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ORIGINAL RESEARCH

Athletic Training Students' Perceptions of and Academic Preparation in the Use of Psychological Skills in Sport Injury Rehabilitation

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Context: Injured athletes rely on athletic trainers to assist them when recovering from injury. Over the last 20 years, the use of psychological skills to speed recovery has become increasingly popular.

Objective: Explore athletic training students' perceptions of the importance and effectiveness of psychological skills in the rehabilitation of sport injury as well as their academic preparation in their use, and examine the differences in perceived effectiveness for those with and without formal training in the skill.

Design: Survey.

Setting: Athletic training students enrolled in CAATE-accredited athletic training programs.

Participants: 180 athletic training students (males, n = 76; females, n = 104) from nine universities.

Data Collection & Analysis: The survey included 15 questions from the Attitudes About Imagery (AAI) survey and a demographic section including questions about their educational preparation, use of, and interest in psychological skills training. Two chi-square analyses, two ANOVAs, and a MANOVA were computed to investigate differences in athletic training students' educational preparation, use of, and interest in psychological skills training.

Results: While athletic training students agreed that it is important to treat the psychological aspects of injury (mean = 4.47 out of 5), only 50.6% reported that they had taken a course in sport psychology or psychological skills training. No differences in the perception of effectiveness were found between students that reported formal training in psychological skills compared to those that did not ($\chi^2_{4,176} = 7.48$, $P = .11$). Overall, the ratings of the effectiveness of psychological skills were positive as indicated by mean AAI scores between 4.31 to 6.17.

Conclusions: We found positive perceptions of psychological skills. However, the students' mean AAI scores were generally lower than previously surveyed athletic trainers and physical therapists.

Key Words: psychology, injured athlete, psychosocial competencies, sport psychology, mental skills, injury

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The effective incorporation of psychological skills into injury rehabilitation is vital to an athlete's successful recovery and return to play.[1-3] Ford and Gordon determined that while an athlete may be physically ready to return to sport after an injury, they may not be psychologically ready; hence, the incorporation of psychological skills training into injury rehabilitation is essential.[4] In addition, Andersen concluded that numerous variables play an equally important role in an athlete's recovery from injury, one of which is the athlete's psychological readiness for return to competition.[5]

Research indicates that while psychological skills are important to an athlete's overall performance,[4] athletic trainers (ATs) often do not incorporate them into their rehabilitation programs.[7,8] Washington-Lofren, Westerman, Sullivan, and Nashman,[8] for example, found that 47.5% of ATs surveyed believed they were unable to fully assist their athletes with the psychological aspects of their recovery. Yet, when athletes were surveyed, 39% of male and 40% of female collegiate soccer players believed their AT was qualified to help them cope with negative emotions regarding their injury.

Athletic trainers are constantly challenged to design and implement rehabilitation programs which return their patient to play as quickly as possible. With the use of psychological skills training becoming more popular, ATs are increasingly in a position to implement psychological skills programs.[9] Therefore, it is important for ATs to both understand and use a wide variety of mental skills to improve rehabilitation effectiveness.[7,10] However, the amount of formal training an athletic training student receives in psychosocial intervention and referral seems to be inadequate for the role ATs play in the psychological recovery of athletes from sport injury.[11]

Athletic Training Education Program (ATEP) students must demonstrate competency and proficiency in 12 specific areas. The National Athletic Trainers' Association (NATA) Competencies dictate the inclusion of psychosocial intervention and referral competencies for all accredited ATEPs; this content area is called "Psychosocial Intervention & Referral" (PIR; Table 1). Despite the NATA Competencies' requirements to include psychosocial competencies, a course specifically in sport psychology is not required for athletic training education.[10] When athletic trainers were surveyed, 85% indicated that a course in sport psychology was important, but only about half of those respondents had taken a course in sport psychology.[7] Furthermore, newly certified athletic trainers do not feel adequately prepared in the areas of mental skills training, counseling, and psychosocial referral.[11] In fact, Stiller-Ostrowski and Ostrowski[11] found that newly certified athletic trainers reported feeling underprepared when communicating and handling psychological issues associated with athletes, parents, and coaches.

Hamson-Utley, Martin, and Walters' recent study[12] investigated athletic trainers' and physical therapists' perceptions of the effectiveness of the use of psychological skills used during injury rehabilitation. They found that both athletic trainers and physical therapists held positive attitudes about the effectiveness of psychological skills, which was an improvement compared to the earlier work of Weiss, Wiese and Yukelson.[14] Hamson-Utley et al.[12] also reported that formal training was correlated with more positive attitudes about the use and effectiveness of psychological skills. Also of interest, recent research by Hamson-Utley & Stiller-Ostrowski surveyed ATEP program directors and asked them to rank instructional emphasis placed on each of the 12 content areas; the PIR content area received the lowest ranking overall (unpublished data, 2010).

No study to date has focused on athletic training students' perceptions of the importance and effectiveness of psychological skills. Students' perceptions are important to understand because they have recently met or are in the process of meeting the psychosocial intervention and referral competencies. Therefore, the purpose of this study was to determine athletic training students' perceptions of the importance and effectiveness of psychological skills in the rehabilitation of sport injury as well as their academic preparation in psychological skills. Similar to Hamson-Utley et al's findings,[12] it is expected that students who have had formal training in psychological skills (ie, taken a course) will hold different perceptions compared those who have not had formal training. In addition, it is expected that students' perceptions of the importance and effectiveness of psychological skills will differ by year in school (ie, freshmen, sophomore, junior, senior, or entry-level master's student), as the students who have been in school longer, (ie, senior or entry-level master's student) may have had more opportunity to be introduced to sport psychology or psychological skills training in clinical education settings.

METHODS

Participants

All participants (n = 180) were currently enrolled in a CAATE accredited athletic training program. A total of 76 males and 104 females ranging in age from 18 to 35 (mean [SD] = 28.16 [2.49]) completed the survey. Of these respondents, 6 (3.3%) were freshmen, 34 (18.8%) were sophomores, 62 (34.4%) were juniors, 70 (38.8%) were seniors and 7 (3.8%) were entry-level masters' athletic training students (note: one respondent did not indicate their year in school).

Procedures

Upon IRB approval, program directors from nine universities in the U.S. were contacted by email to request their participation

Table 1. The National Athletic Trainers' Association Competencies for Psychosocial Intervention & Referral: Competencies (C) & Clinical Proficiencies (CP)

Number	Description
PS-C1	Explain the psychosocial requirements (ie, motivation and self-confidence) of various activities that relate to the readiness of the injured or ill individual to resume participation.
PS-C2	Explain the stress-response model and the psychological and emotional responses to trauma and forced inactivity.
PS-C3	Describe the motivational techniques that the athletic trainer must use during injury rehabilitation and reconditioning.
PS-C4	Describe the basic principles of mental preparation, relaxation, visualization, and desensitization techniques.
PS-C5	Describe the basic principles of general personality traits, associated trait anxiety, locus of control, and patient and social environment interactions.
PS-C6	Explain the importance of providing health care information (communication) to patients, parents/guardians, and others regarding the psychological and emotional well being of the patient.
PS-C7	Describe the roles and function of various community-based health care providers (to include, but not limited, to: psychologists, counselors, social workers, human resources personnel) and the accepted protocols that govern the referral of patients to these professionals.
PS-C8	Describe the theories and techniques of interpersonal and cross-cultural communication among athletic trainers, their patients, and others involved in the health care of the patient.
PS-C9	Describe the basic principles of counseling (discussion, active listening, and resolution) and the various strategies that certified athletic trainers may employ to avoid and resolve conflicts among superiors, peers, and subordinates.
PS-C10	Identify the symptoms and clinical signs of common eating disorders and the psychological and sociocultural factors associated with these disorders.
PS-C11	Identify and describe the sociological, biological and psychological influences toward substance abuse, addictive personality traits, the commonly abused substances, the signs and symptoms associated with the abuse of these substances, and their impact on an individual's health and physical performance.
PS-C12	Describe the basic signs and symptoms of mental disorders (psychoses), emotional disorders (neuroses, depression), or personal/social conflict (family problems, academic or emotional stress, personal assault or abuse, sexual assault, sexual harassment), the contemporary personal, school, and community health service agencies, such as community-based psychological and social support services that treat these conditions and the appropriate referral procedures for accessing these health service agencies.
PS-C13	Describe the acceptance and grieving processes that follow a catastrophic event and the need for a psychological intervention and referral plan for all parties affected by the event.
PS-C14	Explain the potential need for psychosocial intervention and referral when dealing with populations requiring special consideration (to include but not limited to those with exercise-induced asthma, diabetes, seizure disorders, drug allergies and interactions, unilateral organs, physical and/or mental disability).
PS-C15	Describe the psychosocial factors that affect persistent pain perception (ie, emotional state, locus of control, psychodynamic issues, sociocultural factors, and personal values and beliefs) and identify multidisciplinary approaches for managing patients with persistent pain.
PS-CP1	Demonstrate the ability to conduct an intervention and make the appropriate referral of an individual with a suspected substance abuse or other mental health problem. Effective lines of communication should be established to elicit and convey information about the patient's status. While maintaining patient confidentiality, all aspects of the intervention and referral should be documented using standardized record-keeping methods.
PS-CP2	Demonstrate the ability to select and integrate appropriate motivational techniques into a patient's treatment or rehabilitation program. This includes, but is not limited to, verbal motivation, visualization, imagery, and/or desensitization. Effective lines of communication should be established to elicit and convey information about the techniques. While maintaining patient confidentiality, all aspects of the program should be documented using standardized record-keeping techniques.

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in the research study. These program directors were selected because they represented various regions throughout the U.S. (ie, Southern, Midwest, Eastern). All nine program directors that were contacted agreed to participate in the study and subsequently distributed the surveys to their students. Each program director was sent an introductory letter outlining the study administration directions, and copies of the informed consent and surveys to distribute to students. Once completed, program directors returned the informed consent forms and surveys in a postage-paid self-addressed envelope. Of the two hundred surveys distributed, 180 were completed and returned, for a 90% response rate. The surveys included the Attitudes About Imagery (AAI) Student Athletic Trainer survey,[12] a demographic survey, and several questions about their training in, use of, and interest in sport psychology and their beliefs about the psychological aspects of athletic injury. The survey was given to experts in sport psychology and athletic training (n = 5) for review; slight modifications were made to several questions based on feedback to improve overall clarity. No questions on the original AAI were modified.

Surveys

The Attitudes About Imagery (AAI) Survey: The AAI, developed by Hamson-Utley et al.,[12] contains 15 items that measure attitudes and beliefs about the effectiveness of psychological skills for rehabilitating from sport-injury (see Table 3 for the AAI items). An example item from the survey reads, "The use of mental imagery is an effective way to decrease pain during rehabilitation sessions" and the response is on a 7-point Likert scale with anchors *strongly disagree* and *strongly agree*. Hamson-Utley et al.[12] developed the survey based on the Integrated Model of Reponse,[14] and previously established its content validity and reliability. More specifically, test-retest reliability of the survey was established at 0.60-0.84 for all 15 items, and Cronbach's alphas ranged on the four clusters of the survey from 0.65-0.90 (mental imagery = 0.90, positive self-talk = 0.65, goal setting = 0.77, and pain tolerance = 0.77).

Demographic Survey: The demographic survey was comprised of several questions including gender, age, year in school, and the sport(s) in which the athletic training student had clinical experience.

Training, Use of, and Interest in Sport Psychology

Several questions were added to the instrument to assess students' training in, use of, and interest in sport psychology and psychological skill training. To assess if the student had taken a class at the university level in sport psychology, the following question was included, "Have you taken a course at the university level that focused on sport psychology or psychological skills training (such as imagery, positive self-talk, goal setting, etc.)?" In addition, Hamson-Utley et al.[12] included four questions on mental imagery as part of their study. The four questions included: 1) "Have you had any formal training or courses that included the use of *mental imagery*?"; 2) "Have you ever used *mental imagery* to improve your sport performance?"; 3) "Have you ever used *mental imagery* to help you rehabilitate from an injury?"; and 4) "Are you interested in learning about the use of *mental imagery* to help injured athletes." Four additional questions for each of the three clusters in the AAI (positive self-talk, controlling pain, and goal setting) were added to access students' interest in, use of, and training in other areas within sport psychology.

Perceptions on the Psychological Affects of Injury

Two additional questions were added from Larson et al.'s study[7] to assess the students' perceptions of the psychological affects of injury. The students were asked to use a 5-point Likert scale with anchors *strongly disagree a*nd *strongly agree* when responding to these prompts: "Athletes are psychologically affected by athletic injuries" and "It is important to treat the psychological aspects of an athletic injury."

Statistical Analysis

SPSS statistical software (version 12.0; SPSS Inc, Chicago, IL) was used for all statistical analyses with a set α-level of .05. Descriptive statistics were calculated for participant age, gender, and year in school, and to determine the students' perceptions on the psychological effects of injury and their attitudes about the effectiveness of mental skills as a rehabilitation tool. Frequency statistics were also calculated to determine the percentage of students that had coursework and training in sport psychology as well as those that had experience using psychological skills.

To determine if athletic training students who took a course in sport psychology or psychological skills training differed by year in school, a 2 x 5 Pearson chi-square analysis was used. Two one-way analysis of variance (ANOVAs) were used to analyze possible differences in athletic training students' perceptions based on their reported history of formal training in psychological skills. Furthermore, we analyzed possible differences in the athletic training students' perceptions of effectiveness and importance of addressing psychological aspects of injury by year in school using a one-way multivarate analysis of variance (MANOVA).

RESULTS

Coursework, Use of, and Training in Sport Psychology

A total of 50.6% (n = 91) of the students reported that they had taken a course in sport psychology or psychological skills training. A 2 x 5 Pearson chi-square analysis indicated significant differences in year in school (freshmen, sophomore, junior, senior, and entry-level master's) and if the student had taken a course in sport psychology or psychological skills training (Table 2). More specifically, junior, senior, and entry-level master's students were more likely to indicate they had taken a course in sport psychology compared to freshmen and sophomores ($\chi^2_{24,\ 176} = 9.54$, $P = .049$). However, no differences were found regarding students' perceptions of the effectiveness of psychological skills between those that reported formal training in psychological skills and those who reported no formal training ($\chi^2_{4,\ 176} = 7.48$, $P = .11$).

Table 2. Chi-Square Results in Differences in Year in School and University Coursework in Sport Psychology or Psychological Skills Training (No., %)

	Coursework in Sport Psychology	
Year in School	**Yes** (n = 91)	**No** (n = 85)
Freshman	1 (0.6)	5 (2.8)
Sophomore	11 (6.3)	22 (12.5)
Junior	37 (21.0)	25 (14.2)
Senior	38 (21.6)	30 (17.0)
Entry-Level Masters	4 (2.3)	3 (1.7)

[a] $\chi^2 = 9.54$, $p = .049$

Students indicated that they had training in the use of goal setting (74.4%, n = 134) most often, followed by positive self-talk (31.7%, n = 57), imagery (25.0%, n = 45), and pain management techniques (21.7%, n = 39). The students also responded that they had used goal setting most often to improve their own sport performance (86.7%, n = 156), compared to positive self-talk (83.9%, n = 151), imagery (72.8%, n = 131), and pain management techniques (35.6%, n = 64). Similarly, the students stated they had used goal setting themselves most frequently to rehabilitate from a sport injury (78.3%, n = 141), compared to positive self-talk (52.2%, n = 94), pain management techniques (31.7%, n = 57), and imagery (31.1%, n = 56). The students were generally very interested in learning more about psychological skills; 90.6% (n = 163) of the students indicated interest in receiving training in goal setting, as well as training in pain management strategies (83.9%, n = 151), positive self-talk (83.3%, n = 150), and imagery (78.9%; n = 142).

Athletic Training Students' Perceptions on the Psychological Affects of Injury

Results indicated that, in general, the students agreed that athletes are psychologically affected by injury (mean = 4.67 out of 5). Using a one-way analysis of variance (ANOVA), we found no effect on students' year in school and their perceptions of the psychological effects of injury ($F_{4,174} = 2.24$, $P = .06$). In addition, our results suggested that students generally agreed that it is important to treat the psychological aspects of injury (mean = 4.47 out of 5). Using a one-way ANOVA, we found no effect on students' year in school and their responses on the importance of treating the psychological aspects of injury ($F_{4,174}=1.73$, $P = .14$).

Attitudes about the Effectiveness of Mental Skills as a Rehabilitation Tool

The AAI was used to assess the students' attitudes about the effectiveness of mental skills as a rehabilitation tool and included questions within four clusters (ie, goal setting, positive self-talk, pain management strategies, and imagery). Overall, the ratings of the effectiveness of psychological skills were positive; mean scores ranged from 4.31 to 6.17 (Table 3). Overall, the students thought that goal setting was the most effective way to aid athletes in recovering from injury (mean = 6.02) compared to pain management strategies (mean = 5.71), positive self-talk (mean = 5.67), and imagery (mean = 5.11).

A MANOVA was conducted on the students' effectiveness ratings on each of the clusters of mental skills and year in school. No main effect was found between students' ratings of the effectiveness of mental skills and year in school ($F_{4,16} = 1.47$, $P = .11$, $\eta^2 = .033$). The univariate results indicated one significant mental skills cluster (mental imagery) which differed by year in school ($F_{4,174} = 2.86$, $P = .025$, $\eta^2 = .06$). More specifically, the responses of junior students (mean[SD] = 4.95[0.79]) were significantly lower than entry-level master's students (mean[SD] = 5.95[0.82]) regarding perceptions of mental imagery as an effective rehabilitation tool.

DISCUSSION

The purpose of this investigation was to examine athletic training students' perceptions and academic preparation in the use of psychological skills n sport injury rehabilitation. In general, students' perceptions were positive. Additionally, regardless of year in school, they agreed that athletes can be psychologically affected by injury, and that it is important to understand how to treat these non-physical injury aspects, students overwhelmingly agreed on the importance of psychological aspects within the injury rehabilitation process.

The results of this study are similar to those reported by Hamson-Utley and colleagues[12] in which they found that both athletic trainers and physical therapists had positive perceptions of the effectiveness of psychological skills during injury rehabilitation and are presented herein for comparison (see Table 3). Looking closer at Table 3, it is important to note that nearly all reported means for the effectiveness of psychological skills by the students are lower as compared to the athletic trainers and physical therapists in Hamson-Utley et al.'s study.[12] This suggests that students may not have as positive of perceptions about the effectiveness of psychological skills during injury rehabilitation. It may also suggest that post-certification professional practice may serve to improve attitudes about psychological skills that students were once unsure would be useful in the rehabilitation setting.

The results of this study contradict Hamson-Utley et al.'s[12] findings in that no differences in perception of effectiveness were found between students who had and students who had not reported formal training in psychological skills. This is surprising given that we expected the students who reported formal training in psychological skills to perceive psychological skills as more effective and important within sport injury rehabilitation. This finding could be due to the fact that we sampled students whereas Hamson-Utley et al.[12] sampled practitioners in the field (ie, athletic trainers and physical therapists) who have years of experience using a variety of techniques within rehabilitation programs. Students who have yet to graduate may not have firm opinions or attitudes about what works best in rehabilitation programs as they are still learning and developing experience; hence, this could explain why formal training produced no significant differences in perception of psychological skill effectiveness.

Table 3. Attitudes about the Effectiveness of Mental Skills as a Rehabilitation Tool (Mean [SD] Compared to Hamson-Utley et al.[12])

		Our Study	ATs in Hamson-Utley et al.	PTs in Hamson-Utley et al.
1.	The use of mental imagery is an effective way to increase focus on specific rehabilitation exercises.	5.25 [1.01]*	5.47 [1.21]	5.62 [1.20]
2.	The use of mental imagery is an effective way to improve focus on specific goals of rehabilitation.	5.40 [.97]*	5.56 [1.19]	5.42 [1.27]
3.	The use of mental imagery is an effective way to decrease pain during rehabilitation sessions.	4.31 [1.32]*	4.73 [1.45]	4.91 [1.33]
4.	The use of positive self-talk is an effective way to decrease pain during rehabilitation sessions.	4.88 [1.34]	5.28 [1.33]	5.30 [1.25]
5.	The use of mental imagery is an effective way to maintain a positive mind-set during a long rehabilitation from sport-injury.	5.67 [1.05]*	5.95 [1.10]	5.69 [1.16]
6.	The use of mental imagery during rehabilitation can aid the recovery process by visualizing healing occurring within the body.	4.73 [1.40]*	4.98 [1.49]	4.85 [1.42]
7.	The use of mental imagery during rehabilitation from sport-injury has the potential to return the athlete to full participation faster than without the use of mental imagery.	4.75 [1.33]*	5.19 [1.30]	5.12 [1.24]
8.	Keeping a positive attitude during rehabilitation will help speed up the recovery process.	5.95 [1.08]	6.51 [0.89]	6.17 [1.05]
9.	Controlling the level of pain associated with rehabilitation exercises will help speed up the recovery process.	5.67 [1.21]	6.37 [0.93]	6.09 [1.17]
10.	Setting appropriate rehab goals will help speed up the recovery process.	6.12 [0.90]	6.41 [1.01]	5.97 [1.10]
11.	Keeping a positive attitude during rehabilitation will increase the athlete's adherence rate.	6.17 [0.86]	6.46 [0.80]	6.16 [1.00]
12.	Controlling the level of pain associated with rehabilitation exercises will increase the athlete's adherence rate.	5.77 [1.00]	6.35 [0.89]	6.04 [1.05]
13.	Setting appropriate rehab goals will help improve the athlete's adherence rate.	5.94 [0.97]	6.46 [0.81]	5.92 [1.07]
14.	The use of mental imagery during rehabilitation is an effective way to increase motivation to complete rehabilitation exercises.	5.51 [0.97]*	5.48 [1.19]	5.28 [1.20]
15.	The use of mental imagery to increase relaxation is an effective way to reduce anxiety prior to and following surgery.	5.44 [1.12]*	5.80 [1.21]	5.50 [1.24]

*$p \leq .025$

Note: These 15 items compose the Attitudes About Imagery (AAI) Survey.

Our findings indicate that nearly half of the students in this study have taken a university course in sport psychology or psychological skills training. This is similar to Larson et al.'s[7] research that reported roughly half of ATs in their study had taken a course in sport psychology. Although upper-level students in the current study were more likely to have taken a course in sport psychology or psychological skills training, roughly 20% of senior and entry-level master's students still had not had a course in the area. This is concerning since senior and entry-level master's students are close to graduation and may not take a course in sport psychology or psychological skills training before graduation. This finding is not surprising given that athletic trainers report that their ability to assist athletes in the psychological aspects of injury recovery is limited, and that they generally do not feel adequately prepared to implement psychological skills.[8,10,11] In addition, psychosocial intervention and referral (PIR) competencies are typically taught across the curriculum, not in a specific course (Hamson-Utley & Stiller-Ostrowski, in progress). In fact, the tendency to have a single course in a program to meet the PIR content is uncommon; hence, this could explain why only about half of the students in this study have taken a university course in sport psychology or psychological skills training. It is possible that the delivery of the PIR content should be encapsulated within one course (eg, Psychology of Sport Injury), versus spread across a variety of courses (eg, Advanced Topics, General Medical Issues, Rehabilitation) to offer the student a concentrated, practical approach that is likely not afforded when just a few competencies are addressed in each course; a concentrated instructional effort may increase attitudes and students' confidence in using psychological skills post-certification.

Of additional concern, the traditional sport psychology course, which is included in the education of the athletic training student to meet the NATA Competenices' requirements, may not address the use of psychological skills with injured athletes or illustrate the effectiveness of such skills when used within sport-injury rehabilitation. Adding to the quandary, it is likely that the academic preparation of the athletic training program faculty who are instructing the athletic training students do not possess the expertise to teach the psychology specific PIR content because of their lack of formal training and/or lack of confidence in implementing such techniques with patients. Hence, we recommend that instructors of the PIR content have adequate knowledge in the psychology of sport injury which may include faculty who are also Association for Applied Sport Psychology certified consultants (AASP-CC). What is promising, however, is that the students in this study indicated a strong interest in learning psychological skills to aid them in assisting athletes with their injury rehabilitation. In line with prior research,[10] the students thought that of all of the psychological skills mentioned (positive self-talk, pain management strategies, goal setting, and imagery), goal setting was the most effective way to help an athlete recover from an athletic injury. In addition, students had the most training in goal setting, had previously used it to rehabilitate an injury, and were most interested in receiving training in this skill compared to others. This finding is not surprising given that Hamson-Utley et al.[12] concluded that goal setting is the most widely used psychological technique today within rehabilitation programs by ATs and other sports medicine practitioners.[15]

Practitioners, however, may not correlate goal setting behaviors with mental skills, although it clearly falls into that category. Furthermore, students may see goal setting as more concrete when compared to other mental skills such as imagery, relaxation, or self-talk. The effectiveness of goal setting has been thoroughly investigated and shown to be effective by many researchers [16] and it is more widely used by practitioners and students alike, hence the higher mean rating of effectiveness in this study.

Limitations

Although all ATEPs follow the same set of guidelines to educate students, the convenience sampling technique used to recruit students from nine specific institutions in this study may have limited the generalizability of the findings. Future research on this topic should use stratified random sampling. In addition, it is reasonable to assume that some students have not yet progressed far enough in their academic coursework to take a class in which psychological skills are emphasized (eg, sport psychology). Therefore, it may prove more accurate to only survey athletic training students who are either graduating or in their final semester of coursework instead of all levels.

Future Research Recommendations

Unfortunately, since the questionnaires used in this study do not specifically ask students to rate their perceived future implementation of these psychological skills, future research could be done to include this information and compliment the work of Stiller-Ostrowski and Ostrowski.[11] Other future research could also examine pedagogical effectiveness when teaching the psychosocial intervention and referral content area; specifically, how the content is delivered (ie, lecture versus hands-on) and how it is assessed (ie, written versus practical exam). This is particularly important given the lack of training related to the psychosocial competencies that athletic training students in this study as well as ATs in other studies have reported.[8,11,19]

Qualitative approaches to these questions should also seek to identify ATs who effectively and routinely use psychological skills in their rehabilitation programs. A better understanding of the theoretical and practical experiences that led to their success can shed light on best practices, and, in turn, expose possible avenues for curricular change. Likewise, longitudinal methods could also reveal where students and ATs receive the experience of applying psychological skills to the injury rehabilitation process.

CONCLUSIONS

Recommendations for Program Directors and ATEP Faculty

Our findings highlight students' lack of training in psychological skills and point to the importance of university faculty teaching psychological skills, their use, and their effectiveness within an injury rehabilitation program. Considering the emphasis on goal setting across the athletic training curriculum, it is imperative that those who instruct students prepare them to be well rounded practitioners, and place similar instructional emphasis on mental

imagery, self-talk, relaxation, and other psychological techniques as outlined by NATA Executive Committee for Education's guidelines (Table 1). The current trend in rehabilitative medicine is a holistic approach that includes both physical and mental therapies.[17] For students to be fully prepared, they must not only master goal setting, but also the implementation of other psychological skills within the rehabilitation programs of injured athletes. Athletic trainers are medical professionals who are experts in injury prevention, assessment, and treatment and rehabilitation of primarily orthopedic and musculoskeletal injuries to return patients to play when they are both physically and mentally ready. This study highlights that fact that while students are aware of the psychological aspects of injury, they may not be fully trained in their implementation or be aware of the breadth of psychological "tools" in their rehabilitation tool kit. Psychological skills integrated into rehabilitation programs must be completely understood by the practitioner to be effective for the athlete or active patient.[18] We recommend that these skills be taught using hands-on methods and assessed through practical exams to ensure that the athletic training student is competent in employing psychological skills in future work settings. This type of pedagogy has been shown in recent research by Hamson-Utley and Stiller-Ostrowski to increase confidence in graduating athletic training students' ability to use the aforementioned psychological techniques (unpublished data, 2010).

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