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SHORT COMMUNICATION

Individualized, Assessment-Based Manual Therapy to Reduce Chronic Pain and Increase Function: Case Study of a Patient with Fibromyalgia and Diabetes

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Abstract

Fibromyalgia is a medical condition characterized by chronic pain that is attributed to an imbalance in neurotransmitter function. It is now estimated to affect more than 10 million adults in the U.S. and 0.2-6.6% of the general population worldwide. Current treatment options include both pharmacological and nonpharmacological interventions, with massage therapy and physical therapy predominant among nonpharmacological approaches. We conducted a case study of a novel treatment modality, Medical Restorative Massage Therapy (MRMT®), which includes a detailed patient assessment and individualized treatment to address chronic pain. In this case, MRMT® was used over a 6-month period to assess and treat a female patient with fibromyalgia and diabetes. Assessments included patient perceptions of pain, therapist assessments of pain, and patient and therapist assessments of function. We found differences in levels of patient-perceived pain and therapist-assessed pain as well as differences in patient-assessed and therapist-assessed function ratings. These differences are suspected to be due to the psychological component of chronic pain that may impact patients' perceptions of pain and function. The individualized MRMT® approach was successful in evaluating these differences, and helped guide treatment appropriately to reduce pain, improve function and increase activity. Treatments also resulted in improved control of diabetes, as measured by HbA1C levels and reduction in antidiabetic medication. This case study provides evidence that a careful assessment of a patient's condition (*i.e.*, pain level and physical function), together with hands-on therapy and a patient education approach, can improve a patient's ability to self-manage medical conditions through a targeted intervention that reduces pain and increases physical function.

Keywords

Pain assessment, Pain management, Fibromyalgia, Diabetes, Pain treatment

Introduction

Fibromyalgia (FM) is characterized by chronic, widespread pain attributed to abnormal pain processing [1,2]. The prevalence of FM varies worldwide from 0.2% of the total population of Venezuela to 6.4% of the total population of the U.S. [3], and the healthcare costs for patients seeking relief from FM-related pain can be substantial [4-6]. One of the major issues in treating FM patients, however, is that symptoms can vary with each patient, and the cause for the disease is usually unknown [7,8]. FM is characterized by numerous palpation-specific tender points and generalized musculoskeletal pain [3].

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Among several forms of treatment available [9], one of the most effective ways to relieve fibromyalgia pain is through exercise [6,10,11]. However, many FM patients are afraid that movement will exacerbate their pain [12], leading them to avoid exercise. In addition, 67.8% of patients with FM report having at least one comorbid condition [13], making it even more difficult to increase physical activity among these patients. One of these comorbid conditions is Type 2 diabetes, with approximately 21% of patients with Type 2 diabetes reporting that they also have FM [14].

Since increased physical activity is effective in relieving fibromyalgia pain, the challenge is to find a treatment approach that helps a patient overcome their fear of exercise, as well as other health-related barriers to physical activity. We conducted a case study of a novel treatment modality, Medical Restorative Massage Therapy (MRMT®), which is a comprehensive, patient-centered, and assessment-based approach to treating chronic pain. MRMT® focuses on improving physical and structural alignment, as well as empowering patients to self-manage their pain. This report describes treatment of a FM patient with MRMT® that focuses on improving pain management through increased physical activity.

Methods

The patient who participated in this study was a 63-year-old female diagnosed with FM as defined by the American College of Rheumatology [15]; she had a concurrent diagnosis of Type 2 diabetes that had been identified in 2002. This patient presented to the clinic in 2011 complaining of chronic pain that had not improved despite prior treatments that included traditional massage therapy, physical therapy, and chiropractic sessions. While she had also previously tried pharmacologic treatment for FM, she had discontinued this approach due to adverse effects.

Starting in October 2013, the patient was treated approximately every two weeks by a specialist in MRMT®. The study continued for approximately 6 months. This study was performed at an MRMT Clinic. Permission to collect and publish data for this study was obtained from the patient.

Assessment-Based treatment approach: MRMT®

MRMT® uses a multilayered assessment approach for each patient that has been designed to take into consideration a patient's different perceptions of pain and function, as well as differences in how they react to their pain. Both patient and therapist ratings of pain and function are recorded during this process, as described further below. This comprehensive assessment helps the therapist customize the treatment plan with hands-on passive pain management techniques based on J. H. Kellogg's seven massage procedures [16]. The technique or combination of techniques used varies not only from patient to patient, but also may vary for a single patient from one session to another; the techniques used will depend entirely on the results of the assessment. These hands-on passive pain management techniques are combined with active restorative function techniques that are meant to not only alleviate pain by bringing the structure of the body into balance and alignment, but also to work with the patient through personalized patient education to help him or her implement self-care strategies for long-term benefits. Each treatment session, including the assessment, lasts 60 minutes.

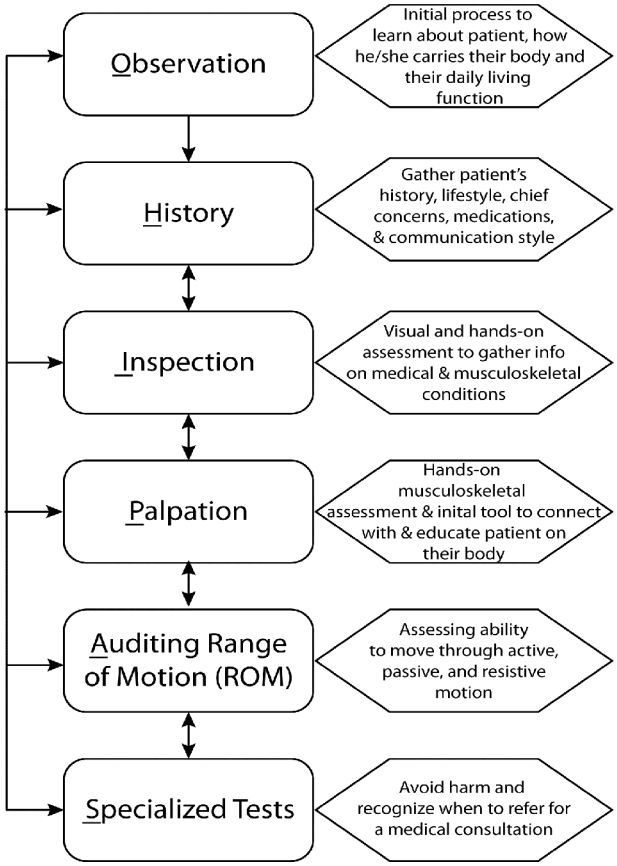

Figure 1: Overview of the MRMT® Assessment Process. Each step of the "OHIPAS" patient-centered approach is carried out as part of every treatment session so that patients are continuously assessed, and manual therapies can be adjusted appropriately to match the patient's needs.

There are six components of this therapist-led MRMT® assessment: *Observation*, *history*, *inspection*, *palpation*, *auditing range of motion*, and *specialized tests* (OHIPAS). This 6-part MRMT® assessment process is presented in greater detail in Figure 1 and explained further next.

As the first step, the therapist assesses the patient's pain levels by observing dynamic posture, including gait and mobility, and static posture. While observing, the therapist asks the patient to describe his or her pain using a list of words (Figure 2). The patient's physical function is then assessed by examining the patient's active range of motion. He or she is asked to use the same descriptive words when a movement elicits pain. Twenty-eight motions of the neck, shoulders, spine, hips, knees, and ankles are assessed by a trained MRMT

			Descriptions	Points Assigned
Physical (3 points max.)			Mechanical words: aching, crepitus, crushing, dull, grinding, pulling, sore, stiffness, strain, tenderness, tightness, throbbing	1
			Neurological words: burning, cramping, gnawing, heavy, nagging, numbness, piercing, pinching, pins/needles, pounding, pressure, pulsing, radiating, ripping, searing, sharp, shearing, shooting, stabbing, stinging, squeezing, swelling, tearing, tingling	2
			Both: neurological and mechanical words used	3
Psychological (4 points max.)	Normal pain behaviors displayed		holding the hurt, rubbing the hurt area	1
			frequent position change	2
	Abnormal pain behaviors displayed		outwardly crying, gasping, grunting, moaning, screaming, frowning, grimacing, irritablity, pacing, restlessness, whimpering	3
			inwardly jaw clenching, mood changes/depression, resisting/guarding, quietness	4
Level of Conciousness	Normal		alert, awake, converse and respond appropriately	—
	Abnormal		abnormal speed (slow or rapid, loud or quiet)	1
			confused, disoriented, restless, agitated, difficulty following commands, memory deficits	2
			lethargy, oriented, slowed mental responses, speech sluggish, sleep often but easily arousable	3
			Maximum Total Points =	**10**

Figure 2: Words to describe pain. The therapist observes the patient's behavior and asks the patient to describe their pain using words in the top two rows during the assessment. Points in the right column are assigned to give a maximum score of 10.

therapist, and the average of the total score is converted into percent function using an empirically derived calculation. The additional elements of the OHIPAS assessment are collected through conversations with the patient, and during the manual therapy treatment.

The six components of the MRMT® assessment are combined to produce a single therapist-assessed rating of the patient's pain and function that includes both the physical and psychological aspects of pain as described by the patient. This therapist-based rating scale was tested for its reliability across six trained therapists with multiple patients. We determined that ratings were not significantly different between therapists ($p > 0.1$), leading us to implement this composite therapist-based rating for all patients.

Study measures

Patient ratings of pain and function: Before each MRMT® treatment, the patient rated her maximum pain level using a scale of 0-10 modified from the Wong-Baker Faces Pain Rating Scale [17]; she also rated her perceived level of function using a scale of 0-100%, divided into 10% increments. These ratings were tracked over time.

Therapist ratings of pain and function: Therapist ratings of the patient's pain and function were collected during each treatment visit through the MRMT® assessment process and were also tracked over time.

Clinical and quality of life measures: At both baseline and at the end of the study, we recorded the patient's BMI, HbA1C levels, medication usage, and perceptions about her FM symptoms. A postural analysis and active range of motion tests were performed before and after each treatment as part of the assessment.

Analysis

We conducted a pre-post evaluation of the results

of 6 months of MRMT® treatments based on changes in both the patient's and the therapist's ratings of pain and function. We also compared patient and therapist ratings, and assessed overall changes in the patient's activity level, diabetes control, and quality of life.

Results

Baseline data

At the time the patient presented for MRMT®, she was taking several medications including metformin (1000 mg, taken orally twice daily), glimepiride (2 mg, taken orally twice daily), and sitagliptin (100 mg, taken orally once daily) for Type 2 diabetes. Her symptoms were extreme fatigue, chronic pain and sleep disturbance which affected her activity levels, irritable bowel syndrome, and mild depression. This patient also reported high levels of work-related stress compounded by regular absenteeism from work due to her FM-related pain. Her initial BMI was 27.6 kg/m^2, and her HbA1C levels had ranged between 7.4% and 7.9% since 2002.

Comparison of pain and function ratings

When we compared the patient's self-assessment of pain and function to the therapist's standardized professional assessments, we found that the patient overrated her level of function 80% of the time and underrated her pain level 55% of the time (Table 1), indicating that the patient was not considering the psychological expression of her pain. For instance, when the patient traveled out of the country and missed a treatment, she self-rated her pain level as 4 and her function level as 90% when she returned for her 6th visit. The therapist, however, rated her pain level at 7 and her function as only 40% during that visit. During this 6th visit, the patient exhibited a depressed mood, guarding with her movement and clenching of her jaw while completing the assessment. Similar discrepancies are evident when comparing ratings from other visits.

Post-study results

After 6 months of assessment-based MRMT® treatments, the patient's BMI had decreased by 5% (a clinically relevant amount [18]) to 26.4 kg/m^2, and her HbA1C had dropped to 6.5% (a 12% decrease). In addition, her daily dose of glimepiride had been reduced by 75% to 1 mg once daily due to much improved glucose control. She also reported substantial changes in her activity level, including integrating exercise into her daily routine. To monitor changes in activity level, the patient reported acquiring a Fitbit® activity and sleep tracker (Fitbit, Inc.; San Francisco, CA).

Continued progress

At two months post-study, the patient reported continuing to exercise daily and maintaining a calorie deficit in her diet. She noted that this contributed to better management of both FM and her diabetes symptoms. The patient continued with a monthly maintenance schedule for MRMT® treatments and noted that she was able to self-manage mild flares of FM. Currently, due to a variety of personal circumstances, this patient is no longer in treatment with MRMT®, but reports continued enhanced ability to self-manage her condition based on her experience with MRMT® treatments.

Discussion

It is now widely accepted that the best way to manage symptoms of FM is to improve a patient's ability to function and increase their level of activity [8,19]. This case study demonstrates the benefits of the individualized approach of MRMT® for a patient suffering from

Table 1: Patient Assessment Data.

Visit #	Patient Pain Rating	Patient Function (%)	Therapist Rating of Physical Pain	Therapist Rating of Psychological Pain	Total Therapist Pain Rating	Therapist Function (%)	BMI	Average Distance Walked (miles/week)
1	1	90	1	4	5	87	27.6	ND
2	1	100	1	1	2	93	ND	ND
3	6	ND[a]	1	1	2	89	27.4	ND
4	3	100	1	4	5	80	27.4	ND
5	3	100	1	1	2	87	27.5	ND
6	4	90	3	4	7	40	27.5	ND
7	3	90	3	2	5	82	27.3	ND
8	2	100	1	1	2	94	27.5	ND
9	4	80	1	4	5	92	26.8	5.16
10	2	90	1	1	2	91	26.8	9.65
11	2	100	1	1	2	92	26.4	9.01
Difference[b]	1	10	0	-3	-3	5	-1.2	
2 wks PS[c]	PS	PS	PS	PS	PS	PS	PS	9.23
4 wks PS	PS	PS	PS	PS	PS	PS	PS	10.93
6 wks PS	PS	PS	PS	PS	PS	PS	PS	12.33
2 mos PS	PS	PS	PS	PS	PS	PS	PS	13.05

Shaded boxes indicate visits when patient under-rated her pain level; [a]ND = Not Determined; [b]Difference = Difference in scores from visit 1 to visit 11; [c]PS = Post-study.

chronic pain due to FM complicated by the additional challenges associated with diabetes. The MRMT® process incorporates a structured assessment before each treatment to allow therapists to better determine a patient's status, including the patient's perception of current pain and function, and customize treatment and self-care education at each visit so that they are both effective and acceptable to the patient. A goal of MRMT is that patients who complete the treatment plan will be better equipped physically and emotionally to deal with their pain as the intervention is tailored to the patient and has a focus on increasing the patient's knowledge of their own condition, leading them to change unhealthy patterns of thought and behavior. Our multimodal therapeutic approach combining assessment and patient-tailored treatment enabled this study patient to become more active as reported by the patient and supported by Fitbit® data. While the increased physical activity also likely contributed to the overall improvement in this patient's health, the patient's history of failed treatments with other methods supports our conclusion that MRMT® empowered her to make lifestyle changes that helped her manage her pain; this then allowed her to increase her activity level, restoring function and promoting better self-management of both her FM and her diabetes.

We hypothesize that the difference between patient-reported pain levels and therapist-assessed pain levels are due to a mismatch between the psychological and physical components of pain. Due to the psychological impact and other co-morbidities associated with FM and other chronic pain conditions, it is necessary to continuously assess both the psychological and physiological components of pain and function of the patient before and during each treatment to tailor the manual therapy and forms of patient education delivered during each treatment session. The number of treatment sessions will likely vary from patient to patient, but ten sessions are a good starting point to establish trust between the therapist and patient and to help the patient convert new beneficial behaviors into habits. The importance of treating FM patients with a multidisciplinary and patient-centered approach has already been recognized [20] and this approach is a component of MRMT®. Our case study suggests that it may also be effective to use a standardized assessment that measures what the patient is presenting rather than only what the patient is self-reporting or verbalizing.

Chronic pain, such as that caused by FM, is costly to both the individual suffering from pain and to society. It is estimated that individuals suffering from chronic pain in the U.S. spend over $30,000 per year, with the annual total direct costs of chronic pain equaling $386 million dollars [21]. This means that finding effective treatments is an extremely important task facing our healthcare system. One of the challenges of most therapies designed to reduce chronic pain is that they do not take into consideration the psychological differences of the patients. For instance, while it is often difficult to get FM patients to engage in exercise due to fears about pain flare-ups, encouraging FM patients to pursue a "start low and go slow" exercise plan [22] as they proceed through MRMT® treatments may be effective. While this case study, by definition, is limited to the study of one patient, we are encouraged by these results and intend to pursue future research that enhances our understanding of the benefits of MRMT®, especially in direct comparison to alternative therapeutic approaches.

Conclusions

Given the prevalence and burden of chronic pain due to FM and other conditions, the individualized and multilayered assessment approach of MRMT® may hold considerable promise for pain reduction and functional improvements for many patients struggling to find relief. This noninvasive process has the potential to reduce burden on primary care providers while improving patient well-being. The use of manual therapies in the treatment of chronic pain is still debated by the scientific and medical communities, but our study shows that if manual therapy is tailored to the patient and used to educate the patient, then physical function and quality of life can be improved, leading to fewer pain symptoms and better overall health.

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