ATHLETIC TRAINING EDUCATION JOURNAL

www.nataej.org
ISSN: 1947-380X

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www.nataej.org
ISSN: 1947-380X

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COLUMN:
EDUCATION LITERATURE

Robert S. Behnke Address to the Attendees of the NATA Athletic Training Educators' Conference

February 21, 2009

Danny T. Foster, PhD

There is a great deal to learn from our colleagues who have had critical and noteworthy contributions to athletic training education. We are pleased, therefore, to periodically include the Robert S. Behnke keynote addresses from recipients of the Sayers "Bud" Miller Distinguished Educator Award in the current and forthcoming issues of the Athletic Training Education Journal. In this issue's special section we present the speech from Danny T. Foster, PhD who received the Distinguished Educator Award in 2005. Dr. Foster's career highlights can be found at http://www.nata.org/DEAwinners#2005.

IT TAKES COURAGE TO TEACH

I should tell you that I am officially a "Baby Boomer;" however, I identify more with the "Silent Generation." Maybe to extend the conversation further I've always thought I was born in the wrong century! And to clarify some of my remarks today, I want you to know that I am very close to the thoughts of Parker Palmer, so you will recognize that as I get further along.

I have been to Washington DC a couple of times before but still to this day, I have not visited the Vietnam Memorial. As a veteran of the Vietnam War, I was stationed most of my tour of duty at a remote fire base called LZ Mary Ann. Thirty-eight years ago on March 28, 1971, we were overrun by a North Vietnamese Sapper attack. I recall there were 113 of us on the firebase at the time and on that early morning 31 were killed and 78 were wounded (109 of 113). I just learned from reading a book about the incident last month, almost 38 years later, that the perimeter company was considered unprepared, lazy in their practices, and lackadaisical in their discipline. Likewise, I learned that the battalion was lax in keeping the troops alert. In contrast, the Sappers were very effective. Even though I knew none of this at the time and I saw no Sappers, I was plenty scared. But I was in the right place at the right time to avoid being killed or taken prisoner.

That luck in place and time seems to be a pattern for me. My first experience in the accreditation of an education program followed my first year of membership on the old PEC (Professional Education Committee) and it turns out that I was paired with Sayers "Bud" Miller, who served as the chief officer of the onsite visit. My very last accreditation visit while still a PEC member was with Robert Behnke. He was a team member and I was the chief. What a great education for a young guy from Iowa. So I hope that gives you a measure of the depth and color that receiving the Distinguished Educator Award in 2005 means to me.

Being in the right place at the right time is definitely good in my experience, but being able to take advantage of it to do something good is even better. That takes courage of the heart.

The Heart of Teaching

After three decades of trying to learn to teach, I have found that every class comes down to this: my students and I, face-to-face, engaged in a conversation that connects us all to a subject. Sometimes, I lose heart when teaching and that connection gets broken.

I lose heart in part because teaching is a daily exercise in vulnerability. I don't need to reveal personal secrets to feel naked in front of a class. All I need to do is write something on the whiteboard while students doze off. No matter how technical or abstract my subject may be, the things I teach are things I care about.

Unlike many professions, teaching is always done at a dangerous intersection involving personal and public life. A good athletic trainer must work in a personal way, but avoid public disclosures. A good lawyer must work in a public forum, never swayed by personal opinion. But a good teacher stands where public and personal meet and connect. Believe me, it can feel like crossing a Washington area freeway on foot. In trying to connect, we make ourselves and our subjects vulnerable to indifference, judgment, and ridicule. To combat this, it is natural to distance ourselves from students and subjects. I've done that—I definitely was not in the right place at the right time or very courageous.

I have faced fear and felt utterly vulnerable in the face of that fear in the classroom. It was not war, but the feeling was there and more subtle in education, yet just as important to me. Even then, another way to face vulnerability in teaching is to use some

teaching techniques. Technique is what teachers use until the real teacher arrives. I have come to find as many ways as possible to help that teacher show up. When I teach poorly, it is not because of poor technique. It is because I have allowed fear to get the upper hand. A teacher's nemesis is not ignorance, but fear. Fear gives ignorance its power.

We are always teaching in the face of fear - it paralyzes learning. That is why we all need the courage to teach. I have found that fear comes from three primary sources: my dominant way of knowing things, the lives of my students, and my personal self.

To deal with the first of these fears, I have found that being objective and evidence-based is my prized way of knowing science, medicine, and education. What I have come to fear at times is to consider a subjective answer when it might be most appropriate. That is a subtle fear but one that has forced me to deal more with facts than the inner wisdom of emotion. How dangerous is that? Is it more desirable to have students who have technical competence but no inner voice that says "this picture doesn't quite fit" or to have students with the wisdom to bring their whole being to the issues that we all face?

Being objective, however, drives me to teach students about the power of facts, and ultimately to teach them to have power over their world. My subjective side wants them to have a mutual destiny with their world. I asked myself a long time ago, "How would my life change if I let the world talk back?" And actually, I was thinking recently, "Why does a biologist think about and study nature?" I think it may be to give nature a voice so we can hear what it needs from us. Being obsessively objective is a way of knowing that seems very limiting to me, so teaching facts and sharing insights about ways of knowing takes a lot of courage.

I've heard many say that the biggest obstacle to good teaching is bad students. Here is a second fear that I think paralyzes learning. The hallmark of bad students, known to all of us, is silence. It overcomes our classes whenever we ask a question. What does the silence mean? Is it indifference, cynicism, hostility; are they brain-dead?

I think a different diagnosis may exist about the reason for silence in my students. It may be the same silence known in other settings: the silence of the powerless in the presence of the powerful; the silence of marginal people, told their voices have no value. In silence there is safety, but still silence born in fear. This is part of the lives of our students.

My own fearful heart makes me as vulnerable as the other two fears in teaching that I have mentioned. To teach well I have to reveal things that I care deeply about. I think the courage to teach is the courage to risk the judgment that comes when I express my passions in public. There are fears of the peer review process for promotion and tenure for sure, but another source of fear easily as powerful as that, but hardly ever named, is the fear of the judgment of the young. Nature decrees that youth be dependent on their elders. Human nature decrees that the converse be true as well. When the young do not consent to be mentored by their elders something vital has been taken from the elder's life. Health comes when we have the courage to acknowledge that even as the young need our guidance, we need their vitality to help us live fully and well.

I have lived fully and well at times, still learning how to teach, still in the right place and trying to make sure that it is at the right time, by mustering up the courage to share myself with my students, and at times with you, which I think is a good thing. This is something I learned a long time ago with members of the PEC and continuing today with all of you.

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ORIGINAL RESEARCH

Student Perspectives on Burnout

Stephanie M. Mazerolle, PhD, ATC, Kelly D. Pagnotta, MA

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Context: While burnout has received a great deal of attention within the athletic training profession, there is little data on how it affects athletic training students (ATSs).

Objective: To determine what factors influence burnout among ATSs enrolled in accredited athletic training education programs.

Design and Setting: Basic, interpretive qualitative study employing on-line interviews with students enrolled in Commission on Accrediting Athletic Training Education (CAATE) athletic training programs.

Patients or Other Participants: Each of the 14 (7 males, 7 females) ATSs, who represented 3 NATA districts, had completed at least one full academic semester of coursework and a clinical assignment. The average age of the participants was 21.4 +/- 1.5 , eight of the ATSs were seniors, and six were junior level students.

Data Collection and Analysis: All interviews were conducted electronically with three separate days of postings using an on-line platform. Interviews were cut and pasted verbatim and analyzed inductively borrowing from the grounded theory approach. Peer review, data triangulation, and multiple analyst triangulation were completed to ensure credibility and trustworthiness of the study's findings.

Results: Twelve out of the fourteen ATSs stated that they have experienced burnout, and all associated a career in athletic training with the potential for burnout. Role Strain and Time emerged as the two major factors leading to burnout, and many capitalized on Social Support and Personal Time to alleviate the stressors causing their burnout.

Conclusion: Athletic training students must find time to balance multiple roles and responsibilities, however, when they feel unable to adequately address those roles, they experience burnout. Program directors and educators are encouraged to promote stress management strategies with their students, and encourage them to seek involvement in outside activities to help increase their ability to regulate and control their stress levels.

Key Words: stress, time, clinical education, role strain

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Full Citation:
Mazerolle SM, Pagnotta KD. Perceptions of burnout from the students' perspective. *Athl Train Educ J*. 2011;6(2):60-68.

Perceptions of Burnout from the Students' Perspective

Stephanie M. Mazerolle, PhD, ATC and Kelly D. Pagnotta, MA

Experiencing burnout is not uncommon for allied health care professionals[1] or athletic trainers (ATs), particularly due to the personal and emotional relationships forged with their patients.[2-9] The condition, which has multiple descriptions and facilitators, is most often characterized by periods of emotional depletion (emotional exhaustion), cynical attitudes toward one's job or patients (depersonalization), and the tendency to negatively evaluate oneself or their work (reduced personal accomplishment).[10] Despite the many definitions, burnout can be simply classified as a condition that results in emotional[10-13] and physical[14] exhaustion facilitated by prolonged stress.

Athletic trainers have been shown to exhibit higher levels of burnout than those in other helping professions, such as teachers and social workers,[4] and are greatly concerned about the potential for burnout due to the nature of their work environment.[15] Personal and organizational factors, such as stress level, social support network, personal time, workload, role conflict, and organizational demand, have been documented as predictors of burnout for health care providers.[2-6,9,16] Specifically, for ATs, personal characteristics predictive of burnout include stress level and leisure time, while organizational factors include coaches' pressure to medically clear an athlete, workload (number of athletes to care for), and frequency of injury-free seasons.[6] The Maslach Burnout Inventory (MBI) is considered the gold standard for measuring burnout among health care professionals,[10-12] and is commonly utilized by athletic training researchers when investigating the concept.[4-9,17] The instrument is built upon the operational definition of burnout as established by Maslach and her colleagues, which includes emotional exhaustion, depersonalization, and decreased personal accomplishment.[10-12] Recently, however, Clapper and Harris[5] recognized the need to have a version of the MBI specific to athletic training to better represent profession-specific contributing factors to burnout. The instrument, termed the Athletic Training Burnout Inventory (ATBI), incorporates elements from the established MBI, but also includes observations made by athletic training researchers[2-4] regarding organizational support, time commitment, and role strain/overload.[5] The ATBI reflects the most frequently cited factors that create the potential for burnout among ATs working in the clinical setting.

While the concept of burnout has been widely studied in the athletic training profession, a majority of the literature has examined those already certified and working in the collegiate setting using the MBI.[4-6,8-9,15] This leaves an identifiable gap in the literature, as these studies have not addressed the occurrence of burnout among athletic training students (ATSs). The prevalence of burnout among graduate students in comparable allied health care professionals is well documented, particularly for nursing, medical, and physical therapy students.[18-22] Generally speaking, undergraduate students have high stress levels,[23] which is no different for an athletic training student.[24] However, ATSs are also required to engage in clinical education experiences, which require additional time and preparation and can lead to increased stress levels. Riter *et al*.[7] recently reported that undergraduate ATSs demonstrate a moderate, cumulative degree of burnout from their roles and responsibilities associated with clinical education, especially during their final semesters of academic study. Although an important finding, the study had several limitations, including a small sample size and recruitment of subjects from one undergraduate athletic training program.

Therefore, the purpose of this study was to build upon the existing literature on burnout, and to specifically extend the work of Riter *et al*.[7] who investigated the presence of burnout among undergraduate ATSs. Moreover, because experiences of burnout can be very personal, we are utilizing a qualitative approach to closely examine this phenomenon, which has infiltrated all levels of the athletic training profession. Specifically this study sought to answer the following questions:

1. Do ATSs perceive to experience burnout as it relates to their roles and responsibilities as a student?

2. If ATSs are experiencing burnout based upon their personal assessments, what factors directly contributed to the experience; and

3. What potential influences does this have on their outlook of the profession of athletic training?

METHODS

Qualitative methodologies, although not a new form of scholarship, are emerging as useful in internet based research methods, particularly in the form of interviews.[25] This type of data collection methodology has many advantages, including the inclusion of a geographically dispersed sample of participants, communication between the researcher and participant at the convenience of the participants, ample time for reflection[26] before responding, increased anonymity, and the reduction in misinterpretation of the data.[25] Seeking to capture these advantages and to answer the research questions, the researchers opted to use a web-based management system to provide a secure place to store data and to conduct the interviews. All participants were assigned individual IDs and passwords, all responses were only viewed by the researchers, and there was no interaction among participants. To confirm and support the findings of the online portion of the study, Likert-scaled questions, borrowed from burnout inventory scales,[5,10] were used to gain a quantitative representation of the student's perceptions. This step, methodological triangulation, is often used in qualitative methodology to ensure data credibility.

Participants

Athletic training students who had completed at least one full academic semester including a clinical practicum experience were purposefully recruited for participation. The inclusion criteria included enrollment in a Commission on Accreditation of

Athletic Training Education (CAATE)-accredited athletic training program and completion of one semester of clinical education and associated coursework, and access to a computer/internet. The researchers initially capitalized on preexisting professional relationships with program directors at CAATE-accredited schools to identify students meeting the criteria (convenience sample).[15,27-28] Additional participants were recruited by a snowball sample[15,27-28] by recruited participants, as well from other colleagues with connections to students enrolled in CAATE-accredited programs. Recruitment of subjects ceased once we met data saturation.[15,28] Institutional review board approval was obtained prior to data collection and the participants voluntarily consented to participate.

Fourteen (7 males, 7 females) ATSs with a mean age of 21.4 ± 1.4 from 8 CAATE-accredited athletic training programs participated in the on-line research study. The volunteers represented three National Athletic Trainers' Association (NATA) districts, and were in their fifth semester (± 2) of their athletic training program. Four of the 14 also held positions within their athletic training student organizations (ie, president, treasurer), and all but one participated in extracurricular activities (intramurals, church groups, etc.). On average, the group spent 18 ± 7.5 hours engaged in clinical education experiences (clinical assignments) and 10 ± 7 hours studying each week. Interestingly, males reported spending more time studying than females (14 ± 8 = males; 7.5 ± 4.0 = females). Table 1 summarizes the individual participant demographic information.

Pilot Study

Prior to data collection, a pilot study was conducted to establish credibility and reliability of the data collection methods and findings. Nine ATSs (4 males, 5 females) at one university who were either juniors or seniors participated in the pilot study. The data was compiled and an initial analysis performed. The participants were instructed, after completing the study, to provide any feedback to the researchers for improvements in clarity and flow of the interview instrument, as well as the background questionnaire. This was an important step to ensure the questions were not misinterpreted, as well as a means to establish face validity due to the on-line nature of the study. Upon evaluation of the data and feedback generated by the pilot study participants, several of the questions were reworded or reorganized for clarity or to avoid redundancy. Data generated by the pilot study was not included for analysis.

Data Collection Procedures

After completing an initial background questionnaire, the participants were sent instructions for study completion. The background questionnaire included demographic questions including age, semester standing, as well as other information regarding the student's clinical experiences. Additionally, students completed a series of 7 Likert-scaled questions borrowed from the MBI and ATBI (1 = never to 6 = always true) on burnout. In total, participants were asked to respond to 7 questions borrowed from both validated measures of burnout. This step, referred to as methodological-triangulation, was included to help confirm/reject the findings generated by the on-line interviewing.[28] Since no verbal communication took place during the online portion of the research, these few borrowed questions were intended to be supplemental and help support or refute the data collected through the online interviews. Furthermore, the Likert scale questions were used previously in athletic training research,[5-7] which should help draw parallels upon data analysis.

All participants completed a series of 11 questions over the course of one week during the mid-point of the spring semester. Questions were posted on Monday, Wednesday, and Friday mornings. An email broadcast was sent to each participant to alert them of the new posting, and to remind them to complete previous questions. Participants were able to log in and out at their leisure to respond to new or edit previous responses. The

Table 1. Participant Demographic Information

Name	Gender	Age	NATA District	Academic Standing	Current Clinical Rotation
Lisa	F	22	1	Senior	DIII College
Stephanie	F	21	2	Junior	High School
Robin	F	20	2	Junior	High School
Sam	F	26	1	Senior	Spring Football and MBB
Kayla	F	22	2	Senior	High School
Scarlett	F	21	1	Junior	High School
Danielle	F	22	1	Senior	D-IA
Rick	M	21	1	Senior	Men's BBALL
Karl	M	21	4	Senior	M/W BBALL
Sven	M	22	1	Senior	DI Baseball
Cade	M	20	1	Senior	Women's LAX
James	M	22	1	Junior	Women's LAX
Bobby	M	20	4	Junior	ER, Spring Football
Luke	M	20	2	Junior	High School

structured interview questions were derived from previously existing literature on burnout including the MBI and the ATBI. Two athletic training scholars with qualitative research experience reviewed the questions for clarity, interpretability, and content prior to data collection. Upon completion of data collection, which was based upon data saturation[15,28] and equity of participants (gender and academic standing), the data was cut and pasted into a Word document for analysis. All participants were assigned a pseudonym for confidentiality.

Data Analysis

The interview data was analyzed inductively, borrowing from the grounded theory approach,[27,29] as well as from the steps discussed by Pitney and Parker,[28] and included:

1. All interview transcripts were carefully read independently by two researchers to gain a holistic sense of the data collected.
2. Key information (data units) was identified as it related to the purpose and research questions established at the outset of the study.
3. Each data unit was assigned a label to capture its meaning (open coding).[27,29]
4. Labels were thematized as emerging categories developed.
5. Relationships between categories were evaluated and examined, and then collapsed together or separated when appropriate (axial coding).[27,29]
6. All final themes were reviewed with the research team and peer reviewer before a final presentation of the data was confirmed.

Establishing Trustworthiness

Trustworthiness was established by peer review,[27-28] triangulation,[30] and multiple analyst triangulation.[28] An AT with more than 15 years of research and athletic training experience provided a peer review. This peer evaluated the data and emergent themes, as interpreted by the researchers, to determine credibility and accuracy with the interpretations. They also provided the final confirmation of the emergent themes. The data collected was triangulated using two distinct methods, including participant triangulation and methodological triangulation. Participant triangulation was secured by interviewing ATSs enrolled at different programs in different regions of the country, as well as by including ATSs at varying academic levels (juniors and senior level students) and both males and female students. Although participant triangulation is not considered a traditional triangulation method,[27,30] it was employed in this study to gain multiple perspectives to ensure that the data collected was an accurate reflection of the emerging themes and the opinions shared by the participants. In addition to completing the on-line interview questions, all participants completed a background questionnaire, which included several measures of burnout. This combination of interview and a questionnaire response was used to add credibility to the findings.[31] Utilizing several researchers to analyze transcripts and discuss emergent themes can help reduce the possibility of misinterpreting the data .[28] In this particular case, 3 researchers were involved in data analysis process.

RESULTS

Twelve of the fourteen ATSs interviewed indicated experiencing burnout at some point during their academic preparation. James stated, “I have definitely experienced burnout as an AT student.” Kayla concurred, saying, “I have experienced a few cases of burnout [during my studies].” When asked how they defined burnout, the participants identified emotional and physical exhaustion with the condition, and linked it to experiences of prolonged stress. They also felt burnout was experienced more often at the end of the semester or academic school year, due to the cumulative effective of their demanding schedules. Kayla continued, “It really is a snowballing effect. It just progresses.” Moreover, the participants, when asked whether burnout is a concern for the profession of athletic training**,** all were in agreement that it was a major concern. Danielle’s response was, “I think over time, some people will eventually have trouble keeping a good work ethic and enthusiasm for the profession, considering the high demand of hours and stress that is put on athletic trainers.” Karl simply said, “Absolutely, it’s a concern.” While several factors were discussed as contributing factors (workloads, responsibilities), the 2 most often cited factors contributing to burnout among ATSs were time and role strain (Figure 1).

Factors Causing Burnout

Time

Time-related issues centered on the amount of time necessary for the student to meet their responsibilities as an ATS, as well as those of being a college student. Bobby discussed why he experiences burnout, stating, “There is not enough time in a day to do everything that I need to get done and that I have to go hard all day long to make sure that I can even keep up [with all my academic and clinical responsibilities].” Robin, another participant, also attributed her experiences of burnout to the

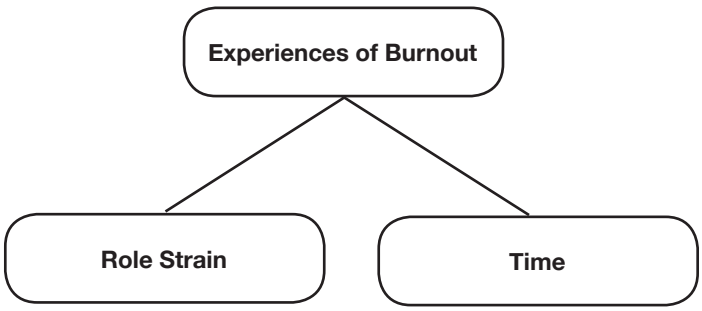

Figure 1. Sources of Burnout for Athletic Training Students in CAATE-accredited Programs.

limited time during the day. She discussed her sources of stress as coming from a multitude of time-dependent activities, which over time, lead to feelings of burnout. She replied,

> *"Personally, my greatest source of stress comes from having limited time to work on schoolwork after performing clinical hours. We could be covering a team anywhere from 3 hours to 6 hours on a school night depending on what was going on. That on top of 3 or 4 classes every day begins to add to my stress level. I am on scholarship at the university I attend and have to maintain a certain grade point average and I also strive give my best effort in everything I do. Over time this can be overwhelming."*

Limited time also impacted the ATS's ability to enjoy activities outside their academic and clinical responsibilities. Cade commented, "I find that my greatest source of stress comes from the fact that I have such limited time to spend for myself and the people that I care about. After a while, it gets frustrating." Sawyer had a similar opinion,

> *"I feel that I have felt burnout at some points, but it has only been temporary. I think the amount of hours I needed to work, mixed with athletes who were not appreciative for the time you put in for them, and stressing about schoolwork was the reason for the burnout. It was the struggle to manage my time between my clinical hours, schoolwork, and social life. It is tough to get all my school work done while getting all the hours I need for clinical, and it is hard to stay in touch with friends."*

The time commitment associated with their athletic training responsibilities, particularly the time spent completing clinical education hours, limited the students' abilities to accomplish other tasks and assumed responsibilities. This is confirmed by the participants' responses to 2 of the Likert scale questions, which indicate a moderate level of concern with time issues related to extracurricular activities (see Table 2).

Role Strain

Time-related issues also facilitated role strain for these ATSs. Role strain, which precipitated experiences of burnout, was related to the time commitment necessary to be an ATS. The students experience *role strain* through role conflict, as they often struggled to fully meet the responsibilities associated with the multiple roles with which they were involved (student, ATS, friend, etc.). Stephanie said, "I find my greatest source of stress juggling my time between class, school work, and my internship while still trying to have free time to hang out with my family and friends." Rick highlighted workload as the major factor, stating, "The workload and hours being an A.T. student can be stressful and exhausting." Samantha touched on the influence of time and the assumption of multiple roles, which may not always allow for completion of all responsibilities and the strain it can initiate.

> *"I was experiencing burnout because I had just become President of the Sports Medicine Club, I am involved in many other university activities, I have a part time job, 5 classes, a clinical rotation, I am married, and I am trying to be all of these roles, and to the best of my ability. By the time, it was midterms I was swamped. I could no longer manage as I had before I had to restrict in some areas and increase in others, which was very overwhelming."*

As highlighted in Table 1, the participants identified being exhausted and wanting more time to spend on social/personal interests and with family and friends. *Role strain* and *time*-related issues are separate factors contributing to burnout for ATSs. A lack of time, however, can precipitate role strain and burnout for students.

Coping Strategies to Reduce Burnout

Two of the 14 ATSs felt that they had not experienced burnout. Their strategies to avoid burnout during stressful situations were twofold, and are presented in Figure 2. The other participants, despite discussing similar burnout prevention strategies, reported being unable to cope as successfully with stress and their responsibilities as these two.

Social Support

Social support is simply defined as a group of people or an individual who provided support and shared other or outside

Table 2. Mean Scores to Burnout Inventory Questions

Question[a]	Mean ± SD[b]
1. I feel emotionally drained from performing the duties of an athletic training student.	3.2 ± 1.1
2. I feel emotionally exhausted after my clinical rotation (end of each day).	3.0 ± 1.4
3. I feel as though I am working extremely too hard.	3.5 ± 1.2
4. I feel as though I have too many responsibilities as an athletic training student.	2.9 ± 1.1
5. I wish I could spend more time with my friends and family.	5.0 ± 1.6
6. I wish I had more time to spend on extracurricular activities.	4.5 ± 1.0
7. I feel overwhelmed by the duties I am expected to perform as an athletic training student.	3.0 ± 1.3

[a] Questions were adapted from the Mashlach Burnout Inventory (MBI) and Athletic Training Burnout Inventory (ATBI)
[b] Likert scale ranging from 1 (never) to 6 (always)

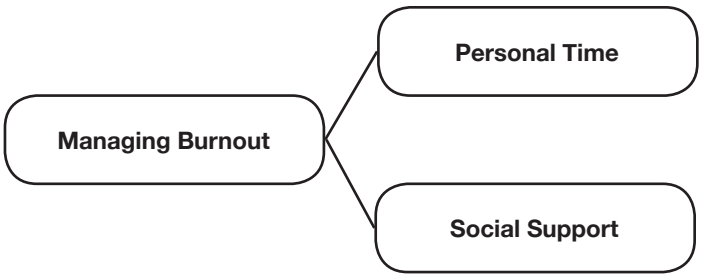

Figure 2. Ways Athletic Training Students Address Burnout

interests, which ultimately helped the student reduce stressful experiences. Danielle said, "I have not experienced burnout. Although there was a time where I worked long clinical hours and had very few days off in the span of a 4-month period, my friends/ classmates helped me cope with the stresses." Cade had similar thoughts about support groups, particularly his fellow peer ATSs, and said, "I have found that the easiest way to cope with the amount of stress that is put on me through my close relationships with the other athletic training students, as they are able to not only understand what I am going through, but also to help with classes and clinical." Another ATS valued a roommate who provided a distraction away from the daily grind of schoolwork and clinical responsibilities. She said, "My roommate and I have been rooming together for three years now so we have established TV nights to watch certain TV shows to take a break from school [and the stress]. "

Personal time

Personal time simply characterized the participant's utilization of free time to rejuvenate or cope with the stress in their lives. Many of the participants discussed proactive strategies as a means to prevent burnout, as they recognized prolonged periods of stress without relief, would or has lead to burnout for them personally. Regardless of the stressor, many described the importance of stress management activities as a way to avoid or mitigate the negative influence of burnout. Paul said, "To cope with stress I like to work out. I feel that it lets me burn off some energy and also gets my mind off of how busy I am." Sven continued to say, "I think burnout can be prevented as long as you find a way to de-stress." Stephanie, echoed Sven's comments about finding a way to distress, replying, "When I feel overwhelmed with school, I'll take an evening off and hang out with my family, boyfriend or friends or watch a movie instead of working on an assignment. Usually that time off is enough to "de-stress" me or at least lessen the stress to where it's bearable again." Time for leisure activities was a central point made by all the participants about preventing burnout, or at least managing their responsibilities as ATSs. Karl stated, "I do something that I enjoy and that takes my mind completely off the source of stress. It is usually, something like hanging out with friends, watching TV, playing sports, exercising, or playing video games."

DISCUSSION

The prevalence of burnout is well documented in the athletic training profession,[2-9, 15, 17, 32-36, 38-43] yet little is known about its occurrence in ATSs. Our purposes, therefore, were to determine whether burnout is a concern for ATSs and identify what factors may contribute to its occurrence during the academic school year. Analogous to the findings of Riter *et al*.,[7] our findings indicate that ATSs do experience burnout during their undergraduate studies. Their experiences of burnout were directly related to the *time* and *strain* related to fulfilling their roles as an ATS, which corresponds to the work of Stigler et al.[24] who reported academic stress (workload, clinical responsibilities, etc.) as the primary concern for ATSs.

The terms stress and burnout are often used interchangeably; however, the two are different, and are often differentiated by physical versus emotional exhaustion, as well as duration of those stressors. Stress is the body's response to a stimulus, but is often a result of an individual being overwhelmed by multiple roles, demands, and responsibilities. A person who is experiencing stress is still able to manage his or her responsibilities. Burnout is more characterized by a lack of interest and motivation for once enjoyable tasks. Often burnout causes a void of feelings, emotions, and abilities to perform once easy tasks. Chronic stress from too many responsibilities is often a precursor to burnout, and for the AT, it stems from long work hours, limited personal time, high workload, and role strain.[2,4,6,32] Our results corroborate previous research, linking workload and a lack of personal time, as major factors related to elevated stress and burnout.[5-6] As illustrated by our data, ATSs feel the most stress due to the *time*-related constraints required to balance their rigorous academic loads and clinical responsibilities with making time for outside activities and obligations. While many discussed the state of current stressors, they also indicated that many of the stressors were developing, and if not alleviated, would result in burnout. *Role strain*, a conflict manifested when an individual has difficulty meeting a variety of personal/professional obligations most often due to the time necessary to fulfill them, appears to best describe the experiences of burnout for ATSs. This is consistent with previous research on burnout,[4,15] work family conflict (WFC),[33] and role strain[34-36] within athletic training, which can be predicted by the number of hours worked. Interestingly, the 2 ATSs who did not report experiencing burnout, cited *social support* as the primary reason for its absence. The 2 students who did not experience burnout, worked similar clinical hours as the other participants, but appeared to be more aware of their thresholds for stress, and were able to prevent burnout through social support and other stress management techniques. This supports other research, which illustrates strong social support and peer support as mitigating role stress[37] and increasing life balancing.[38]

Personal time and *social support* were the 2 major strategies that emerged as effective coping mechanisms for this group of ATSs. Taking advantage of personal time with exercise, extracurricular activities, and leisure activities, is often advocated as an effective stress management technique and a common coping mechanism utilized by graduate assistant athletic trainers.[39] Taking time away from the role of an ATS was seen as a way to rejuvenate and refocus for this particular group of students. Capitalizing on personal time as a method of rejuvenation was documented as an essential component for the AT to remain committed to their

roles as an AT at the secondary level[40] and to avoid the pitfalls of burnout from job overload. Moreover, the concept of time spent in activities outside the profession was recommended by Hunt[41] as an important coping response for prevention of burnout, and has been cited multiple times within editorials[32,42] and empirical research studies[24,38-39] as important for athletic training professionals to evade burnout. Soliciting and protecting personal time is also documented as an important way to promote a balanced lifestyle for athletic training professionals.[38,42] Therefore, strategies such as saying "no" and prioritizing time during the day for personal obligations are also important stress reducing strategies.

The concept of *social support*, particularly through one's peers, has not only been viewed as an influential factor in alleviating the role strain among dual-position ATs at the high school level,[34] but also as an important aspect to the socialization of one's role in the work place, [43] persistence in an athletic training degree program,[44] a means to successful balance one's professional and personal lives,[38] and as an effective coping strategy for work stress for Division I graduate assistant athletic trainers.[39] In a study investigating work life balancing in the Division I clinical setting,[38] social support was important on multiple levels, including at the workplace and in an AT's personal life. The concepts of teamwork and mutual understanding regarding job-related demands and responsibilities and the willingness to help out a peer were fundamental for the AT to have more personal time. Furthermore, support and understanding from a network of family and friends outside of the profession allowed the Division I AT to find a sense of normalcy, thus achieving a more balanced lifestyle. Camaraderie among fellow ATSs can often help the student look beyond the stressful situation, or at best feel supported and not isolated, while managing their assignments and responsibilities. Several participants' statements directly relating social support as important in stress reduction and management of their responsibilities support this theory. Moreover, the positive interactions among peers, work life balance, and burnout prevention strategies were also linked to professional role maintenance.[40]

The ATSs who participated in this study were acutely aware that burnout is a major concern for the profession. Burnout, which is often a precursor to job dissatisfaction and eventual attrition, can be prevented. Providing ATSs with knowledge regarding the signs and symptoms of burnout, as well as effective strategies to manage and cope with the condition, will empower them to be proactive and avoid the negative consequences of prolonged stress. The most effective strategies appear to have overlapping purposes, and it may be assumed that a reduction in stress may create a balanced lifestyle and reaffirm a professional's commitment to their roles and responsibilities.

Implications

Our results corroborate previous research regarding sources of stress, burnout among athletic training professionals, and effective coping strategies to manage stress and reduce experiences of burnout. Table 3 highlights key strategies for both ATSs and their academic programs. Students are encouraged to develop an enriching social support network, which includes peer ATSs, family, and friends outside of the profession of athletic training. A few of the participants in this study provided insightful examples for social support, including AT club intramural teams (basketball, flag football, etc.), scheduled movie nights with roommates, and study-free nights. Furthermore, ATSs need to develop effective time management skills (to-do lists, multi-tasking, prioritizing) and develop healthy habits such as a proper diet and exercise to help alleviate stress and potentially prevent burnout. Many of the participants discussed scheduling time during each day to reduce stress, and that failure to include this time was correlated with

Table 3. Recommendations for Reducing Burnout in ATS

Education Programs/Personnel

1. Encourage participation in outside activities.
2. Continue to follow CAATE guidelines for days off.
3. Educate ATSs on the signs and symptoms of burnout (exhaustion, lack of motivation, depression, change in sleep patterns, etc.).
4. Educate ATSs on effective stress management techniques (meditation, exercise, set boundaries, proper diet, sleeping habits, etc.).
5. Encourage and promote communication between all members of the athletic training education program including the student, clinical instructors, and program staff.
6. Establish a mentorship program (peer or with clinical instructor) to help promote support networks for students.

Athletic Training Student

1. Utilize time management strategies (plan ahead, to do lists).
2. Set a schedule or routine.
3. Take time to reward yourself (things to look forward to after a challenging week).
4. Take advantage of support networks.
5. Develop effective stress management activities.
6. Communicate with program personnel (clinical instructors, academic faculty).

higher levels of stress and feelings of burnout. Athletic training educators and program personnel are encouraged to provide students with a support system or strategies to find one, elicit communication between all members of the education team (clinical instructor, student, etc.), and promote healthy habits for their students.

Limitations and Future Research

Our study utilized a web-based management system to facilitate and collect data. Although a viable data collection tool, we did not conduct follow-up phone interviews to clarify or confirm responses to the questions posted on-line. Steps, including a pilot study, however, were taken to reduce the chance for misinterpretation of the questions posted. Despite this inclusion, future authors are encouraged to incorporate multiple mediums of data collection, including in-person interviews or focus group sessions to confirm the study's findings. While our results appear to support the work of Riter el al.[7] and indicate that burnout is affecting ATSs, the data is limited to a small, regionally biased sample group. Future investigations should include a national random sample of ATSs to confirm the emergent data presented here. The data collected and presented in this paper were only accumulated at one point in time, and therefore do not take into consideration time of year influences. A longitudinal study may more accurately assess students' experiences of burnout, as suggested by Stigler *et al.*,[24] stress for an ATS is often impacted by the time of year (ie, mid-terms, finals). Moreover, the findings presented were based upon the participants' reflections, opinions, and perceptions of burnout. Although they were asked to define burnout, and the definitions were fairly accurate, what they may interpret as burnout personally may in actuality only be high levels of stress and not genuine burnout. Future inquiries may need to distinguish more clearly between stress and burnout to better understand ATSs' experiences. Finally, there is a marked connection between burnout and retention.[33] Therefore, it is important to ascertain whether burnout experienced during academic preparation influences the student's entrance into the workplace and/or selection of graduate work/studies. A recent study[45] highlights that the number of hours worked is a precursor to burnout,[4] and a major influence for the ATS and recent graduate to not enter the workforce.

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APPENDIX. Interview Guide

1. What attributes drew you to the career of athletic training?
2. What do you like the least about the profession of athletic training?
3. Where do your greatest sources of stress come from?
4. How to you cope during stressful times?
5. Define the concept of burnout?
6. Based upon your description or definition of burnout please discuss whether you have ever experienced it and what factors contributed to your experiences (if not why not)?
7. Do you think burnout is a concern for the profession of athletic training (please explain)?
8. What issues or concerns are facing the profession of athletic training?
9. What can be done to prevent the occurrence of burnout in the work place?
10. Where do you see yourself in 5 years (post graduation/schooling) and why?
11. What has influenced your career choice/career path (as discussed in the previous question)?

ATHLETIC TRAINING EDUCATION JOURNAL

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ORIGINAL RESEARCH

Effect of Performance Feedback on Perceived Knowledge and Likelihood to Pursue Continuing Education

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Context: For practicing health care professionals, waiting for a teachable moment to identify a gap in knowledge could prove critical. Other methods are needed to help health care professionals identify their knowledge gaps.

Objective: To assess the effect of performance feedback on Athletic Trainers' (AT) perceived knowledge (PK) and likelihood to pursue continuing education (CE).

Design and Setting: Pre-test, post-test control-group design to measure PK and likelihood to pursue CE before and after assessing actual knowledge (AK) in an on-line classroom (Campus Edition 6; Blackboard Inc.).

Participants: We randomly sampled potential participants (n = 2000) from the National Athletic Trainers' Association membership directory and then randomly assigned (n = 103/2000, 5.1%) them to control (n = 58) or experimental groups (n = 45).

Interventions: Performance feedback following the AK assessment in the experimental group.

Main Outcome Measures: We assessed PK and likelihood to pursue CE before and after the AK assessment. We calculated differences between pre-test and post-test scores and knowledge gap. Two independent samples t-tests examined the effects of feedback on the dependent measures. Multiple linear regression was used to predict post-test likelihood to pursue CE using three variables: PK, pre-test likelihood to pursue CE knowledge gap.

Results: We found a significant difference (68.2%) between groups for likelihood to pursue CE (P = 0.01, ES = 0.45). The experimental group demonstrated a 13.8% (pre-test = 4.12 ± 1.32, post-test = 4.78 ± 1.13) increase in likelihood to pursue CE, while the control group increased 4.4% (pre-test = 4.60 ± 1.07, post-test = 4.81 ± 1.08). Pre-test likelihood to pursue CE was a significant predictor of post-test likelihood to pursue CE (r = 0.74, R^2 = 0.55, P = 0.05). We observed a moderate relationship between pre-test knowledge gap and post-test likelihood to pursue CE (r = 0.31, R^2 = 0.10, P < 0.01). Pre-test knowledge gap was a significant predictor of post-test knowledge gap (r = 0.88, R^2 = 0.77, P < 0.01).

Conclusions: Knowledge assessment alone increases the likelihood to pursue CE, yet when feedback is provided ATs are more likely to pursue CE.

Key Words: actual knowledge, self-directed learning, knowledge gap

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Full Citation:
Eberman LE, Tripp BL. Effect of performance feedback on perceived knowledge and likelihood to pursue continuing education. *Athl Train Educ J*. 2011;6(2):69-75.

Effect of Performance Feedback on Perceived Knowledge and Likelihood to Pursue Continuing Education

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The dynamic nature of continuing education (CE) makes it an ideal platform to present health care providers with new knowledge that extends beyond entry-level education. Developments in medical research advance the depth and breadth of knowledge at a rate that often exceeds the capabilities of entry-level educators and traditional texts. Therefore, CE is essential in providing practicing health care professionals with current methods of recognition and treatment of injuries and illnesses. In the athletic training profession, CE provides skills that broaden the body of knowledge beyond the National Athletic Trainers' Association (NATA) Education Competencies of professional education. Exertional heat illness and fluid replacement are examples of topics for which research has yielded new knowledge beyond that of entry-level curricula; understanding such advanced clinical skills will help practitioners improve their ability to prevent, recognize, and treat exercise-associated muscle cramps (EAMC).

Exercise associated muscle cramps occur most frequently when athletes are participating in extreme environmental conditions.[1] Although most cases of EAMC are benign, attributed to mineral deficiencies, and easily treated,[2] the condition can be extremely painful, involve multiple muscle groups, and may be associated with more serious and fatal conditions, such as myopathy, rhabdomyolysis, and acute renal failure.[2] The NATA Education Competencies regarding EAMC are limited in that they are neither specifically addressed, nor do they reflect new research regarding prevention, recognition, and treatment. Continuing education is necessary to inform practitioners of these new advances.

Practitioners must be motivated to seek out CE and gain new knowledge about EAMC and exertional heat illness in order for patients to benefit from current medical research. Adult learning theory suggests that the ideal learner is interested in the application of new knowledge and self-directed, and is therefore capable of directing his or her own learning.[3] Self-directed learners choose what to learn, taking into account both personal and professional experiences.[3] These experiences help self-directed learners set educational content, make education decisions, and set goals, which are the 3 critical steps of the adult learning process.[4] The self-directed learner initiates the educational process after reflecting on his or her own understanding of the topic and identifying a knowledge gap. Once aware of the knowledge gap, the self-directed learner then seeks methods, such as individual learning or CE, to address the gap. Researchers measure such knowledge gaps by comparing perceived knowledge defined as what the learner thinks he or she knows, with actual knowledge what the learner actually knows.[5-10] A poor relationship exists, however, between perceived knowledge and actual knowledge[5-10] suggesting that most learners are unaware of their knowledge gap or are not self-directed and are therefore not likely to pursue CE. Without adequate professional or personal experiences, all learners, even self-directed learners, may require external feedback to identify the gap in their knowledge. Once a learner identifies a knowledge gap, the likelihood of pursuing CE may improve.[11-14]

In an ideal clinical simulation or formal education, a learner can easily identify a shortcoming and resolve it through further study. For practicing health care professionals, however, waiting for a personal experience to identify a knowledge gap for the recognition and treatment of an emergent condition could prove critical to the patient. Another method is needed to provide health care professionals the opportunity to become aware of any such knowledge gap. External feedback has been shown as an effective means of initiating such awareness and exploring CE opportunities in various professions.[15-17] No research has quantified the effects of external performance feedback on athletic trainers' (AT) perceived knowledge and likelihood to pursue CE. Therefore, our purpose was to identify the effects of performance feedback on AT perceived knowledge and likelihood to pursue CE. Because of the risk of the potential grave consequences of poorly managed exertional heat illnesses, we chose to assess AT perceived and actual knowledge of current standards for the prevention, recognition, and treatment of EAMC.

METHODS

Research Design

We measured the effect of performance feedback on perceived knowledge and likelihood to pursue CE using a pre-test post-test control-group design. We measured each AT perceived knowledge and likelihood to pursue CE prior to and after assessing his/her actual knowledge. Immediately following a knowledge assessment, we provided members of the experimental group with performance feedback consisting of both item-by-item and summative feedback. The control group received no external performance feedback. The two dependent variables were perceived knowledge and likelihood to pursue CE regarding the prevention, recognition, and treatment of EAMC. The independent variable was external performance feedback.

Participants

We used the NATA membership directory to select a random sample of ATs (n = 2000). We then randomly assigned ATs to the experimental and comparison groups. Of the 2000 invitations sent, 103 individuals volunteered to participate in the study (response rate = 5.15%; control group n = 58, experimental group n = 45). Levene's statistic indicated that the groups were heterogeneous on three of the five demographic variables (Table 1), therefore we compared the groups using parametric statistics. The groups were not significantly different with regard to occupational region, occupational setting, and level of expertise. The groups were significantly different, but with very little effect, with regard to gender (t_{101} = 2.45, P = .02, ES = 0.12 [small]) and level of education ($F_{1,101}$=5.48, P=0.02, ES= 0.04 [small]).

Instrumentation

We used two instruments to measure the dependent variables: the Perceived Knowledge Questionnaire (PKQ) and the Actual Knowledge Assessment (AKA).

Perceived Knowledge Questionnaire

The PKQ is a 16-item questionnaire (Table 2) we modified from a validated 5-item subjective knowledge assessment tool.[18] The original instrument was implemented with a 7-point Likert-scale[18] which provided participants with a centralized option.[19] We preferred a 6-point Likert-scale, so we performed a test-retest crossover pilot study design (n = 18 AT and AT students) to compare results of the PKQ employing a 6-point scale. Fourteen of the 16 items as well as the mean of all the item-correlations demonstrated strong[20] (0.50-1.00) reliability. In light of such strong correlations and to obtain greater variance in answers, we decided to employ the 6-point scale.

The 5-item subjective knowledge assessment tool was validated to interchange a variety of constructs from several disciplines. We were able to insert the concepts of prevention (5-items), recognition (5 items), and treatment (5 items) of EAMC directly into the instrument for our purposes. The 16th item was used to determine each participant's likelihood to pursue CE. Previous investigations have identified the self-perceived CE needs of ATs[21] and deterrents to obtaining CE units,[22] but neither measured the likelihood to pursue CE.

Actual Knowledge Assessment

The 25-item AKA quantified each participant's understanding of the prevention, recognition, and treatment of EAMC that was developed from the Inter-Association Task Force and NATA position statements on exertional heat illness and fluid replacement.[23-25] These position statements define the professional standards for athletic trainers. We solicited 3 experts to review the AKA for clarity, accuracy, and reflection of current knowledge regarding exertional heat illnesses and fluid replacement. The panel scored each item's level of clarity (4-point Likert scale), accuracy (dichotomous: Yes or No), and level of agreement (4-point Likert scale) that the item reflects current knowledge. An analysis of the panel's agreement with the AKA revealed strong clarity (mean= 4±0), strong accuracy (3 items deemed inaccurate by 2 or more panelists), and strong agreement on reflection of current knowledge (mean= 4±0). More importantly, the experts provided comments for item improvement which were incorporated into the instrument. Each expert was a member of the NATA's Exertional Heat Illness or Fluid Replacement Task Force or a researcher with publications along this area of expertise.

Table 1. Demographic Characteristics of Experimental (n = 45) and Control Groups (n = 58)

		Experimental		Control	
Characteristic		n	%	n	%
Gender	Male	18	40.0	37	63.8
	Female	27	60.0	21	36.2
Occupational Region	District 1	0	0.0	1	1.7
	District 2	7	15.6	4	6.9
	District 3	4	8.9	9	15.5
	District 4	11	24.4	12	20.7
	District 5	3	6.7	7	12.1
	District 6	5	11.1	6	10.3
	District 7	3	6.7	3	5.2
	District 8	5	11.1	2	3.4
	District 9	5	11.1	11	19
	District 10	2	4.4	3	5.2
Occupational Setting	Professional Sports	0	0.0	3	5.2
	College/University	20	44.4	25	43.1
	Secondary/Intermediate School	11	24.4	18	31
	Sports Medicine Clinics	5	11.1	1	1.7
	Industrial/Occupational Setting	1	2.2	1	1.7
	Physician's Office/Hospital	1	2.2	1	1.7
	Other	7	15.6	9	15.5
Level of Education	Doctoral	2	4.4	5	8.6
	Masters	25	55.6	42	72.4
	Bachelors	18	40.0	11	19
Level of Expertise	More than 5 years of working experience	26	57.8	33	56.9
	5 years or fewer of working experience	19	42.2	25	43.1

Table 2. Correlation Analysis to Employ a 6-point Likert Scale in the Perceived Knowledge Questionnaire

Item	Description	Spearman's rho Correlation	*P* value
1	I know pretty much about preventing EAMC.	0.85	< 0.001
2	I do not feel very knowledgeable about preventing EAMC. (reverse scored)	0.94	< 0.001
3	Among my colleagues, I'm one of the "experts" on preventing EAMC.	0.82	< 0.001
4	Compared to most other ATs, I know less about preventing EAMC. (reverse scored)	0.64	0.005
5	When it comes to preventing EAMC, I really don't know a lot. (reverse scored)	0.67	0.003
6	I know pretty much about recognizing EAMC.	0.78	< 0.001
7	I do not feel very knowledgeable about recognizing EAMC. (reverse scored)	0.88	< 0.001
8	Among my colleagues, I'm one of the "experts" on recognizing EAMC.	0.90	< 0.001
9	Compared to most other ATs, I know less about recognizing EAMC. (reverse scored)	0.39	0.11
10	When it comes to recognizing EAMC, I really don't know a lot. (reverse scored)	0.94	< 0.001
11	I know pretty much about treating EAMC.	0.83	< 0.001
12	I do not feel very knowledgeable about treating EAMC. (reverse scored)	0.85	< 0.001
13	Among my colleagues, I'm one of the "experts" on treating EAMC.	0.84	< 0.001
14	Compared to most other ATs, I know less about treating EAMC. (reverse scored)	0.35	0.15
15	When it comes to treating EAMC, I really don't know a lot. (reverse scored)	0.79	< 0.001
16	I am likely to pursue continuing education to improve my knowledge of EAMC.	1.00	< 0.001
	Mean =	0.78	
	SD =	0.19	

Procedures

The Institutional Review Board approved the investigation prior to soliciting potential participants, whom we contacted via electronic mail with instructions and an individualized access code for the secure testing site (Campus Edition 6; Blackboard Inc.). The testing site was accessible for approximately 6 weeks after the initial email. Upon accessing the test site (implying consent to participate), each participant answered 6 demographic questions, followed by the pre-test PKQ and then the AKA. Immediately following the AKA, each member of the experimental group received both summative feedback (total and percent of correct questions and an item-by-item feedback regarding every question in the AKA. The item-by-item feedback detailed each question including the list of possible responses, the participant's chosen response, the correct response, and then the correct response in sentence format (Figure 1). Members of the comparison group did not receive any feedback. All participants then completed the post-test PKQ.

Statistical Analysis

We imported the data from the test-delivery system into SPSS Statistical Package for Windows (Version 15.0) for statistical analysis. We calculated descriptive statistics for dependent measures and all demographic data. To quantify the effects of the AKA and the independent variable, we calculated the variable 'change in PKQ' as the difference between pre and post PKQ scores and the variable 'change in likelihood to pursue CE' in the same manner. We isolated the effects of the feedback provided by comparing these variables between the two groups using two independent samples t-tests. To identify knowledge gap, we calculated z-scores from the dependent measures and measured the differences (ie, Pre-test knowledge gap = Z-score (Pre-test PKQ) – AKA).

We used multiple linear regression (MLR) to identify the prediction qualities of the dependent variables and the demographic characteristics (gender, occupational setting, occupational location, level of expertise, level of education). We chose this

Question: Sweat rate generally increases after a period of acclimatization, typical after ____ of heat exposure, requiring a greater fluid intake for a similar bout of exercise.

Student Response	Value	Correct Answer	Feedback
A. 0-5 days	0%		
B. 7-12 days	***0%***		Incorrect
C. 10-14 days	100%	√	
D. 15-20 days	0%		
Score:	**0%**		

General Feedback:

Sweat rate generally increases after a period of acclimatization, typical after **10 to 14 days** of heat exposure, requiring a greater fluid intake for a similar bout of exercise.

Figure 1. Item-by-item performance feedback including the question, list of possible responses, participant's response (***italics***), and correct response (√) were provided.

method of analysis because it is more flexible than a traditional ANOVA. We analyzed the relationship between the dependent variables, post-test perceived knowledge and likelihood to pursue CE using MLR. We used MLR to identify the degree to which pre-test knowledge gap can predict post-test knowledge gap. We also used MLR to identify the degree to which knowledge gap can predict likelihood to pursue CE. Finally, we analyzed the degree to which gender, occupational setting, occupational region, level of expertise, and level of education affected the predictive relationship between knowledge gap and likelihood to pursue CE using MLR. We set the a-priori alpha level at $p < 0.05$.

RESULTS

Effect of Performance Feedback

We identified no significant differences with the independent samples t-tests between groups on difference-scores of the pre and post PKQ means ($t_{10\,1} = -0.66$, $P = 0.50$, $1\text{-}\beta = 0.54$). However, we found a 68.4% significant difference ($t_{101} = 2.72$, $P = 0.01$, ES = 0.45) between groups in the change scores for likelihood to pursue CE because of the performance feedback. The experimental group demonstrated a 13.7% increase in the likelihood to pursue CE after the AKA in the experimental group, as compared to only a 4.3% in the group receiving no feedback.

Predicting Post-Test Likelihood to Pursue Continuing Education

Pre-test likelihood to pursue CE was a significant predictor of post-test likelihood to pursue CE ($r = 0.73$, $R^2 = 0.53$, $P < 0.01$). This model of predicting post-test likelihood to pursue CE was enhanced when the variable 'group' was included; 'group' accounted for a significant amount of unique variance in the model ($r = 0.74$, $R^2 = 0.55$, $P = 0.05$). The finding indicates that pre-test likelihood to pursue CE is a significant predictor of post-test likelihood to pursue CE in the experimental group.

$$Y_{CEpost} = 0.76X_{CEpre} - 0.34X_{group} + 2.24 + E$$

We observed a moderate relationship between pre-test knowledge gap and post-test likelihood to pursue CE ($r = 0.31$, $R^2 = 0.10$, $P < 0.01$) regardless of group allocation:

$$Y_{CEpost} = 0.31X_{KGpre} + 4.80 + E$$

None of the demographic variables were significant predictors between pre-test and post-test measures of knowledge gap and post-test likelihood to pursue CE.

Predicting Post-Test Knowledge Gap

Pre-test knowledge gap, the difference between perceived knowledge and actual knowledge, was a significant predictor of post-test knowledge gap ($r = 0.88$, $R^2 = 0.77$, $P < 0.01$):

$$Y_{KGpost} = 0.88X_{KGpre} + 0.002 + E$$

DISCUSSION

Effect of Performance Feedback

The primary purpose of this investigation was to measure the effect of performance feedback on perceived knowledge and likelihood to pursue CE regarding EAMC. We hypothesized that providing participants with performance feedback would affect both their post-test perceived knowledge and likelihood to pursue CE. Our findings suggest that performance feedback did not have a significant effect on perceived knowledge, but did significantly increase the likelihood to pursue CE regarding EAMC (68.4% difference between groups). These results indicate that providing ATs with an AKA and performance feedback can facilitate a learner to recognize the need to seek out new knowledge, but may not necessarily change their perception of their own knowledge gap.

This finding contradicts previous literature suggesting feedback will alter perceived knowledge;[26-28] however it supports the reports that feedback will alter participant information-seeking behavior. When there is a large discrepancy between goals and outcome feedback, perceived knowledge is altered and, often, goals are realigned.[26,29,30] Our investigation only resulted in a small change in pre-test and post-test perceived knowledge scores. This smaller discrepancy may not have warranted the changes in perceived knowledge, but did refocus goals toward gathering CE for the prevention, recognition, and treatment of EAMC. In planning new CE opportunities, including knowledge assessments prior to participation may help ATs set more focused goals to meet their knowledge needs.

Predictive Relationships Between Variables

Perceived Knowledge

Self-efficacy theory suggests that students' perception of ability is positively related to his or her level of engagement in strategies to improve a task.[11,31] Further, as a student's interest in learning for the sake of improving knowledge increases, the use of strategies to improve knowledge also increases.[32-34] A strong relationship between perceived knowledge and likelihood to pursue CE has been theorized in the literature. Although our results failed to indicate this relationship, the role of perceived knowledge is one important component to guiding CE. Needs assessments, often driven by the learner's current patient care needs, have been used to plan CE.[35-37] An assessment of knowledge prior to acquiring learners' perceived needs may be more effective in focusing CE curricula.

Knowledge Gap

The MLR we employed indicated that a pre-test knowledge gap was a significant predictor of a post-test knowledge gap. Previous reports, which only provide an assessment of perceived knowledge prior to a test, suggest that perceived and actual knowledge are poorly correlated.[5-10] In contrast to these reports that correlated pre-and post-test values, we calculated the difference between perceived knowledge and actual knowledge and sought to answer the applicable question: Can pre-test

values predict the post-test knowledge gap? Our results indicate that a pre-test knowledge gap was indeed a strong and significant predictor of a post-test knowledge gap. These findings imply that early identification of a knowledge gap may help to guide more specific learning to meet a deficit. Needs assessments to plan CE have used only perceived needs[38] to articulate a potential topic for CE.[35-37] These learners are often unaware of their knowledge gaps and are likely to report their needs based on a current problem, not an identified knowledge deficit. Further, the "clinical care gap" described as the difference between evidence and practice in medical CE literature, is also unknown by practitioners. Therefore, perceptions alone will fail to resolve the gap, unless some means to identify the knowledge deficit is utilized.

Predictors of Pursuing Continuing Education and Perceived Knowledge

Our findings indicate that a pre-test knowledge gap was a moderate and significant predictor of post-test likelihood to pursue CE. However, performance feedback did not significantly enhance the relationships between these variables. No researcher has incorporated the theory of external or performance feedback in investigations that compare actual and perceived knowledge. Research suggests that learners are more effective when responding to externally provided feedback,[15,17] like that provided through peer evaluation, teacher remarks on class work, or answer sections of a textbook.[39] This external feedback is most often provided after a task is completed and is therefore feedback about performance aimed at improving student scores on the task.[39]

Performance feedback may also serve an alternative purpose, particularly with self-directed or adult learners. Self-directed learners who experience an impediment to learning, which may come in the form of negative performance feedback, will trigger reassessment of the educational goal.[40] Our findings support the theory that performance feedback that identifies a knowledge gap may trigger a learner to reassess and subsequently increase the likelihood of engaging in CE opportunities.[11-14] Our results suggest this change may be a result of test taking, where internal and external feedback are both affecting the outcome. We may then conclude that test taking prior to instruction may have a significant impact on the subsequent learning. These implications are far-reaching, from a first-year Introduction to Athletic Training course to post-professional education, in that identifying what is not known can guide students in acquiring new knowledge.

Limitations

The most significant and inevitable limitation of our investigation is participant self-selection. Although the effect size statistics suggest that a sufficient sample was acquired to identify a meaningful difference between groups, few ATs (response rate= 5.15%) chose to participate in an EAMC content-specific educational assessment. We understand that CE seeking behavior is multifactorial and the response rate may indicate that athletic trainers do not inherently seek opportunities to test their knowledge in the manner provided. Future research should employ similar methods but attempt to differentiate between internal and external feedback. Also, we did not identify actual CE seeking behavior and therefore future investigations should observe these actual behaviors.

CONCLUSIONS

Performance feedback increased participants' likelihood to pursue CE; however, it did not alter AT perceived knowledge scores. Although the performance feedback we provided did not enhance the participants' abilities to recognize their knowledge deficit after testing, it did increase their likelihood to pursue new knowledge. In this study, we found that learners were able to reflect on their experience by reporting that they would likely seek methods to meet their inadequacy.

Knowledge gap was a significant predictor of likelihood to pursue CE, regardless of whether performance feedback was provided. Individuals often overestimate actual knowledge and thereby create a barrier to acquiring new information.[28-30] Perhaps internal feedback, as a result of self-assessment through test-taking as we employed, rather than the previously suggested external feedback, may be the trigger necessary to seek new knowledge through CE.

For ATs, a more self-directed approach to acquiring new knowledge should be employed. Further, planning CE opportunities should include methods of pre-assessment to aid in more focused knowledge acquisition.

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ORIGINAL RESEARCH

Educator Perceptions of the Evidence-Based Teaching Model in Undergraduate Athletic Training Education

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Context: While research recommends that health professions expand the instruction and use of evidence-based practice (EBP) due to the individualized approach to patient health care, few examples of the incorporation of EBP into academic courses exist in athletic training.

Objective: To evaluate educators' perceptions of the Evidence-Based Teaching Model (EBTM) as a strategy to introduce EBP concepts to athletic training (AT) students.

Design: Qualitative program evaluation including semi-structured interviews. Setting: Institutions that sponsor CAATE-accredited professional undergraduate programs.

Participants: Stratified purposeful sampling of 9 experienced educators (2 males, 7 females; average years teaching 8 ± 5 years) teaching therapeutic modalities or rehabilitation were trained in the EBTM and interviewed regarding their experience.

Measures: Educators' experiences regarding implementation of the EBTM. Coded categories were triangulated via member checks and peer review to establish trustworthiness of the findings.

Results: Educators valued the EBTM as a method to implement evidence-based concepts within a short time frame in their course, and perceived it as a user-friendly and effective teaching tool. Assignments requiring direct interaction between students and clinical instructors were considered most favorable. Training materials provided educators with a new perspective of how to implement EBP at the professional level.

Conclusions: Implementation of the EBTM helped educators attain their goals of expanding evidence-based concepts within professional undergraduate curricula and increasing student and clinical instructor interaction. Overall, the EBTM provided a mechanism to begin incorporation of EBP concepts in athletic training curricula.

Key Words: evidence-based practice, program evaluation, competencies

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Full Citation:
Manspeaker SA, Van Lunen BL, Turocy PS, Pribesh S, Hankemeier D. Educator perceptions of the evidence-based teaching model in undergraduate athletic training education. *Athl Train Educ J*. 2011;6(2):76-87.

Educator Perceptions of the Evidence-Based Teaching Model in Undergraduate Athletic Training Education

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While other health care professions have published teaching methods and course content relating to evidence-based practice (EBP) concepts,[1-6] such methods are not evident within athletic training education. Evidence-based practice encourages critical decision making through consideration of patient values, best available evidence, and clinician expertise.[7] The use of EBP is important in athletic training, just as it is in other health professions. To ensure best clinical practice, athletic trainers should learn the process of conducting EBP inquiry[8] and make it part of their practice. Learning the techniques and understanding the process early in professional preparation is essential for today's students to integrate evidence into their future clinical practice.

Health care practitioners must be "evidence users," in that they can utilize the EBP process to locate, evaluate, and incorporate research from an evidence-based process into their clinical practice.[9] There has been a recent push toward infusing the instruction and use of EBP within health education[10] due to the individualized approach to patient healthcare.[11,12] By requiring students to understand evidence-based content, such as clinical questioning, literature searching and appraisal, as well as levels of evidence,[1-3,5,6] they should be able to create an evidence-based approach to individualized patient care that can later be modeled in clinical practice. Athletic training education has adopted these goals through the addition of EBP knowledge and skills in the 5th edition of Athletic Training Education Competencies.[13]

The curricula of other health professions have already integrated EBP concepts through teaching methods that provide learning opportunities focused on enhancing evidence-based thinking. Specifically, teaching methods in nursing[1,5,9,14] and medicine[15,16] achieve inclusion of EBP content via journal clubs, critical appraisal during didactic and clinical teaching, and clinically integrated methods that combine didactic focus with reinforcement of evidence in the clinical setting. These curricular emphases include use of clinical cases, relevant articles, critical appraisal activities, and use of medical literature. [11,15,6] For example, nursing curricula progress undergraduate students from developing clinical questions specific to patient cases early in their enrollment, to charting search strategies with results, and progressing to critical appraisal of studies or practice guidelines during their senior year.[11]

A similar learning experience[17] model in medicine allows students to select a clinical problem based upon their clinical encounters. They use the "PICO" (Patient, Intervention, Comparison, Outcome) approach to formulate a clinical question, create a list of related articles, use appropriate guidelines to appraise validity of the results, and then finally apply their new knowledge back in the clinical setting. Other medical programs have been successful at integrating EBP concepts through journal clubs.[15,16] This more didactically focused method provides a mechanism to introduce current practice literature to students in an informal manner.[15] In comparison, physical therapy programs have integrated EBP through complimentary conceptual models[18] that are first introduced in didactic coursework, and then expanded upon during patient-centered care opportunities. Although both didactic and clinically integrated curriculum models have been successful in improving EBP knowledge and skills in health care curricula, these formats have not yet demonstrated success in achieving long-term influence on clinical practice.[15,16]

The evolution of EBP in clinical practice within health care professions has led to broad integration within didactic and clinical courses. While this integration of EBP-focused teaching has been successful in other professions, much of it is not directly applicable to athletic training education. Methods, such as those previously described, are needed to guide athletic training educators in their formation of course content and clinical application opportunities that align with the current edition of Athletic Training Education Competencies.[13] Currently, it is unknown how many Commission on Accreditation of Athletic Training Education (CAATE)-accredited programs have implemented EBP into select courses, as little information has been published to disseminate outcomes or to demonstrate "how" to include EBP concepts in teaching. Therefore, the need for integration of EBP into athletic training education exists.

This project was part of a larger study designed to evaluate the Evidence-Based Teaching Model (EBTM) as an EBP-focused teaching strategy for athletic training education. Specifically, this portion of the study sought to identify athletic training educators' perceptions regarding experience, goals, ease of use, and outcomes related to implementation of the EBTM. Student outcomes were evaluated separately and will be presented in subsequent publication.

METHODS

Participants

Nine educators, consisting of 2 males and 7 females (Table 1), from different CAATE-accredited professional undergraduate Athletic Training Education Programs (ATEPs) were trained in the EBTM and interviewed pre- and post-implementation regarding their experiences during the fall semester 2009. A stratified purposeful, critical case sampling method was employed to identify educators who best fit the criteria of: 1) expressed interest in implementing a new teaching method involving EBP concepts; 2) believed to be responsible to follow the project through to completion; and 3) matched for course instruction in the areas of therapeutic modalities or therapeutic rehabilitation. An initial contact list of 25 educators fitting the first two criteria

Table 1. Participant Demographic Information

Participant Pseudonym	Sex	Terminal Degree	Years Teaching	District	Research Role	Clinical Role	Prior EBP Instruction
Miss Grassly	F	No	3	3	No	Yes	No
Dr. Cloud	M	Yes	10	2	No	Yes	Yes
Miss Dawes	F	No	3	9	No	No	No
Miss Helenga	F	No	5	4	No	No	No
Dr. Humphrey	M	Yes	16	3	Yes	No	Yes
Miss Harryson	F	No	10	6	No	No	No
Dr. Mott	F	Yes	10	4	No	No	No
Dr. Ressler	F	Yes	14	4	No	Yes	No
Miss Perott	F	No	5	6	No	No	No

was created based on interest expressed at the 2009 Educators' Conference. These educators were subsequently contacted to confirm appropriate course matching. Exclusion criteria for the initial participant list included lack of course matching, as well as undergoing an accreditation site visit during the associated semester and not wanting to implement a new teaching approach during that process. A total of 9 educators and their respective students began the project and completed all associated components. Participation was not limited by whether educators were already teaching evidence-based concepts in their curricula. This population of athletic training educators served the data collection sources best due to the following criteria: the people -and activity-focused nature of the inquiry and procedures;[19] their ability to voice opinions, suggestions, and reflections as educators of a program; and consistent exposure to athletic training students.

Instrument

The EBTM was designed to teach core EBP concepts including: 1) defining a clinical question; 2) searching for evidence; 3) critical appraisal skills; 4) using clinical expertise; and 5) determining appropriate treatment approaches.[20] Creation of the EBTM lecture and associated activities occurred through referencing of appropriate EBP content and teaching methods of other professions.[7,12,17,21-27] Delivery of the EBTM consisted of one PowerPoint lecture covered over 2 to 3 days of either therapeutic modalities or rehabilitation due to the decision-making nature of these courses. In addition to the lecture, EBP assignments included an article review, formation of a clinical question, in-class discussions, and discussions with clinical instructors (CI). Refer to Table 2 for a daily overview of EBTM contents.

Day 1 of EBTM

Day 1 of the EBTM featured lecture using part 1 of the PowerPoint reviewing the 5-step EBP process, an in-class discussion on formulating clinical questions, and review of an article read prior to class via the "Make it Stick Activity." This activity required students to write any questions or points they found interesting from the article on separate sticky notes and place them on the board. These notes were then reviewed by the educator and a discussion of common thoughts was initiated. To further review the information, students were assigned to complete the "Clinical Instructor Discussion Activity" outside of class. This activity allowed students to develop a PICO-formulated clinical question based on a case scenario and discuss the question, potential intervention options, and decision making, with their clinical supervisor.

Table 2. Contents of the EBTM by Day

Day 1	Day 2	Day 3
Pre-read article	PowerPoint lecture over literature search/appraisal	Complete any items not covered on Day 2
PowerPoint lecture over 5-step EBP process	Discuss Day 1 assignment	
Formulate PICO question	Review requirements for "Clinical Decision Making" activity	
"Make it Stick" activity		
Class discussion		
Take home assignment: Clinical Instructor Discussion		

Day 2 of EBTM

The second instructional day allowed for completion of part two of the PowerPoint lecture, review of the clinical supervisor discussion, and overview of the requirements of the out-of-class "Clinical Decision Making" assignment for students to perform a more complete EBP inquiry relating to a new case scenario. This activity required students to develop a new clinical question through the PICO format, conduct a literature search, critique 2 articles, discuss the scenario and treatment options with a clinical supervisor, and ultimately determine potential outcomes from the plan developed. A third instructional day was used when necessary to complete any items not achieved during day 2.

The EBTM was piloted at 3 institutions of a convenience sample during the spring semester 2009. None of the pilot institutions participated in the final study. All instructional material was taught by 2 members of the research team within courses of therapeutic modalities, rehabilitation, and research design. Though a research design course was utilized for pilot testing as the target population of students was appropriate, it was not sought out during full study conduction due to the treatment-centered nature of assignments.

Participants were recruited via email and telephone and attended an online tutorial session for the EBTM during August 2009. The online tutorial format was deemed appropriate due to both the large geographic area represented by the educators and to ensure consistent dissemination of EBTM contents to all educators. Table 3 depicts contents of the online tutorial. The tutorial closely emulated the contents of the EBTM so that participants were educated in a similar manner to that which they would provide to students. During the tutorial, educators answered review questions to verify understanding of model content and evidence-based concepts. Educators were required to answer 90% of the review questions correctly in order to continue participation; all participants met these criteria on the first attempt.

Table 3. Contents of the Online Training Tutorial and Instructor Manual

Purpose of the EBTM
Informed consent for the research project as approved by the University
Steps to earning internal review approval from instructors' own institution if required
Steps of conducting an evidence-based inquiry
Evidence-based objectives for potential inclusion on syllabi
PowerPoint for lecture use
Test questions
Recommended articles for class discussions
Class activities for student completion
Rubrics for grading of student activities
Suggested timelines for implementation
Additional lecture content

During the subsequent fall semester, participants implemented the EBTM with their students according to the timeline determined during the pre-interview session. Freedom to implement the model into a portion of the course that best matched their required course content was granted to each participant. The primary researcher was available to the educator for advice, clarification, and encouragement via telephone and email throughout the implementation period. Additional information provided to the educators as a courtesy, though not required for their use during the EBTM implementation, included suggested course objectives related to EBP, questions to include on written examinations, and rubrics to assist grading of student assignments.

On 2 occasions, once prior to EBTM implementation and once within 2 weeks of its completion, educators administered the Evidence-Based Concepts: Knowledge, Attitudes, and Use (EBCKAU) survey to athletic training students. This instrument was created by the research team to assess students' knowledge, attitudes, and use of evidence-based concepts presented in the educational intervention. This survey and the students' results will be presented further in a subsequent publication.

Design

Upon IRB approval, we began a qualitative program evaluation of the EBTM within the 9 selected ATEPs. Our target population, ATEP educators teaching therapeutic modalities or rehabilitation, was selected as they were the intended users of the EBTM.[19] This approach permitted collection of summative qualitative data related to the process and outcomes of the EBTM as perceived by the educators.[19] Additional purposes of our program evaluation included determining the goals and objectives for model implementation and the perceived effectiveness of the EBTM as a mechanism to achieve these goals.[19]

To establish educator's perceptions of the EBTM, semi-structured qualitative interviews were conducted via telephone both pre- and post-implementation by the primary researcher. These interviews allowed for the meaning and structure of educators' experiences regarding the EBTM to be established through program evaluation.[19,28] Interview questions were created by the research team to target specific aspects useful in program evaluation,[19] and were refined according to feedback from and analysis of the pilot study. A sample of interview questions was provided to educators prior to the interview. Pre-interviews were used to establish educators' goals for use of the EBTM, anticipated outcomes and barriers to use of the model, demographic information relating to his/her institution, student population, and course for implementation, as well as to ensure understanding of all educational materials. Following EBTM instruction, educators provided a 30-minute conclusion interview to identify the perceived outcomes, barriers, and ease of implementation of the EBTM. See Appendix 1 for the interview protocol.

All interviews were tape-recorded, professionally transcribed, and coded openly using grounded theory constant comparison within and between educators to discern recurrent categories.[19] Notes taken by the researcher during the interviews served as the basis for category identification as interview transcripts were

read and categories emerged within transcript documents. Once categories were established, data were analyzed axially through comparison of similar topics.[19,28] Related categories were then condensed and sub-categorized to the point of saturation.[19,28]

Triangulation, peer review, and member-checking[9,28] were used to establish trustworthiness of the findings. Multi-analyst triangulation[19] was obtained as 3 members of the research team analyzed transcriptions and discussed emerging categories. Peer review[19] was conducted by 2 athletic training educators with knowledge of evidence-based practice and qualitative research through examination of the data for accuracy of categories. Lastly, select participants who had identified willingness to review data were asked to review coded transcriptions for their agreement with resultant categories and sub-categories.[28]

RESULTS

Analysis of coded and collapsed data revealed 3 primary categories relating to inclusion of the EBTM within professional education. These categories included the overall need for an EBP presence in education, specific goals for implementation of the EBTM, and perceptions of the EBTM. A framework of identified categories and subcategories is provided in Figure 1.

Need for EBP Inclusion

The initial category to emerge was that of the need to implement EBP concepts within educational aspects of athletic training. Educators revealed their beliefs that EBP is a necessary component for the future and longevity of the profession of athletic training. Additionally, they expressed their views on the presence of EBP concepts within Athletic Training Education Competencies and continuing education opportunities.

> *It's got to be something that we push at the national level, and also education programs have got to take some responsibility here. And that's why we kind of push it (within our ATEP) as much as we do. We are educating tomorrow's leaders, we need to work hard to make sure they understand the importance and the fact that we can't just go on doing what we've done forever without some type of evidence to back it up.—Dr. Cloud*

> *This is what the medical field is doing. We need to be on top of it so that we can enter the conversation. And if this (EBP process) is working for other professions, then we need to incorporate it more, because that's how we better ourselves as a profession. –Dr. Mott*

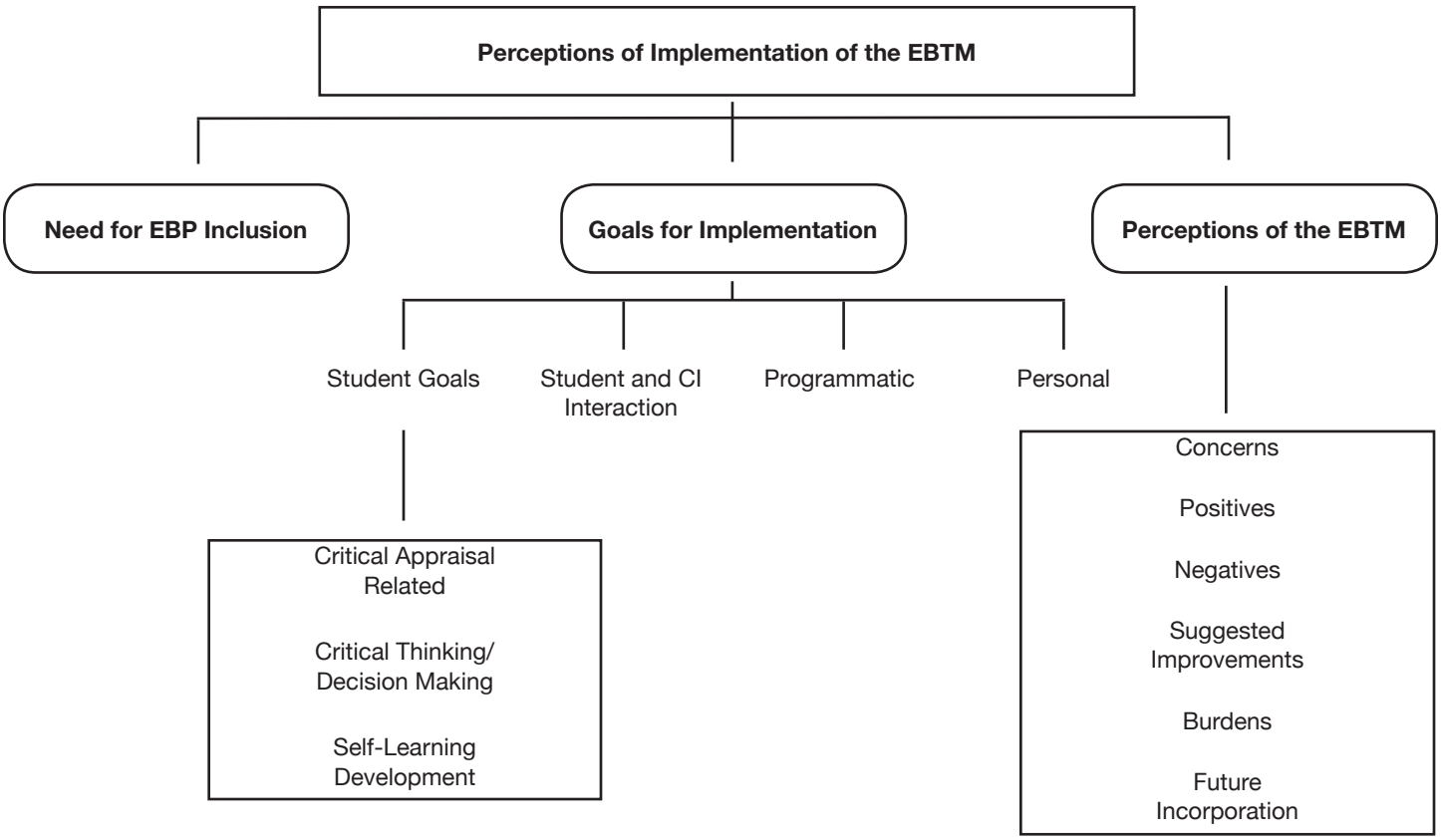

Figure 1. Conceptual Framework of Categories Relating to the Evidence-Based Teaching Model

Incorporating it (EBP) into undergraduate athletic training programs, which I think is one way to look at this, maybe it should be one of the competencies that are required to teach and students to understand. –Miss Perrott

The first thing is getting it (EBP) more into the educational system…(educators have) been trying so hard to figure out what the competencies are, that it almost takes competencies to get us to do something. –Dr. Mott

Educators expressed the perceived need for EBP in athletic training education to continue to progress our profession and provide future clinicians with the foundational concepts already adopted by other professions. Furthermore, they also expressed their goals for incorporating the EBTM within their courses.

Goals for Implementation

An additional category that emerged was the educators' personal goals for implementation of the EBTM. Four sub-categories were identified within this topic: 1) Student goals; 2) Student and CI interaction; 3) Programmatic goals; and 4) Personal goals. By allowing educators to define their individual goals for implementation of the EBTM, it became apparent that educators had specific reasons for participation. These reasons included, though were not limited to students, program, and self, and therefore, a baseline description of what they hoped to gain from study participation was established.

Student Goals

Initially, educators defined what they hoped students would gain from the EBTM through Student Goals. These Student Goals were further sub-divided into sub-categories of: 1) Research related; 2) Critical thinking/decision making; and 3) Self-learning development which, they envisioned would enhance the educational development of their students. Tables 4-6 display student sub-categories and supporting quotations for this section.

Student and CI interaction

The second sub-category of goals expressed educators' desire for increased interaction between students and clinical educators through student and CI Interaction. Educators expressed that while they knew interaction was occurring, they felt that discussion could be increased, particularly regarding EBP, to improve the clinical to didactic link for students. Prior to EBTM implementation, educators stated,

I want them (students) to start educating their CIs a little bit too, questioning why they do this, why they do that, and choices they make.— Miss Grassly

Incorporating more of these evidence things in and to get our CIs more involved with evidence-based practice and getting our students to discuss it with them.—Miss Dawes

Following the EBTM, educators expressed an appreciation for the discussion and interaction generated by the EBTM assignments students completed with their CIs.

They (students) really like getting feedback from our clinical instructors, I think that most of them responded that they felt like that was valuable to hear what another professional has to say and their input from that.—Dr. Ressler

I think anytime you create a conversation between a clinical instructor and a student, that both people benefit. The assignments kind of assisted in that relationship. —Miss Helenga

The CIs responses weren't always the best, but in the overall scheme of things, there were still some good things that came out of it.—Dr. Ressler

I think it was good for them (students) to see the range of people and what they know, and also how maybe they can, in a nice way, kind of help their CI learn a little bit more. —Miss Grassly

Table 4. Results: Implementation of EBTM: Instructor Goals for Students—Critical Appraisal Related

Pre-Implementation Goals	***Post-Implementation Perceptions***
We want our students to be aware of the research that is out there and how to read it and how to interpret it. –Miss Grassly	*I think that was, to me, the biggest success on the entire thing was, they really now know how to critique an article and for it to make sense on what they are looking for. —Miss Harryson*
I'm hoping that this will help them…to formulate a research question and how to look critically at research. —Dr. Ressler	*They accomplished the ability to read research a little bit more critically and not just read it and take it as face value. Without a doubt I think that they have learned to construct a research question using the PICO format.—Dr. Ressler*
Hopefully, they'll be able to recognize that research is always changing and that you can't base all your opinions strictly off the book.—Miss Dawes	*I think that it helped them realize that research doesn't have to be a big, scary, formal process.—Dr. Mott*

Table 5. Results: Implementation of EBTM: Instructor Goals for Students—Critical Thinking/Decision Making

Pre-Implementation Goals	*Post-Implementation Perceptions*
I would like them to be able to tie it into critical thinking; I think that's the big connection. I want our students to be able to say, "Here's a question that I don't know the answer to, how can I find the answer with good quality research?"—Dr. Cloud	*I think it made them think through their process of why they are using what modalities. They learned a lot and they understand how to use this type of model and how they can apply it in the future.—Miss Helenga*
Maybe they can start questioning some of the methods and techniques that we do (in the ATR). You know, why are we doing that, and is there evidence to support us using that type of modality or that type of rehab?—Dr. Ressler	*They're a little bit more willing to question things a bit better than maybe what they would have before, definitely. —Dr. Ressler*
I want them to think critically about what treatments they're giving. I want them to really think about that and hopefully will make them better clinicians for the future. —Miss Perrott	*Well, for the first time, promoting it, I think just the whole idea that they knew that there was something out there that could help them explain why they were doing what they are doing.—Miss Harryson*

Programmatic Goals

Thirdly, benefits to the ATEP, Programmatic Goals, were discussed as educators described the potential longitudinal interests and impact of EBP integration on curricular content. Specifically, educators expressed the potential for EBP to become part of future competency requirements, and thus their aspirations to implement EBP in advance of such changes.

I know that this (EBP) is a hot topic, and honestly I know that it will probably show up on the next set of educational competencies. So I think this is a great way to get us started in that direction.—Dr. Ressler

For the last several years, we've really tried to increase the amount of evidence-based medicine content…but we haven't specifically identified a way to do it.—Dr. Cloud

Undergraduate students need to be exposed to this (EBP). I wanted to teach it in some way, and I think it's (the EBTM) going to really help me figure out a way to teach it.—Miss Perrott

During post-implementation interviews, educators discussed how the EBTM influenced their thinking about EBP within their programs. One participant discussed how the EBTM provided the foundation for re-evaluation of their current course sequencing, and how, as a faculty, they decided to create a new one-credit course that would instruct the EBP process.

It greatly improved our evidence-based medicine component in the program. It actually has led to…a new syllabus being developed (for a new course), an evidence-based medicine syllabus. So it definitely helped streamline things for us. —Dr. Cloud

Now that they (students) know these terminologies, I'm like, "this is competency stuff, this is stuff they need to be exposed to." –Dr. Mott

Personal Goals

Lastly, personal benefits to the educator, identified as Personal Goals, described the potential improvements in knowledge related to the EBP process through the tutorial and EBTM contents. Educators also expressed an interest in expanding the breadth of their instructional methods by implementing the EBTM.

I could see how it's (the EBTM) done, see if it works better than some of the other units (of instruction), see if they get it better than some of the other concepts. —Miss Perrott

It (EBP) was something that I didn't know anything about. So for me it was more personal. I was more interested in learning as much as I could about this because it is a buzz word, but I think it is an important buzz word. —Miss Harryson

Table 6. Results: Implementation of EBTM: Instructor Goals for Students—Self-Learning Assessment

Pre-Implementation Goals	*Post-Implementation Perceptions*
That they can become self-sufficient learners, that they don't have to always rely on other people's opinions.—Miss Grassly	*This was a way for the students to give their own input into the situation (for patient care), because they did have something else that they could look at.—Miss Harryson*
My goal is to have the students think for themselves, to be able to disseminate the information and hopefully compare that to anecdotal experience.—Dr. Humphrey	

The post-interview comments provided by the educators illustrated the personal gains from implementation, ranging from pedagogical approach to knowledge.

Giving me some good ideas for the future as far as just my teaching methods. I don't think I learned anything new from it other than the PICO stuff.—Dr. Ressler

I got to learn more about it (EBP), this was a nice way of kind of reiterating some of the stuff I have read, and it was a nice clear format.—Dr. Mott

Perceptions of the Evidence-Based Teaching Model

In addition to identifying what educators hoped to gain from the EBTM, participants discussed the perceived usefulness and applicability of the model within their course after implementation. These topics were presented through concerns, positive aspects, recommendations for improvement, and intended future use. Figure 2 features quotes regarding educators' perceptions of the EBTM.

DISCUSSION

Athletic training educators appear to value the EBTM as a tool to implement evidence-based concepts into therapeutic modalities or therapeutic rehabilitation within a brief time frame. Specifically, educators described that the EBTM met their objectives of integrating EBP in a succinct, useful manner, while meeting student, programmatic, and personal goals. The outcomes expressed by the educators also reflect their overall satisfaction with the EBTM and desire to include all or part of the model in future semesters.

Need for Implementation

Current athletic training practice, as with other health professions, is sometimes limited by the inaccuracy and irrelevance of out-of-date patient-care resources.[20,29] As reflected in participant responses, athletic trainers must become more familiar with the need for EBP, as a shift in the utilization of valid preventative, diagnostic, and treatment options for patient care[20] is foreseen. Nationally, progress toward inclusion of these concepts is evident in the cohesive agenda of the NATA, CAATE, and Board of Certification,[30] to infuse EBP in all aspects of athletic training. In this manner, the EBTM was designed to assist educators' implementation of these concepts within courses that already exist in their curricula.

As athletic training heads into the future, we are facing issues related to educational reform requiring infusion of EBP concepts[13] and third-party reimbursement.[31] These topics are intricately related,[31] as fee-for-service is a major influence in health care. The underlying factor of fee-for-service is the ability to document positive patient outcomes for the care provided. To maximize this opportunity, athletic trainers must be able to demonstrate that our clinical practice is grounded in evidence, and that we are providing the validated best care for patients. Educators participating in this study recognized the need to instill an evidence-based approach in their students so they are better prepared to recognize and provide quality patient care, and perhaps, generate new evidence themselves.

As with any other reform, infusion of evidence-based practice into athletic training will not occur quickly. The process should be cultivated within both the AT education and clinical environments before true transformation is seen. In medicine, the desired method to enhance competence as evidence-based practitioners is an integrated didactic and clinical curricular approach.[16,17] Educators should provide students with the skills inherent to EBP in order to foster clinical decision making, determine clinical relevance of research,[8] and promote new research through inquisition.[31] In consideration of these recommendations, our findings indicate that the educators felt the EBTM provided a foundation for combined didactic knowledge that students could integrate during clinical experiences.

Goals for Implementation

An initial category to emerge from the data was educators' goals for implementation of the EBTM. They specifically identified goals relating to students, student: CI interaction, and their athletic training education program, as well as items for their own personal benefit.

Student Goals

The primary goals for implementation of the EBTM identified by educators related to improving students' knowledge of research and ability to think critically. These goals align with other researchers[11,32] who emphasized the importance of establishing teaching prior to implementing teaching strategies. Ciliska[11] suggested that successful curricular implementation of EBP begins with defining what the educator expects of the student. Recommended evidence-based concept objectives for student mastery typically include: 1) establishing a clinical question;[33] 2) assessing medical literature;[8,29,33] 3) applying and using the best available information;[8] 4) creating an environment for inquisition;[13,31,34] and 5) implementing EBP in the clinical realm to establish best practices.[34] Current Athletic Training Education Competencies[13] emphasize the need for student mastery of critical thinking skills and research, thus making ATEPs an ideal venue for introduction of EBP concepts. The 5th edition of Athletic Training Education Competencies expands on these critical thinking components by including specific requirements dedicated to EBP.[13]

Student and CI Interaction

One of the most noteworthy aspects of the post-implementation interviews occurred during educators' discussions of the perceived outcomes of the EBTM. Most participant responses regarding implementation, whether positive or negative, directly related to facets of the student and CI discussion assignments. In accordance with other research,[35-37] educators identified knowledge of EBP, time, and student contact as areas in which they noticed differences in CIs from the beginning to the end of EBTM implementation. The link offered through clinical

Pre-EBTM Implementation Concerns	*I'm curious how students will respond to this (the EBTM) because it is a little bit of a different way of thinking for them. --Dr. Ressler* *To be honest with you, I'm not sure when it's going to fit in (to the course). --Dr. Humphrey* *My kids like to be as lazy as they possibly can. My concern is that they're going to start growling about it. --Miss Grassly*
Post-Implementation Positives of EBTM	*I think this is very user-friendly, I thought it was all very clear, the PowerPoint was good. It's (the EBTM) just kind of putting it in a more outlined and systematic fashion than maybe people have looked at before. --Dr. Mott* *I think that the PICO portion of it went really well as far as them (students) trying to come up with their own clinical questions. --Miss Harryson* *You (the EBTM creator) provided me with the structure to make sure that it (EBP) was included and included well, better than the kind of "hit or miss" approach that we've used in the past. --Dr. Cloud* *It fit in really nice with what we are doing in class. It was a nice precursor to ultrasound and things like that. --Dr. Ressler*
Post-Implementation Negatives of EBTM	*I think it was too advanced for our students. It's actually their first year in our program. They are only sophomores, so they are being bombarded with other things and they lack research knowledge. --Miss Helenga* *It may be a little much for the ACIs to deal with...at institutions that don't have large athletic training staffs to dedicate the time (to student discussion). --Dr. Humphrey*

Figure 2. Results: Instructor Perceptions of EBTM

education permits students to apply EBP theories and hands-on experience in patient care.[1] A major stakeholder in the success of this link is the clinical instructor. Coomarasamy and Khan[38] found that integrating classroom teaching with clinical practice components improved EBP skills, attitudes, and behaviors of medical students. Educators in our study expressed interest in having the EBTM cultivate a path for inclusion of EBP concepts by their clinical instructors. As the EBTM included assignments targeted at promoting evidence-based discussions between CIs and students regarding patient care, it seemed appropriate that the educators addressed this point during their interviews.

Since clinical education is part of the requirements for entry-level athletic training curricula, implementation of EBP concepts should easily transcend from the didactic setting to students' clinical experiences. The Athletic Training Educational Competencies encourages behaviors that include dissemination of new knowledge and promotion of research,[13] which are both foundational components of the transition toward EBP inclusion in education and professional practice. Therefore, to maximize their professional responsibility and properly mentor students, athletic trainers who choose to serve as CIs should become comfortable using and discussing EBP concepts. Additionally, CAATE standards include provisions that Approved Clinical Instructor (ACI) training must provide instruction in the areas of communication, mentoring, and appropriate clinical knowledge.[39] Thus, ACI training could be an ideal avenue for implementation of EBP concepts to help strengthen the link between didactic and clinical education.[1] Specifically, the EBTM could be adapted for inclusion in ACI training. Once ACIs and CIs are comfortable with EBP, it is important that they model its use with students when making clinical decisions.[11]

Programmatic and Personal Goals

Progression of EBP in athletic training depends on the cultivation of evidence-based practitioners who have knowledge in critical appraisal, clinical experience,[40] and the ability to integrate these topics together. While athletic training educators should infuse these concepts in their courses, the integration is often difficult for educators who are unfamiliar with EBP or unable to effectively teach the information.[11] Several educators in this study stated that they were not confident in their EBP knowledge prior to the online tutorial, and one reason they chose to participate in the study was to improve their knowledge. Additionally, a few educators expressed that they had previously taught the EBP process, but were uncertain as to the effectiveness of their teaching approach. Therefore, participation in this project permitted them to reach their personal goal of improving EBP infusion within their programs. The use of the EBTM and establishing objectives for its implementation also aligns with recent recommendations[11, 41] that educators approach EBP infusion in an organized manner

involving establishment of goals, use of specific teaching methods reflecting those goals, and presence of activities for students to complete beyond the didactic environment.

Perceptions of the EBTM

To the best of our knowledge, no other teaching model specific to the EBP process exists within athletic training education. Most publicized educational models of EBP instruction are focused on single institutional practices.[3,17,26] The EBTM, however, was implemented in nine CAATE-accredited ATEPs representing five NATA districts and two separate didactic courses. Therefore, the experiences of educators in this study potentially represent a broader perspective of model impact than most other research done in individual institutions.

While a few educators in this study noted limited knowledge and use of EBP prior to implementation, they did not illustrate any differences in their perceptions of ease of implementation, importance of material, or overall applicability of the EBTM to athletic training students. No support was given to the notion that educators with additional responsibilities, such as clinical or research roles, fared better or worse in implementation of the EBTM than educators without these roles. This result is similar to that of a recent study[42] regarding athletic training educators' knowledge, comfort, and perceived importance of EBP concepts. This study found that educators, regardless of role, perceived EBP to be an important process in athletic training education, and were comfortable in implementing EBP concepts within didactic curricula.[42]

Overall, the educators valued the contents of the EBTM and intend to use all or part of the model in future courses. Of particular note was the acceptance of the EBTM and EBP by one institution's full ATEP faculty. The participant from this specific program presented the EBTM to his colleagues, and they used the model contents as a catalyst to create a full course in EBP for the upcoming academic year. Together, they determined that EBP should become a key foundation of their ATEP, and realigned content within several of their courses to create an available credit for a self-standing EBP course. With permission of the primary researcher, this institution is expanding components of the EBTM to fulfill the content of this course, including objectives, lecture materials, and student assignments. The faculty discussions, curricular evaluation, and desire to expand the EBTM further to a full course was an unforeseen by-product of this study.

Overall, educators appreciated the structure of the EBTM, the close match to course topics such as ultrasound, and the emphasis on treatment. They elaborated on the matching of EBTM content to their courses by suggesting that some of the concepts and activities could also be beneficial to courses taught later in educational sequencing, due to the critical thinking nature of treatment decisions. The educators feedback supporting EBP concept instruction, with subsequent exposure during other courses, reflects recommendations made in nursing[11,21] and medicine[17,27] that content relating to the process of EBP, such as defining a clinical question and literature searching, is appropriate early in professional education.

The experiences of these educators should be embraced and reflected upon by other educators as they transition toward inclusion of EBP concepts in their curricula. ATEPs should evaluate their own faculty strengths and student learning styles as they develop plans for curricular implementation of EBP.

Limitations

Our educators comprised a small, non-randomized, critical case sample of educators with varying backgrounds in EBP. Thus, it is unknown if similar results would be seen in a randomized sample representing all NATA districts and levels of higher education. While educators were given a tutorial, the contents of the EBTM, instructions for implementation, and researcher support, the researcher was not present for the EBTM instructional sessions. Therefore, it can only be assumed that the implementation protocol was followed. Educators were permitted to add to instructional content, though they could not remove any pieces from the model or skip assignments. Disclosure of changes was detailed to the researcher during post-interviews. Additional assumptions include that educators gave maximal effort during tutorial completion and EBTM instruction, provided appropriate instruction to students during survey administration, and answered truthfully during interviews. Lastly, due to the nature of the investigation, the EBTM was only used during a 2 or 3-day session in therapeutic modalities or therapeutic rehabilitation courses, therefore, it is not known if similar results would be evident if taught throughout the entire semester.

CONCLUSION

The EBTM was viewed as successful by AT educators because it fostered an inquisitive learning environment, critical thinking, and communication with CIs. Though the EBTM was only used during a two or three-day session, positive responses were evident in educator feedback regarding the instruction of the five-step EBP process. As programs prepare for the implementation of the 5th edition of Athletic Training Educational Competencies, this educational model could be considered as an implementation strategy to assist in meeting EBP content area. We suggest that further elaboration of the EBP concepts instructed in the model be included longitudinally throughout curricula. Utilizing teaching methods that are valid and effective will help to enhance student retention of evidence-based practice concepts.

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APPENDIX 1. Interview Questions Regarding Implementation of the EBTM

INTERVIEW 1: Pre-EBTM Implementation

1. How many years teaching experience do you have?
    a. Which course do you intend to incorporate the EBTM in?
    b. For how many years have you taught this specific course?
    c. How many students are enrolled in this course, and are they all AT majors?
    d. Please discuss your clinical responsibilities, if any.
    e. Please discuss your research responsibilities, if any.
    f. Was EBP part of your undergraduate or graduation education?
2. Please briefly describe the admission process and where these students fall within your ATEP curriculum.
3. Please discuss the emphasis your program currently places on evidence-based practice.
4. Please discuss your background in evidence-based practice prior to going through the online tutorial for the EBTM.
5. Please discuss your goals for implementation of the EBTM within your course?
6. What timeline do you intend to use for EBTM implementation?
7. What specific questions can I answer for you regarding the EBTM?
8. Why did you select to implement the EBTM?
9. What concerns do you have regarding implementation of the model?
10. What impact do you feel the EBTM will have on your student's?
11. What steps do you feel could be taken to broaden the use of EBP in the AT profession?
12. Is there anything you would like to discuss that I have not specifically asked about?

INTERVIEW 2: Post-EBTM Implementation

1. Review information from previous interview:
    a. Did you follow the timeline you identified in the pre-interview?
    b. Please discuss how the concerns you presented in the pre-interview played out during implementation of the model. (Read instructor their answer from pre-interview)
    c. Did you utilize any of the objectives provided within the Instructor Manual? If yes, which specific objectives?
    d. In what ways was the EBTM helpful in meeting the objectives you selected?
2. Please discuss the aspect(s) of the model you found easiest to implement.
3. Please discuss the aspect(s) of the model you found most difficult to implement.
4. What aspects of the model could be improved and what specific suggestions do you have to accomplish these improvements?
5. Please discuss your perception of how the student's accepted the model, including content, activities and discussion.
6. Please tell me about the clinical instructor discussion assignment.
    a. In what ways did this assignment influence student: clinical instructor interaction?
    b. What were your perceptions of this assignment overall?
7. Please tell me about the larger clinical decision making assignment.
    a. In what ways did this assignment influence student: clinical instructor interaction?
    b. What were your perceptions of this assignment overall?
8. Please discuss your use of the rubrics provided within the EBTM Instructor Manual.
9. Please discuss how well the content of the model fit the content of your course.
    a. Was it appropriate to your students' educational level and in what way?
    b. Please discuss how well content of the EBTM matched with the intended objectives of your syllabus.
10. In what ways do you feel the model may have influenced your student's perceptions of the athletic training profession?
11. Would you continue to use the model after this semester? (all or part)
12. Would you recommend the model to other educators within your ATEP? Outside of your ATEP?
13. Are there other courses you think may fit well with the model and why?
14. Has your ATEP made any move toward further inclusion of EBP since the beginning of the semester? If yes, please discuss the process.
15. Is there anything I have not asked about that you would like to discuss?

ATHLETIC TRAINING EDUCATION JOURNAL

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ORIGINAL RESEARCH

Student Knowledge, Attitudes, and Use of Evidence-Based Concepts Following an Educational Intervention

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Context: While evidence-based practice (EBP) concepts are being taught in health profession education programs, models of instruction and effectiveness of these models are not evident in athletic training.

Objective: To evaluate the effectiveness of the Evidence-Based Teaching Model (EBTM) in increasing student knowledge, attitudes, and use of evidence-based concepts.

Design: Within subjects design with pre- and post-test evaluations of students' knowledge, attitudes, and intended use using the researcher-developed Evidence-Based Concepts: Knowledge, Attitudes and Use (EBCKAU) survey. Setting: CAATE-accredited undergraduate programs.

Participants: Eighty-two students from a stratified purposeful sample of 9 institutions were enrolled in the study, 78 students (95%) completed the knowledge portion of the survey, while 68 students (83%) fully completed the knowledge, attitudes, and use portions of the survey.

Data Collection and Analysis: The EBCKAU survey was used to assess student factors relating to EBP through multiple choice, Likert scale, and open-ended questions.

Results: Students significantly increased their knowledge, confidence in knowledge, familiarity with, and confidence in use of EBP skills following the EBTM. Prior to the EBTM, students earned a mean knowledge score of 50%. This improved to 66% post-EBTM. Students' interest and perceived importance scores did not increase. Barriers to student use of EBP included time, available resources, ACI open-mindedness, and experience.

Conclusions: The EBTM was effective in improving student factors related to knowledge and use of EBP concepts. To our knowledge, this is the first published teaching model that assessed student outcomes related to EBP in athletic training education.

Key Words: evidence-based practice, competencies

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Full Citation:
Manspeaker SA, Van Lunen BL, Turocy PS, Pribesh S, Hankemeier D. Student knowledge, attitudes, and use of evidence-based concepts following an educational intervention. *Athl Train Educ J*. 2011;6(2):88-98.

Student Knowledge, Attitudes, and Use of Evidence-Based Concepts Following an Educational Intervention

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Infusion of the knowledge and skills related to evidence-based practice (EBP) in health care professional education programs is needed to promote current clinical practice and quality patient care.[1] As a core component of educational curricula,[2-5] EBP promotes critical thinking among students through integration of patient values, best available evidence, and clinician expertise.[6] Specific to athletic training (AT), these components of EBP should be taught in educational curricula to provide a more scientific base for clinical practice.[7]

Recently, the National Athletic Trainers' Association (NATA) began increasing resource availability for athletic trainers to begin incorporating EBP into clinical practice. These resources center on improving accessibility to current, high quality, evidence-based research through databases, forums, and continuing education opportunities. Implementation of the EBP process and associated concepts in the clinical setting and professional education is necessary as we continue to seek third-party reimbursement, demonstrate effective athletic training methods, increase the presence of evidence in our literature,[8] promote critical thinking, and enhance our reputation within health care.[7] Students enrolled in Commission on Accreditation of Athletic Training Education (CAATE)-accredited programs should have significant exposure to EBP, as they will be future leaders of the AT profession.[7,9]

Curricula and continuing education opportunities of other health care professions have focused on increasing students' and professionals' abilities to find, analyze, and utilize research evidence to improve individualized patient care.[10-13] To assist instruction of these concepts, specific teaching strategies have been developed in medicine,[2,3,5] nursing,[14,15] occupational therapy,[16,17] and physical therapy.[18] These strategies are typically profession-specific, focus on the process of EBP, and have varied manners of delivery such as short courses, weekend workshops, and online modules.

To further promote inclusion of EBP, the Committee on the Health Professions Education Summit (2003) established competencies that health care practitioners should incorporate into clinical practice including: 1) patient-focused care; 2) interdisciplinary collaboration; 3) use of EBP; 4) improving quality of care; and 5) use of technology to obtain information.[4] Similarly, athletic training education has added EBP competencies by including many concepts specifically related to the EBP process in the 5th edition of Athletic Training Education Competencies.[19]

Other studies in the medical,[2,5] nursing,[14] occupational therapy,[16] and physical therapy,[20] fields have evaluated EBP knowledge and attitudes following EBP academic and clinical training, and have noted a change in knowledge but not in attitude or behavior. Evaluation of teaching strategies in these professional programs demonstrate that gains in knowledge and skills can be seen via EBP infusion in semester courses,[5] clinical rounds,[2] and practicum courses.[14] Unfortunately, these studies do not illustrate changes in attitudes or behavior, perhaps due to the fact that subjective changes such as these take time to be seen. Each of these studies evaluated attitudes and behaviors immediately upon completion of the course, thus not allowing enough time to apply the knowledge and skills gained from EBP instruction.

In comparison, EBP concepts are somewhat new to athletic training, and no incorporation of EBP studies exist in the athletic training literature.[21] Therefore, it is not known whether there will be improvement in student knowledge, attitudes, and use. The athletic training profession needs information regarding these topics in order to fully implement EBP. Because behavior change occurs over time, it is essential that our students in professional education are engrained with the knowledge of EBP concepts, so that EBP-associated behaviors can be reflected in future practice. Therefore, the purpose of this study was to implement an innovative teaching strategy, the Evidence-Based Teaching Model (EBTM), in select ATEPs to determine its effectiveness in improving student knowledge, attitudes, and use of EBP concepts. Please refer to *Educator perceptions of the Evidence-Based Teaching Model in undergraduate athletic training education* on pages 76-87 of this issue for a complete description of the EBTM.

METHODS

Study Design

We employed a within subjects study design with pre- and post-intervention evaluations of students' EBP knowledge, attitudes, and intended use via the *Evidence-Based Concepts: Knowledge, Attitudes, and Use* (EBCKAU) survey. Athletic training students were enrolled in a therapeutic modalities or rehabilitation course at one of nine CAATE-accredited institutions during the time of participation.

Participants

The EBCKAU was administered to a stratified purposeful sample of 9 CAATE-accredited programs representing 5 NATA districts. Eighty-two students consisting of 33 males and 49 females (20.18 ± 1.12 yrs), with an average ATEP semester enrollment of 2.30 ± 1.15, and an average GPA of 3.13 ± 0.42 completed the instructional sessions for a 100% participation rate. Please see Table 1 for further demographic information. Due to the self-report nature of GPA obtained in this study, a one-time Family Educational Rights and Privacy Act (FERPA) form was not completed. Students were excluded from section analyses (knowledge, attitudes, or use) if they did not fully complete part of a respective section of the EBCKAU survey. For example, if a student did not answer all Likert-scale items for attitudes, they were not scored for the

Table 1. Participant Demographics (N = 79)

Institution	NATA District	Course of Implementation	Number of Students	Mean GPA (SD)	Mean Semesters Enrolled in ATEP (SD)	Instructor Teaching Experience (Yrs)
A	4	Modalities	7	3.31 ± .41	4.00 ± .58	10
B	4	Modalities	10	2.84 ± .35	1.40 ± .84	5
C	4	Modalities	12	3.14 ± .53	1.08 ± .29	14
D	2	Rehabilitation	12	2.91 ± .43	1.92 ± .29	10
E	9	Modalities	9	3.14 ± .31	2.11 ± .33	3
F	3	Modalities	6	3.19 ± .37	2.83 ± .41	3
G	6	Rehabilitation	7	3.19 ± .25	4.43 ± .98	10
H	6	Modalities	4	3.20 ± .66	3.00 ± .82	5
I	3	Modalities	12	3.39 ± .25	2.07 ± .27	16

entire attitude section, though were still evaluated in knowledge and use. Seventy-eight students (95%) completed both pre- and post-*knowledge* portions of the EBCKAU survey, and 68 (83%) completed all sections of the survey. Approval for data collection was obtained from the human subjects committee at the university where the EBTM was developed and participating schools when applicable.

Knowledge of EBP concepts, as related to treatment decisions, was addressed through 6 multiple choice questions and 1 fill-in the blank question, for a maximum knowledge score of 7. *Attitudes* were assessed through Likert-scale items relating to familiarity, confidence in use of EBP concepts, student interest in, and perceived importance of EBP. Scales included four ordered choices ranging from "1," which indicated "Not at all," to "4" which indicated "very" for the sections of familiarity, confidence, interest, and perceived importance. *Use* of resources were measured through checklists and ranking of items that students regularly use to conduct EBP, such as course notes, peer-reviewed articles, previous experience, and discussion with their Approved Clinical Instructor (ACI) or Clinical Instructor (CI). Additionally, use was evaluated through open-ended questions regarding the sub-categories of perceived barriers to use and intended future use of EBP concepts. Demographics included questions to describe the sample and to determine representation of the population.

Instrument

The EBKCAU survey was developed by the research team, and was used to assess student knowledge, attitudes, and use of EBP concepts. Each of these categories was assessed via separate sections of the survey. Topics assessed within the category of attitudes included familiarity, confidence, interest, and perceived importance, while the use category evaluated future intended use and perceived barriers to utilization of EBP. Figure 1 depicts the specific content areas addressed by each section of the survey.

The EBCKAU Survey was examined for content validity through blueprint design and examination by a panel of athletic trainers. In a previous pilot study (n = 86), reliability of the EBCKAU survey was determined in a sample of students enrolled in therapeutic modalities or rehabilitation courses. The knowledge section was analyzed using Kuder-Richardson (K20) analysis for internal consistency of multiple choice items, and percent agreement for fill-in-the-blank. Knowledge multiple choice questions achieved consistency values per question ranging from .360 to .786, with an overall K20 value of .250. The fill-in question on the knowledge section earned a percent agreement of 100%, as all students answered this question incorrectly on both administrations. Cronbach's alpha was calculated for the ordinal data with values for familiarity (α = .814), confidence in use (α = .813), interest (α = .669), and importance (α = .707), for an overall attitudes section reliability of satisfactory, at the value of .70 or higher. Reliability of barriers and intended use were not conducted due to the qualitative nature of information collected in these sections.

Procedures

The EBCKAU survey was administered by participating instructors in the associated therapeutic modalities or rehabilitation classes both prior to, and within two weeks of completing, implementation of the EBTM. Delivery of the EBTM occurred over 2 or 3 days

Knowledge Section	EBP process in treatment decisions
Attitudes Section	Familiarity with EBP process
	Interest in EBP process
	Perceived importance of EBP process
Use Section	Confidence in use of EBP process
	Intended future use of EBP process

Figure 1. EBCKAU Survey Areas of Evaluation

of either therapeutic modalities or rehabilitation due to the decision-making nature of these courses. In addition to a lecture, the EBTM required students to complete various assignments including article review, formation of a clinical question, in-class discussions, and discussions with clinical instructors. Given the time lapse from implementation to completion of the EBTM, the average time between survey administrations was 4 weeks.

Each survey included a front page instructional sheet which was read as a script to students by the instructor. Students were instructed to tear off the instructional sheet as a record of their consent to participate in the survey. Upon completion of the post-survey, the instructors mailed all survey and EBTM assignments back to the primary investigator, where they were kept in a locked filing cabinet. Appendix 1 illustrates the EBCKAU survey in its entirety.

Data Analysis

Normality of the data was obtained through descriptive statistics of means, standard deviations, and frequencies. A paired t-test was used to determine differences in knowledge scores from pre- to post-EBTM implementation. Wilcoxon matched pairs signed ranks were used to assess differences in familiarity, confidence in use, interest in, and importance of EBP concepts. Pearson product-moment correlations (r) were used to determine relationships between knowledge change scores and student factors of number of semesters accepted in an ATEP and GPA, as well as instructor teaching experience. Spearman's rank correlations (p) were used to detect relationships for familiarity, confidence in use, interest, and importance with the same student and instructor factors previously described. Additional categories of barriers and future use were analyzed qualitatively for patterns of student responses. Axial coding was employed to determine appropriate categories within answers to these questions. A value of P=0.05 was set a *priori* to indicate statistical significance. Data analyses were conducted using SPSS v.16.0.1 *(SPSS Inc. Chicago, IL).*

RESULTS

Knowledge

Of the 82 students enrolled our study, 78 completed both pre- and post-EBTM *knowledge* portions of the EBCKAU survey for a 95% response rate. Prior to implementation of the EBTM, students had a mean knowledge score of 50%, showing that they had low knowledge of EBP concepts. Post-implementation, the mean percentage increased to 66%, for a significant increase in overall knowledge ($t_{1,77}$ = -6.39, $P < .001$, $d = .72$) with a moderate effect size; the confidence interval for this mean was between -1.50 and -0.79 (Table 2). Average overall knowledge change scores were equivalent to an increase in total score by 1 point with a range of -2 to 5, while 23% of participants increased their score by 3 points or more.

Student confidence in EBP knowledge also increased significantly from pre- to post-BTM implementation (z = -7.04, $P < .01$). The mean pre-intervention confidence in EBP knowledge score was 14.06 ± 3.33. Following EBTM implementation, the confidence in EBP knowledge score increased to 21.03 ± 3.27 (Table 2).

There was no significant relationship between semesters accepted in an ATEP or GPA and knowledge change scores. Additionally, no correlation was identified between instructor years of teaching experience and student knowledge change scores.

Attitudes and Confidence in Use

For the attitudes and confidence in use portions of the EBCKAU, only 68 responses were used due to full completion of the scale (see Table 3). Significant differences were found in students' *familiarity* (z = -6.55, $P < .01$) and *confidence in use* (z = -6.37, $P < .01$) of EBP following implementation of the EBTM. *Familiarity* mean pre- and post-intervention scores were 12.34 ± 2.94 and 16.10 ± 2.22, respectively; while *confidence in use* means were 12.19 ± 2.95 pre- and 15.59 ± 2.05 post-EBTM.

Student interest and perceived importance were not significantly influenced as a result of the EBTM. Additionally, no significant differences were identified for number of semesters accepted in an ATEP or GPA and familiarity, confidence in use, interest in, or perceived importance of EBP concepts. A negative correlation was identified for confidence in use of EBP concepts and instructor years of teaching experience (r = -.29, $P < .05$). No correlations were found between years of teaching experience and familiarity, interest in, or perceived importance.

Barriers and Intended Future Use

Several patterns emerged through the open-ended questions relating to barriers and intended future use of EBP resources. Students were asked to identify specific barriers to their use of EBP resources; the most common answers were expressed as time, available resources, relevance of literature to the athletic population, ACI/CI open-mindedness, and agreement with class information. Samples of student responses are provided below.

Table 2. EBCKAU Knowledge Scores (N = 78)

Portion of EBCKAU	Maximum Possible Score	Pre-Test Mean (SD)	Post-Test Mean (SD)	*P*-Value	Change Score	Effect Size	95% CI
Knowledge	7	3.49 ± 1.28	4.63 ± 1.27	< .001	1.14 ± 1.58	0.72	-1.50 to -0.79
Confidence in Knowledge	28	14.06 ± 3.33	21.03 ± 3.27	< .001	7.15 ± 3.90		

* Indicates statistical significance at $P < .05$

Table 3. EBCKAU Attitudes and Confidence in Use Scores (N = 68)

Portion of EBCKAU	Maximum Possible Score	Pre-Test Mean (SD)	Post-Test Mean (SD)	Change Score	*P*-Value
Familiarity	20	12.34 ± 2.94	16.10 ± 2.22*	3.76 ± 3.06	< .001
Confidence in Use	20	12.19 ± 2.95	15.59 ± 2.05*	3.40 ± 3.05	< .001
Interest	20	15.62 ± 2.87	15.60 ± 2.70	-0.01 ± 2.98	> 0.05
Importance	20	16.01 ± 2.95	16.24 ± 2.75	0.22 ± 3.32	> 0.05

* Indicates statistical significance at *P < .05*

The largest barrier I see is that when treating an athlete I don't foresee myself going to look up literature between evaluation and treatment.

EBP is not always in agreement with what we have been taught in class.

We might not have computers or any other way to find evidence-based information and lack of knowledge.

I think the only barrier is the ACI in charge who is not open-minded.

Not every athlete is the same. The subject used in the research may be completely different from your athlete.

Students also identified their intended use of EBP skills and knowledge in their future during graduate school, if a treatment was not working, with chronic injuries, and during discussions with peers or ACI/CIs. Specific student comments included:

If I have a chronic injury that seems that other treatments are not being successful.

Whenever I find what I'm doing isn't working or whenever I'm not sure of a treatment plan, or in special consideration athletes.

I see myself using it to stay current with treatment protocols and for providing my athletes with optimum care.

I will take EBP into any discussions I have with my head ACI and use their opinions to influence my decision making.

I would use EBP skills in determining which modalities will work best with my different individuals. It will also help me in the decision process as well as in normal treatment of the individual.

Students also indicated via lists that they use the following resources more than 2 times per week both when studying and determining treatments: course notes, discussion with ACI/CI, classmate conversation, textbooks, and previous experience. General web-sites also were provided as a resource students use more than twice per week when studying, but not when determining patient care.

DISCUSSION

We anticipated that athletic training students would have limited knowledge of EBP prior to EBTM instruction, with associated low familiarity, confidence, interest, and perceived importance. Based on our results, athletic training students benefited from instruction of EBP through the EBTM, particularly in the areas of knowledge, familiarity, and confidence in use of EBP. As with other research findings regarding attitudes toward EBP,[22] the EBTM did not appear to increase students' interest in or perceived importance regarding EBP.

Knowledge

Evidence-based practice concepts are relatively new to students within CAATE-accredited programs. As demonstrated on the EBCKAU, initial student knowledge was low at 50%, representing 3.5 questions correct out of a possible 7. Following implementation of the EBTM, student knowledge increased an average of 1 point to 66%, or the equivalent of 1 letter grade. While the final knowledge score obtained in our study is still somewhat low, it is similar to findings of teaching strategies in other professions. For example, Wanvarie[2] found that medical residents had an average score of 63% (out of 30 multiple choice questions) following a full semester course on EBP. Additionally, Thom et al[22] showed increases in knowledge following a two-week residency rotation. Burns and Foley[23] qualitatively reported that freshman nursing students improved knowledge and skills following a semester course in EBP.

We should note that the knowledge portion of the EBCKAU was composed of questions relating to the 5-step EBP process, thus representing the introductory concepts of EBP. Knowledge was evaluated at the lower levels (remembering and understanding) of the revised Bloom's Taxonomy.[24] The EBCKAU survey was not designed to assess higher levels of learning, such as applying and evaluating EBP,[24] nor did we target statistical concepts of EBP such as sensitivity, specificity, or likelihood ratios.

We hypothesized that there would be no significant difference in knowledge in relation to GPA and number of semesters enrolled in an ATEP. The observed increase in knowledge (from 50% to 66%) across student demographics may illustrate that students had similar levels of knowledge at the time of initial assessment (pre-EBTM implementation), and therefore, were capable of similar amounts of increase in knowledge following the intervention.

Attitudes and Intended Future Use

The EBCKAU student interest and perceived importance scale scores of the attitudes section were high during the pre-test, with values of 16.01 and 16.04, respectively, indicating that EBP concepts were "very" interesting and important to students. Because the maximum possible score on the interest and importance scales was 20, there was a ceiling effect for these section scores. Familiarity with and confidence in use were appropriately low during the pre-test, matching the assumption that if students were not familiar with an EBP concept, their confidence in using that concept would also be low. Students reported greater familiarity with and confidence in all aspects of the EBP process, including forming clinical questions and literature searching skills, following completion of the EBTM assignments. Similar to our results, Thom[22] found that medical residents' confidence in the skills of clinical questioning through the PICO format and critical appraisal of literature, were increased after residency rotation. Additionally, Wanvarie[2] demonstrated increased confidence in formulating clinical questions and appraising literature following longitudinal instruction within a curriculum.

Common patterns emerged as a result of the question regarding how students intended to use the EBP process beyond EBTM educational sessions. More specifically, students identified their intention to use EBP skills and knowledge in graduate school, if a treatment was not working, with chronic injuries, and during discussions with peers or ACI/CIs. While our findings regarding future use are in agreement with other investigators,[22] most other studies do not identify specific examples of when students might find EBP beneficial to use. The addition of open-ended questions to the EBCKAU survey allowed students to express their own personal intentions for EBP use, rather than trying to "fit" their answers into more structured questions.

Barriers to EBP

Previous studies have identified several barriers to use of the EBP process.[25-29] Similar to our findings, these barriers include time, relevance of the literature to target population, available resources, ACI/CI open-mindedness, and agreement with class information. Identification of these barriers is important to the transition toward inclusion of EBP concepts in professional education. Educators and clinicians should understand these barriers, identify potential implications on instruction, and act proactively to overcome them. Specific strategies for surmounting these barriers should be embraced by ATEP faculty and ACI/CI's through goal setting and alignment with the current edition of Athletic Training Education Competencies' requirements.[30]

For example, athletic training students responded that they felt that what was taught in the classroom was not supported by what they observed in the clinical setting. While this problem cannot immediately be remedied, fostering an educational environment that is open to obtaining and incorporating evidence in practice[8] could serve as a starting point. Cohesion of didactic information and clinical application could be enhanced by establishing evidence-based expectations among all parties associated with the ATEP, thus fostering a change in attitudes and behavior toward evidence.[31] Creating interactive opportunities, such as programmatic planning meetings, ACI training sessions, in-services, and continuing education topics[29] that will promote infusion and use of EBP, could be beneficial to establishing this environment. To solidify the evidence-based environment, educators and clinicians could then make the use of evidence visible to students, both during instruction and patient care.

Another barrier provided by students was the lack of available and applicable resources to support their clinical questions. One suggestion to ease this barrier could be to expand the amount of scholarly activity within areas that relate to outcomes that have clinical and patient perspectives that can be used to examine patient care.[30] We must examine the information that is readily available to and documented by clinicians in order to change care within our traditional settings. Additionally, continuing education opportunities that address this area should be available for promotion of this practice-based research network. Modeling of best practices by clinicians providing clinical instruction could help students to see evidence as a valued part of patient care as they learn to use judgment when integrating evidence into clinical decisions.[6,20]

The barriers identified in our study, combined with our suggestions for progression toward overcoming these barriers, are in alignment with recommendations of physical therapy literature as well.[32] Physical therapy embraces collaboration of academic and clinical faculties in efforts to approach EBP throughout student education. With a unified vision aimed at promoting EBP behaviors in the clinical setting, curricular designs of physical therapy professional programs have transitioned to emphasize EBP skills, knowledge, attitudes, and behaviors, while providing practicing physical therapists with opportunities to model this behavior to students.[20]

Limitations

Limitations to our study exist primarily in threats to internal validity, including the stratified purposeful sampling method used. An additional concern for the sample is the self-report nature of the EBCKAU survey. It is possible that student responses were based upon what they felt was the "socially desirable" answer to survey questions rather than their true knowledge or attitudes. A limitation may also be identified in the content of the EBCKAU survey, as it was designed to assess foundational components of EBP knowledge, specifically the process of EBP, and does not assess higher levels of EBP knowledge. We also did not assess the amount of EBP concept exposure students had within each ATEP prior to the intervention. However, the high response rate (95% knowledge, 83% attitudes/use) increases the external validity of our study. Additionally, the inclusion of the EBTM as a two-day session in a semester long course is only representative of a small component of these classes. Therefore, the results are only applicable to those classes.

Clinical Relevance

Despite these limitations, our study provides a unique approach to evaluating a teaching model related to EBP. When analyzing

teaching strategies of other health professions, it is evident that few analyzed pre/post-quantitative results. Most publications present the strategy itself with qualitative results.[14, 33, 34] Prior studies have focused on displaying enabling factors for student understanding of EBP, student perspectives on the teaching strategy, or faculty perceptions of the model. Therefore, our study and the EBCKAU are unique in that we assessed multiple aspects of the EBTM that most other research has not yet evaluated. Unlike other teaching strategies, the EBTM was implemented in multiple institutions of varying size from several NATA districts, in courses that already were in existence, while most other strategies were implemented in individual programs or workshops. Also, the EBCKAU survey assessed knowledge, attitudes, use, and barriers through various types of quantitative and qualitative questions, thus determining a broader scope of influence of the EBTM.

CONCLUSION

Our EBTM curriculum, based on a 2-day interactive didactic lecture format combined with clinically-integrated activities, appears to improve athletic training students' knowledge and confidence. Such EBP teaching structures have been recommended to maximize knowledge, skills, and attitudes among students.[12, 13] A primary aim of the EBTM was to provide a method for inclusion of EBP concepts in athletic training education that would promote critical thinking in students.[7]

Based on our results, lower levels of knowledge, confidence in knowledge, and familiarity increased. However, interest and importance did not increase, and commonly reported barriers related to time, resources, ACI/CI open mindedness, and agreement with class information were noted. Specific strategies for surmounting these barriers should be embraced by ATEP faculty to prepare students and clinical instructors for the forthcoming edition of the Athletic Training Education Competencies which include EBP concepts. Lastly, since each of the attitudes and confidence in use variables showed no relationship to GPA, instructor teaching experience, or semesters accepted in an ATEP, it is unknown how these factors might influence EBP competency implementation.

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APPENDIX 1. EBCKAU Survey

Knowledge Evaluation: Please answer the following questions in the left column, and rate your confidence in that answer with the scale in the right column. For the confidence questions, circle the answer that best completes this sentence regarding the corresponding question on the left: *I am _____ confident that I answered this question correctly.*

QUESTION	Confidence Scale			
1. The first step in evidence based practice is to A. Search for research literature B. Critically appraise the current research C. Define a clinical question D. Choose a research database	Not at all	Mildly	Moderately	Extremely
2. When defining a clinical question using the PICO technique, which factor should you consider first? A. Return to play criteria B. Patient goals C. Patient age D. Personal experience	Not at all	Mildly	Moderately	Extremely
3. When conducting a literature search, which of the following on-line sources holds the highest quality content? A. Google Scholar B. Medline C. Cochrane Database D. WebMD	Not at all	Mildly	Moderately	Extremely
4. Which type of research design is considered to have the highest quality of evidence? A. Randomized control trial B. Independent laboratory investigation C. Case study D. Single subject design	Not at all	Mildly	Moderately	Extremely
5. An athletic trainer's personal experience with ultrasound should primarily be used to A. Develop expertise that can be passed on to students B. Guide future clinical practice and decision making C. Provide solid evidence in support of ultrasound D. Create standard treatment protocols for all patients	Not at all	Mildly	Moderately	Extremely
6. When assessing the outcome of a treatment you used what factor would most likely lead you to use it again? A. Patient satisfaction with the outcome B. Outcome agreement with current literature C. Short length of treatment time to achieve outcome D. Outcome achieved consistent with selected goals	Not at all	Mildly	Moderately	Extremely
7. Please list below the steps of the PICO process of developing a clinical question.	Not at all	Mildly	Moderately	Extremely

The remaining questions do NOT require you to complete a confidence scale.

8. When conducting an on-line literature search, list below which sources you personally utilize and rank your preference in using those sources (1 = most preferred, 5 = least preferred).

9. Which factors should be considered when appraising literature for potential use as a treatment option for a patient? (Check all that apply)

___ Results of the study ___ Validity of the study ___ Subject characteristics
___ Year of the study ___ Length of abstract ___ Journal of publication
___ Number of authors ___ References listed ___ Location of the study
___ Applicability to patient

10. Which of the following items do you use greater than 2 times per week when studying? (Check all that apply)

___ Course notes ___ Creating a Clinical Question ___ Textbooks
___ Journal Articles ___ PICO Process ___ Websites
___ Peer-Reviewed Research ___ Classmate Conversation ___Library Databases
___ Discussion with ACI ___ Previous Experience
___ Appraisal of Research ___ Athlete Suggestions

11. Which of the following items do you use greater than 2 times per week when ***determining treatments for patients?***

___ Course notes ___ Creating a Clinical Question ___ Journal Articles
___ PICO Process ___ Textbooks ___ Peer-Reviewed Research
___ Classmate Conversation ___ Websites ___ Discussion with ACI
___ Previous Experience ___ Library Databases ___ Appraisal of Research
___ Athlete Suggestions

12. Describe below any barriers you may/will have for using evidence-based practice concepts in athletic training.

13. Describe below ways in which you envision yourself using evidence-based practice skills in your future work as an athletic training professional.

Attitude and Use Evaluation

The following questions pertain to your *familiarity, confidence, interest, and perceived importance* of evidence based practice concepts. For each of the four sections, please check one box that best describes your answer. A sample has been provided.

SAMPLE	**Section 1** **To what extent are you *familiar* with this concept?**				**Section 2** **How *confident* are you in your ability to use this concept?**				**Section 3** **How *interested* are you in using this concept?**				**Section 4** **How *important* is this concept to you?**			
Concept	Not at all	Limited	Some-what	Exten-sively	Not at all	Limited	Some-what	Very	Not at all	Limited	Some-what	Exten-sively	Not at all	Limited	Some-what	Very
SAMPLE: Evaluating a lateral ankle Sprain			X				X					X				X

Please answer these questions from the perspective of an athletic training student.

	Section 1 **To what extent are you *familiar* with this concept?**				**Section 2** **How *confident* are you in your ability to use this concept?**				**Section 3** **How *interested* are you in using this concept?**				**Section 4** **How *important* is this concept to you?**			
Concept	Not at all	Limited	Some-what	Exten-sively	Not at all	Limited	Some-what	Very	Not at all	Limited	Some-what	Exten-sively	Not at all	Limited	Some-what	Very
Creating a clinical question																
Searching literature for information to support clinical decisions																
Critical appraisal of literature																
Accessing clinical expertise from your clinical instructor																
Improving patient outcomes using evidence-based processes																

ATHLETIC TRAINING EDUCATION JOURNAL

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ORIGINAL RESEARCH

Educational Preparation and Experiences in the Industrial-Occupational Setting: A Qualitative Study of Athletic Training Graduates' Perspectives

Jim F. Schilling, PhD, ATC, CSCS

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Context: The industrial-occupational setting provides a workplace of substantial potential for the athletic training graduate. Acquiring input from entry-level athletic trainers (ATs) pertaining to experiences, knowledge, and skills necessary to be successful in the industrial-occupational setting is critical information for future Athletic Training Education Program (ATEP) curriculums, continuing education, and post-graduate fellowships.

Objective: To gain understanding of the experiences encountered and education needed for successful preparation as an entry-level AT in the industrial-occupational setting.

Design: Qualitative

Setting: Industrial-Occupational

Participants: Seven professional-level industrial ATs

Data Collection and Analysis: Structured interview questions were used with an electronic platform. Participants were questioned relating to their experiences and perceptions pertaining to educational preparation for the industrial-occupational setting. An inductive content analysis was performed for textual data analysis.

Results: The rationale for acquiring positions in the industrial-occupational setting upon graduation was due to fewer hours and higher salaries, but once hired the most positive experience and greatest job satisfaction came from helping people. The area the participants felt ill-prepared was ergonomics, but respondents felt well-prepared in injury evaluation and treatment. They also commented that gaining respect from the company was the most challenging aspect when entering the industrial-occupational setting as an entry-level AT.

Conclusion: Graduates are attracted to the salary and hours associated with the industrial-occupational setting, but helping people provided the greatest job satisfaction. Although most entry-level ATs perceived themselves as well prepared for the industrial-occupational setting, weakness in the area of ergonomics was identified.

Key Words: athletic trainer, professional education, industry

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Full Citation:
Schilling JF. Educational preparation and experiences in the industrial-occupational setting: A qualitative study of athletic training graduates' perspectives. *Athl Train Educ J*. 2011;6(2):99-106.

Educational Preparation and Experiences in the Industrial-Occupational Setting: A Qualitative Study of Athletic Training Graduates' Perspectives

Jim F. Schilling, PhD, ATC, CSCS

Employment settings in athletic training have expanded from university, high school, and professional sport environments to clinics, hospitals, and industry. The industrial-occupational setting is an area of employment which consists of the following subcategories: clinic, ergonomics, health-wellness-fitness, and other industrial-occupational.[1] The industrial-occupational setting currently employs approximately 1.26 % of the total 26,074 National Athletic Trainers' Association (NATA) certified members.[1] Although this setting presently employs a small percentage of the total NATA members, the industrial-occupational setting has great potential for further workforce expansion. The industrial population would certainly benefit from an athletic trainer's (AT) expertise in treating the physically active workers who have sustained a musculoskeletal injury. The benefits ATs can supply industrial – occupational setting companies were recognized in a survey of industrial companies that utilize the services of an AT conducted by the NATA in 2008.[2] The results found that 100% of the companies surveyed reported the AT provides a favorable return on investment.

Past studies[3-4] have investigated the educational preparation of ATs employed in various settings. One study examined whether ATs perceived receiving adequate preparation for their careers.[3] The findings suggested that 90% of the respondents felt they received adequate preparation for ATs at the entry-level. Another study of 183 ATs employed no longer than 18 months in sports medicine centers, colleges, and high schools examined the ATs professional preparation.[4] The findings indicated there was adequate preparation in the task areas of evaluation of athletic injuries and illnesses, prevention of athletic injuries and illnesses, and first aid and emergency care. The authors determined that enhancement should occur in the task areas of rehabilitation of athletic injuries, organization and administration of athletic training programs, and counseling and guidance of athletes. The entry-level participants of this study were educated in programs following the manual for athletic training education programs (ATEPs) entitled (*The Guidelines for Development and Implementation of NATA Approved Undergraduate Athletic Training Education Programs*.) Although not labeled as such, this document was the first edition of educational competencies for the athletic training major. The entry-level participants of this research were also not employed in industrial-occupational settings.

A previous investigation examining educational needs of ATs employed in a variety of job settings, including the industrial environment, found that ATs in the industrial-occupational group felt the less traditional topics such as OSHA compliance, worksite wellness, ergonomics, legal issues, administration, budgeting, workmen's compensation, promotion and marketing of athletic training, and documentation were not adequately being addressed.[5] Although previous investigations of AT educational preparation specific to the clinical setting as perceived by clinical directors[6] and employers[7] have been conducted, entry-level practitioners who studied under the latest *Athletic Training Educational Competencies* document (4th edition)[8] and work in the industrial setting have not shared their perceptions of educational preparation. This type of research can be used as a measuring tool to indicate the effectiveness of the present curriculum at preparing students as entry-level ATs. As a tool, it can be used to compare results from future investigations on graduates studying under revised editions of competency documents.

The purpose of this study was to provide insight into 2 questions regarding entry-level ATs who studied under the 4th edition competency document and are employed in industrial-occupational settings. The first question is what experiences do entry-level ATs encounter when taking positions in industrial-occupational settings? The second question is how entry-level ATs perceive their educational preparation for careers in industrial-occupational settings?

METHODS

Qualitative methods were used for this study. Data collected from participants of a qualitative study may be accomplished through oral interviews, researcher observation, or in writing.[9] Inductive content analysis has an established position in nursing research[10] and is commonly used in health and social science research.[11]

Participants

The criteria for inclusion in this research consisted of being a Board of Certification-credentialed AT; employed in only industrial-occupational setting and graduated from a Commission on Accreditation of Athletic Training Education (CAATE)-accredited ATEP between May 2007 and May 2009.

There were a total of 353 certified NATA members listed under the industrial-occupational job setting category.[1] Eighteen of the total 353 industrial ATs graduated between May 2007 and May 2009 according to data supplied by the NATA organization member services. Seven of the potential 18 entry-level industrial ATs volunteered to participate in this study. This number represents approximately 39% of the total number of graduates taking employment in industrial-occupational settings between May 2007 and May 2009.

Instrumentation

For this qualitative research study, a web-based questionnaire using SurveyMonkey® was chosen for participant convenience, fast response times, and cost effectiveness. Other advantages of using web-based qualitative research have been documented, such as responders being more likely to reply to open-ended questions,[12] and add more insightful comments.[13] A questionnaire was constructed by the author of this qualitative study which consisted of demographic information, a section asking open-ended questions regarding the participant's experiences within

the industrial-occupational setting, and a section asking open-ended questions pertaining to their perceived educational preparation for the industrial-occupational setting (Appendix 1). Several questions included in the educational preparation section were synonymous in nature to ensure reliability of the data through consistent responses.

The instrument was reviewed by 3 industrial AT experts and 3 qualitative research experts for content validity. Expert status was determined by a minimum of 10 years experience in their respective fields. The industrial AT experts were asked to verify that the questions included in this questionnaire would best gain an understanding of the experiences and educational preparation of an entry-level AT in an industrial-occupational setting. The research experts were asked to verify that the questions included in this questionnaire were constructed and organized to achieve the research purpose. As a result of expert review, 2 questions were eliminated and several were edited to improve clarity.

The instrument was also piloted to 2 ATs listed under the industrial-occupational job setting category (non-participants of the study) to gain input on questionnaire clarity, length, and technical issues. No changes were recommended as a result of the pilot.

Data Collection

Appropriate institutional review board was granted prior to data collection. The email distribution list, customized invitation message, and schedule for delivery of the questionnaire were placed in the email invitation collector option within the web-based software. The volunteers needed to agree to the stipulations stated in the consent form, which was a portion of the invitation message, before being transferred to the questionnaire to begin participation. The initial data collection took place in November of 2009. Two follow-up surveys using identical procedures were sent to the non-respondents at 1 week intervals following the initial survey. All responses to this questionnaire were anonymous.

Data Analysis

The results of this investigation were derived through an inductive content analysis strategy which consisted of organizing the data toward common themes. For example, responses such as "helping individuals who otherwise have no exposure to athletic training services," "I consider helping ordinary people (not athletes) to be a positive experience," and "helping people reduce pain" were placed under the category of "helping people." The emergent themes were peer reviewed by 3 experts in the Industrial-Occupational setting to ensure credibility and truthfulness of the results. This technique is used to ensure trustworthiness of qualitative data by attempting to establish credibility of the results through agreement by experts.[14]

RESULTS

All volunteers for this study responded to all the questions. Common themes of the participants were grouped into themes and labeled. With 7 participants in this research study, a category was established when a minimum of 3 common data units emerged from a question.

Experiences

Reasons for Selecting the Industrial-Occupational Setting

Under the experiences as an entry-level AT working in the industrial-occupational setting, 3 categories were developed. The first was regarding the question "Why did you choose employment in the industrial setting as opposed to working in a university, high school, or other setting?" The responses suggested the participants preferred the industrial-occupational setting due to fewer hours, and better salary. For example, one participant wrote:

> *I chose to work in the industrial setting because my employer offers great benefits including licence/dues reimbursement and pays for continuing education. My job provides me with the opportunity to work as an athletic trainer while only working 40 hour weeks and getting paid for the hours I work.*

Another participant also commented on the hours and pay when he stated "Semi-consistent hours, higher pay, wanted to be part of an emerging setting" were reasons for choosing the industrial setting.

Job Satisfaction

The second category was developed when considering the responses from the questions regarding positive experiences encountered and what things about the position provide the greatest job satisfaction. The consistent response for both questions was categorized as the feeling of helping people. Some examples of the open ended data were:

> *Helping individuals who otherwise have no exposure to athletic training services.*

> *Working with those people that seriously appreciate what you do for them and how you can help them is the most satisfying.*

Future Graduates Should Feel Confident

The third category evolved from the question regarding recommendations for future graduates considering the industrial-occupational setting. A consistent recommendation was for athletic trainers to be confident in their abilities. Responses included "come in with an open mind. Although it's a completely different setting compared to traditional settings, you will still be able to utilize traditional setting knowledge." Other responses indicated that ATs are prepared for the setting. For example, one participant stated:

> *Strap on your creative helmets and get ready for a battle. The industrial setting is a unique beast, but we are heavily equipped (as ATs) to provide a positive influence for any company looking to provide preventative medicine.*

Educational Preparation

Areas Ill-Prepared

Under the section concerned with the educational preparation for working in the industrial-occupational setting, 3 categories emerged. The first was established from 3 questions that pertained to subject matter in the ATEP curriculum that was not covered or that ill-prepared respondents for the industrial-occupational setting. A competency area that the participants repeatedly felt was not covered in their ATEPs that was needed for employment in industrial-occupational settings was in the area of ergonomics. Some of the comments were "some ergonomic evaluation was covered, but not enough! Job assessment was not covered. Pre-work screens were not covered, however they did go through physical tests for pre-participation in sports." Another participant indicated "…the only shortcoming is lack of ergonomics." Also, "Business practices, insurance issues related to billing, no ergonomic training" were identified by another participant.

Areas Well-Prepared

The second category was derived from answers to the question regarding areas which their ATEP prepared them well. The areas the participants felt most prepared were injury evaluation and treatment skills. Comments made were "the basic knowledge that all athletic trainers must have: prevention, evaluation, treatment, and rehabilitation of injuries." Another participant stated "Modalities and rehab" again indicated good preparation in the treatment skills.

Most Challenging Aspects

The third category was derived from the results of the question referring to aspects of the job that were most challenging. Several participants commented that gaining respect from the company for which they were employed was most challenging. Open ended data included: "gaining the trust of workers."

> *Continuing to prove myself to individuals that I work with in regards to my worth for the company.*

DISCUSSION

There were 2 specific aims of this study. One was to provide an understanding of the experiences of entry-level ATs initially employed in industrial-occupational settings.The other was to gain a perspective on how well the ATEPs have prepared students for the industrial-occupational setting as perceived by entry-level industrial ATs who studied under the 4th edition *Athletic Training Educational Competencies* document.[8]

Reasons for Selecting the Industrial-Occupational Setting

Findings from the current study indicate that participants were drawn to the industrial-occupational setting because of higher salaries and stable hours. Previous studies have explored AT salaries and time commitments specific to job settings.[15,16] According to a survey on entry-level athletic training salaries, the hospital – clinic AT boasted a higher salary and fewer average hours worked per week than university or high school setting ATs.[15] The results of a salary survey conducted by the NATA in 2008 demonstrated that when comparing traditional employment settings (professional sports, college – university, and high school) to nontraditional (industrial – occupational and clinic), the average annual salaries of ATs employed in professional sports were highest, followed by industrial-occupational, then high school, closely followed by clinic, and lastly college – university setting salaries which were significantly lower than the preceding.[16]

As the data indicates,[15, 16] an athletic training graduate could anticipate a life of greater financial comfort with possibly less stress being employed in an industrial-occupational setting rather than a college or university. Students may become wise to the excessive demand of their time with traditional settings during their clinical education. This exposure provides an understandable motive for athletic training graduates to seek nontraditional employment in settings such as industrial-occupational.

Job Satisfaction

The participants of this study discovered early in their career what truly makes employment in health care rewarding. Their comments addressing the questions regarding what provided the most positive experiences and greatest job satisfaction was the satisfaction they received from helping their patients express for their service. I would anticipate this response being universal among job settings; however the degree of appreciation may be specific to the individual.

Recommendations for Future Graduates

Entry-level industrial ATs lack comfort when first exposed to an unfamiliar environment. Although the mechanism of injury may differ from those witnessed in their professional preparation, the types of injuries are similar with comparable treatment protocols. The participants of this study realized it was simply new surroundings and an unfamiliar patient population. Their recommendation to future industrial ATs was not to fear the industrial-occupational work setting and have confidence in their professional abilities.

Educational Preparation

Athletic training student preparation for the industrial-occupational setting has little previous investigation. A survey using an importance scale of 33 hiring criteria explored employee characteristics of most importance as perceived by employers seeking ATs.[17] Six percent of the employers who responded were from industrial settings. The results suggested that regardless of the ATs work setting, personal characteristics such as communication skills, enthusiasm, initiative, interpersonal skills, self-confidence, ambition, and problem-solving skills were rated highly important. Interestingly, from the employer's perspective the soft skills such as communication and self-confidence, as opposed to technical skills such as special evaluation tests and treatment techniques, are of greatest importance to them.

The educational preparation of professional practitioners has been explored in other health care disciplines. Entry-level physiotherapists from Australia and Canada have shared their perceptions using questionnaires and interviews as methodology.[18,19,20] The study of entry-level Australian physiotherapists identified communication skills, coping in the workplace, and workplace management as gaps between education and the workplace.[18] Research using entry-level Canadian physiotherapists employed in private practice settings discovered they felt unprepared in the areas of issues related to insurance and challenging patients, such as those with chronic conditions.[19] The authors of this research commented that students need to feel confident with the broad based competencies that result from their professional training and mentorship. The project investigating entry-level Canadian physiotherapists employed in acute – care hospitals concluded educators need to address communication, collaboration, and time management skills.[20] Another study conducted in Norwich, England provided qualitative findings from entry-level occupational therapists who expressed feeling ill-prepared in the areas of accessing related services, counseling, and dealing with difficult patients.[21] The participants in this English research felt their education primarily supplied theory and did not adequately supply practice. Research providing input from both entry-level physical therapists and occupational therapists in the United States has suggested the need for educators to link theory and practice.[22] A study of entry-level nurse practitioners in the United States indicated they were least prepared in the areas of coding and billing.[23] Entry-level health care practitioners of disciplines similar to athletic training consistently report soft skill areas such as communication and consulting skills along with insurance issues as primary areas of feeling ill-prepared.

In comparison, the subject matter with which the participants in the present study felt ill-prepared was in the area of ergonomics. Ergonomics in the industrial-occupational setting is composed of the science of designing the job, equipment, and work area to fit the employee for optimal safety and production. The participants of this research did not specify, but there are multiple procedures within the domain of physical ergonomics in which an AT could participate. The primary areas would concern the prevention and rehabilitation of musculoskeletal injuries which is familiar territory for the AT in general, however the procedures in the industrial-occupational setting are somewhat unique. When considering injury prevention, as opposed to a pre-participation exam for athletes, industry uses pre-employment screens to ensure the worker is capable of performing the physical demands of a work station. Such screens often consist of activities such as, box lifts consistent with the weight and repetitions required of a work station, and possibly certain flexibility measures. With athletes there is the need to identify the functional demands of a sport and specific position within the sport to properly prepare the athlete for the stresses encountered. In industry, a job demand analysis is conducted to identify the physical demands of a job and attempt to control risk factors such as repetition, forces applied, and employee position to prevent injury.

Employee education in the way of proper lifting techniques and warm-up strategies may also be employed to prevent injury to the industrial athlete. Injury treatment protocols are similar; however time frames may be delayed with the industrial athlete due to patient deconditioning and, at times, a lack of motivation to return to the workplace. As the rehabilitation process proceeds to the later stages, implementation of functional activities simulating the sport and athlete's position begins to take place. With industrial patients, administering job simulation activities and work conditioning strategies begin. With athletes, a return to play criteria may consist of functional activities, running programs, or throwing programs. Industry sometimes utilizes specific functional capacity exams as an objective way of determining return to work status. The areas of musculoskeletal injury prevention and treatment specific to employees of the industrial setting were not addressed by competencies listed in the 4th edition document.[8] Since the data collection of this investigation, an updated educational competency document was created (*Athletic Training Education Competencies*, 5th Edition).[24] However, competencies specific to the prevention, evaluation, and treatment of injuries common to employees of the industrial setting were not addressed to any further capacity in relation to the previous edition. For example, the need for competencies specific to ergonomics. The competency areas would include, injury prevention, evaluation, and treatment. The area of injury prevention may include competencies in designing work stations such as work surface areas and seat dimensions. The area of prevention may also include proper conditioning strategies, lifting techniques, proper handling of materials, and the job demand analysis process. The evaluation and treatment of industrial injuries would stress the arms and low back parts of the body. Areas that traditionally have not been stressed in athletic training education programs. To graduate competent AT practitioners seeking employment in the industrial setting, additions to the curriculum may need to be considered.

Areas Well-Prepared

After extensive coursework covering evaluation and treatment principles and theory, receiving training of skills, and clinical education, the ATs are quite well rehearsed in the evaluation and treatment of musculoskeletal injuries. The injuries sustained by industrial athletes are going to be very familiar to the AT, so participants stating this area as one they were most prepared would be expected.

Most Challenging Aspects

Athletic trainers gaining employment within industrial-occupational settings is somewhat new. Companies and staff are sometimes ignorant to the services and level of competency an AT has. The participants of this research stated gaining respect from the company and its employees as being a challenge for entry-level ATs. A greater attempt to educate the industrial stakeholders on an athletic trainer's scope of practice by the NATA may be beneficial. The ATEP curriculum may need to educate students on strategies for better educating the industrial population on the areas of expertise and potential services that can be provided by ATs to benefit companies and their employees.

Limitations

This qualitative study explored the perceptions of the participants as they presently exist and not past or future perceptions. Although the questionnaire was piloted, misunderstanding of the content could influence the entry-level industrial ATs' perceptions. The somewhat low response rate could leave the potential for non-response bias and possible invalid representation of the population. However, the population for this project was acquired by unbiased sampling and no specific response rate ensures an unbiased representation of a population. One of the participants in this study graduated in May, 2007 which allowed only one year of their program to study under the 4th edition document. All other participants either graduated in May of 2008 or 2009. Using only 3 common statements from participants to constitute a common theme could be challenged. However, with a low number of participants and lack of established number or percentage of common statements from participants defining a common theme, the author argues 3 to be sufficient in justifying accurate data for this study. Due to a limited number of potential participants that fit the criteria of this investigation, conclusions made from the results are difficult arguments. However, the data from this inquiry certainly should encourage further investigation to optimize student knowledge base in preparation for the industrial-occupational setting.

Future Investigation

A continuation of this research to include populations of entry-level ATs in other settings would be advised to provide information specific to practice settings. The present inquiry may be used as a foundation for future quantitative research. Investigation utilizing additional stakeholder populations such as experts and patients associated with each athletic training job setting to obtain a consensus of perceptions regarding educational preparation would be critical for future curriculum development, continuing education, and post-professional programs. Research conducted in the near future could take into consideration the recent update of *Educational Competencies* (5th edition)[24], and assess its contribution to the competency level of entry-level AT practitioners.

CONCLUSIONS

Athletic trainers can be of tremendous benefit to the injured industrial employee and company by providing injury prevention and injury management programs. Demonstrating the ability to service the industrial employee population would encourage present and future stakeholders to acknowledge the athletic training profession with improved status.

Limited data presents challenges in drawing conclusions, but the data does suggest some general experiences that may be encountered and an exposed area of subject matter that may need emphasis to prepare students for employment in the industrial-occupational setting. Initial interest from novice ATs in the industrial-occupational setting seems to stem from the competitive salaries and attractive work schedules. The participants of this study quickly discovered the true benefits of working in health care which are the positive feeling and satisfaction experienced when helping someone regardless of their athletic status.

This study indicated that to prepare students to an improved extent for the industrial – occupational setting, a greater emphasis is needed in the area of ergonomics. As students continue to filter into this job setting the need to supply a more competent product for this environment will increase. Consequently, stressing knowledge and skills in the area of basic ergonomics and its contribution to injury prevention and treatment will need strong consideration in future ATEP curriculums.

To improve the quality of AT education, higher education programs must rise to meet the demands of our changing society.[25] The expansion of employment into settings once considered nontraditional, such as industrial – occupational and clinical forces ATEP curriculums to adjust their areas of subject matter concentration or rely on continuing education, post-graduate fellowships, internships, or possibly residencies to fulfill these needs allowing the profession to grow and prosper.

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APPENDIX 1. Study Questionnaire

DEMOGRAPHIC INFORMATION

Gender:	**Age:**	**Highest Degree:**	**Years as Athletic Trainer:**
Male	21-25	Bachelor's	0-1
Female	26-30	Master's	2-3
	31-35	Doctorate	4-5
	36+		6+

Length of time employed in an industrial/ occupational setting:

0-6 months

7-12 months

13-18 months

19-24 months

25-30 months

31-36 months

37+ months

Indicate your current industiral/occupational practice setting:

Clinic

Ergonomics

Health/Wellness/Fitness

Other Industrial/Occupational Setting

OPEN-ENDED QUESTIONS

Please express your thoughts to the following questions:

The following addresses your experiences as a novice athletic trainer working in an industrial setting:

1. Why did you choose employment in a industrial setting as opposed to working in a university, high school, or other setting?
2. What have you done in instances whereby you needed some assistance or support to fulfill an obligation at work?
3. What positive experiences have you encountered so far working in the industrial setting?
4. What did your orientation to your present position involve? Was adequate information supplied to you? If not, what was lacking?
5. Is there a role model for you in athletic training? If there is, what is the relationship and what did you learn from him or her?
6. What things about your position provide the most job satisfaction? What things provide the least satisfaction?
7. What recommendations would you share with current athletic training graduates beginning their first job in an industrial setting?
8. When you began your job, how did you envision yourself as an industrial practitioner compared to other more experienced industrial practitioners?

The following asks how prepared you felt you were for working in the industrial setting:

9. As you know, beginning in the year 2006, the athletic training education programs were required to be accredited by the Commission on Accreditation of Athletic Training Education (CAATE). Do you feel the competencies required by CAATE in your athletic training education program covered what was needed at your job? What competencies were covered? What competencies were not covered?
10. When you first began working in an industrial setting, did you feel prepared in regards to the knowledge needed for your position?
11. When you first began working in an industrial setting, did you feel prepared in regards to the skills needed for your position?
12. Have you noticed differences between your educational experience and your present “real world” experience in the industrial setting? Are there specific skills you have had to learn on the job that could not be taught in the education program?
13. What aspects of your job do you find to be most challenging?
14. What areas did your athletic training education program prepare you well for in your role in the industrial setting?
15. What areas did your athletic training education program not prepare you well for in your role in the industrial setting?
16. The purpose of this questionnaire was to gain an understanding of what novice athletic trainers experience working in an industrial setting. Is there anything you would like to add about your experience that was not covered in this set of questions?

ATHLETIC TRAINING EDUCATION JOURNAL

www.nataej.org
ISSN: 1947-380X

COLUMN:
TEACHING AND LEARNING

Educating the Educator: Teaching Airway Adjunct Techniques in Athletic Training

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The 5th edition of the *Athletic Training Education Competencies* (*Competencies*) now requires athletic training educators (ATEs) to introduce into the curriculum various types of airway adjuncts including: (1) oropharyngeal airways (OPA), (2) nasopharyngeal airways (NPA), (3) supraglottic airways (SGA), and (4) suction. The addition of these Acute Care (AC) knowledge and skill competencies, as well as others (eg, rectal temperature, oxygen saturation, blood glucose level, nebulizers) were incorporated into the curriculum to reflect the National Athletic Trainers' Association's published position statement recommendations or those in development.[1] The specific knowledge and skill statements addressing these educational areas can be found in Table 1. However, for many ATEs teaching airway adjuncts and suctioning is an unfamiliar concept. Therefore, the purpose of this column is to provide the ATE with a resource document on how to use and teach different adjunct breathing devices within their educational program.

ADJUNCT BREATHING DEVICES

Adjunct breathing devices commonly used in athletic training have three main functions: (1) clear and maintain a patent airway, (2) provide adequate ventilation and promote pulmonary gas exchange, and (3) supply supplemental oxygen.[2] Clearing an obstructed airway can be accomplished using either a mechanical or manual suction device. Oropharyngeal and/or nasopharyngeal airways are used to assist in maintaining an airway and enhance the effects of positive pressure ventilation (eg, bag-valve ventilation) during a respiratory or cardiac emergency. Finally, supplemental oxygen therapy (which is not discussed in this column) is administered to patients demonstrating signs of hypoxia to increase the overall amount of oxygen delivered to the body's cells, thus increasing a patient's chances of survival during an emergency.[2]

Suction

Suction devices are indicated when gurgling sounds are heard during breathing or artificial ventilations; when breathing is impeded by vomitus, blood and/or body fluids, respiratory secretions, and small particles; or when the recovery or HAINES (High-Arm IN Endangered Spine) positions and/or finger sweep are ineffective at clearing and maintaining a patent airway.[2] Suctioning is contraindicated when brain tissue is visible in the pharynx secondary to a skull trauma (eg, fracture).[2]

Several types of suction devices are available to athletic trainers (ATs), including: (1) mechanical wall mounted units, (2) mechanical portable units, and (3) manual (hand-powered) units.[2] Wall

Table 1. Acute Care of Injuries and Illnesses Competencies

Number	Competency
AC-9	Differentiate the types of airway adjuncts (oropharyngeal, nasopharyngeal and supraglottic airways) and their use in maintaining a patent airway in adult respiratory and/or cardiac arrest.
AC-10	Establish and maintain an airway, including the use of oro- and nasopharyngeal airways, and neutral spine alignment in an athlete with a suspected spine injury who may be wearing shoulder pads, a helmet with and without a face guard, or other protective equipment.
AC-11	Determine when suction for airway maintenance is indicated and use according to accepted practice protocols.

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Full Citation:
Berry DC, Seitz RS. Educating the educator: Teaching airway adjunct techniques in athletic training. *Athl Train Educ J*; 2011;6(2):107-116.

mounted suction units are powered by an electrical source (eg, hospital units) or in some cases a car's manifold (eg, ambulance). Portable mechanical suction units generate their vacuum suction pressure via an electrical source, battery, or an oxygen-powered device. Hand-powered suction devices (Figure 1) generate their vacuum pressure when a handle/trigger is compressed. Regardless of the suction unit utilized, all devices must be able to generate a negative vacuum suction pressure greater than 300 mm Hg when the suction tubing is clamped and be powerful enough to provide airflow greater than 40 L/min at the end of the suction tubing.[2]

When suctioning, it will be necessary to observe body substance isolation (BSI) precautions, especially when performing a finger sweep. A finger sweep (performed only when an object is visible in the airway) is essential because it removes large foreign particles before inserting the suction tip into the patient's airway. A soft suction tip/catheter is recommended when suctioning low viscosity type fluids, while removing vomitus or thick secretions often requires a hard or rigid suction tip[2] (Figure 2). If fluid or foreign matter is allowed to accumulate in the airway, it can pass through the trachea to the lungs, rather than the esophagus, thereby increasing the risk of aspiration. General directions for the use of a hand-powered suction device are found in Table 2. Always follow the manufacturer's recommendations and instructions for proper use.

Remember, suctioning limits the ability to properly ventilate a patient and the longer one suctions, the more oxygen-deprived the patient may become. Therefore, it is necessary to limit the amount of suctioning (normally no more than 15 seconds for an adult) in order to adequately ventilate and/or perform adequate chest compressions. Suctioning can also remove oxygen from the airway and lungs[3] requiring an AT to constantly monitor a patient's pulse rate or oxygen saturation levels (using a pulse oximeter). If changes are noted (decreased pulse rate or oxygen saturation levels), stop suctioning and resume positive pressure ventilation. Finally, avoid jabbing the suction tip into the oral cavity to minimize soft tissue damage.[2]

Figure 1. Hand-Powered Suction Devices

A. V-VAC™ Manual Suction Unit
(Laerdal Medical, Wappingers Falls, NY)
B. Ambu Res-Cue Pump
(Ambu Inc., Glen Burnie, MD)

Table 2. Using a Manual Suction Device

Steps	Procedure
1.	Practice body substance isolation procedures.
2.	Assemble the unit by attaching the suction tubing and the suction tip to the suction tubing.
3.	If **no** spinal injury is suspected turn the patient's head to the side. If a spinal injury is suspected, manually stabilize the spine and log roll the patient to his/her side.
4.	Open the patient's mouth with a gloved hand.
5.	Remove solid foreign material and/or large volumes of body fluid using a finger sweep.
6.	Measure the distance of insertion of the suction tip from the patient's ear lobe to the corner of the mouth.
7.	Insert the suction tip into the throat using the measurement from above as a guide. Do not insert the suction tip deeper than the base of the tongue or further than what can be visualized.
8.	Suction from the back of throat outward, use a circular method, and avoid losing sight of the tip. Suction an adult no longer than 15 seconds and 10 seconds in a pediatric patient.
9.	Monitor the patient's response to suctioning and provide necessary interventions such as positive pressure ventilations using a bag-valve. If the patient begins to gag, withdraw the suction tip until they stop gagging and then resume suctioning.

Adapted with permission from Miller M, Berry D. *Emergency Response Management for Athletic Trainers*. Baltimore: Lippincott Williams & Wilkins; 2011: pp. 211-212.

Figure 2. Insertion of Suction Tip/Catheter

Airway Adjuncts

Airway adjunct devices such as OPAs, NPAs, and SGAs assist in maintaining an airway established during the primary assessment through the use of the head-tilt/chin-lift or jaw-thrust with extension or jaw-thrust without extension (in the case of cervical spine injured patient). Both the head-tilt/chin-lift and jaw-thrust maneuver move the tongue (which is the most common cause of an airway obstruction) away from the back of the throat allowing air to enter into the lungs. As the names imply, an OPA is inserted into the patient's mouth while an NPA is inserted into the nose. When placed properly, OPAs and NPAs assist in keeping the tongue away from the back of the patient's throat, thereby helping to preserve the airway. An improperly placed airway may also push the tongue further into airway, causing further blockage. A supraglottic airway, also known as blind insertion airway device (BIAD)[4,5], is designed to create a seal in the posterior pharynx and obstruct the esophagus, forcing air into the trachea (with the exception of the laryngeal mask airway [LMA]).

Oropharyngeal Airways

An OPA is a rigid plastic device forming the letter "J." It is designed to fit the natural contour of the mouth and throat and is useful when the tongue falls back against the posterior pharynx. The OPAs range in size from infant to adult large (40mm-110mm) and are normally stored in an airway management kit. Oral airways (Figure 3) possess either a hole in the center of the device (Guedel Oral Airways) or grooves along the sides (Berman Airways) to allow air to pass through the trachea to the lungs. If sized correctly, the OPA's "flanged" end should rest on the lips and a resuscitation mask or bag-valve should fit over the airway device without any impedance.

Because an OPA is inserted into the posterior throat it is possible to stimulate the pharyngeal reflex (gag reflex) and/or facilitate a laryngospasm in a conscious or semi-conscious patient,[6] inducing emesis and further obstructing the airway. Therefore, OPAs are contraindicated in a responsive patient with an intact gag reflex or cough.[7] An OPA is ONLY indicated for an unresponsive patient without a gag reflex. If the unresponsive patient begins gagging while inserting the OPA; immediately remove the airway and reattempt insertion at a later time, usually after the level of consciousness has deepened and/or consider the use of an NPA until the OPA can be inserted. An OPA may also be contraindicated in the presence of some types orofacial trauma due to the difficulties inserting the device or because of the increased risk of further injury.[2] Be prepared to suction the airway pre and post OPA insertion and always avoid pushing the tongue further into the throat when inserting the device, causing a more significant airway obstruction.[8]

When sizing an OPA, measure from the corner of the patient's mouth to the tip of the earlobe (an anatomically correct lobule – not altered by body art or piercings). An alternative approach is to measure form the center of the patient's mouth to the angle of the jaw. Steps describing how to properly insert an OPA are found in Table 3. Once inserted, the AT should note the position of the airway adjunct. If sized correctly the OPA's flange should rest on the patient's lips. If it falls past the lips or does not rest on the lips then it is likely the OPA has been sized incorrectly and needs to be removed and resized. Too large of an OPA will increase the risk of the device blocking the airway and prevent proper placement of a resuscitation mask or bag-valve; while too small of an OPA may cause the tongue to block the airway.[2] To remove the OPA simply withdraw the OPA following the contour of the airway while holding open the lower jaw.

Nasopharyngeal Airways

Nasopharyngeal airways, also known as "trumpets," are made of a soft flexible material with a beveled tip (right side) and are normally inserted into the right nasal passageway to help secure an airway. Airways range in size from 6.5 mm-8.5 mm (28FR-36FR, FR=French) and require the use of a water-soluble lubricant (eg, K-Y® Brand Jelly, Johnson & Johnson, New Brunswick, New Jersey; Surgilube®, Fougera, Melville, NY) to decreases the risk of damage to the nasal mucosa and prevent bleeding[2] (Figure 4). An NPA also contains a hole in the center of the device to allow air to pass down the trachea to the lungs. If an NPA has been sized correctly, the flared end of the device should rest on the patient's right naris and a resuscitation mask or bag-valve should fit over the airway without any impedance.

Figure 3. Oropharyngeal Airways

A. Berman Airways
B. Guedel Oral Airways

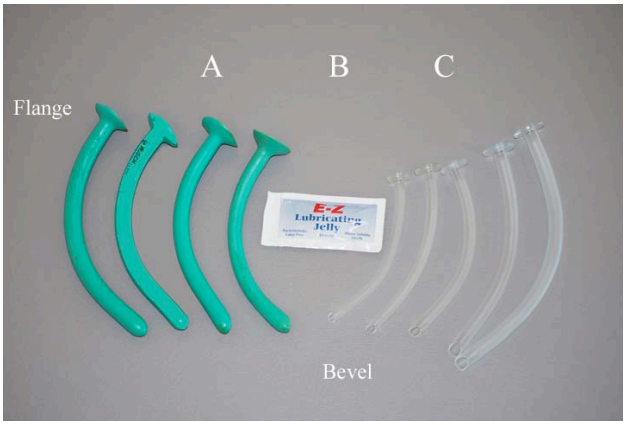


Figure 4. Single Use Nasopharyngeal Airways

A. Latex-free Robertazzi Nasal Airways
B. Lubricating Jelly
C. Soft PVC Airways with Bevel Tip

Table 3. Insertion of an oropharyngeal airway (OPA)

Steps	Procedure	Image
1.	Assume BSI.	
2.	Establish the patient's level of responsiveness.	
3.	Establish an airway using a head/tilt-chin/lift or jaw-thrust (with or without extension) maneuver if a spinal injury is suspected.	
4.	Correctly size the OPA.	
5.	Using a cross-finger technique open the patient's mouth.	
6.	Place the tip of the OPA's tip against the roof of the mouth.	
7.	Gently slide the OPA down until resistance of the soft palate is noted. Rotate the airway 180° so the OPA's tip is now pointing down into the throat. *Note:* The OPA may also be started so that the point is against the inside of the cheek and then rotated 90° so the tip of the OPA is pointed down into the throat.	
8.	Continue inserting the OPA until the flange rests on the lips.	
9.	Prepare to artificial ventilate using a resuscitation mask or bag-valve with a C-E hand placement technique (the thumb and index finger form a "C" to clamp the mask to the patient's face digits 3-5 form the letter "E" to lift the jaw).	

Adapted with permission from Miller M, Berry D. *Emergency Response Management for Athletic Trainers.* Baltimore: Lippincott, Williams & Wilkins; 2011:214

An NPA can be inserted in a responsive or unresponsive patient with an intact gag reflex or in an patient sustaining oral trauma[9] where an OPA would be contraindicated, or have a clinched jaw.[8] NPAs are contraindicated in the presence of a basilar skull fracture,[9] epistaxis, nasal deformity, and past history of nasal fractures.[2] Establishing a clinical diagnosis of a basilar skull fracture in the out-of-hospital setting, while not impossible, can be difficult as many of the signs of a fracture do not readily present themselves during a secondary assessment[9] (eg, Battle sign) or requires diagnostic testing equipment (eg, presence of CSF) to increase testing sensitivity. The evidence for avoiding the use of NPAs in the out-of-hospital setting is solely based upon two case reports.[10-11] Therefore, securing the airway should take precedent over the possible presence of a basilar skull fracture.[9] Athletic trainers would be prudent to consult with their supervising physician regarding the use of NPAs as caution should be used if an NPA is placed in a patient with head trauma in order to avoid penetration through the cranium to the brain.

When sizing an NPA, measure from the nostril to the tip of the earlobe. An alternative method is to measure from the nostril to the angle of the jaw. The diameter of the NPA should also be no larger than the patient's nostril. The right naris is typically the first choice for insertion, as the right septum tends to be straighter. If resistance is felt during insertion, STOP, do not force the NPA any further. Rather, remove the NPA and reattempt inserting the device into the left naris. If resistance is still felt, discontinue and continue providing care as necessary as complications can occur when attempting to insert a NPA, even by trained physicians.[12] Steps describing how to properly insert an NPA can be found in Table 4.

If the NPA is placed correctly, the distal end should rest approximately 10 mm above the epiglottis, separating the soft palate from the posterior wall of the oropharynx.[13] An NPA that is too long increases coughing and can stimulate the gag reflex as well as become an obstruction itself for airflow while an NPA that is too short will not adequately separate the soft palate and pharynx.[2] To remove the NPA simply withdraw the device following the contour of the nasal passageway.

Supraglottic Airways

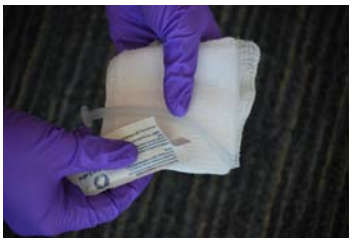
The use of supraglottic (part of the larynx above the glottis, where the vocal cords reside) airways (SGA) also known as "blind insertion airway devices" or BIAD[4], were introduced in the early 1970s to be utilized by individuals untrained to intubate the trachea.[14] Today, multiple types of SGAs (Figures 5-7) exist in the marketplace, and are inserted into the pharynx without visualization during placement (hence the name, blind insertion). With the exception of the laryngeal mask airway (LMA) (Figure 8), SGAs are designed to create a seal in the posterior pharynx and obstruct the esophagus, forcing air into the trachea. An LMA is designed to only create a supraglottic seal by their placement in the hypopharynx (posterior pharyngeal space). All devices utilize air to inflate a pharyngeal and esophageal seal (cuff). The time to insert an SGA is under 30 seconds[15] which facilitates minimal interruption of basic ventilator or cardiopulmonary resuscitation support. At present, out-of-hospital use of SGAs is typically reserved for emergency medical

Figure 5. Pharyngeal-Tracheal Lumen (PtL)®
Gettig Pharmaceutical Instrument Company, Spring Mills, PA.

Figure 6. Esophageal Tracheal Combitube ®
The Kendall Company, Mansfield, MA.

Figure 7. King Airways
King Systems, Noblesville, IN.

Table 4. Insertion of an nasopharyngeal airway (NPA)

Step	Procedure	Image
1.	Assume BSI.	
2.	Establish the patient's level of responsiveness.	
3.	Establish an airway using a head/tilt-chin/lift or jaw-thrust (with or without extension) maneuver if a spinal injury is suspected.	
4.	Correctly size the NPA.	
5.	Coat the NPA with a water-soluble lubricant.	
6.	Flare the nares to reveal the airway, placing the NPA's bevel edge against the right septal wall. *Note:* If resistance is felt in the right nare, consider using the left instead – however, DO NOT rotate the NPA when inserting in the left nare.	
7.	Gently insert the NPA parallel to the nasal floor following the contour of the nasal passage and the device. Avoid lifting the NPA upward.	
8.	Continue inserting until the flange rests on the nare.	
9.	Prepare to artificial ventilate using a resuscitation mask or bag-valve with a C-E hand placement technique (the thumb and index finger form a "C" to clamp the mask to the patient's face digits 3-5 form the letter "E" to lift the jaw).	

Adapted with permission from Miller M, Berry D. *Emergency Response Management for Athletic Trainers.* Baltimore: Lippincott, Williams & Wilkins; 2011:216-217

Figure 8. The Laryngeal Mask Airway
North America, Inc., San Diego, CA

technicians (EMT) and paramedics, normally in situations where a difficult airway has been identified or as a rescue airway when an endotracheal intubation fails.

Supraglottic airways are designed with either a dual lumen (channel) (King LTS-D, LTS II, King Systems, Noblesville, IN; Combitube™, Covidein, Boulder, CO) or single lumen (KING LT®, KING LT-D™; LMA). While each device offers a slightly varying design and criteria for insertion (age, height and weight), all devices require an unresponsive patient with an absent gag reflex and no evidence/suspicion of injury to the esophagus. An inadvertent misplacement or dislodgement may create an obstructed airway that would be disastrous to the patient. Therefore, once inserted continuous monitoring for airway patency is necessary.

In the absence of suspected head and spinal injury, insertion of the SGA is accomplished with slight flexion of the neck and extension of the head. While maintaining control of the tongue (Figure 9), the SGA is introduced into the mouth to the depth indicted by the device being utilized. An appropriate placement of all SGAs is required to obtain a seal and the use of lubrication is recommended with during insertion. Once appropriately placed, a device specific amount of air is used to inflate the pharyngeal seal and where equipped, the esophageal seal. The attachment of a resuscitator bag with evaluation of placement occurs to confirm an ability to provide adequate ventilation. Deflation of the seals must occur when removing the device. Finally, the probability for vomiting is high following removal of an SGA. Be prepared to manage the airway through proper positioning and suction. An excellent article for review of alternative airways is Guyette, et al[5], *Alternative airways in the prehospital setting (resource document to NAEMSP position statement).*

Equipment

Practicing airway adjunct skills requires the use of the following pieces of equipment: (1) airway management trainers, (2) OPAs, (3) NPAs, (4) water-soluble lubrication, (5) personal protective equipment and (6) miscellaneous equipment such as towels, gauze, tongue depressors, etc. The most costly piece of equipment will be the Airway Management Trainer. These trainers range in price (retail) from $400.00 to $1400.00 depending on the manikin features. I (DB) have used both the Nasco Life/form "Airway Larry" Adult Airway Management Trainer with stand (Figure 10) and Nasco Life/form® Airway Trainer without stand (Figure 11). Both of these airway manikins, according to one manufacture website, "simulate nonanesthetized patients for practicing intubation - ventilation - suction and CPR techniques"[16] by providing "realistic anatomy and landmarks including teeth - tongue - oral and nasal pharynx - larynx - epiglottis - arytenoids - false cords - true vocal cords - trachea - lungs - esophagus and stomach."[16] Both trainers allow students to practice oral and nasal intubation, as well as Combitube™ insertion. The biggest difference between the two manikins, besides the price, is "Airway Larry" represents an adult with a larger mouth. This means more room to maneuver the OPA and suction, making it easier for the students to grasps the required skills. The Nasco Life/form® Airway Trainer represents a smaller adult and is more difficult to work with when introducing the OPA and suction for the first time (Appendix 1).

The OPAs and NPAs can also be purchased from the manufacturers listed in Appendix 1. Both can be bought as singular items or as a kit. A Berman airway kits typically contain 6 to 7 different sized airways per kit and average between $3.25 (Savelives.com) to $17.95 (CPR Saver). Guedel airway kits average between $6.75 (Savelives.com) to $19.95 (CPR Saver). Latex-free NPA airways kits typically include 6 NPAs and 6 packets of water-soluble lubrication and averages between $17.95 (Savelives.com) to $19.95 (CPR Saver). Nasopharyngeal airways do require a water-soluble lubricant to properly insert the airway and typically an 8-oz pump spray bottle will accompany an airway management trainer.

Teaching the Skill

One challenge to teaching airway adjunct skills is how to keep all of the students engaged when limited resources are available. The skills themselves are not difficult to master; it is often the lack of adequate equipment that increases the lag time between students' practice sessions. This lag time, in combination with students' inability to see the importance of these skills (because

Figure 9. Tongue Depressor and Miller Laryngoscope Blade
Used to control the tongue during an airway insertion.

they have never seen it in the real world) devalues the experience and students do not always take the skill session seriously. The importance of these skills must be stressed in the out-of-hospital setting and the necessity for proper practice.

I have also been fortunate the past several years to have at least two airway management trainers or manikins where the OPA fits into the airway at my place of employment. This allows for station-based activities that help to provide students with an opportunity to practice OPA and NPA insertion for both adults and pediatric patients (Figure 12). The challenge as a single instructor is watching multiple stations at one time. To streamline this process I try to use my teaching assistant to assess the students at each of the stations. When this is not possible I discreetly try to have my "best" students in class practice the skills first. I assess their competence and then assign them to watch over an airway management trainer so that I have now doubled or tripled my eyes. Another suggestion would be to utilize skill sheets and have students not engaged with the psychomotor skill(s) perform an evaluation of their peers. This provides feedback to the instructor as well as the student. A final strategy may include having student digitally record their performance for the instructor to review at a later date

When lack of equipment is the issue, consider alterative resources. If your institution offers other health science programs such as nursing, determine if their simulation manikins accept OPAs and NPAs (most do). The local emergency medical services system may also possess airway-training manikins and may be willing to "guest lecture" and/or allow you to use their equipment. Not only does this allow the athletic training program to meet the educational competency, but it also meets the health provider accreditation standard. Finally, check with the local American Red Cross and American Heart Association to determine whether they rent the airway management trainers.

When executing the skills there are several steps to observe that students often perform incorrectly. First, rather than inserting the OPA or NPA while kneeling at the top of the head, a student may try to insert the device while kneeling from the side (not the worst thing) or, they will position the head and stand where the patient's torso would be. In a live situation this is unlikely to occur, nonetheless, the skill should be practiced the correct way as hand position may change between the top of the head and when standing where a patient's torso would be located. Second, when attempting to rotate the airway 180° so the tip of the OPA is now pointing into the throat, a student will often attempt to rotate the OPA toward them, rather than away from them. Moving away from the hand performing the cross-finger technique will offer students more room to maneuver the OPA. It should also be noted that some instructors do not teach students to place their fingers in anyone's mouth. Thus, the use of a tongue depressor or another device (Figure 9) to control the posterior tongue during insertion facilitates anatomic placement (no rotation) of the OPA. A final alternative approach to teaching OPA insertion would be externally displacing the mandible with the thumb or fingers and then inserting the OPA on a 90° axis from the corner of the mouth works when no equipment exists to manage the tongue. When removing the OPA, students will often just grab the flange and pull the airway out. In an actual patient they would need to open the mouth by moving the mandible downward. Finally, students often place the OPA off to the side making it easier for subsequent

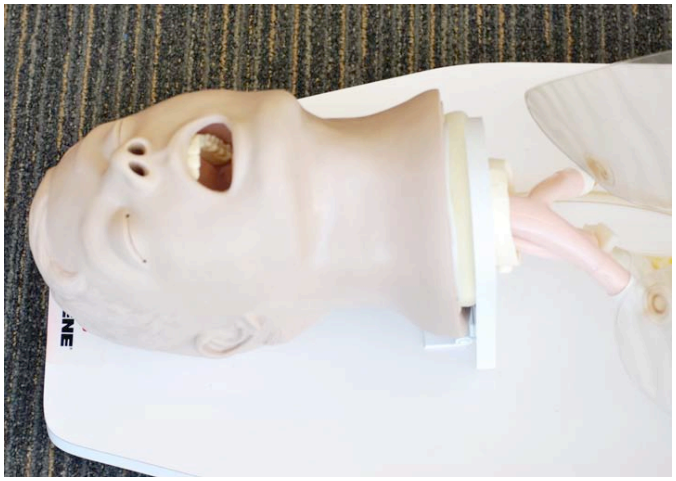


Figure 10. Life/Form "Airway Larry" Adult Airway Management Trainer with Stand

Figure 11. Life/Form Adult Airway Management Trainer without Stand

Figure 11. Airway Adjunct Practice Stations. Use a regular CPR mani kin when, and if possible, to practice positive ventiliation with a bag-valve inserted with an airway adjunct.

student to readily identify the properly sized airway. Try placing the airways in a bowl or bag and then have the student draw out the airways until they find the correct size.

Nasopharyngeal airways are much easier to insert than OPAs. The issue with these devices is the mess they can make when using the lubrication required for insertion, especially the pump-spray that comes with the airway management trainers. I (DB) have found that lubricating the device once helps to limit the excessive accumulation of lubrication that will collect in the airway management trainer's nasal cavity. When teaching, if only one NPA is lubricated (due to sizing issue) it becomes very easy for subsequent students to identify the correct size. To remedy the selection of the proper NPA size, pre-lubricate all of the NPAs. This makes selection now based on size, rather than lubrication.

The final teaching suggestion is to integrate the skill just acquired by the students into different scenarios allowing student to demonstrate decision-making and skill integration ability.[1] Students may be able to insert airway adjunct, but will they remember under what circumstances these devices can be applied when dealing with a patient with multiple issues based on the primary, secondary, and ongoing assessment? Who will be responsible for inserting the device in the presence of two rescuers, seeing that the skill is often practiced individually? What if a complication arises while providing care, such as the bag-valve does not fit over the patient's face or the patient begins to vomit while providing rescue breaths? These are all real life events that will and do take place, which is why gaining practical experience with real life applications readies students to become competent professionals.

CONCLUSION

The concepts of airway adjuncts, especially those required by the educational competencies should not be viewed as a challenge, rather they should be viewed as an advancement of the profession. Yes, it does add to already long list of knowledge and skills required for an entry-level AT, however, these are also skills required for proper emergency care of a patient. If we are truly going to be the first on the scene of an emergency situation then having the requisite training in one of the most fundamental skills taught in every emergency medical responder course is important.

Acknowledgement

We would like to thank Ron Courson, ATC, PT, NREMT-I, CSCS for his time and effort in reviewing this manuscript.

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Appendix 1. Airway Adjunct Equipment Resources

Company	Web Address	Airway Management Trainers	Retail Price
Savelives.com	http://www. savelives.com	Simulaids Adult Airway Management Trainer Torso	$1063.42
		Nasco Life/form® Airway Management Trainers	$391.00-$598.00
		Nasco Life/form® "Airway Larry" Adult Airway Management Trainer with Stand	$790.00
eNasco	http://www.enasco.com	Nasco Life/form® "Airway Larry" Adult Airway Management Trainer	$575.00
		Nasco Life/form® Advanced "Airway Larry" Trainer Head without Stand	$670.00
CPR Saver	http://www.cpr-savers.com	Nasco Life/form® "Airway Larry" Adult Airway Management Trainer Head	$495.00
Laerdal	http://www.laerdal.com	Laerdal® Airway Management Trainer	$ 1,895.00
Simulaids	http://www.simulaids.com	Simulaids Adult Airway Management Trainer Torso	$1128.10
		Simulaids Economy Adult Airway Management Trainer	$824.20

Speak with a company representative to inquire about educational pricing.

ATHLETIC TRAINING EDUCATION JOURNAL

www.nataej.org
ISSN: 1947-380X

COLUMN:
EDUCATIONAL TECHNOLOGY

Delicious - A Bookmark Option for Athletic Training Educators

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Accessing quality internet-based information in a timely manner can help streamline teaching and administrative functions faced by educators. When a good website is found, most individuals save it as a bookmark in Firefox or as a favorite in Internet Explorer. More effective ways exist, however, to bookmark these resources through a service called Delicious. Delicious is a social bookmarking web manager for storing, classifying, organizing, and sharing bookmarks. Delicious was founded by Joshua Schachater in 2003, and purchased by Yahoo in 2004. In September 2007, the name was changed from del.icio.us to Delicious.[1,2]

Within a Delicious social network anyone can access these bookmarks from any computer and from any location or the links can remain hidden. Delicious can be installed as an add-on to any web browser that allows for one click bookmarking. After installing the add-on, a button will appear that allows you to save and post your bookmarks to Delicious. Current bookmarks in your computer(s) can also be imported into Delicious. After finding an interesting website, you can save it to your personal list. Simply click on "Post to Delicious" and you can enter the appropriate information. The most important feature of Delicious is to provide the appropriate tag(s) to organize and locate it. The tags can be personalized either as a single word (eg, ATEP, rehabilitation, teaching, stretching) or multiple words (eg, athletic-training, critical_thinking, learning+styles). Delicious will also provide popular tags already in their website or from your list of tags. When typing in a tag word, Delicious will also provide suggestions related to your entry (eg, at = ATEP or athletic or athletictraining). You can also hide your personal Delicious bookmark(s) from others using a privacy function. After bookmarks are saved, they can be viewed in your Delicious account. You can click on the appropriate tag or related tag for a listing. To search websites in Delicious, you can type in or click on one of your tag word(s). This search can be done in your personal "My Delicious" or on http://www.delicious.com. Other uses for Delicious include research, wish list, podcast, and much more.

GETTING A NEW ACCOUNT AND TOOLS

This is a free service, but you must still register for a new account at https://secure.delicious.com/register. After you register, it is helpful to add Delicious buttons to your web browser. These buttons will make it easy to post to Delicious whenever you come across a web page you want to bookmark.

There are also several websites that provide additional links, add-ons, tools, and resources.

1. Delicious Toolbox – 180 Tools and Resources
   http://mashable.com/2007/08/31/delicious-toolbox
2. Absolutely Delicious Tools Collection
   http://www.quickonlinetips.com/archives/2005/02/absolutely-delicious-complete-tools-collection
3. Essential Delicious Tools
   http://www.techroam.com/essential-delicious-tools

SAVING OR POSTING BOOKMARKS INTO DELICIOUS

There are two ways to save a bookmark to Delicious:

1. On the Delicious website
   a. Click on the "Save a New Bookmark" link on the Delicious navigation bar
   b. Enter the URL of the site you want to bookmark
   c. Click on Save
   d. On the next page, enter a brief description, notes, and any tags (keywords) you want to use. Separate your tags by a space (do not use a comma).

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Full Citation:
Fuller D. Educational technology: Delicious - a bookmark option for athletic training educators. *Athl Train Educ J*. 2011;6(2):117-120.

2. Using special browser buttons:

    a. Open the URL of the web page you want to bookmark using the web browser.

    b. Click on the "Post to Delicious" button

    c. Add notes and tags on the open window. The description will already be filled in from the webpage, but you can edit it as needed.

Figure 1 displays the saving/posting feature.

Viewing Your Delicious Bookmarks

To view your bookmarks, click on your bookmarks link on the navigation bar. You can view older bookmarks by clicking on the earlier link at the bottom of the page. If you only want to see the bookmarks that have a specific tag assigned, click on the tag name in the list that appears on the right side of the page. To delete or edit a bookmark once it has been saved, click on the "edit" or "delete" link to the right of its title. Figure 2 displays a view of a bookmark.

Moving Your Bookmarks into Delicious

Delicious works with any web browser (eg, Firefox, Internet Explorer, Safari, Opera) as it will integrate very easily with the click of a button that is available from the previous add-on websites. The most popular buttons to add include: My Delicious, Tag, and Post to Delicious.[3] If you already have bookmarks in your computer or web browser, you can import your bookmarks into Delicious from the Settings panel. Once your bookmarks are imported, you are ready to start using Delicious.

Sharing Delicious Bookmarks

One of the most powerful features of Delicious is the ability to share bookmarks (ie, social bookmarking). By default, Delicious bookmarks are public (except if they are imported, in which case you can mark them as private during the import). You do have the option to enabling private bookmarks by changing your settings. Figure 3 displays a an example of a networking bookmark.

There are several ways for others to access your Delicious bookmarks:

1. Using the URLs for your account
2. By joining your network
3. Using the RSS feed for your user name.

You can also add someone to your network by clicking on the link that appears at the top of their bookmarks page.

Delicious is a bookmark program that allows you to easily tag and access websites efficiently and effectively. Moreover, it allows you to share your bookmarks with other educators, students, researchers and others who may have similar interests. The program can be viewed as a form of collective intelligence that is constantly adding, reviewing, and filtering new information. Having a community of contributors in Delicious allows you to find some of the best resources on the internet without having to trudge through all the junk.

Author's Note: Delicious has recently been bought out by the founders of YouTube, though the plan is to continue with the same functionality and service. Visit http://www.delicious.com/help/transition for more details of this transitional process and how it may affect users.

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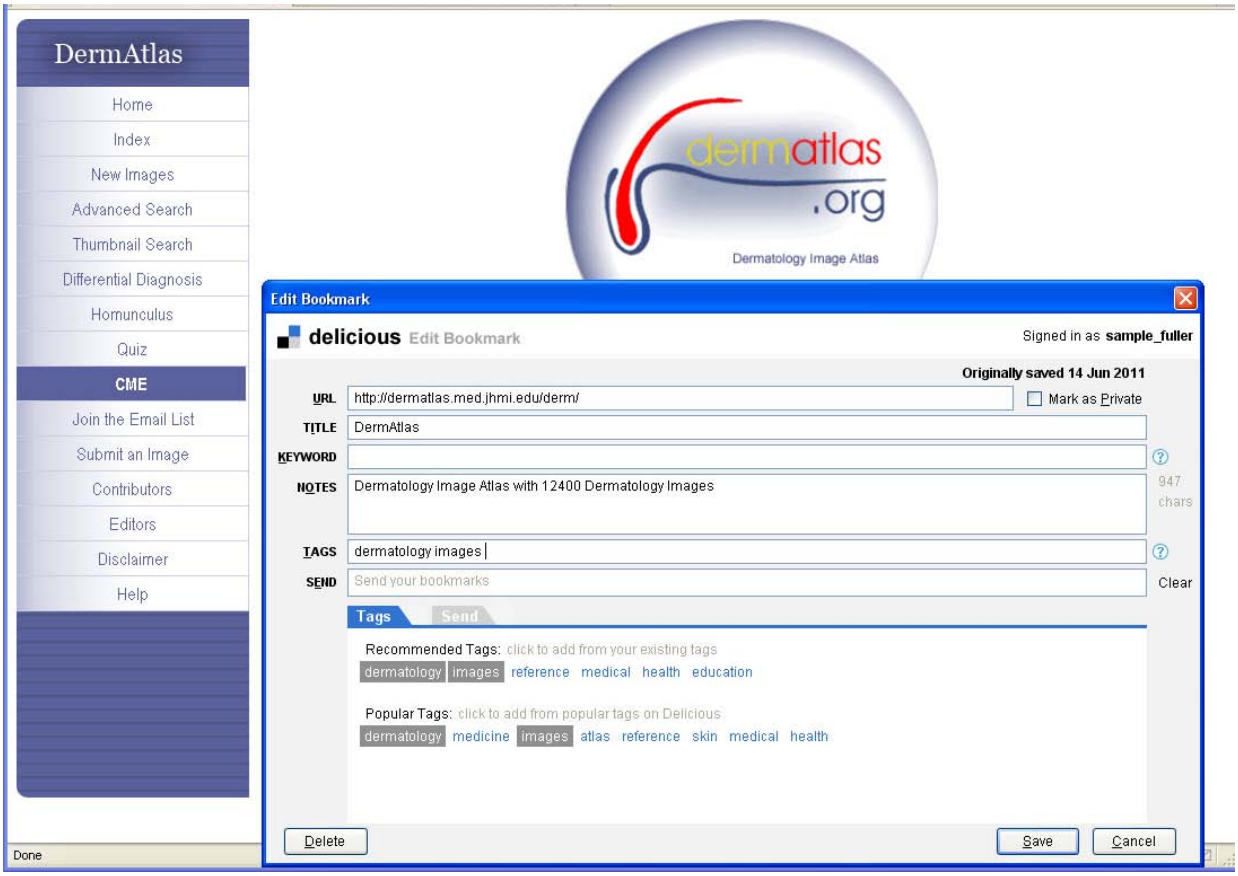

Figure 1. Example of Posting (Saving) a Website

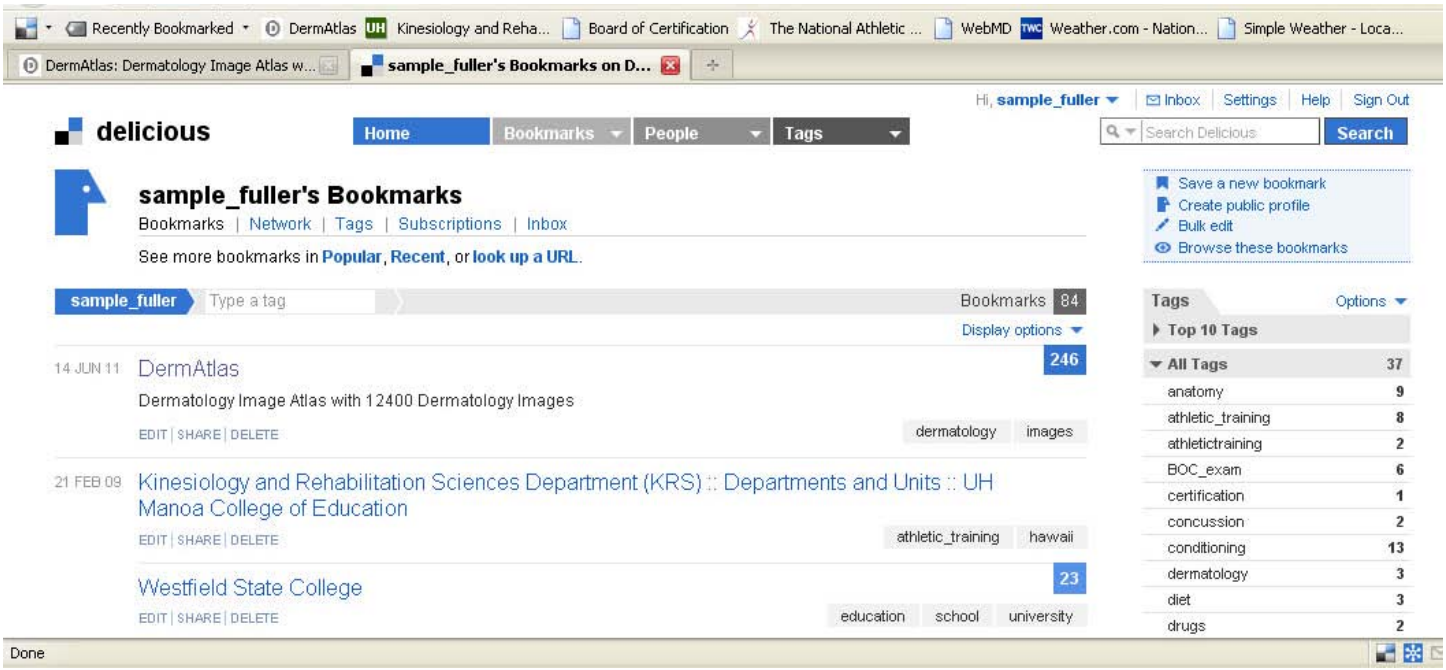

Figure 2. Example of Saved Bookmarks and Tags

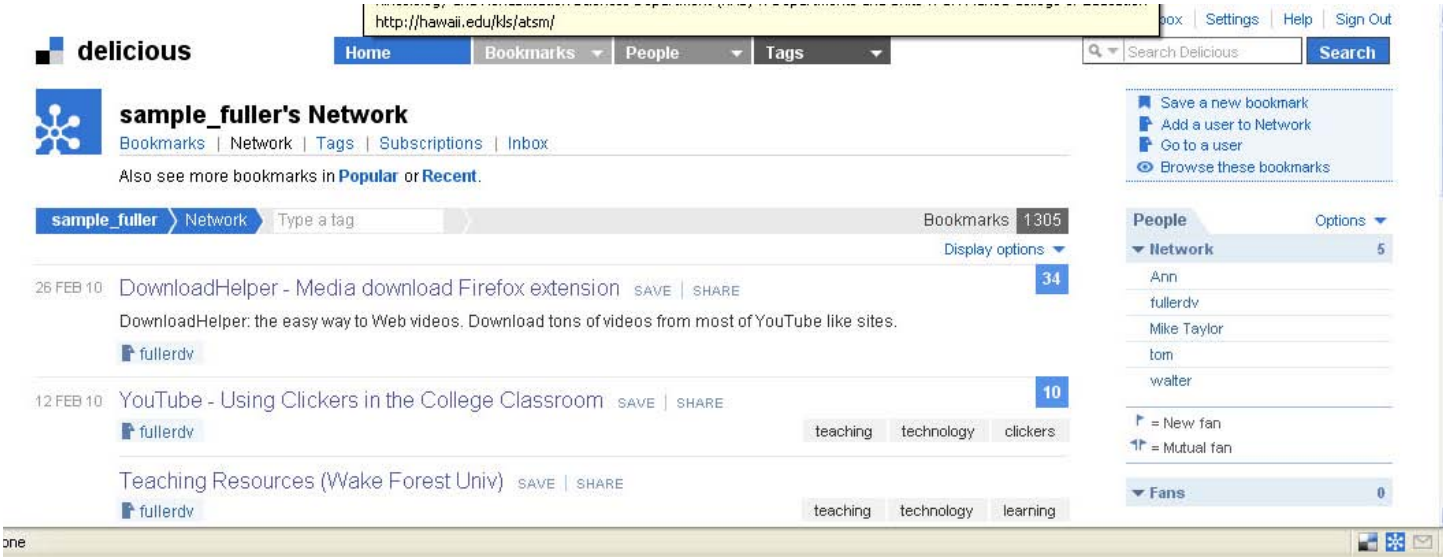

Figure 3. Example of Networking Bookmarks

ATHLETIC TRAINING EDUCATION JOURNAL

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Current Literature Summary

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Evidence-based practice collectively involves research evidence, clinician expertise, and patient preference while making health care decisions. Due to health care reform legislation, there is greater emphasis on evidence-based practice as a means for improving the quality, and lowering the cost, of health care. Principles of evidence-based practice must be integrated into athletic training curricula for students to develop the skill set of accessing, understanding, and evaluating research to appropriately apply evidence–based procedures in clinical practice. We will provide brief synopses of current research related to teaching evidence-based practice and discuss possible applications to athletic training.

Kim SC, Brown CE, Fields W, Stichler JF. Evidence-based practice-focused interactive teaching strategy: A controlled study. *J Adv Nurs*. 2009;65(6):1218-1227.

Reviewed by Sarah A. Manspeaker, Texas Christian University

Summary of research context and methods: Nursing educators are challenged to implement new and effective teaching strategies relating to evidence-best practice (EBP). Although EBP inherently involves incorporation of the best research evidence, little evidence is available to demonstrate effectiveness of EBP teaching strategies. Teaching methods that employ clinical integration have been found to improve knowledge and attitudes toward EBP.

The purpose of this study was to assess the effectiveness of the EBP-focused teaching (E-FIT) strategy in the areas of knowledge, attitudes, use, and future use of EBP. The E-FIT strategy included a combination of classroom lessons and clinically integrated group projects in collaboration with clinical preceptors. Senior level nursing students (n = 208) from 2 nursing schools participated in this study and were assigned to either the intervention or control group based upon semester of enrollment in Nursing Leadership/ Management Theory and Clinical Practicum courses.

Summary of research findings: Nursing students' EBP knowledge and use, as assessed by the Knowledge, Attitudes, and Behaviors Questionnaire for EBP, significantly increased from pre-test to post-test; however, no difference in attitudes or future use of evidence-based practice was identified. Regression analysis indicated that the E-FIT intervention explained 7.6% and 5.1% of EBP knowledge and use, respectively.

Implications for athletic training education/research: This study proposes that the E-FIT strategy may be helpful in educating nursing students in EBP, particularly in the areas of knowledge and use. Interactive projects requiring group participation and guidance from clinical preceptors appear to provide a successful mechanism for clinical application of EBP. Athletic training students could benefit from similar educational methods that permit direct involvement with clinical instructors and infusion of the EBP process within clinical decision making. Recent research in athletic training education has evaluated teaching strategies, both didactic and interactive, though more research is needed to determine teaching best practices. In addition to the teaching strategies themselves, specific areas for future research should include longitudinal evaluation of student retention and application of knowledge, attitudes, and use of EBP in clinical practice.

Bloom RL. A Case-based approach to teaching evidence-based practice and motor speech disorders. *Contemp Issues Commun Sci Disord*. 2010;37:123-130.

Reviewed by Lisa S. Jutte, Xavier University

Summary of research context and methods: Current standards from the American Speech-Language-Hearing Association require evidence based practice (EBP) in both the didactic and clinical curriculum for speech-language practitioners. Research on inductive teaching methods, such as case-based teaching, suggests that students are better motivated to figure things out independently using a scholarly approach to solving problems. The process of problem solving must be introduced along with the classic steps of EBP to provide a framework for case-based learning to be successful.

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Full Citation:
Doherty-Restrepo J. Education literature: Current literature summary. *Athl Train Educ J*; 2011;6(2):121-123.

The purpose of this descriptive study was to demonstrate how case-based learning is used to teach the intricate steps of EBP in a capstone graduate motor speech disorders course. Prior to enrolling in the course, students completed both a graduate level research methods course and a minimum of 2 semesters of supervised practicum in at least two different settings. Students were provided with 3 weeks of instruction on the 5 steps of EBP and then assigned to 1 of 2 cases to implement the EBP process as a group project. These cases were designed by the faculty to be realistic, context-based clinical scenarios in motor speech disorders. At the end of the semester, students submitted a written report and made a 30 minute oral presentation on the case including any necessary elaboration of relevant medical history, a treatment plan with potential patient progress, and documentation of how the EBP process would influence treatment.

Summary of research findings: The EBP case-based project approach provided students with a collaborative learning experience that demonstrated how research can complement clinical decision-making. Each case demonstrated a different way EBP influences patient care. One case study demonstrated how early treatment would impact the patients future communication abilities while the other case study demonstrate how the evidence did not connect an improved outcome with any type of treatment. These researchers reported that the case-based EBP approach encouraged students to practice clinical decision making by weighing clinical opinion against available evidence.

Implications for athletic training education/research: Many athletic training professionals are concerned with the ability of new clinicians to apply their knowledge and make appropriate clinical decisions. A case-based approach to teaching the EBP process may assist athletic training educators in addressing 2 learning outcomes with a single project: (1) applying the intricate steps of EBP and (2) making appropriate clinical decisions. The authors do identify that EBP cannot be taught in a single class or practical experience. Student must have basic knowledge regarding research and clinical practice; therefore, the integration of such a project is best for higher level classes after students have been exposed to basic research methods content. As such, athletic training education programs may want to consider teaching research methods earlier in their education programs. Since this was a descriptive study, it is difficult to know the actual impact of such a project on students' abilities to use EBP. A more quantitative assessment of EBP case-based learning is warranted.

Schreiber J, Downey P, Traister J. Academic program support for evidence-based practice: A mixed-methods investigation. *J Phys Ther Educ*. 2009;23(1):36-43.

Reviewed by Thomas Hunkele, Minnesota Vikings

Summary of Research context and methods: One of the hottest topics in today's medical care community is the implementation of evidence-based practice (EBP) into our profession. The inclusion of EBP is important for a wide variety of reasons including improved patient care to reimbursement. The purpose of this research study was to examine how a physical therapy academic program may assist clinical educators, who are practicing clinicians, in the application of EBP at their clinical education sites. The researchers aimed to improve the clinical educators' knowledge base in respect to evidence-based research and techniques of implementing it into current clinical practice via a 1-day five hour workshop. The clinical educators completed a survey (baseline) prior to, and 6 months after, the workshop to assess beliefs and attitudes toward research. Additionally, the researchers conducted semi-structured interviews to clarify clinical educators' attitudes, beliefs, and practices of EBP.

Summary of Research Findings: The researchers identified 4 main outcomes from the data. First, clinical educators have a positive attitude toward EBP which was evident at baseline and 6 months after the workshop. The clinical educators believe the use of research and EBP is important to guiding clinical decisions. Second, the clinical educators self-reported modest, yet statistically significant, improvement in their knowledge about research and personal reading of research journals following the workshop. Third, the clinical educators identified challenges and barriers to the implementation of EBP. Lack of time was described as the greatest challenge to employing evidence-based practice, while difficulty with technology and the inability to translate that knowledge into everyday practice were also cited as barriers. Lastly, the clinical educators noted the need for academic program support via workshops, guided practice on research and implementation, and access to research databases.

Implications for athletic training education/research: Athletic training emphasizes the importance of EBP. Previous research, as well as this research study, suggests that health care professionals have a positive attitude toward EBP workshops and continuing education seminars; however, the impact on clinical decision making behavior is lacking. As suggested by the authors of this article, perhaps faculty members could serve as a "knowledge broker" between researchers and clinicians to better facilitate EBP. Athletic training programs must not only integrate EBP in the didactic setting, but also the clinical education setting. As suggested in this article, athletic training education programs should consider the needs of the clinical instructors while integrating EBP into the curriculum by offering educational workshops or seminars, conducting on-site visits, providing on-line information repositories, or developing interactive, web-based discussion groups as appropriate to help educate and socialize students into a culture of evidence-based athletic training practice.

York AM, Nordengren FR, Stumbo T. Teaching evidence-based medicine with an asynchronous web module: Measuring student preferences and outcomes. *J Physician Assist Educ*. 2009;20(1):44-50.

Reviewed by Bonnie Van Lunen, Old Dominion University

Summary of research context and methods: Web-based education in evidence-based practice (EBP) concepts provides a medium that can be implemented into educational programming as it can be accessed while students are at various clinical experiences and providing patient care. The purposes of this study were to demonstrate that evidence-based practice principles could be effectively taught to physician assistant students via a Web-based tutorial and to identify student preference for delivery format. Students (n=42) were able to choose their format preference of (1) an interactive slide-based format with music, (2) a text-based PDF format, or (3) a combination of the previously mentioned formats. The tutorials were presented using Blackboard course management software and consisted of 5 modules that included information related to the 5 steps of evidence-based practice.

Summary of research findings: The physician assistant students perceived that they increased their understanding in most of the EBP concepts presented with the exception of "searching for evidence" and "confidence intervals." Searching for evidence may require more practice opportunities for students to utilize all of the components related to the content of the module. The students also achieved an 85% or higher on the EBP content posttest, therefore indicating that the Web-based tutorials effectively teach students the concepts of EBP. The students preferred the combination of the interactive slides and the PDF format (65%, n=26/40). Interestingly, most students (78%, n=31/40) also reported that they would like to have the information delivered via a face-to-face lecture format.

Implications for athletic training education/research: As athletic training educators further develop the professional curriculum to include more structured evidence-based practice concepts, they will seek to implement this information within a format that is conducive to student learning and implementation. Web-based delivery is a mechanism that will contribute to a greater understanding of concepts while also providing the student with self-paced learning opportunities. This format may be best utilized when combined with face-to-face lectures to accommodate for interaction with an instructor who can provide direct feedback and more clinical practice examples that apply to the foundational knowledge. Additional research is needed within this area to determine if this instructional method is effective for different learners with varied amounts of clinical experience, and would be most relevant if assessment of implementation and patient care outcomes were also examined.