CASE SERIES

Immediate Effect of Therapeutic Massage on Pain Sensation and Unpleasantness: A Consecutive Case Series

按摩治疗对痛觉和不愉快感的即刻效果：连续病例系列

Efectos inmediatos del masaje terapéutico en la sensación de dolor y molestia: una serie de casos consecutivos

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ABSTRACT

Background: Musculoskeletal pain is a common condition that poses a significant burden to its sufferers and costs the US economy billions of dollars each year in lost productivity. Individuals complaining of musculoskeletal pain make up a large proportion of clients treated by massage therapists in community practices, yet few studies have examined the immediate effect of therapeutic massage on this type of pain in the practice setting.

Purpose: To assess the immediate effect of therapeutic massage on musculoskeletal pain sensation and unpleasantness in a community setting.

Setting: Solo private practice in central Virginia, United States.

Participants: One hundred sixteen first-time clients who complained of musculoskeletal pain as a presenting symptom.

Research design: Prospective, consecutive practice-based case series.

Intervention: A single 60-minute session of individualized therapeutic massage; techniques used included Swedish massage employing effleurage, petrissage, and friction,;deep tissue; myofascial; positional release; passive and resisted joint mobilization; and biofield modalities.

Main Outcome Measures: Visual Analog Scales for pain sensation and unpleasantness.

Results: Both pain sensation and unpleasantness were significantly reduced by a single session of therapeutic massage. Mean pain sensation decreased from 3.76 (SD=1.87) prior to massage to .89 (SD=1.35) following massage, with t=18.87, P<.001. Mean pain unpleasantness decreased from 5.21 (SD=2.48) prior to massage to .64 (SD=1.23) following massage, with t =20.45, P<.001. Effect sizes were 1.76 and 1.90, respectively.

Conclusions: In this case series, therapeutic massage appeared to be an effective intervention for common musculoskeletal pain that influenced both the physical and affective dimension of the pain experience. Although care was taken to reduce potential bias through limiting eligibility to first time clients and use of a standardized script, practice-based case series have inherent limitations. Issues in conducting practice-based research by massage therapists and recommendations for future research are discussed.

摘要

背景：肌肉骨骼痛是一种常见病，给患者带来显著的负担，并且每年给美国造成价值数十亿美元的生产力损失。在社区诊所接受按摩治疗的患者中，主诉肌肉骨骼疼痛的患者占有很大比例，但只有少数研究检验了实践中用按摩治疗此类疼痛的即刻效果。

目的：评估社区环境中按摩治疗对肌肉骨骼痛觉和不愉快感的即刻效果。

环境：美国弗吉尼亚州中部的独立私人诊所。

参与者：116 名首次就诊，主诉肌肉骨骼疼痛的患者。

研究设计：前瞻性、连续性、基于实践的病例系列。

干预：单次 60 分钟个性化按摩治疗；使用的技术包括瑞典式按摩，采用轻抚法、揉捏法、深度按摩、肌筋膜按摩、姿位松弛、被动和关节活动度受限，以及生物场方式。

主要结果指标：对痛觉和不愉快感进行视觉模拟量表评估

结果：经过单次按摩治疗后，痛觉和不愉快感均明显减弱。痛觉平均值从按摩前的 3.76 (SD=1.87) 减少到按摩后的 0.89 (SD=1.35)，t =18.87，P<0.001。疼痛不愉快感的平均值从按摩前的 5.21 (SD=2.48) 减少到按摩后的 0.64 (SD=1.23)，t =20.45，P<0.001。效应量分别为 1.76 和 1.90。

结论：在此病例系列中，按摩治疗为常见肌肉骨骼痛的有效干预措施，肌肉骨骼痛不仅能影响身体感受，还能影响痛觉的心理感受。虽然通过限制首次就诊患者的资格和使用标准化的手法来减少护理的潜在偏倚，但是以实践为基础的病例系列仍存在固有的局限性。本文还讨论了按摩治疗师开展的基于实践的研究中发现的问题和对日后研究的建议。

SINOPSIS

Antecedentes: el dolor musculoesquelético (artromialgias) es una enfermedad frecuente que supone una carga importante para los pacientes que la padecen y el coste para la economía estadounidense es de miles de millones de dólares al año en pérdida de productividad. Las personas que se quejan de dolor musculoesquelético constituyen un gran porcentaje de los clientes tratados por fisioterapeutas en prácticas comunitarias, sin embargo pocos estudios han examinado los efectos inmediatos del masaje terapéutico en este tipo de dolor en la práctica clínica.

Propósito: evaluar los efectos inmediatos del masaje terapéutico en la sensación de dolor y molestia musculoesqueléticos en un entorno comunitario.

Entorno: consulta privada independiente en Virginia central, Estados Unidos.

Participantes: ciento dieciséis nuevos clientes que se quejaban de dolor musculoesquelético como síntoma principal.
Diseño de la investigación: serie de casos prospectivos, consecutivos y basados en la práctica.
Intervención: una única sesión de 60 minutos de masaje terapéutico individualizado; las técnicas utilizadas incluyeron un masaje sueco que empleó effleurage (masaje con las yemas de los dedos), petrissage (amasado), fricción, masaje profundo de tejidos, miofascial, relajación postural, movilización articular pasiva y resistida, y modalidades biocampo.
Criterios de valoración principales: escalas visuales analógicas para la sensación de dolor y molestia.
Resultados: la sensación de dolor y molestia disminuyó considerablemente mediante una única sesión de masaje terapéutico. La puntuación promedio correspondiente a la sensación de dolor disminuyó de 3,76 (DE = 1,87) antes del masaje a 0,89 (DE = 1,35) después del masaje, con t = 18,87, P < 0,001. La puntuación promedio correspondiente a la molestia inducida por el dolor disminuyó de 5,21 (DE = 2,48) antes del masaje a 0,64 (DE = 1,23) después del masaje, con t = 20,45, P < 0,001. Las magnitudes de efecto fueron de 1,76 y 1,90, respectivamente.
Conclusiones: en esta serie de casos, el masaje terapéutico pareció ser una intervención eficaz para el dolor muscoloesquelético habitual que influyó tanto en la dimensión física como en la afectiva de la experiencia del dolor. Aunque se tuvo especial cuidado de reducir el posible sesgo mediante la limitación de la idoneidad para los nuevos clientes y el uso de un guion estandarizado, la serie de casos basados en la práctica tiene limitaciones inherentes. Se analizan cuestiones relacionadas con la realización de investigaciones basadas en la práctica por fisioterapeutas y recomendaciones para futuras investigaciones.

INTRODUCTION

Musculoskeletal pain affects 1 in 5 adults[1] and costs an estimated $61.2 billion (USD) annually in lost productivity.[2] Musculoskeletal conditions are among the most common causes of severe long-term pain and physical disability, affecting hundreds of millions of people around the world.[3] Pain is a multidimensional experience that impacts all aspects of a person's life through limiting activities of daily living and affecting mobility and performance and is often associated with subsequent changes in mood, such as depression and anxiety. It is also one of the conditions most frequently treated by massage therapists.[4] Yet few studies have assessed the immediate effectiveness of therapeutic massage in a community-based practice setting for relieving this common health problem.

Previous studies on massage and pain have typically used tightly controlled clinical trial designs focusing on a single type of pain, such as acute or chronic pain within a specific region where pain is experienced, including subacute low back pain,[5] mechanical neck pain,[6] and other types of pain such as pain following surgery[7] or cancer.[8] To test efficacy using the controlled trial design, narrowly defined populations and highly standardized interventions are often used, and these are appropriate to answer the research question of whether an active intervention works better than an inactive intervention. However, controlled trials are often not generalizable, and highly standardized massage protocols bear little resemblance to the way that massage therapy is defined and practiced day-to-day by knowledgeable and experienced therapists.

In the current economic climate, recent studies on massage and pain have emphasized the duration of observed benefits, such as Cherkin and colleagues' well-designed comparative effectiveness trial comparing 2 types of individualized massage for treating chronic low back pain, which assessed pain at baseline and then again at 10, 26, and 52 weeks.[9] Both longer-term and more immediate effects of therapeutic massage are of interest to consumers, who, with few exceptions, generally pay out of pocket for massage therapy services. A previous meta-analysis on massage effects[10] across various conditions reported no immediate reduction in pain following massage. This is a surprising conclusion in light of the results of a recent national consumer survey, where pain relief was cited by 54% of respondents as a primary reason for seeking massage therapy and 92% considered massage to be effective in reducing pain.[11] To provide an additional perspective to this question, the current observational study examined the immediate effect of therapeutic massage across a sample of clients in a community-based private practice presenting with a complaint of common musculoskeletal pain.

METHODS

Participants

Over a 4-year period, every first time client (n=116) who presented with musculoskeletal pain as their primary complaint during the initial intake was considered eligible to participate. It is standard in this practice to routinely assess clients for pain sensation and unpleasantness using a visual analog scale (VAS) as part of their normal intake interview and again following the massage session as part of any future treatment planning. To reduce potential response bias, only new clients without a previous therapeutic relationship with the treating therapist were eligible for inclusion. Because this case series relied on routinely collected information, no formal institutional review board review was required; however, the same principles to protect the rights of participants were applied: for example, clients were offered the option to refuse participation without penalty. Clients were informed that information gathered during the intake and treatment session would be aggregated and summarized anonymously for research purposes and were asked to give written permission for such use, with the option of

declining to have their information included clearly stated. No client declined to participate.

Outcome Measure

The VAS is a widely used and well-accepted measure of pain. It is often used as a global measure of pain intensity, but can also be used to assess physical pain sensation and affective pain unpleasantness separately.[12] In this study, the treating therapist chose to use a printed paper VAS to quickly assess both the physical and affective dimensions of the client's pain, reduce client burden, and provide more time during the intake to discuss the client's treatment goals. The VAS was printed on each side of a single sheet of paper, attached to the intake form, with one side labeled "Initial Pain Rating" at the top of the page and the other side labeled "Post-treatment Pain Rating." Each side had the same 2 scales, 1 titled Pain Sensation and below it a second, identical scale titled Pain Unpleasantness. Each scale consisted of a 10 centimeter line, marked in increments of 1 centimeter and with the endpoints labeled 0 (none) and 10 (worst it could be). Higher scores indicate more pain sensation or unpleasantness, while lower scores indicate less. Marks made on one side of the paper could not be seen from the reverse side.

Procedures and Intervention

During the intake interview, the concepts of pain sensation and unpleasantness and the differences between them were explained using a script so that each client heard the same explanation presented the same way. Pain sensation was described as the sensation felt physically when hitting one's shin against a hard object after having had a good day, with several consistent examples of emotionally positive experiences. Pain unpleasantness was described as how much the same pain sensation would bother or distress you after having already had a bad day, again with several consistent examples of emotionally negative experiences. Clients were asked to rate their current level of pain using a separate VAS for pain sensation and for pain unpleasantness before the massage and were told that they would be asked to repeat the process following the session, to see whether the massage treatment was helpful for them or not. As is common in many private practice massage therapy offices, the treating therapist was also responsible for collecting the pain ratings, together with all intake information. The pain ratings were framed in a neutral, “Let’s see” manner as a standard form of assessment.

The massage treatment was individualized to each client; however, the duration of the massage was standardized to 60 minutes. The treating therapist had more than 20 years of clinical experience, a background in clinical psychology and pain management, and employed a variety of techniques from a menu that included Swedish massage, focused deep tissue work on specific muscles, myofascial release, positional release, passive and resisted joint mobilization, and biofield modalities. An individualized treatment was created based on the client's preference and pain tolerance, the therapist’s clinical judgment, and client feedback during the session. An individualized treatment that blends multiple techniques is common among experienced therapists and is employed to maximize treatment effectiveness as part of a patient or client-centered care plan.[13] Following the session, clients again rated their current level of pain sensation and unpleasantness using the VAS to evaluate the effectiveness of the intervention in meeting the client's therapeutic goal and for any future treatment planning.

Analysis

Demographic data were summarized using descriptive statistics. Mean pain scores before and after massage were compared using paired *t*-tests. Data analysis was performed using Excel (Microsoft Corp, Redmond, Washington).

RESULTS

Ninety-four women and twenty-two men ranging in age from 18 to 86 years participated. Their average age was 42 years (SD=13.89 y), with a median age of 41 years. Most participants (95%) were white, with 3 Asian, 1 African-American, and 1 Hispanic/Latino. Ninety-six participants reported previous experience with massage. The majority of clients complained of musculoskeletal back pain (n=53), neck and upper shoulder pain (n=27), followed by pain in one or both shoulders (n=17), with pain duration generally lasting less than 3 months. Demographic characteristics of participants are presented in Table 1.

Mean pain sensation decreased from 3.76 (sd 1.87) prior to massage to .89 (SD=1.35) following massage, with t=18.87, P<.001. Mean pain unpleasantness decreased from 5.21 (SD=2.48) prior to massage to .64 (SD=1.23) following massage, with t=20.45, P<.001. Effect sizes were 1.76 and 1.90, respectively. Results of the paired *t*-tests are shown in Table 2.

DISCUSSION

The impetus for conducting this study developed from the lack of congruence between the meta-analysis previously cited and other published research, combined with a desire to investigate the question within the capacity of an individual provider with research expertise conducting practice-based research in a community setting. All of the 8 studies included in that meta-analysis measured pain with a global VAS that did not differentiate between pain sensation and unpleasantness and may have failed to capture the affective dimension of pain. That result is surprising when considered in light of the same meta-analysis’ reported 64% reduction in state anxiety following a single massage. The role of anxiety in negatively influencing the perception of pain has been well documented[14] and reduction of anxiety is one of the most consistent effects attributed to massage therapy across multiple studies.[10]

Table 1 Participant Characteristics

1a. Demographic Characteristics (N=116)		
Mean age, y	42	(±13.89)
History of previous massage	96	(82.7%)
Male	22	(18.9%)
Female	94	(81.1%)
White	111	(95.7%)
Asian	3	(2.7%)
African-American	1	(<1%)
Hispanic/Latino	1	(<1%)
Total	116	
1b. Location of pain		
Back pain	53	(46.7%)
Neck & upper shoulder pain	27	(23.3%)
Pain in one or both shoulders	15	(13%)
Low back/gluteal area	9	(7.7%)
Head/jaw	4	(3.4%)
Other (legs, wrist)	8	(6.8%)
Total	116	

Total percentage does not equal 100 due to rounding.

In this instance, the results are both statistically and clinically meaningful, particularly the substantial reduction in pain unpleasantness. Current management of pain conditions is beginning to focus less on the complete elimination of pain and more on increasing function.[15-16] Given the current epidemic of chronic pain in the United States,[16] massage therapy may be an especially useful tool in integrative pain management approaches for its ability to reduce both pain sensation and unpleasantness, which could improve functional outcomes while also reducing affective suffering. For example, as part of a comprehensive program of care massage could be employed just prior to physical activity—a person experiencing less pain and improved mood immediately following massage might then be more motivated and willing to engage in exercise.

Massage therapy, as defined by its practitioners, is a complex intervention that employs multiple modalities, incorporates therapeutic relationship and patient education as an essential aspect of the therapy, and is grounded in the biopsychosocial model, wherein clients are viewed as active participants in their own care rather than passive recipients.[17] It is possible that massage may reduce both pain sensation and unpleasantness through psychophysiological mechanisms that operate on multiple physiological and cognitive levels—both "top-down" and "bottom-up." For example, Rapaport and colleagues demonstrated changes in neurohormone levels following a single massage[18] and a different pattern of neurohormonal changes with repeated sessions of massage.[19] This pattern of results also suggests that learning or a conditioned response may play a role in the individual client's response to massage therapy over time.

Limitations of the Study

Case series have inherent limitations, such as the lack of a comparison group noted previously. In particular, selection bias can be an issue in retrospective case series. To reduce selection bias, this study employed a prospective design and consecutive sampling strategy, with strict eligibility criteria to reduce the influence of any prior therapeutic relationship. Social desirability is also an issue when the same person who provides the treatment also collects the data. While having a separate person collect the pain rating data might have reduced the potential for social desirability bias, it could have been perceived as obtrusive in this setting and perhaps called attention to the fact that something other than ordinary clinical practice was occurring. Most participants in this case series had previously experienced massage, so it is possible that they were predisposed to view massage therapy positively and such a predisposition could have inflated their self-reported ratings. At the same time, one could argue that because these participants were experienced consumers and were paying the full cost of the massage therapy session out of pocket, they may have been more discerning and had more exacting expectations.

While the sample size was adequately powered to detect a clinically meaningful difference, the results may not be generalizable beyond the participants' most common demographic. The practice pattern described here is comparable in terms of client demographics and treatment approach to that reported in a larger study.[4] It is also possible that the experience of the therapist and individual interpersonal and communication skills played a role in achieving these results. A less experienced therapist with a more limited repertoire of therapeutic skills and techniques might not have produced the same degree of clinical effectiveness. A therapist unfamiliar with designing and conducting research may have also introduced avoidable bias into the results, such as the use of casual social touch outside the treatment room.

Future Research

Descriptive and observational studies that capture the reality of clinical practice in integrative healthcare

Table 2 Pain Scores Summary—Mean Visual Analog Scales Scores for Pain Sensation and Unpleasantness Before and After a Single 60-Minute Massage

	Before Massage	After Massage (SD)	*t*	*P* value	Effect Size
Pain sensation	3.76 (±1.87)	.89 (±1.35)	18.87	<.001	1.76
Pain unpleasantness	5.21 (±2.48)	.64 (±1.23)	20.45	<.001	1.9

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are needed to develop a foundation of empirical knowledge that can inform and complement studies employing more rigorous experimental designs. Practice-based research is well-suited to capture such information. Massage therapy is a comparatively young healthcare discipline that has yet to establish its own research capacity, however, and such research poses substantial challenges at this time. Most therapists do not have affiliations with universities or research institutions that would allow access to research infrastructure, particularly the information technology infrastructure needed for a practice-based research network (PBRN), and relatively few massage therapists have graduate degrees or formal healthcare research training.[11] While a single PBRN specifically for massage therapy has been created and registered with the Agency for Healthcare Research and Quality,[20] it has not as yet been used to conduct large studies on practice or patient demographics or specific conditions. For solo practitioners, whether or not affiliated with a PBRN, having patients enter self-reported data using commonly available and inexpensive survey software running on a mobile device such as a tablet or smartphone could be a solution to the issue of having treating therapists collecting data because it would allow data collection from any location and over multiple time points. There is also the potential to use routinely collected and de-identified information from practice management software as a data source.

The effects of massage therapy on pain merit more extensive research, particularly in regard to early treatment of acute musculoskeletal conditions to prevent the development of chronic pain and in managing chronic pain. As a nonpharmacological approach, massage therapy holds promise as part of an individualized, integrative package of care, and the nature of the therapeutic relationship in massage therapy positions the massage therapist as an effective coach in supporting the client's self-care efforts. Future research should employ outcome measures that go beyond a simple global rating of pain. Given existing disparities in accessing integrative pain management,[16] future studies should also make every effort to recruit and retain a larger percentage of participants from minority, economically disadvantaged, and underserved populations.

CONCLUSION

A single 60-minute massage performed by an experienced therapist appeared to be a highly effective intervention for reducing common musculoskeletal pain sensation and unpleasantness in this sample of clients drawn from a community-based private practice. Outcome measures that reflect the multidimensional nature of the pain experience are necessary to accurately evaluate the effectiveness of interventions to reduce pain. In this case series, therapeutic massage positively influenced both the physical and affective dimension of the pain experience. Further observational research consistent with the biopsychosocial model of massage therapy and focusing on improving functional outcomes in pain conditions is warranted.

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