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Within the athletic training profession, there are continuing education requirements in order to maintain national certification. Although the profession mandates completion of continuing education, little research has assessed the effectiveness of continuing education interventions. A total of 31 certified athletic trainers began this study (age =  $38 \pm 11$ , years of credentialed experience =  $15 \pm 11$ ). A web-based survey assessed education, usage, and perceived and actual knowledge of cupping therapy. Upon completing the initial survey, participants were asked to watch a recorded continuing education presentation on cupping therapy and take a second survey with 19 completing the requested task. One month after completion of the second survey, participants were sent a follow up survey to assess retention of knowledge and changes to clinical practice. Prior to the presentation participants had a mean perceived knowledge score of  $29.1 \pm 19.4$  out of 60 indicating that on average, they had at least some confidence in their knowledge of cupping therapy. Following the presentation, the mean perceived knowledge score was  $20.2 \pm 6.1$  out of 60 with lower scores indicating more confidence. This represented a significant improvement in perceived knowledge,  $t(16) = 4.31, p < .01$ . At the one-month follow the mean perceived knowledge score was  $17.3 \pm 6.2$  with no significant change over the month,  $t(7) = -.07, p = .943$ . Initially, participants had a mean sum of correct actual knowledge items ( $n=22$ ) of  $19.5 \pm 1$ , which was equivalent to 88.5% had this been a written exam. Following the presentation, the mean sum of actual knowledge items was  $19.9 \pm 1.62$ , with no significant increase in actual knowledge ( $p = .382$ ). Findings suggest that a virtual presentation directed toward athletic trainers may be effective in improving perceived knowledge. Although there was no significant improvement in actual knowledge, this may be due to the high initial scores on actual knowledge items. Further research should be conducted to determine the effectiveness of virtual continuing education on topics with which individuals are less knowledgeable.

IMPACT OF A VIRTUAL EDUCATION PRESENTATION ON KNOWLEDGE AND  
USAGE OF CUPPING THERAPY AMONG ATHLETIC TRAINERS

by

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Approved by

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## DEDICATION

*This project is dedicated to my wonderful and supportive wife, Heidi, and amazing daughter, Emilia. Also, to the memory of my grandfather, William Hounsell.*

## APPROVAL PAGE

This dissertation written by Stephen Andrew Cage has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

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## TABLE OF CONTENTS

DEDICATION .....	ii
APPROVAL PAGE .....	iii
LIST OF TABLES .....	vii
CHAPTER I: Project Overview .....	1
Review of Relevant Literature .....	1
Athletic Training Continuing Education.....	2
Cupping Therapy .....	3
Cupping Therapy in Sports Medicine .....	4
Purpose & Specific Aims.....	6
Methods.....	6
Participants.....	6
Measures .....	7
Intervention/Program .....	8
Data Collection Procedures.....	8
Data Analyses .....	9
Results.....	9
Education on Cupping Therapy .....	9
Frequency of Cupping Therapy Usage .....	10
Perceived Knowledge .....	10
Actual Knowledge .....	11
Attitudes Toward Presenter and Presentation .....	11
Discussion.....	13
Limitations and Recommendations.....	15
Conclusion .....	15

CHAPTER II: Dissemination Plan .....	16
Presentation Script .....	16
CHAPTER III: Action Plan .....	21
REFERENCES .....	23
APPENDIX A: Best practices in cupping therapy presentation outline.....	26
APPENDIX B: Presentation surveys .....	28
APPENDIX C: Presentation for Southwest Athletic Trainers' Association .....	45

## LIST OF TABLES

Table 1. Participant demographic information. ....	7
Table 2. Totals and percentages for previous cupping therapy education. ....	10
Table 3. Totals and percentages for usage of cupping therapy pre-presentation and at one-month follow up. ....	10
Table 4. Totals and percentages for responses regarding the presenter and presentation. ....	11

## CHAPTER I: PROJECT OVERVIEW

The athletic training profession has continuing education requirements in order to maintain national certification (CAATE, 2018). Of the biennially required 50 CEUs, 10 must be classified as evidence-based practice (EBP) units. These EBP units must undergo additional rigor to ensure that quality content is presented. Although the profession mandates completion of continuing education, only one study has assessed the effectiveness of a continuing education intervention (Schellhase et al., 2017). Schellhase (2017) demonstrated that a continuing education intervention was effective in improving perception and attitudes toward caring for patients suffering from exertional heat stroke. Without established methods of assessing the effectiveness of continuing education presentations, it is difficult to determine if the current continuing education model is truly ensuring that athletic trainers' skills and knowledge advance over time. Cupping therapy is one such topic that requires further education. Cupping therapy is a therapeutic modality that uses various forms of suction to achieve benefits such as pain relief, increased blood flow, and increased range of motion (Cage et al., 2020a; Arce-Esquivel et al., 2017, Cao et al., 2014). Despite an increase in studies that highlight the potential uses of cupping therapy there remains a need for research on the use of cupping therapy on athletic populations (Bridgett et al., 2018). In the meantime, a clinical expert statement was created to provide athletic trainers with recommendations arising from clinical expertise and anecdotal evidence on how best to use cupping therapy (Cage et al., 2019). This project not only creates a presentation on cupping therapy based on these recommendations, but also demonstrates a method of assessing continuing education presentations. This project has the potential to improve continuing education practices within athletic training as well as extend research on cupping therapy that could inform and improve clinical practice.

### **Review of Relevant Literature**

Athletic training as a profession has long recognized the need for continuing education to ensure optimal patient care (CAATE, 2018). To this end, athletic trainers have been required to obtain 50 continuing education units (CEUs) during a two-year reporting cycle (CAATE, 2018). Of these 50 CEUs, 10 must be classified as "evidence-based practice units". These evidence-based practice units must undergo additional rigor to ensure that a quality concept is being presented to the attendees. Even though athletic trainers are required to obtain continuing

education units, the majority of athletic trainers have expressed a desire to learn through informal methods such as peer-to-peer knowledge transfer, reading peer reviewed journal articles, teaching courses on topics relevant to athletic training, and gaining clinical experience (Armstrong & Weidner, 2011).

### **Athletic Training Continuing Education**

In spite of this need for continuing education, there appears to be only one study that has assessed the effectiveness of a continuing education intervention on impacting perceptions and attitudes of an aspect of clinical practice (Schellhase, Plant, & Mazerolle, 2017). While Schellhase and colleagues demonstrated that a continuing education intervention was effective in improving perception and attitudes toward caring for a patient suffering from exertional heat stroke, this was not an exhaustive study on continuing education interventions. Fortunately, other allied healthcare professions have explored continuing education practices within their domains.

Andrew and Theiss (2015) suggested that a program using the PICOT (Population, Intervention, Comparison, Outcome, Time) method of questioning helped ensure that the program remained learner centered. This idea lends credence to the use of the PICOT model to structure evidence-based practice continuing education presentations for athletic trainers (CAATE, 2018). This concept partners well with the evidence-based practice continuing education units that athletic trainers must obtain which utilize the PICOT model of questioning as well (CAATE, 2018). Thus, the practice of using PICOT questioning may indicate that the required evidence-based practice continuing education units in athletic training are being evaluated in an appropriate manner.

In addition to the PICOT model, the Kirkpatrick Model of Assessment has been used to assess continuing education programs within nursing (Bijana, Rostami, Momennasab, & Yektatalab, 2018). The Kirkpatrick Model has been well established as a means of assessing education interventions in general (Reio et al., 2017; Yoon et al., 2016). This model has gained popularity, in large part due to how easy it is for individuals from various professions to understand (Reio et al., 2017). Another aspect that sets this model apart is that it has maintained popularity and withstood scholarly review and critique over a relatively long period of time (Reio et al., 2017). The Kirkpatrick Model can be used to assess how well a continuing education program is received by attendees, how well it increases knowledge of attendees, how well it affects favorable behavior change, and how well it solves existing problems within a profession

or organization (Bijana et al, 2018). Using this method Bijana (2018) described a continuing education presentation that imparted the desired knowledge to the target population. Based on this information, the Kirkpatrick Model is a viable choice for assessing effectiveness of an education presentation centered on cupping therapy.

### **Cupping Therapy**

Cupping therapy is an ancient modality that utilizes suction to achieve therapeutic effects and has been growing in popularity within the athletic training profession (Bridgett et al., 2018). By increasing blood flow, patients may increase nutrients and chemical markers that assist with decreasing pain and increasing function (Arce-Esquivel et al., 2017; Cao et al., 2014). Since the turn of the century, cupping therapy has grown in popularity in the United States and other countries where Western Medicine is the primary source of healthcare (Bridgett et al., 2018). Much of this popularity can be attributed to increased media interest resulting from elite level athletes receiving cupping therapy (Futterman, 2016; Lyons, 2016). Even though cupping therapy has gained popularity in the United States, there is still no consensus on the ideal parameters for applying cupping therapy treatment to either amateur or professional athletes (Bridgett et al., 2018). This lack of consensus can be attributed to a lack of high-quality studies and standardized methodology (Cao et al., 2014; Cao et al., 2012). Another issue is that few studies specifically assess the effects of cupping therapy on athletic populations (Bridgett et al., 2018). Despite this lack of studies, an increasing number of original research and case studies have detailed the use of cupping therapy to treat athletes for orthopedic injuries (Cage et al., 2020b; Warner et al., 2019; Fiesler et al., 2018; Cage et al., 2017). Thus, preliminary work and anecdotal clinical evidence shows the benefits of cupping therapy. However, controlled trials are still needed to provide further supporting evidence.

Several scholars have suggested that creating standardized practices for cupping therapy would make clinicians and researchers more willing to use the technique when exploring means of decreasing pain in patients (Bridgett et al., 2018; Chen et al., 2016; Ernst, 2009). Not only would this standardization allow for more efficient research and treatment, it may also reduce the number of adverse events that occur when cupping therapy is performed (Chen et al., 2016; Ernst, 2009). Recent research supports the use of cupping therapy for the previously mentioned effects, but a consensus statement on best practices would better inform clinical practice. In the absence of such a consensus statement a clinical experts' statement was created by enlisting a

panel of certified athletic trainers who were also certified in cupping therapy to create a recommendation for the use of cupping therapy in athletic training (Cage et al., 2019). This statement included recommendations for indications, contraindications, and application methods for athletic trainers wishing to use cupping therapy in their clinical practice. While this statement was not a definitive document, it did provide suggestions for achieving the best possible outcomes for the use of cupping therapy by athletic trainers (Cage et al., 2019). One method of ensuring up to date research-based information reaches athletic trainers is to incorporate it into continuing education programming.

While cupping therapy is usually thought of as a practice that originated in Traditional Chinese Medicine, evidence suggests cupping therapy was used as early as 3300 B.C. in Macedonia (Bridgett et al., 2018). In addition to China and Macedonia, archaeological evidence suggests that cupping therapy was practiced in other ancient cultures including Egypt (Bridgett et al., 2018). Cupping therapy has also been popular in the United States in the past. In fact, until the mid-19<sup>th</sup> century the use of cupping therapy by physicians in the United States was a fairly common practice (Potter, & Wilson, 1919). No documentation was found regarding the decrease in popularity of cupping therapy in the United States, but one could speculate that the drop coincided with advances in other aspects of the medical field along with some of the treatment practices that were associated with cupping therapy. In Europe, cupping therapy remained a regular practice at least through the 1920's (Valmyre, 1924). During these early uses, practitioners did not always use specific cupping therapy tools. Valmyre (1924) noted that physicians using cupping therapy in France would utilize implements such as jam pots and mustard jars when proper tools were not available. While this showed ingenuity, using implements that were not designed for cupping therapy may place the patient at risk. The fact that cupping therapy has not been widely used in Western Society for some time may explain why some individuals express concern over the safety of the modality (Cao et al., 2014).

### **Cupping Therapy in Sports Medicine**

A major contributing factor for the rise in popularity is the use of cupping therapy by professional athletes (Futterman, 2018; Lyons, 2018). In fact, the large number of athletic trainers report using cupping therapy in their clinical practice (Cage et al., 2020c; Cage et al., 2020d). Unfortunately, with therapeutic modalities in sports medicine, a common issue is the lack of research on the effect of the modality in question (Bridgett et al., 2018).

Bridgett (2018) evaluated 11 randomized control trials from around the world. While all 11 trials examined the effects of cupping therapy on athletes, methodologies were not consistent. For instance, in the 11 trials cupping therapy treatments were applied between 1 and 20 times, and either daily or weekly (Bridgett et al., 2018). Another confounding factor was that the 11 trials did not use consistent outcome measures (Bridgett et al., 2018). Ultimately, Bridgett (2018) reached a conclusion similar to Cao (2014). Aside from Bridgett's (2018) systematic review, the majority of published literature on the use of cupping therapy to treat athletes is in the form of case studies (Warner et al., 2019; Cage et al., 2018; Fiesler et al., 2018). To reach a consensus regarding the best practices for the prescription and application of cupping therapy, more high-quality research that measures the effects of consistent parameters on consistently measured patient related outcomes is needed (Bridgett et al., 2018; Cao et al., 2014). While neither Bridgett (2018) nor Cao (2014) was able to identify a singular cause for this lack of high-quality studies, both noted that previous research lacked studies with low risk of bias or large sample sizes. Both authors advocated for more high-quality studies. To this end Cage et al (2019a) recruited a panel of experts to create a clinical experts' statement on the use of cupping therapy in athletic training. This statement did not purport to be a definitive document, but did provide a resource for athletic trainers looking to apply cupping therapy in their clinical practice. Although this statement has been created, there is still a need for determining the best method of disseminating this information.

In summation, athletic trainers need to obtain continuing education credits to maintain certification (CAATE, 2018). These continuing education programs could disseminate information on the best practices for using cupping therapy in athletic training. Presently, there is little research assessing the effectiveness of athletic training continuing education programs (Schellhase et al., 2017). Cupping therapy is an ancient treatment technique that has been regaining popularity in the United States, particularly among athletic trainers. Many athletic trainers use cupping therapy in some form in their clinical practice, but do not have readily available recommendations for the best methods for prescribing and applying the treatment (Cage et al., 2019). As more information becomes available on how to best use cupping therapy in athletic training, there is a need for an effective means of distributing this information (Cage et al., 2020b; Cage et al., 2019). Therefore, research on the assessment of athletic training

continuing education programs is needed to improve the transfer of knowledge on topics pertinent to athletic training such as cupping therapy.

### **Purpose & Specific Aims**

The purpose of this project was to determine the effect of a virtual continuing education presentation on cupping therapy on knowledge and retention over time. A second aim was to assess the impact of the continuing education intervention on the use of cupping therapy in clinical practice.

*Specific Aim #1: To determine the effect of a cupping therapy education program in the style of an athletic training continuing education presentation on knowledge and retention over time.*

*Specific Aim #2: To determine the influence of a cupping therapy education program in the style of an athletic training continuing education presentation on the use of cupping therapy in clinical practice.*

### **Methods**

A one-group pre-post design was used to conduct this study. Data were collected using pre- and post-presentation survey measures. The pre-presentation survey collected demographic information, and baseline information on perceived and actual knowledge of cupping therapy as well as current cupping therapy usage in clinical practice. The post-presentation surveys included the same measures of knowledge of cupping therapy and use of cupping therapy in clinical practice among participants.

### **Participants**

Institutional Review Board (IRB) approval was obtained from the University of Texas at Tyler and the University of North Carolina, Greensboro. Recruitment of certified or licensed athletics trainers was done via email. Individuals who received the electronic invitation were also asked to forward the invitation to other athletic trainers they knew. The recruited athletic trainers (n=31) worked in a number of settings including high school, college/university, professional sports, and emerging settings. A total 31 certified or licensed athletic trainers were recruited and completed the initial survey (age= 38 ± 11, years of credentialed experience= 15 ± 11). Following the presentation, 17 certified athletic trainers completed the post-presentation survey (age= 34 ± 9, years of credentialed experience= 11 ± 10). Further demographic information is recorded in Table 1.

<b>Demographic Factor</b>	<b>Criteria</b>	<b>Pre-Survey (n=31)</b>	<b>Post-Survey (n=19)</b>	<b>One-Month Follow Up (n=8)</b>
Sex	Male	16, 51.6%	9, 47.4%	2, 25.0%
	Female	15, 48.4%	10, 52.6%	6, 75.0%
Clinical Practice Setting	College/University	4, 12.9%	14, 73.7%	5, 62.5%
	Secondary School	24, 77.4%	3, 15.8%	3, 37.5%
	Clinical/Hospital	1, 3.2%	1, 5.3%	0, 0.0%
	Emerging Settings	2, 6.5%	0, 0.0%	0, 0.0%
	Professional Sports	1, 3.2%	1, 5.3%	0, 0.0%
Highest Degree Earned	Professional Bachelor's	2, 6.5%	2, 10.5%	0, 0.0%
	Professional Master's	5, 16.1%	4, 21.1%	4, 50.0%
	Post-Professional Master's (in AT)	5, 16.1%	3, 15.8%	1, 12.5%
	Post-Professional Master's (Not AT)	14, 45.16%	7, 36.8%	3, 37.5%
	Post-Professional Clinical Doctorate	1, 3.2%	1, 5.3%	0, 0.0%
	Academic Doctorate	4, 12.9%	2, 10.5%	0, 0.0%

Table 1. Participant demographic information.

## Measures

The pre-presentation survey that was developed specifically for this project included participants' demographic information, current usage of cupping therapy in their clinical practice, perceived knowledge of cupping therapy, and actual knowledge of cupping therapy. The questions in this survey were adapted from previous surveys intended to determine certified athletic trainers' perceived and actual knowledge of cupping therapy (Cage et al., 2020c; Cage et al., 2020d). Although the survey lacks established reliability and validity, the previous studies and measures were evaluated by the peer review process (Cage et al., 2020c; Cage et al., 2020d). Participants responded to questions on demographic information, athletic training experience, education, and clinical practice setting, current usage of cupping therapy within clinical practice, perceived knowledge of cupping therapy, and actual knowledge of cupping therapy. Perceived knowledge questions were answered on a 6-point scale of "Strongly Agree" to "Strongly

Disagree”. Actual knowledge questions were answered in multiple choice format that were scored based off either being right or wrong.

Following completion of the presentation, participants (n=17) completed an immediate post-presentation survey that included the same questions assessing perceived and actual knowledge, along with 11 questions on the presentation. Those included one overall rating, two questions rating the presenter, two ratings on knowledge imparted and whether they would be more likely to use cupping therapy in the future, and five open-ended questions about the strengths and weaknesses of the presentation. The overall rating was on a 5-point scale of “Excellent” to “Very Poor” and the following four questions were answered on a 6-point scale of “Strongly Agree” to “Strongly Disagree”. This line of questioning allowed for assessment of the presentation using the Kirkpatrick Model of Assessment (Bijana et al., 2018). The complete survey can be found in Appendix B.

One month after the presentation, participants were sent a follow-up survey with the same knowledge and use in clinical practice questions. The survey was distributed electronically through Qualtrics, with reminders sent once a week for four weeks or until all participants completed the follow up survey.

### **Intervention/Program**

The intervention was a 1-hour continuing education program on cupping therapy that was consistent with the standards and formats for presentations at virtual professional conferences. Athletic trainers primarily receive their formal continuing education via this format (Armstrong & Weidner, 2011). The presentation provided a summary of the history of cupping therapy, theoretical mechanisms by which cupping therapy achieves therapeutic effects, a summary of the best available evidence surrounding cupping therapy, and clinical expert-driven recommendations for using cupping therapy in athletic training. An initial draft of the presentation was delivered to a different group of 28 athletic trainers, and then revised based on their comments and suggestions. The presentation used a combination of PowerPoint slides, video demonstrations, and verbal information from the presenter. At the end of the presentation, participants were provided with a link to the post-presentation survey.

### **Data Collection Procedures**

The recruitment email directed participants to the link to the pre-presentation survey. After completing the pre-presentation survey, the participants watched the recorded presentation

on the use of cupping therapy in athletic training. Upon completion of the presentation, the participants were asked to complete the post-presentation survey. The final question of the survey asked participants to provide their email addresses if they wished to be included in the one-month follow up survey. The following month, participants who gave their email addresses received an email with a link to the follow-up survey. Follow up emails were sent one and two weeks after the first email in an attempt to make sure the most responses possible were recorded.

**Data Analyses**

For all rating questions means with standard deviations and frequencies were recorded. Open-ended responses were read and common responses were identified. Paired t-tests were performed to determine if there were any differences in perceived and actual knowledge before and after the intervention and one month after the completion of post-presentation survey. Significance was set with a *p* value of  $p < 0.05$ . Statistical procedures were performed using SPSS V26 (IBM, Armonk, NY).

**Results**

The previous education and frequency of usage for cupping therapy are presented first, followed by perceived and actual knowledge of cupping therapy pre- and post-presentation and at one month follow up, attitudes toward the presenter and presentation, and changes to education and usage following at one month follow up.

**Education on Cupping Therapy**

All participants reported they had received at least some education on cupping therapy. The responses are detailed in Table 2. The majority of athletic trainers reported getting their information from peer-to-peer instruction. In contrast, few received any form of formal instruction on cupping therapy.

<b>Education Format</b>	<b>Pre-Survey (n=31)</b>	<b>Post-Survey (n=17)</b>	<b>One-Month Follow Up (n=8)</b>
Formal undergraduate coursework	4, 12.9%	3, 17.6%	3, 37.5%
Formal graduate coursework	2, 6.5%	2, 11.8%	2, 25.0%
Continuing education course through a cupping therapy company	7, 22.6%	4, 23.5%	4, 50.0%
Continuing education lecture at conference	10, 32.3%	7, 41.2%	5, 62.5%

Continuing education lab at conference	8, 25.8%	5, 29.4%	4, 50.0%
Peer-to-peer teaching of the skill	23, 74.2%	13, 76.5%	6, 75.0%
Personal experience (reading articles, searching the internet)	21, 67.7%	13, 76.5%	7, 87.5%

Table 2. Totals and percentages for previous cupping therapy education.

### Frequency of Cupping Therapy Usage

Most participants reported completing a cupping therapy treatment on a patient in their clinical practice (n=24, 77.4%), but 22.6% (n = 7) reported not using cupping therapy at all in a typical week. Changes in usage among participants who completed the follow up survey are detailed in Table 3.

Frequency of Usage	Pre-Presentation (n=8)	One-Month Follow Up (n=8)
Never	0, 0.0%	0, 0.0%
Rarely (Less than once a week)	2, 25.0%	0, 0.0%
Seldom (1-3 patient encounters)	3, 37.5%	4, 50%
Occasionally (4-6 patient encounters)	2, 25.0%	3, 37.5%
Frequently (7+ patient encounters)	1, 12.5%	1, 12.5%

Table 3. Totals and percentages for usage of cupping therapy pre-presentation and at one-month follow up.

### Perceived Knowledge

The participants who completed the post survey (n=17) had an initial mean perceived knowledge score of  $29.1 \pm 19.4$  out of 60 (minimum = 10, maximum = 50). Lower scores represented a higher confidence in knowledge. This indicated that on average, participants had at least some confidence in their knowledge of cupping therapy prior to the presentation. Following the presentation, the mean perceived knowledge score was  $20.2 \pm 6.1$  out of 60 (minimum = 12, maximum = 32). This represented a significant improvement in perceived knowledge,  $t(16) = 4.31, p < 0.01$ . The follow up perceived knowledge (M= 17.25) did not significantly change from the post-presentation (M= 20.18),  $t(7) = -.07, p = 0.943$ .

## Actual Knowledge

The participants had a mean sum of correct actual knowledge items (n=22) of  $19.5 \pm 1.8$  (minimum = 16, maximum = 22) prior to watching the presentation. This represented a mean score equivalent to 88.5% had this been a written exam. Following the presentation, the mean sum of actual knowledge items was  $19.9 \pm 1.6$  (minimum = 17, maximum = 22). This did not represent a significant increase in actual knowledge,  $t(16) = -0.90, p = .382$ . At the one month follow up, the mean sum of actual knowledge items was  $20.0 \pm 1.8$  (minimum = 17, maximum = 22). This indicated no change in actual knowledge over the month,  $t(7) = -0.68, p = .516$ .

## Attitudes Toward Presenter and Presentation

When asked to rate the presentation, the majority of participants who completed the post-presentation survey (n=19) stated the presentation was “Excellent” (68.4%, n = 13). Regarding the presenter, the majority of participants strongly agreed that the presenter was knowledgeable on cupping therapy (79.0%, n = 15), and was effective in delivering information (73.7%, n = 14). Participants also agreed that they learned more about cupping therapy from this presentation. The majority of participants also reported that they were more likely to use cupping therapy after the presentation (94.7%, n= 18). Most frequent responses are found in Table 4.

Question	Responses
How would you rate this presentation overall?	Excellent = 13, 62.4% Good = 6, 31.6%
The speaker was knowledgeable on cupping therapy.	Strongly Agree = 15, 79.0% Agree = 4, 21.0%
The speaker was effective in delivering information.	Strongly Agree = 14, 73.7% Agree = 5, 26.3%
I learned more about cupping therapy from this presentation.	Strongly Agree = 9, 47.4% Agree = 8, 42.1% Somewhat Agree = 2, 10.5%
Following this presentation, I am MORE likely to use cupping therapy in my clinical practice.	Strongly Agree = 9, 47.4% Agree = 5, 26.3% Somewhat Agree = 4, 21.1% Somewhat Disagree = 1, 5.3%

Table 4. Totals and percentages for responses regarding the presenter and presentation.

When asked about the strongest or best parts of the presentation, participants commonly cited the presentation of peer-reviewed evidence and the video demonstrations as highlights. Other comments regarding strengths included:

- *I appreciated the historical lesson about cupping therapy.*
- *The best part was highlighting the need of a standard method of practice for cupping therapy in the athletic training setting.*
- *The reiteration and definitive proclamation that cupping is safe and effective when selected for the right patient and performed the right way.*

When asked about weaknesses in the presentation, the majority of participants stated that they felt there were not any weakness (63.2%, n=12). Comments regarding weakness included:

- *Could go into more information on specific cupping therapy protocols for different injuries.*
- *Would have liked additional treatment and setup pearls.*
- *Maybe potential for bias considering majority of the studies presented were performed by the presenter.*

When asked to provide suggestions for improving the presentation, some of the comments included:

- *Maybe a more detailed video of putting cups on and taking them off.*
- *Maybe adding videos of patients using cups functionally.*
- *More info on cupping protocols.*
- *Specific treatment recommendations.*

At the one-month follow up, athletic trainers reported that the majority of their reasons for using cupping therapy were symptoms based. Specifically, muscular pain and tightness were listed as reason athletic trainers used cupping therapy in their clinical practice. Other answers included:

- *I believe it is an effective modality.*
- *I have seen it help patients.*
- *Because I have found that it is a very useful tool that has positive effects on my patient population.*

At the one-month follow up, the most common reasons to not perform cupping therapy had to do with common contraindications. These included open wounds, and patients who were minors. Other answers included:

- *It is dependent on the injury and goal of the treatment and rehab.*
- *Not enough time with athletes.*
- *I do not like to throw cups on everybody. I do not always want it to be my go-to and forget other useful tools.*

Athletic trainers also reported being able to recall important pieces of information from the previous month. Common answers included:

- *That there are many different indications for cupping therapy.*
- *Cupping therapy has been around for a long time.*
- *It is a safe and effective modality. It can treat muscular pain and tightness.*
- *It has been used for centuries. The marks are not bruising.*
- *Treat each injury as an individual and adjust treatment to best benefit the patient.*

### **Discussion**

The purpose of this study was to determine the effect of a virtual continuing education presentation on cupping therapy on perceived and actual knowledge and retention over time. The findings suggest that a virtual continuing education presentation directed toward athletic trainers may be effective in improving perceived knowledge on cupping therapy. Although there was no significant improvement in actual knowledge of cupping therapy, it is possible that this was due to the high initial scores on actual knowledge items. While initially, most athletic trainers reported using cupping therapy in their clinical practice, most participants who completed the post-presentation survey said they would increase their usage of cupping therapy. Given the small sample size, further research is needed to determine whether or not there was a significant increase.

The lack of improvement in actual knowledge may be related to the fact that participants had a high base level of knowledge regarding cupping therapy. The sample was also a relatively experienced group (years of credentialed experience =  $11 \pm 10$ ). This sample may have had more time within the profession to gather knowledge and experience with cupping therapy. Another variable that may have led to actual knowledge scores not improving may have been the nature of recruitment. With a virtual presentation, it is possible that the athletic trainers who participated were more interested in cupping therapy and therefore had a higher level of knowledge coming into the study.

The fact that perceived knowledge improved indicates that the participants who watched the presentation had increased confidence in their knowledge of cupping therapy. Even though there was a high level of actual knowledge regarding cupping therapy at the initial survey, participants were close to the midline of agreement about their perceived knowledge. This

suggested that some participants were not confident in their knowledge of cupping therapy. The participants may have received affirmation that their answers on the actual knowledge questions were correct by watching the presentation, which would improve confidence. By improving confidence in knowledge of cupping therapy, this may remove a potential barrier to performing the treatment during clinical practice.

Overall, the presentation on cupping therapy was well received by participants. Participants noted that they enjoyed the presentation, and that the speaker was knowledgeable and effective at delivering information regarding cupping therapy. The participants also stated that they learned more about cupping therapy by watching the presentation, and that they were more likely to use cupping therapy following the presentation. This information suggests that the presentation would be a useful tool for delivering information to other athletic training populations, as well as educating athletic training students on cupping therapy. Based on suggestions from participants, future presentations might include examples of treatment protocols for specific injuries, including videos demonstrating exercises while silicone cups are applied, and spending more time discussing treatment recommendations based off current best practices.

These results may be useful for educators, as the use of virtual continuing education and professional development has grown even more popular during the COVID-19 pandemic. Multiple athletic training conferences have moved to virtual delivery platforms, and other professions have begun to study the effectiveness of virtual professional development (Brooks, Fan & McMullen, 2020; Eusuf, England, Charlesworth, Shelton & Thornton, 2020; Jordan, Bayolek, Dyne, Richard, Villa & Wheaton, 2020; Tang, Tong, Irby, Alecio & Guerrero, 2020). The authors of these previous studies theorize that virtual professional development will continue to play a large role in continuing education from this point forward. This increases the importance for future research on how effective this platform is for increasing perceived and actual knowledge.

Findings from the current study are consistent with previous studies that report virtual professional development being effective in improving confidence and leading to knowledge transfer (Brooks et al, 2020; Tang et al, 2020).

## **Limitations and Recommendations**

Given that this study was conducted during the COVID-19 pandemic, extenuating circumstances may have impacted responses to questions on education on cupping therapy, and frequency of usage. The primary investigator attempted to account for this limitation by asking participants to report how frequently they would use cupping therapy in a “typical week”, and whether or not they “intended” to pursue further education on cupping therapy. However, it was difficult to account for all potential influences the pandemic might have had on responses.

Ideally, this study would have involved more participants. Initially 31 athletic trainers began the survey, but 8 completed the final follow up survey. These numbers are similar to previous continuing education studies on athletic trainers (Schellhase, et al, 2017). Additionally, the number of participants is consistent with the number of attendees for some athletic training continuing education presentations.

Future research should attempt to gather a larger participant pool from diverse clinical settings. Instruments should be developed to specifically measure the retention of knowledge and changes to clinical practice over time following continuing education presentations. Future studies should also examine retention of knowledge at different times such as three months and six months.

## **Conclusion**

Virtual professional development opportunities are increasingly available for athletic trainers. Even as the world continues to grapple with the COVID-19 Pandemic, it is becoming apparent to researchers that virtual continuing education will continue to be a platform for professional development. The participants in this study exhibited high levels of actual knowledge, leading to little change following the presentation. Perceived knowledge increased significantly, and participants provided a positive evaluation of the presentation. Participants also reported feeling that they gained knowledge and were more likely to use cupping therapy in their future clinical practice. Future research needs to be conducted with a sample that does not have a high level of knowledge on the topic being covered.

## CHAPTER II: DISSEMINATION PLAN

For the purposes of immediate dissemination, the investigator will put particular emphasis on submitting the findings of the dissertation for presentation at the Southwest Athletic Trainers' Association Symposium as a free communications lecture. Attendees at this conference are credentialed athletic trainers, many of whom present at this conference and others. By presenting in the free communications section of the conference, it provides the opportunity for an abstract publication in the *Clinical Practice in Athletic Training Journal*. The free communications program is often heavily attended by others presenting in the same or similar sessions. This means the presentation has a chance of reaching fellow presenters who may find the information valuable. As such, the presentation script I have prepared is geared toward that specific population, and encourages those presenters and future presenters to take the time to deliver virtual presentations as well as in-person presentations. The investigator will present on his findings using the script below, and the slides presented in Appendix C.

### **Presentation Script**

#### *Slide 1*

“Hello, and thank you for taking the time to attend my presentation. I also want to take this time to thank SWATA and the Free Communications and Research Committee for accepting my topic for presentation. Today, we will be talking about the study I conducted on the effectiveness of a virtual continuing education presentation with regards to knowledge transfer and retention. The fact that you are all here for this presentation means that you have an appreciation for continuing education, or at least you understand that you have to obtain continuing education credit. Throughout this presentation we will discuss some of the aspects that made the presentation used for this intervention effective. Another finding we will discuss will be the effect of this presentation on clinical practices, specifically the use of cupping therapy.

#### *Slide 2*

To start, let's discuss a brief overview of the current state of continuing education in athletic training. Athletic trainers who are certified at the national level are required to obtain 50 continuing education units every two years. Previously, athletic trainers had to obtain 10 evidence-based practice units within that 50, which required the presenters and their

presentations to undergo a more thorough review prior to the information being used in a continuing education format. Here in the state of Texas, we also have to maintain continuing education units, but as most of you know these are covered within our requirements to maintain our certification. While these continuing education events have been offered virtually in the past, the more common route for continuing education in athletic training has been face-to-face instruction conferences or symposiums. Due to the COVID-19 Pandemic, there has been a shift in the athletic training continuing education model, with most conferences moving to either synchronous or asynchronous virtual instruction.

While the move to more virtual continuing education options has occurred rapidly, the development of methods of measuring how effective these offerings are at knowledge transfer and behavior change has not. To date, there do not appear to be any studies that have assessed the effectiveness of virtual professional development and continuing education among athletic trainers. Until we gain more information about the viability of this method of continuing education for transferring knowledge, it is difficult for us to say whether or not it is a worthwhile option. If we are counting on virtual continuing education to improve and reinforce knowledge of clinical skills and topics, we owe it to ourselves as a profession to take a long and discerning look at it.

#### *Slide 3*

Therefore, the purpose of our study was to assess the effects of a virtual continuing education presentation on the knowledge and clinical behaviors of athletic trainers. For the purposes of our study, we chose cupping therapy as the topic for the presentation. Cupping therapy was selected due to the primary investigator holding two post-graduate certifications in the skill and having presented and published multiple times on the topic. This gave us a reasonable assurance that the person speaking on the topic would be knowledgeable.

#### *Slide 4*

A one-group pre-post design was used to gather data. A convenience sample of credentialed athletic trainers were recruited by email. These athletic trainers had email addresses that were publicly available on staff directories. Snowball recruiting was also employed, with participants being asked to forward the inviting email to any credentialed athletic trainers they knew. Participants began by taking a pre-presentation survey, and then watched a recorded presentation on cupping therapy that lasted approximately one hour. Following the presentation,

the participants were asked to complete a second survey. One-month after viewing the presentation, participants were asked to complete a follow up survey.

*Slide 5*

These surveys were designed to gather demographic information about the participants including their age, years of experience, practice setting and education. The surveys also asked questions regarding the participants' previous education on and usage of cupping therapy, with other questions assessing the participants' perceived and actual knowledge of cupping therapy. The post-presentation and follow up surveys included questions related to the participants' opinions of the presentation and the presenter.

*Slide 6*

Data were analyzed using a commercially available statistics software package. When appropriate, frequencies, means, and standard deviations were calculated. To determine differences in perceived and actual knowledge over time, dependent t-tests were performed comparing pre-presentation and post-presentation surveys as well as the post-presentation and follow up surveys.

*Slide 7*

All told, 31 credentialed athletic trainers completed the initial survey, 19 watched the presentation and completed the post-presentation survey, and 8 responded to the one-month follow up survey. When performing any form of study that involves a follow up after a period of time, it is difficult to retain your participant population. We would have liked to see a higher number of participants at the one-month follow up, but we were still able to gather valuable information from the data we did collect.

*Slide 8*

The majority of participants had obtained their cupping therapy education through peer-to-peer teaching as well as personal experiences such as reading articles or searching the internet. So, these athletic trainers were either being taught in the clinic by fellow athletic trainers, or watching videos on the internet to learn how to perform this treatment. This happens with a lot of skills and knowledge in athletic training that are not considered foundational. If an athletic trainer wants to learn about them, chances are they will have to seek out some of that information from a colleague or an electronic source. Among the athletic trainers that completed the entire study, there did appear to be an increase in the usage of cupping therapy at the one-month follow

up. However, the small sample size that completed the study made it difficult to form a conclusive statement. That being said, we did find information that suggested an intent to increase usage that we will discuss later on.

*Slide 9*

Among the athletic trainers that watched the presentation and completed the post-presentation survey, all agreed that the speaker was knowledgeable about cupping therapy and effective at delivering information. They also all agreed that they learned more about cupping therapy from the presentation, and all but one stated they were more likely to use cupping therapy in their clinical practice following the presentation. Based off this, it is reasonable to say that the presentation was well-received and the participants enjoyed it. It was also effective at getting individuals interested in using cupping therapy in their clinical practice.

*Slide 10*

From a perceived knowledge standpoint, which we can also think of as confidence, participants increased in perceived knowledge at the post-presentation and remained higher at the one-month follow up check points, with the improvement from pre to post-presentation being statistically significant. The lack of change between the post-presentation and follow up surveys suggested that the improvement was retained for at least one month. From this, we can see that the participants' confidence in the answers they were providing on cupping therapy improved. Any chance you get to improve a clinician's confidence in their abilities, it is a worthwhile thing to do.

For actual knowledge, it is important to note that the highest possible score was a 22. At baseline, participants averaged a 19.5. This means the average for the group would have been over 88.5% if this was a quiz or exam in a course. As such, there was little room for a large improvement in actual knowledge. These participants also had an average of over 10 years of experience, meaning that these were experienced and established clinicians who were answering these questions.

*Slide 11*

In conclusion, this virtual continuing education presentation resulted in a significant improvement in perceived knowledge, or confidence, related to cupping therapy. The presentation and presenter were also well received by the participants and seemed to be effective at prompting them to apply their knowledge in clinical practice. This appears to be the first study

to demonstrate these improvements. Furthermore, the increase in perceived knowledge was retained for at least one-month.

*Slide 12*

These findings were consistent with previous research conducted in other professions and highlight the need for future research as virtual continuing education becomes an increasingly popular method of continuing education. I also plan to use the feedback gathered to further improve the presentation on cupping therapy, so that it can be delivered to other athletic trainers and athletic training students. Future studies might attempt to use samples that do not have such high levels of actual knowledge. Future research should also work to develop and validate a method of measuring retention of knowledge following continuing education presentations.

If you find yourself in a position to give a virtual continuing education presentation, I would encourage it. This has certainly been a learning experience for me and has given me a deeper appreciation for the amount of forethought that goes into a virtual presentation. Try to keep in mind that you will need to engage your target population as much as possible since they will not be in the same room as you, and make sure that you do not deliver your presentation with any less energy than you would if it was in-person. It is also important to keep in mind the audience you are presenting to. Make sure you are using relevant language, and exploring techniques to remain engaging for the people you are presenting for. Lastly, if you are presenting on a clinical skill, make liberal use of videos and scenarios to provide your attendees with the clearest picture possible.

*Slides 13 & 14*

At this time, I will be happy to take any questions any of you might have.”

### CHAPTER III: ACTION PLAN

The first step will be for the investigator to submit and deliver the presentation outlined in Chapter II. Ideally, this will take place at the Southwest Athletic Trainers' Association Annual Symposium during the Free Communications Program. After this presentation, previously established professional connections provide opportunities to present the findings at the local level, state, and district levels. Some of the conferences are the South Padre Athletic Training Seminar, Arizona Athletic Trainers' Association Annual Symposium, Louisiana Athletic Trainers' Association Annual Meeting, and the East Texas Athletic Trainers' Workshop. Often times, athletic trainers are unable to attend multiples conferences a year, so presenting at multiple conferences there is a better opportunity to reach different athletic trainers. By presenting at this information at multiple conferences, the hope is to reach as many presenters and future presenters as possible. In the short term, presenting my initial finding at as many conferences as possible would hopefully provide a chance to reach other educators who engage in professional development speaking opportunities.

In general, these professional conferences would be more likely to be interested in offering the presentation on best practices for cupping therapy in athletic training. Ultimately, this would also be worthwhile knowledge to disseminate within the profession, but would not address the findings on delivering an effective continuing education presentation. While these conferences would allow some of the findings to be disseminated to a section of the athletic training population, the investigator would also submit findings on developing an effective continuing education presentation to the National Association of Kinesiology in Higher Education Annual Conference (NAKHE), and the NATA Athletic Training Educators' Conference (ATEC). The NAKHE and ATEC meetings would provide the investigator with the opportunity to present these findings targeted to athletic training and kinesiology educators. Ideally, this will lead to the educators in attendance applying what they learn from this presentation to future continuing education presentations that they prepare.

From a long-term perspective, the investigator would seek out ways to use the information gathered on developing an effective continuing education event to assist future presenters. One method of doing so would be developing a document to serve as a guide for creating a continuing education presentation. This guide would potentially be distributed through

the Southwest Athletic Trainers' Association (SWATA) Free Communications and Research Committee so that members of the organization would have access to it. A resource such as this would have the potential to help improve the quality and effectiveness of continuing education presentations offered at the SWATA Annual Symposium, and thus encourage athletic trainers to seek out their continuing education units through the medium of face-to-face presentations.

The investigator would also seek to conduct further research on continuing education interventions. This research may include using sample populations with a lower base knowledge on cupping therapy, or selecting an intervention that fewer subjects have a high level of knowledge on. This would allow the investigator to draw further conclusions regarding actual knowledge transfer, and therefore add to the programming being delivered to educators on creating effective continuing education presentations. As more information and data is gathered, a training module or program will be developed for presenters and continuing educators to facilitate these more effective presentations.

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## APPENDIX A: BEST PRACTICES IN CUPPING THERAPY PRESENTATION OUTLINE

- Introduction
  - What is cupping therapy?
    - Ancient modality
    - Utilizes suction to provide therapeutic benefits
  - History of Cupping
    - Documented as early as
      - 3300 BC Macedonia
      - 1550 BC Egypt
      - 28 AD China
  - Eastern vs. Western Medicine
    - Graphic
  - Proposed effects
    - Eastern Medicine
      - Treats general medical conditions
      - Removes impurities from the blood.
      - Incorporates blood letting
    - Western Medicine
      - Used for treating musculoskeletal conditions
      - Acts on muscle and fascia
      - Does not incorporate blood letting
- PICO Question
  - P(atients) = Patients with muscular pain
  - I(ntervention) = Cupping therapy
  - C(omparison) = Conventional treatment
  - O(utcome) = Decrease pain intensity
- Best Available Evidence
  - Indications
    - Muscular Pain
    - Muscle Stiffness
    - Decreased Range of Motion
    - Decreased Perceived Function
  - Contraindications
    - Pregnancy
    - Neurovascular Conditions
    - Open Wounds
    - Cancer
  - Treatment Parameters
    - Length of Treatment
    - Size of Cup
    - Number of Cups
    - Amount of Suction
    - Location of Cups
  - Bridgett et al., 2018
    - Systematic review on the use of cupping therapy on athletic populations.

- Authors were unable to reach a conclusion regarding a consensus statement due to the lack of studies on athletic populations.
    - Authors called for an increase in the number of studies on athletic populations that also utilized standardized methodology.
  - Cage et al., 2019a
    - Agreed with Bridgett et al's previous assertions.
    - Set out to create a clinical experts statement in place of research driven consensus statement.
    - List out the most relevant recommendations.
- Methods of cupping therapy
  - Plastic pump cups
  - Glass fire cups
  - Silicone cups
- Brief anecdotes
  - Pitchers throwing with silicone cups
- Conclusions
  - Cupping is a safe and effective modality for treating muscular pain.
  - Cupping therapy is a relatively low economic impact treatment technique.
    - Most supplies are reusable.
  - Advanced training in cupping therapy is encouraged.
- References
- Questions

## APPENDIX B: PRESENTATION SURVEYS

### Pre-Presentation Survey

The following section is designed to gather demographic information. Please answer the following questions.

1. Please list the last four digits of your phone number, followed by your first initial (ex. 0317A): \_\_\_\_\_
2. Age (to the nearest year): \_\_\_\_\_
3. Gender: \_\_\_\_\_
4. Race/Ethnicity:
  - a. White
  - b. Black or African American
  - c. Hispanic, Latino, or Spanish
  - d. Asian
  - e. Native Hawaiian or other Pacific Islander
  - f. American Indian or Alaska Native
  - g. Other: \_\_\_\_\_
5. Years credentialed as an athletic trainer (to the nearest year, including the current year as a full year): \_\_\_\_\_
6. Highest level of education completed:
  - a. Bachelor's degree
  - b. Master's degree
  - c. Clinical doctorate (i.e. DAT)
  - d. Academic doctorate (i.e. PhD, EdD)
  - e. Other: \_\_\_\_\_
7. Current primary clinical setting:
  - a. Secondary School
  - b. College/University
  - c. Clinic/Hospital
  - d. Professional Sports
  - e. Emerging Setting (i.e. Military, Industrial, Public Safety)
  - f. Other: \_\_\_\_\_
8. Have you received instruction in cupping therapy in any of the following settings? Please select all that apply.
  - a. Formal undergraduate coursework
  - b. Formal graduate coursework
  - c. Continuing education course through a cupping therapy company or organization

- d. Continuing education lecture at a state, district, or national conference
- e. Continuing education lab/skill practice at a state, district, or national conference
- f. Other clinicians or peer-to-peer teaching of the skill
- g. Personal experiences (reading articles, searching the internet)
- h. Watching video instruction (YouTube, DVDs, etc.) of others performing the skill

The following questions are designed to assess your current usage and perceptions of using cupping therapy in clinical practice.

9. On average how often do you perform cupping therapy on a weekly basis? **If answered A, question 10. If any other answer, question 11.**
- a. Never
  - b. Rarely (Less than once a week)
  - c. Seldom (1-3 patient encounters)
  - d. Occasionally (4-6 patient encounters)
  - e. Frequently (7+ patient encounters)
10. I have considered using cupping therapy in my clinical practice.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
11. If applicable, which type of cupping therapy equipment do you use? Please select all that apply.
- a. Plastic pump cups
  - b. Glass fire cups
  - c. Silicone cups
12. I am concerned about the potential for discoloration at the treatment site when using cupping therapy.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
13. I am concerned about the cost associated with using cupping therapy in my clinical setting.
- a. Strongly Agree

- b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
14. I am concerned about doing cupping therapy because I do not believe there is enough evidence supporting its use.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
15. I can accurately explain the modes of action for cupping therapy.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
16. I can accurately list the indications and contraindications for cupping therapy.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
17. I believe the currently available evidence supports the use of cupping therapy in athletic training clinical practice.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
18. I can explain how to set up a cupping therapy treatment using plastic pump cups.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree

- e. Disagree
  - f. Strongly Disagree
19. I can explain how to set up a cupping therapy treatment using glass fire cups.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
20. I can explain how to set up a cupping therapy treatment using silicone cups.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
21. Around my colleagues, I am considered knowledgeable about cupping therapy.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
22. I am skilled and proficient in the application of cupping therapy.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
23. I am likely to pursue continuing education to improve my knowledge and skills about cupping therapy.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
24. I am able to describe the physical sensation or patient experience of cupping therapy to a new patient.

- a. Strongly Agree
- b. Agree
- c. Somewhat Agree
- d. Somewhat Disagree
- e. Disagree
- f. Strongly Disagree

The following questions are designed to assess your knowledge of using cupping therapy in clinical practice. Please answer the following questions to the best of your ability.

- 25. What type of cupping is being performed in this picture?
  - a. Pneumatic/pump cupping
  - b. Baguanfa/silicone cupping
  - c. Fire cupping
  - d. Wet cupping
- 26. What type of cupping is being performed in this picture?
  - a. Pneumatic/pump cupping
  - b. Baguanfa/silicone cupping
  - c. Fire cupping
  - d. Wet cupping
- 27. What type of cupping is being performed in this picture?
  - a. Pneumatic/pump cupping
  - b. Baguanfa/silicone cupping
  - c. Fire cupping
  - d. Wet cupping
- 28. What type of cupping is being performed in this picture?
  - a. Pneumatic/pump cupping
  - b. Baguanfa/silicone cupping
  - c. Fire cupping
  - d. Wet cupping
- 29. True/False: Cupping therapy has been used for over 2,000 years.
- 30. True/False: Cupping therapy uses compression as its mode of action.
- 31. True/False: Cupping therapy has been found in recorded history in cultures such as China, Egypt, and Macedonia.
- 32. True/False: Cupping therapy requires blood letting to be effective.
- 33. True/False: Cupping therapy has no reported severe adverse effects.
- 34. True/False: Cupping therapy must be uncomfortable to achieve therapeutic effects.
- 35. True/False: Cupping therapy has been shown in literature to decrease muscular pain.
- 36. True/False: Cupping therapy must leave a bruise in order to be effective.

37. Yes/No: Diabetic neuropathy is an indication for cupping therapy.
38. Yes/No: Chronic, non-specific low back pain is an indication for cupping therapy.
39. Yes/No: Non-pathological hamstring tightness is an indication for cupping therapy.
40. Yes/No: Osteosarcoma is an indication for cupping therapy.
41. Yes/No: Respiratory distress is an indication for cupping therapy.
42. Yes/No: Achilles tendinopathy is an indication for cupping therapy.
43. Yes/No: Decreased glenohumeral external rotation due to delayed onset muscle soreness is an indication for cupping therapy.
44. Yes/No: Lesion exhibiting signs of delayed healing is an indication for cupping therapy.
45. You are scheduled to provide treatments for a patient that is recovering from a hamstring strain. In the medical documentation, a clinician on the care team for the patient states in the previous daily note they are scheduled for cupping therapy. Which of the following would be the most appropriate intervention time for this patient?
  - a. 15-minutes
  - b. 45-minutes
  - c. 60-minutes
  - d. 90-minutes
46. When treating a patient with plastic/pump cups for the first time, how many pumps should be used to draw air from the cup when using a pneumatic/vacuum pump?
  - a. 1
  - b. 2
  - c. 3
  - d. 4

## Post-Presentation Survey

The following questions are designed to assess your experience with today's presentation. Please answer the questions below to the best of your ability.

1. Please list the last four digits of your phone number, followed by your first initial (ex. 0317A): \_\_\_\_\_
2. How would rate this presentation overall?
  - a. Excellent
  - b. Good
  - c. Average
  - d. Poor
  - e. Very Poor
3. The speaker was knowledgeable on cupping therapy.
  - a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
4. The speaker was effective in delivering information.
  - a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
5. I learned more about cupping therapy from this presentation.
  - a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
6. Following this continuing education intervention, I am MORE likely to use cupping therapy in my athletic training clinical practice.
  - a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree

f. Strongly Disagree

The following questions are designed to assess your current usage and perceptions of using cupping therapy in clinical practice.

7. I am concerned about the potential for discoloration at the treatment site when using cupping therapy.
  - a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
8. I am concerned about the cost associated with using cupping therapy in my clinical setting.
  - a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
9. I am concerned about doing cupping therapy because I do not believe there is enough evidence supporting its use.
  - a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
10. I can accurately explain the modes of action for cupping therapy.
  - a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
11. I can accurately list the indications and contraindications for cupping therapy.
  - g. Strongly Agree
  - h. Agree
  - i. Somewhat Agree
  - j. Somewhat Disagree

- k. Disagree
  - l. Strongly Disagree
12. I believe the currently available evidence supports the use of cupping therapy in athletic training clinical practice.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
13. I can explain how to set up a cupping therapy treatment using plastic pump cups.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
14. I can explain how to set up a cupping therapy treatment using glass fire cups.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
15. I can explain how to set up a cupping therapy treatment using silicone cups.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
16. Around my colleagues, I am considered knowledgeable about cupping therapy.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
17. I am skilled and proficient in the application of cupping therapy.
- a. Strongly Agree

- b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
18. I am likely to pursue continuing education to improve my knowledge and skills about cupping therapy.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
19. I am able to describe the physical sensation or patient experience of cupping therapy to a new patient.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree

The following questions are designed to assess your knowledge of using cupping therapy in clinical practice. Please answer the following questions to the best of your ability.

20. What type of cupping is being performed in this picture?
- a. Pneumatic/pump cupping
  - b. Baguanfa/silicone cupping
  - c. Fire cupping
  - d. Wet cupping
21. What type of cupping is being performed in this picture?
- a. Pneumatic/pump cupping
  - b. Baguanfa/silicone cupping
  - c. Fire cupping
  - d. Wet cupping
22. What type of cupping is being performed in this picture?
- a. Pneumatic/pump cupping
  - b. Baguanfa/silicone cupping
  - c. Fire cupping

- d. Wet cupping
23. What type of cupping is being performed in this picture?
- a. Pneumatic/pump cupping
  - b. Baguanfa/silicone cupping
  - c. Fire cupping
  - d. Wet cupping
24. True/False: Cupping therapy has been used for over 2,000 years.
25. True/False: Cupping therapy uses compression as its mode of action.
26. True/False: Cupping therapy has been found in recorded history in cultures such as China, Egypt, and Macedonia.
27. True/False: Cupping therapy requires blood letting to be effective.
28. True/False: Cupping therapy has no reported severe adverse effects.
29. True/False: Cupping therapy must be uncomfortable to achieve therapeutic effects.
30. True/False: Cupping therapy has been shown in literature to decrease muscular pain.
31. True/False: Cupping therapy must leave a bruise in order to be effective.
32. Yes/No: Diabetic neuropathy is an indication for cupping therapy.
33. Yes/No: Chronic, non-specific low back pain is an indication for cupping therapy.
34. Yes/No: Non-pathological hamstring tightness is an indication for cupping therapy.
35. Yes/No: Osteosarcoma is an indication for cupping therapy.
36. Yes/No: Respiratory distress is an indication for cupping therapy.
37. Yes/No: Achilles tendinopathy is an indication for cupping therapy.
38. Yes/No: Decreased glenohumeral external rotation due to delayed onset muscle soreness is an indication for cupping therapy.
39. Yes/No: Lesion exhibiting signs of delayed healing is an indication for cupping therapy.
40. You are scheduled to provide treatments for a patient that is recovering from a hamstring strain. In the medical documentation, a clinician on the care team for the patient states in the previous daily note they are scheduled for cupping therapy. Which of the following would be the most appropriate intervention time for this patient?
- a. 15-minutes
  - b. 45-minutes
  - c. 60-minutes
  - d. 90-minutes
41. When treating a patient with plastic/pump cups for the first time, how many pumps should be used to draw air from the cup when using a pneumatic/vacuum pump?
- a. 1
  - b. 2
  - c. 3
  - d. 4

42. Why would you use cupping therapy in your athletic training clinical practice?

- a. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

43. Why would you NOT use cupping therapy in your athletic training clinical practice?

- a. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

44. What were the strongest or best parts of the program?

- a. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

45. What were the weakest parts of the program?

- a. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

46. What suggestions do you have for improving the program?

- a. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

47. Please add any other comments you have about the program.

- a. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

48. Please list the 1-2 pieces of information you remember as the most important from last month's lecture.

- a. \_\_\_\_\_  
\_\_\_\_\_

## 1-Month Follow Up Survey

The following questions are designed to assess your usage of cupping therapy since last month's lecture. Please answer them to the best of your abilities.

1. Please list the last four digits of your phone number, followed by your first initial (ex. 0317A): \_\_\_\_\_
2. Have you received, or made plans to receive, formal instruction in cupping therapy since attending last month's lecture? If so, what instruction have/will you receive?
  - a. Yes, \_\_\_\_\_
  - b. No
3. Do you currently perform cupping therapy in your clinical practice?
  - a. Yes
  - b. No
4. If so, on average how often do you perform cupping therapy on a weekly basis?
  - a. Never
  - b. Seldom (1-3 patient encounters)
  - c. Occasionally (4-6 patient encounters)
  - d. Frequently (7+ patient encounters)
5. If applicable, which type of cupping therapy equipment do you use?
  - a. Plastic pump cups
  - b. Glass fire cups
  - c. Silicone cups

The following questions are designed to assess your current usage and perceptions of using cupping therapy in clinical practice.

6. I am concerned about the potential for discoloration at the treatment site when using cupping therapy.
  - a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
7. I am concerned about the cost associated with using cupping therapy in my clinical setting.
  - a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree

8. I am concerned about doing cupping therapy because I do not believe there is enough evidence supporting its use.
  - a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
9. I can accurately explain the modes of action for cupping therapy.
  - a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
10. I can accurately list the indications and contraindications for cupping therapy.
  - m. Strongly Agree
  - n. Agree
  - o. Somewhat Agree
  - p. Somewhat Disagree
  - q. Disagree
  - r. Strongly Disagree
11. I believe the currently available evidence supports the use of cupping therapy in athletic training clinical practice.
  - a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
12. I can explain how to set up a cupping therapy treatment using plastic pump cups.
  - a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
13. I can explain how to set up a cupping therapy treatment using glass fire cups.
  - a. Strongly Agree
  - b. Agree

- c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
14. I can explain how to set up a cupping therapy treatment using silicone cups.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
15. Around my colleagues, I am considered knowledgeable about cupping therapy.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
16. I am skilled and proficient in the application of cupping therapy.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
17. I am likely to pursue continuing education to improve my knowledge and skills about cupping therapy.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree
  - f. Strongly Disagree
18. I am able to describe the physical sensation or patient experience of cupping therapy to a new patient.
- a. Strongly Agree
  - b. Agree
  - c. Somewhat Agree
  - d. Somewhat Disagree
  - e. Disagree

f. Strongly Disagree

The following questions are designed to assess your knowledge of using cupping therapy in clinical practice. Please answer the following questions to the best of your ability.

19. What type of cupping is being performed in this picture?
  - a. Pneumatic/pump cupping
  - b. Baguanfa/silicone cupping
  - c. Fire cupping
  - d. Wet cupping
20. What type of cupping is being performed in this picture?
  - a. Pneumatic/pump cupping
  - b. Baguanfa/silicone cupping
  - c. Fire cupping
  - d. Wet cupping
21. What type of cupping is being performed in this picture?
  - a. Pneumatic/pump cupping
  - b. Baguanfa/silicone cupping
  - c. Fire cupping
  - d. Wet cupping
22. What type of cupping is being performed in this picture?
  - a. Pneumatic/pump cupping
  - b. Baguanfa/silicone cupping
  - c. Fire cupping
  - d. Wet cupping
23. True/False: Cupping therapy has been used for over 2,000 years.
24. True/False: Cupping therapy uses compression as its mode of action.
25. True/False: Cupping therapy has been found in recorded history in cultures such as China, Egypt, and Macedonia.
26. True/False: Cupping therapy requires blood letting to be effective.
27. True/False: Cupping therapy has no reported severe adverse effects.
28. True/False: Cupping therapy must be uncomfortable to achieve therapeutic effects.
29. True/False: Cupping therapy has been shown in literature to decrease muscular pain.
30. True/False: Cupping therapy must leave a bruise in order to be effective.
31. Yes/No: Diabetic neuropathy is an indication for cupping therapy.
32. Yes/No: Chronic, non-specific low back pain is an indication for cupping therapy.
33. Yes/No: Non-pathological hamstring tightness is an indication for cupping therapy.
34. Yes/No: Osteosarcoma is an indication for cupping therapy.
35. Yes/No: Respiratory distress is an indication for cupping therapy.

36. Yes/No: Achilles tendinopathy is an indication for cupping therapy.
37. Yes/No: Decreased glenohumeral external rotation due to delayed onset muscle soreness is an indication for cupping therapy.
38. Yes/No: Lesion exhibiting signs of delayed healing is an indication for cupping therapy.
39. You are scheduled to provide treatments for a patient that is recovering from a hamstring strain. In the medical documentation, a clinician on the care team for the patient states in the previous daily note they are scheduled for cupping therapy. Which of the following would be the most appropriate intervention time for this patient?
- 15-minutes
  - 45-minutes
  - 60-minutes
  - 90-minutes
40. When treating a patient with plastic/pump cups for the first time, how many pumps should be used to draw air from the cup when using a pneumatic/vacuum pump?
- 1
  - 2
  - 3
  - 4
41. Why do you plan to use cupping therapy more frequently in your athletic training clinical practice?
- \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
42. Why do you NOT plan to use cupping therapy more frequently in your athletic training clinical practice?
- \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
43. Please list the 1-2 pieces of information you remember as the most important from last month's lecture.
- \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_

APPENDIX C: PRESENTATION FOR SOUTHWEST ATHLETIC TRAINERS'  
ASSOCIATION



**Impact of a Virtual Educational Presentation on Knowledge and Attitudes Toward Cupping Therapy Among Athletic Trainers**

S. Andrew Cage, MEd, LAT, ATC  
Defense: April 27, 2021 – 10:30  
Committee: Dr. Diane Gill, Dr. Pam Brown, and Dr. Randy Schmitz

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## Background

- Continuing education is a requirement for athletic trainers to maintain certification and licensure (CAATE, 2018)
  - 2-year reporting cycle
  - 50 CEUs → 10 Evidence based practice CEUs
- Lack of research on efficacy of current continuing education offerings (Schellhase et al., 2017; Schellhase et al., 2015; Sandperil, 2012)
- Athletic trainers demonstrate knowledge gaps in multiple areas (Schellhase et al., 2015; Cage et al., 2020a; Cage et al., 2020b).



## Purpose and Aims

- Purpose
  - To assess the effects of an educational presentation on the knowledge and attitudes towards cupping therapy among athletic trainers.
- Aims
  - #1: To determine the effect of a cupping therapy education program in the style of an athletic training continuing education presentation on knowledge and retention over time.
  - #2: To determine the influence of a cupping therapy education program in the style of an athletic training continuing education presentation on the use of cupping therapy in clinical practice.



## Methods

- One-group Pre-post Design
  - Pre-Presentation Survey
  - Recorded Presentation
  - Post Presentation Survey
  - 1-Month Follow Up Survey
- Participants - Credentialed Athletic Trainers
- Recruitment
  - Preceptors from CAATE Accredited Programs
  - Collegiate athletic training staffs
  - Email
  - Snowball recruiting



## Surveys

- Qualtrics electronic surveys
  - Pre-Presentation → 46 items
  - Post Presentation → 48 items
  - 1-Month Follow Up → 43 items
- Demographic section
- Usage of cupping therapy
- Previous education on cupping therapy
- Perceived knowledge
- Actual knowledge
- Opinion on presentation



## Data Analysis—Survey

- SPSS, V26
- Frequencies, means, standard deviations
- Differences in perceived and actual knowledge over time → Dependent t-test



## Results

- Sample size
  - Pre-Survey
    - n = 31
  - Post-Survey
    - n = 19
  - One-Month Follow Up
    - n = 8



## Results

Education Format	Pre-Survey (n=31)	Post-Survey (n=17)	One-Month Follow Up (n=8)
Formal undergraduate coursework	4, 12.9%	3, 17.6%	3, 37.5%
Formal graduate coursework	2, 6.5%	2, 11.8%	2, 25.0%
Continuing education course through a cupping therapy company	7, 22.6%	4, 23.5%	4, 50.0%
Continuing education lecture at conference	10, 32.3%	7, 41.2%	5, 62.5%
Continuing education lab at conference	8, 25.8%	5, 29.4%	4, 50.0%
Peer-to-peer teaching of the skill	23, 74.2%	13, 76.5%	6, 75.0%
Personal experience (reading articles, searching the internet)	21, 67.7%	13, 76.5%	7, 87.5%

Frequency of Usage	Pre-Presentation (n=8)	One-Month Follow Up (n=8)
Never	0, 0.0%	0, 0.0%
Rarely (Less than once a week)	2, 25.0%	0, 0.0%
Seldom (1-3 patient encounters)	3, 37.5%	4, 50%
Occasionally (4-6 patient encounters)	2, 25.0%	3, 37.5%
Frequently (7+ patient encounters)	1, 12.5%	1, 12.5%



## Results

Question	Responses
How would you rate this presentation overall?	Excellent = 13, 62.4% Good = 6, 31.6%
The speaker was knowledgeable on cupping therapy.	Strongly Agree = 15, 79.0% Agree = 4, 21.0%
The speaker was effective in delivering information.	Strongly Agree = 14, 73.7% Agree = 5, 26.3%
I learned more about cupping therapy from this presentation.	Strongly Agree = 9, 47.4% Agree = 8, 42.1% Somewhat Agree = 2, 10.5%
Following this presentation, I am MORE likely to use cupping therapy in my clinical practice.	Strongly Agree = 9, 47.4% Agree = 5, 26.3% Somewhat Agree = 4, 21.1% Somewhat Disagree = 1, 5.3%



## Results

- Perceived knowledge
  - Pre-presentation =  $29.13 \pm 19.40$
  - Post-presentation =  $20.18 \pm 6.11^*$
  - One-month follow up =  $17.25 \pm 6.18$
- Actual knowledge
  - Pre-presentation =  $19.53 \pm 1.94$
  - Post-presentation =  $19.88 \pm 1.62$
  - One-month follow up =  $20.00 \pm 1.85$



## Discussions/Conclusions

- Significant improvement in perceived knowledge after presentation,  $t(16) = 4.31, p < 0.01$
- No significant decrease at one-month follow up,  $t(7) = -0.07, p = 0.943$
- Consistent with findings from previous research  
(Brooks et al., 2020; Fusuif et al., 2020; Jordan et al., 2020)
- Virtual professional development opportunities may be a viable option for knowledge transfer



## Future Directions

- Recreate study using a sampling that does not have the same level of actual knowledge of the chosen topic
- Further research to develop an instrument to measure the retention of knowledge following a continuing education presentation



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UNC GREENSBORO

Thank You!

Questions?

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