For which sports do you use SBGMS as a screening tool for specific groups/teams of athletes in your AT clinical practice at the university/college setting?	Football
		Soccer
		Baseball
		Athletics (running, track and field)
		Aquatics
		Gymnastics
		Softball
		Volleyball
		Basketball
		Lacrosse
		Golf
		Tennis
		Other
63	Please specify which "other teams/groups" of sport athletes on whom you use SBGMS as a screening tool.	Fill in
64	If you do use SBGMS to screen individual athletes (but not full teams/groups), how do you determine which individuals on whom you use SBGMS? (Please briefly describe the circumstances in which you would use SBGMS.)	Fill in
65	Please explain why you do not use SBGMS to screen any athletes in your AT practice at the college/university setting.	Fill in
66	Please provide your level of agreement with the following statements regarding the ideal use of any SBGMS.	n/a, Explaining statement
66a	There is sufficient evidence to support the use of SBGMS in your AT clinical practice.	Strongly Agree
		Agree
		Disagree
		Strongly Disagree
66b	The use of SBGMS enhances an AT's ability to correctly evaluate injuries at the college/university setting.	Strongly Agree
		Agree
		Disagree
		Strongly Disagree
66c	The use of SBGMS enhances the outcomes from rehabilitation programs in AT practice at the college/university setting.	Strongly Agree
		Agree
		Disagree
		Strongly Disagree
66d	The use of SBGMS enhances an AT's ability to successfully return an athlete/patient to activity in AT practice at the college/university setting.	Strongly Agree
		Agree
		Disagree
		Strongly Disagree
66e		Strongly Agree

	The use of SBGMS enhances an AT's ability to reduce the number of injuries at the college/university setting.	Agree
		Disagree
		Strongly Disagree
66f	The use of SBGMS are helpful in enhancing an AT's ability to reduce the severity of injuries at the college/university setting.	Strongly Agree
		Agree
		Disagree
		Strongly Disagree
66g	The use of SBGMS is helpful in an AT's ability to discover faulty movements during PPE at the college/university setting.	Strongly Agree
		Agree
		Disagree
		Strongly Disagree
67	Closing Statement	n/a

*In 2 situations, gender is used in demographic questions (#4 and #9). While it may be accurate to alter these questions to ask about sex, this survey tool is left in the format that the participants answered.