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Sports Massage Research Protocols and Industry Standards

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SPORTS MASSAGE RESEARCH PROTOCOLS AND INDUSTRY STANDARDS

by

AMBER R. B. KEST, LMT

A thesis submitted in partial fulfillment of the requirements
for the Honors in the Major Program in Sport and Exercise Science
in the College of Education and Human Performance
and in The Burnett Honors College
at the University of Central Florida
Orlando, FL

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Thesis Chair: Dr. Anna Valdes

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ABSTRACT

The purpose of this study was to determine which MT techniques current licensed massage therapists practicing sports massage are using to treat delayed onset muscle soreness (DOMS) by conducting an anonymous online survey of practicing sports massage therapists. The secondary purpose was to determine if previous sports massage research protocols match current practices in sports massage to treat DOMS. There were 85 anonymous respondents ranging in age from 24 to 74 years with a mean age of 44.5 years. Participants included 55 female (65.5%) and 29 male (34.5%) therapists. Professional experience ranged from 4 years or less to more than 20 years, and the majority reported having training specific to sports massage. Previous research methods have placed an overwhelming emphasis on effleurage and petrissage in the treatment protocols to test the effects of massage on DOMS. However, practicing therapists rely on many more techniques and modalities when giving sports massage treatments for DOMS. On a scale of 1 to 5 respondents rated the importance of effleurage strokes in their sports massage treatment at 3.3, petrissage strokes averaged 3.4, friction 3.3, and tapotement ranked slightly lower with a weighted average of 2.1. Sixty six percent of respondents reported that they use stretching techniques often or always. Myofascial release techniques are used sometimes or often for 65% of the respondents, but fewer utilize manual lymphatic drainage in their sports massage. Additional techniques besides those mentioned in the survey are used by 64% of the respondents.

ACKNOWLEDGMENTS

I cannot express enough thanks to my committee for their support and insight throughout the development of this project. Dr. Anna Valdes, my committee chair, thank you for your guidance, wisdom, and support along the way. Dr. Thomas Fisher, I offer my sincere appreciation for sticking with me and helping me to see this through to the end. Dr. Sherron Roberts, thank you for always being there with a hug and words of encouragement.

Completion of this project could not have been accomplished without the support of my family.

To Kody and Isabel, thank you for allowing me time away from you to research and write. To my youngest daughter, who is due to join us in the fall, thank you for making this an easy pregnancy.

Thanks to my mom, for stepping in as mom when mom's away and enduring countless nights in the "down bed," and to dad for allowing me to steal your wife on each of those nights.

To my in-laws, John and Sally Kest, for the countless times you kept the children when our schedules went awry, I offer my sincere appreciation.

Finally, to my husband, Michael: my love and gratitude. Thank you for graciously providing the means, patience, and encouragement that I needed when I finally decided to pursue an education. My heartfelt thanks.

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CHAPTER ONE: INTRODUCTION

Historically, little interest has surrounded the investigation of the general efficacy of MT techniques or in weighing the effectiveness of one technique over another. However, as massage therapy is beginning to integrate into the stream of conventional biomedicine, MT has gained interest among the research community (Smith 2010). The use of touch as a means to facilitate healing has ancient roots. This is because people seem to intuitively “know” that touch can be helpful in alleviating discomfort. For instance, a bump on the head triggers an immediate and almost involuntary response to put a hand on it. The general acceptance of touch as a healing method is one possible reason that research investigation into the efficacy, effectiveness, and safety of therapeutic massage modalities has largely been neglected in the scientific community. “A 2004 meta-analysis identified only thirty-seven [massage therapy (MT)] studies of sufficient quality for inclusion (p.16),” which speaks to the idea that MT research is in its very early stages (Moyer, 2009).

This growing interest in developing a research infrastructure is a big step toward the overall professionalization of the MT field, but it is not without problems. Massage therapy stems from the paradigm of holism, which aims to treat the whole patient, mind, body, and spirit (Holism). As such, MT does not fit within the confines that are set in biomedical research. The difficulty in conducting research is due to problems in developing a methodology that will produce valid results and that accurately tests MT techniques currently being used in the profession (Cassidy, 2003; Hymel, 2006; Rich, 2002). A common mistake is allowing “an overemphasis on reductionism at the expense of ecological validity and the whole system” (Moyer, 2009, p. 22).

Massage researcher, Christopher Moyer (2009), asserted, “standardized and lab-based MT research must be complemented with studies that more accurately reflect how this form of treatment is delivered in the real world” (p. 21). One article notes that the careful researcher will “ensure that the factors that make [massage therapy] distinct are accounted for in the design of research” (Cassidy, 2003, p. 3). Not doing so would not only hinder the efficacy of the treatment being delivered, but also produce data of little “clinical relevance and applicability” (Cassidy, 2003, p. 3). Cassidy (2003) pointed out that one fundamental difference between biomedicine and massage is that interpersonal communication is limited to “brief contacts” in biomedicine, with the primary emphasis being instead on pharmaceuticals. Conversely, massage focuses on holism, utilizing touch and “direct and immediate communication between patient and practitioner” (pp. 4-5) as its fundamental characteristics.

One of the commonly proclaimed methodological weaknesses in the currently available massage research literature is the lack of standardization among treatment protocols (Cassidy, 2003). The problem with this criticism is two-fold. First, it seems that standardizing all treatment protocols in studies measuring perceived pain would affect the general validity of the data and the external validity of the study. By eliminating major components of the therapy as it is practiced, investigators potentially induce an artificial negative effect on the overall efficacy of the treatment. “Therapists often self-correct and change techniques and modalities as they see fit... Standardized protocols thus form a rigid straitjacket limiting the effectiveness of the intervention, and are invalid by definition of the therapy as it is practiced” (Rich, 2002). Also, it is not possible to formulate a standard treatment protocol for research purposes if no standard has been defined and established by those practicing in the industry. One must first define what a

“standard treatment” is in the practice of any particular modality before it can be used as a “standardized protocol” in research.

Purpose and Significance

The purpose of this study is to determine which MT techniques current licensed massage therapists practicing sports massage are using to treat delayed onset muscle soreness (DOMS) by conducting an anonymous online survey of practicing sports massage therapists. The secondary purpose is to determine if previous sports massage research protocols match current practices in sports massage to treat DOMS. The results of this study may be useful in the formation of “standardized” protocols to increase validity and clinical relevance in future research.

CHAPTER TWO: LITERATURE REVIEW

Very little is truly known about the physiological effects of massage therapy. While many claims have become commonly accepted as truth, most of these claims are not supported by research. Much of the prior research conducted has methodological problems, and often the results are inconclusive. Some of the most frequently touted assertions are that massage can reduce pain, increase blood flow, and speed the removal of waste products; therefore, the following literature review addresses these three assertions: pain, blood flow, and waste removal, as well as, discussing DOMS and DOMS research.

Delayed Onset Muscle Soreness (DOMS)

The primary cause of delayed onset muscle soreness (DOMS) is structural damage, caused by unfamiliar, intense, eccentric exercise (Tiidus, 1997). “Eccentric contractions create more stress, in comparison to concentric exercise, because it recruits a smaller number of motor units for a given exercise” (Olson, 2001, p. 12). This results in a stretching of the sarcomere, or contractile unit of the muscle cell, causing a “misalignment of myofibrils” (Olson, 2001, p. 13). Additionally, damage to the sarcolemma causes a “disruption in the normal permeability of the cellular membrane leading to an increased intracellular calcium concentration” (Olson, 2001, p. 13). The injuries to the contractile elements and cell membrane trigger a regional inflammatory response and subsequently, localized edema. “The breakdown products of injured tissues sensitize nociceptors” (Proske, 2001, p. 339), or pain receptors, causing soreness. DOMS typically presents within 8 to 24 hours post-exercise and peaks at 48 to 72 hours depending on the severity of the structural damage within the muscles. Then symptoms usually diminish within a week.

Physiological Explanations for Pain Reduction

While, the evidence does suggest that massage therapy can be an effective means of reducing perceived pain, the physiological basis for this effect is still only theorized. The 'gate control theory' could explain a short-term reduction in perceived pain after a massage, whereby the sensory stimulation from massage stimulates mechanoreceptors in the skin and sends information up A-beta fibers, large diameter fibers, to the spinal cord. This blocks the pain stimulus, which travels up smaller, slower conducting fibers (Olson, 2001; Prentice, 1999).

Pain control that continues beyond the short-term seems to be due to endogenous pain control mechanisms, namely the 'descending pain suppression mechanism,' whereby the midbrain stimulates the release of endogenous opiates due to cutaneous discomfort caused by vigorous manual therapy. The presence of these inhibitory neurotransmitters in the spinal cord reduces the perception of the painful stimuli (Basbaum, 1978).

Psychological Effects

The psychological impact that a massage therapy treatment has on the athlete should not be overlooked, and in fact could be the most profound and significant effect produced by a MT treatment (Prentice, 1999). Research is beginning to recognize the link between psychosocial characteristics and physiological aspects of pain recognition (Gatchel et al., 2007). "Biopsychosocial proponents suggest that the pain experience does not necessarily result from tissue damage; rather each individual's pain is dependent upon their genetics, history, current mental status, patient expectations, and socio-cultural influences" (Nelson, 2013).

Correspondingly, George and colleagues (2007) found that participants in their DOMS study who demonstrated a high fear of pain also reported higher levels of perceived pain compared to those who had lower anxiety about the possibility of pain. These findings suggest that psychological factors could greatly influence an individual's perception of DOMS symptoms and remedies. One study found that massage stimulated a 16% increase in plasma endorphin concentration, which could explain the perception of wellbeing and reduced pain after a massage treatment even in the studies where the physiological biomarkers to support the process of muscle recovery are missing (Kaada, 1987).

Blood Flow

The currently available literature with regard to the effect MT has on blood flow and waste removal is contradictory in nature and therefore indeterminate. Several experts agree that MT does increase circulation (Prentice, 1999; Skull, 1945). According to Skull (1945), massage stimulates the sympathetic nervous system resulting in vasodilation and subsequently, an increase in the overall flow of blood. Similarly, Prentice (1999) suggested that the mechanical force of massage could have a direct affect on circulation, by “squeezing” the blood vessels and forcing the movement of blood. Additionally, a 2014 study conducted at the University of Illinois found that even a 30 minute local massage treatment produced a systemic effect on blood vessel function. In this study, a 30-minute lower extremity massage improved the flow-mediated dilation (FMD) of the brachial artery, which continued for 48 hours (Franklin).

However, other studies have concluded that blood flow was unaffected by massage therapy treatments. Tiidus and Shoemaker (1997) found no significant increase post-massage in mean blood velocity, whether arterial or venous, as measured by Doppler ultrasound.

Nevertheless, light muscular contractions did produce a significant change. Likewise, Ebel and Wisham (1952) concluded that massage did not effectively increase blood flow during their study which measured muscle temperature and sodium clearance.

Waste Removal

Existing research on the effects of massage on waste removal is inconclusive and only a few studies have been conducted. In fact, it seems only one study has been conducted to assess the effect manual lymphatic drainage (MLD) has on muscle enzymes after exercise, which stated that MLD after exercise caused a significant decrease in serum muscle enzyme levels (Schillinger, 2006). Besides determining the appropriate treatment protocol, another issue in developing a valid methodology is determining which biomarkers to test for after the treatment is delivered. Smith and colleagues found that MT did reduce creatine kinase, but increased cortisol levels (1994). Another study by Crane and colleagues saw a significant reduction in inflammation and an increase in mitochondrial biogenesis, but muscle metabolites (glycogen and lactate) remained unchanged. A 2000 study supported these findings with regard to lactate removal (Hemmings). However, research strongly suggests that muscle lactate levels and hydrogen ion accumulation are not indicative of muscle injury, tissue damage, or DOMS regardless of continued popular belief (Tiidus, 1997).

DOMS Research

The effects of massage therapy on DOMS has only been studied a few times and the results are not conclusive. Generally the findings lean in the direction of supporting massage therapy to treat the perceived pain, but not necessarily to speed the recovery of muscle function. A literature review of MT included two studies performed by Hart and colleagues in 2005 and

Jonhagen (2004), which found no significant decrease in perceived pain in the massage therapy group and one study by Micklewright and colleagues (2013), which determined that soft tissue release actually exacerbates DOMS. However, findings from all of the other studies (Farr et al., 2002; Hilbert, 2003; Jakeman et al., 2010; Mancinelli et al., 2006; 1994; Smith et al., 1994; Zainuddin et al., 2005) showed a significant reduction in perceived pain associated with DOMS, even when no apparent physiological reason was present and muscle function was unchanged. Still, to fairly compare the results of each study is difficult because the methods and treatment protocols vary greatly and are in some cases poorly defined (see figure 1).

The most commonly utilized massage techniques in research treatment protocols are effleurage, or gliding strokes, and petrissage, which are kneading strokes. Few use friction, vibration, tapotement, which is a hacking technique, and myofascial techniques, which consist of slow sustained pressure to reduce connective tissue adhesions. None of the studies used stretching or range of motion techniques in the treatment protocol. Notably none of the studies stated that the massage treatment was given by a “licensed” or “certified” massage therapist. Instead, some claim to have used “experienced,” or “qualified” massage therapists or “masseurs,” with no mention of what made them qualified to perform the treatment protocol. Other studies stated that the treatment was given by certified athletic trainers, physiotherapists, or senior physical therapy students (see Figure 1).

Figure 1: Existing DOMS Research Protocols and Outcomes

Author	year	N	DOMS induction	muscle group	person delivering massage	treatment duration	massage protocol techniques	outcome on perceived soreness
Boguszewski	2014	29	5 sets squat jumps to exhaustion	quadriceps	physiotherapist	10m	effleurage, petrissage, vibration	reduced
Han	2014	21	isotonic exercises	gastrocnemius	physiotherapist	15m	"light stroking, milking," friction, skin rolling	reduced
Jay	2014	22	10 x 10 stiff-legged dead-lift	hamstring	undefined	10m	distal to proximal with roller massager	reduced
Andersen	2013	20	dynamometer eccentric contraction	upper trapezius	"experienced" massage therapist	10m	effleurage, petrissage	reduced
Jakeman	2010	32	10 x 10 drop jumps	quadriceps	"qualified masseur"	30m	not discussed	reduced
Micklewright	2008	20	4 x 20 eccentric contractions at 80% 1 RM	triceps	"qualified" sports massage therapist	n/a	30 soft tissue release compressions	increased
Hart	2005	19	4-5 sets of 35 eccentric contractions at 90% 1RM	triceps surae	certified athletic trainer	5m	effleurage, petrissage	no significant effect
Mancinelli	2005	22	regular pre-season training	"lower extremity"	two "therapists" with 3 years experience	17m	effleurage, petrissage, vibration	reduced
Zainuddin	2005	10	60 maximal eccentric contractions	elbow flexors	"qualified" massage therapist	10m	effleurage, petrissage, friction	reduced
Jonhagen	2004	16	300 maximal eccentric contractions	quadriceps	physical therapist	12m	effleurage, petrissage	no significant effect
Hilbert	2003	18	6 x 10 maximal eccentric contractions	right hamstring	senior physical therapy student	20m	effleurage, petrissage, tapotement	reduced
Farr	2002	8	40 min treadmill walk with 10% BW load	quadriceps, and hamstrings	"trained masseur"	30m	effleurage, petrissage	reduced
Smith	1994	14	4-5 sets of 35 eccentric contractions at 75% 1RM	triceps and biceps	physical therapist	30m	effleurage, petrissage, shaking, wringing, cross-fiber friction	reduced

CHAPTER THREE: METHODS

The purpose of this study is to determine which MT techniques current licensed massage therapists practicing sports massage are using to treat delayed onset muscle soreness (DOMS) by conducting an anonymous online survey of practicing sports massage therapists and to determine if previous sports massage research protocols match current practices in sports massage to treat DOMS. Therefore, in an attempt to identify which MT techniques are being used in practice to treat DOMS, an anonymous online survey was created via surveymonkey.com. The survey included an informed consent and 20 survey questions including non-identifying demographic questions (See Appendix A for Survey). The focus of this survey was to assess the respondents' perception of the relative importance and frequency of use of specific techniques in their post-exercise sports massage treatments. First, I obtained IRB certification through Citiprogram, and then submitted my proposal to the UCF IRB site. Then, upon IRB approval, a link inviting professionals to participate was posted on Facebook pages for licensed massage therapists consisting of approximately 12,000 group members, though it is unclear how many of the members are active on the site. Only responses from those who reported being licensed or certified massage therapists were included. The data from 85 respondents were collected anonymously.

Sample

There were a total of 85 respondents, ranging in age from 24 to 74 years with a mean age of 44.5 years. Participants included 55 female (65.5%) and 29 male (34.5%) therapists. This seems to be a fair representation of the target population, since the ABMP (Associated Bodywork & Massage Professionals) 'massage profession metrics' statistics determined the

average age of licensed massage therapists is 43, and 83% are female. The professional experience of respondents ranged from 4 years or less to more than 20 years (see figure 2). Sports massage curriculum was taught in massage school for 68% of respondents, and 64% of respondents reported having additional training or continuing education in sports massage methods (see Figure 3). The majority (51%) of respondents claimed to treat clients with post-exercise related muscle soreness or DOMS often.

Figure 2: Respondents' Years of Experience

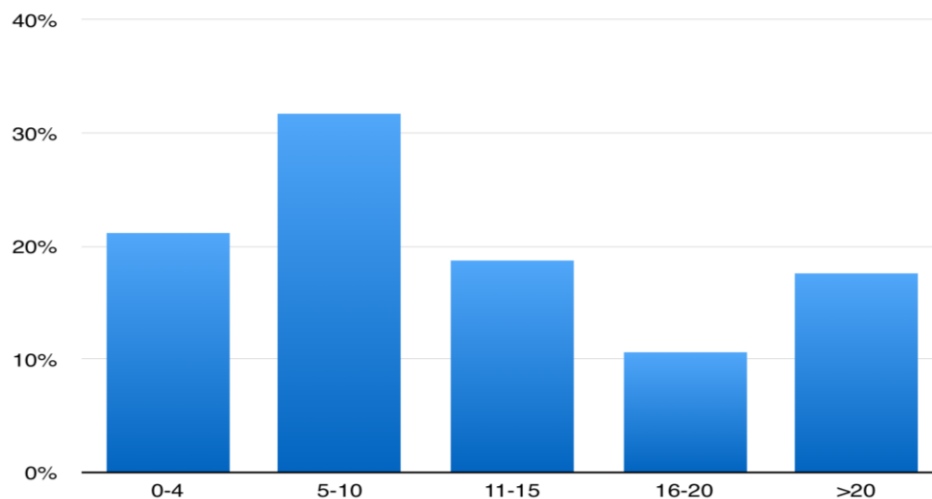
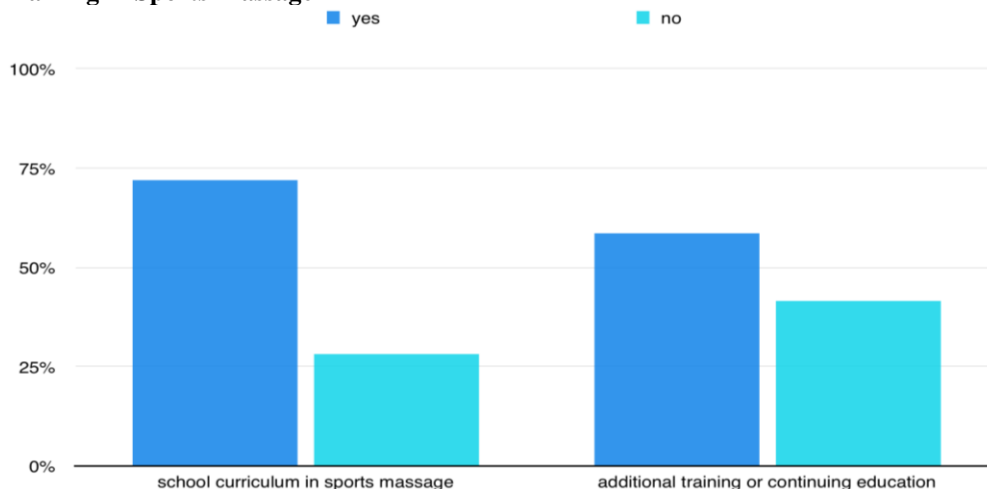


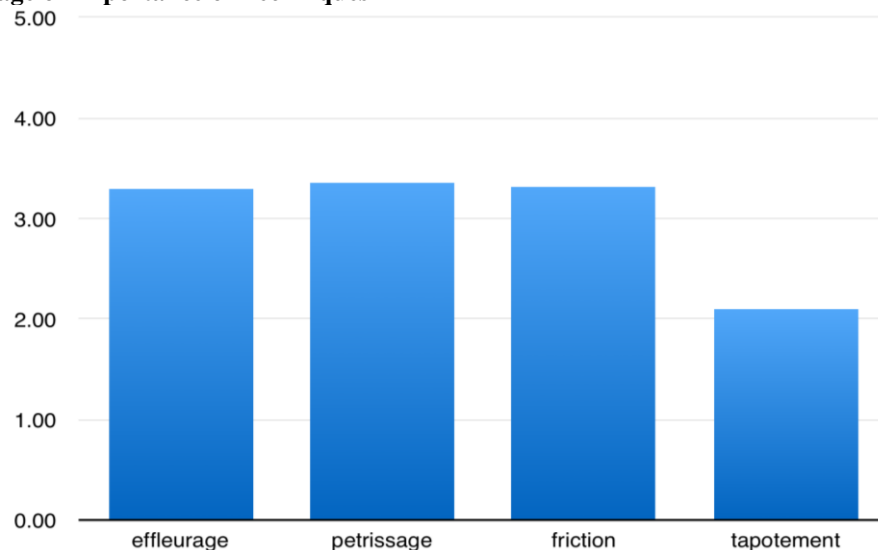
Figure 3: Training in Sports Massage



CHAPTER FOUR: RESULTS

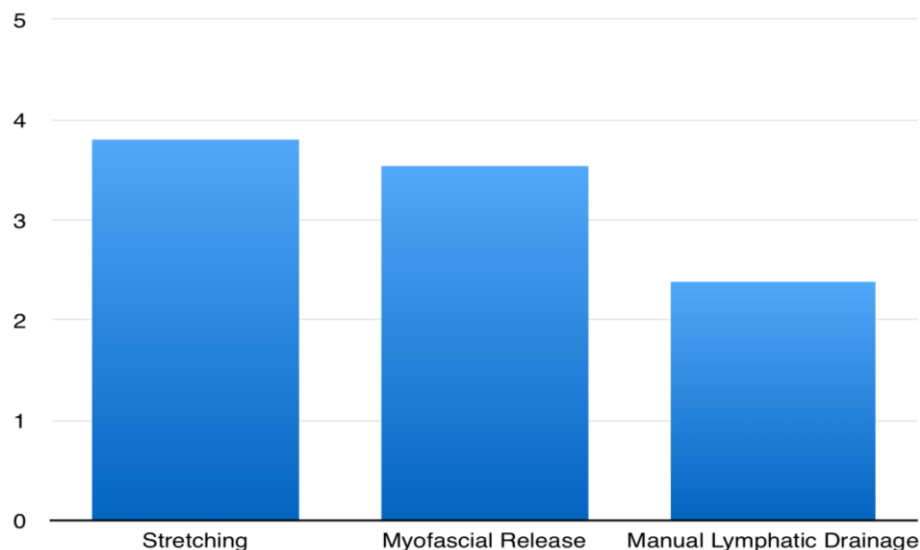
This section discusses the responses as they were reported and addresses them in the order of the survey questions. Most of the respondents (62%) claimed to give massage treatments in response to existing exercise related muscle soreness often. In fact, only 2 of the 85 respondents stated that they rarely or never give treatments in response to existing exercise related muscle soreness. On a scale of 1 to 5 with 1 being not at all important and 5 being essential (actual scale: not at all important, slightly important, important, very important, essential), respondents reported that the use of effleurage strokes in their sports massage treatment was on average 3.3, or important to very important. The importance of the use of petrissage strokes was reported at a weighted average of 3.4, again important to very important. Similarly, the importance of friction was determined to have a weighted average of 3.3, while the importance of tapotement ranked slightly lower with a weighted average of 2.1, or slightly important (see Figure 4).

Figure 4: Average of Importance of Techniques



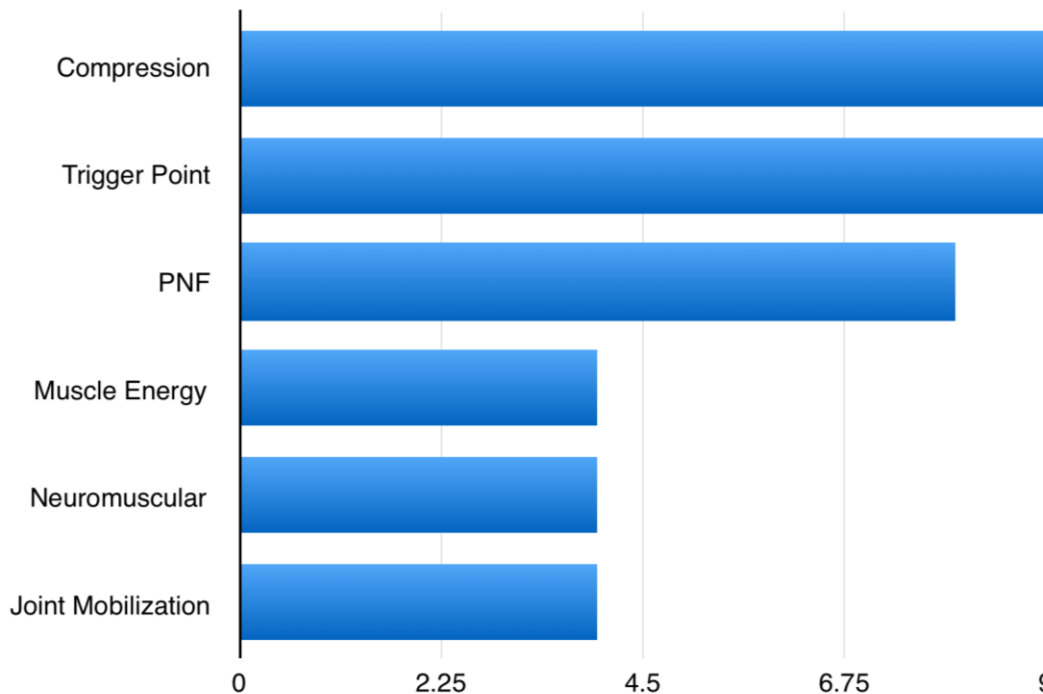
Respondents were then asked a series of questions regarding their frequency of use of stretching techniques, myofascial release techniques, and manual lymphatic drainage when giving a post-activity sports massage. With regard to stretching, 66% reported using stretching techniques often or always during a post-event sports massage, while only 1 respondent claimed to never use stretching techniques. Myofascial release techniques were reported to be used sometimes or often for 65% of the respondents, while 3 stated that they never use myofascial release during a post-event massage. Respondents report that manual lymphatic drainage techniques were used less frequently (29% never, 27% rarely, 25% sometimes, 14% often, and 5% always) (see Figure 5).

Figure 5: Average Frequency of Use of Techniques



Additionally, 64% of the respondents claimed to use other techniques that were not previously mentioned in the survey. The most common of these were compression, trigger point therapy, and proprioceptive neuromuscular facilitation (PNF) (see Figure 6).

Figure 6: Additional Write-in Techniques



Qualitative data

The final question of the survey prompted respondents to report anything else that they would like to share about their sports massage techniques that was not already asked. Two major themes were repeated in these responses. The first is that many therapists think that positive therapist-client communication and a thorough intake, which consists of assessing the clients medical history, goals, and expectations, is key to insuring that the client's needs are met. One respondent stated, "launching into PNF stretching with someone who was only seeking the massage component, irrespective of the benefits, would not result in a happy customer." This idea points back to the psychological aspect of the practice and the link between client expectations and outcomes.

The second common theme in the data is that “sports massage is an application,” not a cookie cutter formula. Sports massage is “the integrated use of various massage therapy strokes,” and the application of those strokes can “range drastically depending on several factors.” Another respondent said, “sports massage techniques should be applied based on physiological effects.” However, most of these effects are currently only theorized with little or no scientific support.

Limitations

It was not possible to compare the respondents’ answers regarding effleurage, petrissage, friction and tapotement to their responses regarding stretching, myofascial release or lymphatic drainage since the first group of questions was asked relative to importance and the second was asked relative to frequency of use. While this research may begin to shed some light on the disconnect between research methods and industry practices, no statistical significance could be determined given the nature of the study.

CHAPTER FIVE: DISCUSSION

Michael McGillicuddy, an expert practitioner and educator in sports massage who was inducted into the massage therapy Hall of Fame, said:

Event sports massage is just a small part of what sports massage is. Sports massage also looks at posture, biomechanics, flexibility, strength, injury prevention, rehabilitation, and how to work on common athletic chronic conditions. The amount of education, knowledge and application of modalities that goes into what a sports massage therapist needs to know takes years to develop (2015).

It is important to remember that the application of sports massage is multifaceted and specific to the needs of each individual client. Each client brings a unique history, perspective, and set of expectations that help to determine their needs and can dramatically influence the treatment outcome. This is precisely why it is difficult, or inappropriate, to develop a completely standard treatment protocol in a study testing the effectiveness of sports massage to treat DOMS.

Implications

The implications of this study are methodological. The hope is that these findings will encourage researchers to broaden the scope of future research to encompass valid effectiveness studies. Then, those future studies could improve our understanding of the effects of MT as it is practiced and result in actual practical implications for practitioners.

Future Research

The profession of massage therapy research is still in its infancy, and it is critical for the future of the profession to continue developing a research infrastructure. However, in order to do so, massage researchers must develop methodologies that appropriately represent the therapy as it is practiced. This thesis sought to determine which techniques licensed massage therapists are

using to treat delayed onset muscle soreness, and to compare those findings to previous sports massage research protocols. By surveying currently practicing therapists about the MT modalities and specific techniques that they are using in real-life practice prior to developing a treatment protocol for research purposes, researchers will be better equipped to formulate a research treatment protocol that increases the external validity of the whole study. Future surveys focusing on only frequency of use or only importance of specific techniques and modalities could assist in better formulating some type of standardized treatment. Then effectiveness studies should then be conducted using these findings to develop a treatment protocol with increased external validity. These effectiveness studies can be complimented by efficacy studies with increased internal validity, which focus on the physiological effects of specific strokes or techniques.

APPENDIX A: IRB APPROVAL LETTER



University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: UCF Institutional Review Board #1
FWA00000351, IRB00001138

To: Anna Sarmiento Valdes and Co-PI: Amber Kest

Date: June 12, 2015

Dear Researcher:

On 06/12/2015, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review:	Exempt Determination
Project Title:	Sports Massage Research Protocols and Industry Standards
Investigator:	Anna Sarmiento Valdes
IRB Number:	SBE-15-11285
Funding Agency:	
Grant Title:	
Research ID:	N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the [Investigator Manual](#).

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

A handwritten signature in black ink, appearing to read "Patria Davis", written over a horizontal line.

Signature applied by Patria Davis on 06/12/2015 10:47:18 AM EDT

IRB Coordinator

APPENDIX B: INFORMED CONSENT



EXPLANATION OF RESEARCH

Title of Project: Sports Massage Research Protocols and Industry Standards

Principal Investigator: Anna Valdes, Ed.D

Other Investigators: Amber Kest, LMT

You are being invited to take part in a research study. Whether you take part is up to you.

- The purpose of this study is to determine which MT techniques current licensed massage therapists practicing sports massage are using to treat or prevent delayed onset muscle soreness (DOMS). The secondary purpose is to determine if previous sports massage research protocols match current practices in sports massage to treat DOMS.
- If you choose to participate in this research, you will be asked to complete an anonymous online survey consisting of survey questions and non-identifying demographic questions. The survey will be no more than 20 questions including demographics. You do not have to answer every question or complete every task.
- We expect that you will need no more than 5 minutes to complete the survey. Once the survey is completed, there are no further expectations or requirements.

You must be 18 years of age or older to take part in this research study.

Study contact for questions about the study or to report a problem: If you have questions, concerns, or complaints: Amber R. Kest, LMT, undergraduate honors student, Sport and Exercise Science, College of Education and Human Performance, (407) 592-6350 or Dr. Anna Valdes, Department of Educational and Human Sciences at (407) 808-8957 or by email at anna.valdes@ucf.edu.

IRB contact about your rights in the study or to report a complaint: Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review Board (UCF IRB). This research has been reviewed and approved by the IRB. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, Office of Research & Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246 or by telephone at (407) 823-2901.

APPENDIX C: SURVEY QUESTIONS

1. Are you a licensed or certified massage therapist?
 2. What is your age?
 3. What is your gender?
 4. Would you say that you give "sports massage" treatments?
 5. Did your massage school training include a curriculum in sports massage?
 6. Have you had additional training/ continuing education specific to sports massage?
 7. How many years of experience do you have practicing massage therapy?
 8. Do you treat clients that have post-exercise activity related muscle soreness?
- Never Rarely Sometimes Often Always
9. Do you give massage treatments as an effort to *prevent the onset* of exercise related muscle soreness? Never Rarely Sometimes Often Always
 10. Do you give massage treatments in *response to existing* exercise related muscle soreness? Never Rarely Sometimes Often Always
 11. How important is the use of effleurage strokes in your sports massage treatment? Not at all important Slightly important Important Very important
 12. How important is the use of petrissage strokes in your sports massage treatment? Not at all important Slightly important Important Very important
 13. How important is the use of friction in your sports massage treatment?
- Not at all important Slightly important Important Very important
14. How important is tapotement in your sports massage treatment?
- Not at all important Slightly important Important Very Important
15. When you give a post-activity sports massage, do you use stretching techniques? Never Rarely Sometimes Often Always
 16. When you give a post-activity sports massage, do you use myofascial release techniques? Never Rarely Sometimes Often Always

17. When you give a post-activity sports massage, do you use manual lymphatic drainage techniques? Never Rarely Sometimes Often Always

18. Do you use other strokes or techniques not previously mentioned?

19. What strokes or techniques do you use that were not previously mentioned.

20. Is there anything else that you would like to share about your sports massage techniques that was not already asked?

Thank you for your help!

I appreciate that you took the time to participate in my survey.

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