PAIN MANAGEMENT

SPECIAL INTEREST GROUP

President's Message

The one thing that is constant is change. The way we look at our persistent pain patients has evolved from only the bio medical model to the bio psychosocial model, which has given us a new dimension on successful treatment. One of my students, last year, found that with many of our patients who initially scored high on the FABQ improved in function but continued to score high on the FABQ at discharge. Since we cannot change a person's beliefs in a short period of time, perhaps understanding what their beliefs are and treating accordingly is enough for successful treatment. This idea was recently reinforced by the Sindhu et al[1] study.

Thank you Nate for sharing your case report with us in this issue of OP.

I hope you have a happy, safe, and pain free fall.

REFERENCE

1. Sindhu BS, Lehman LA, Tarima S, et al. Influence of fear-avoidance beliefs on functional status outcomes for people with musculoskeletal conditions of the shoulder. *Phys Ther*. 2012;92(8):992-1005.

Management of a Client with Chronic, Unexplained Musculoskeletal Pain Using the Biopsychosocial Model

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BACKGROUND AND PURPOSE

Chronic pain is very common, affecting 100 million adults in the United States.[1] The primary mechanisms of pain change drastically from the acute to the chronic stage. The biomedical and the biopsychosocial model are two well-known models for the assessment and treatment of musculoskeletal pain. The goal of the clinician in the biomedical model is to identify the physiological defect causing the pain and then treat the defect thereby eliminating pain. In the biopsychosocial model, the clinician evaluates and treats pain as an interaction of biological, psychological, and sociocultural factors.[2] The biomedical model is generally sufficient for acute conditions, but often ineffective for chronic pain conditions.[2] If the biopsychosocial model is not used to treat chronic pain, key mechanisms of the client's pain may not be addressed, making resolution of pain difficult if not impossible.[2]

Acute pain is primarily caused by nociception from body tissues associated with clear injury or pathology. The goal of treatment in this stage is to decrease nociceptive output to the central nervous system. Based on characteristics of the pathology, involved body tissues, age, co-morbidities and other factors, an expected healing time frame can be estimated after which pain should not exist due to nociception from the original injury.

Chronic pain can be described as pain that persists past normal tissue healing time, occurs in the absence of tissue damage, and/or results in disability out of proportion with physical findings.[2] Central nervous system sensitization plays a dominant role in chronic pain. As pain persists, the magnitude of nociceptive input increases along with an elevated response to nociception in the central nervous system. Pain may be entirely out of proportion with actual threat to body tissues. Nociception may be produced in the tissues due to leading to pain output from the brain. However, even non-noxious stimuli to intact albeit weak, deconditioned tissues may be sufficient to produce nociception leading to pain. Pain may also be experienced independent of nociception, through other types of input to the central nervous system.[3] For more information on the other types of input read *Explain Pain*.[3]

Psychosocial factors highly modulate the experience of acute and chronic pain through supraspinal mechanisms.[2,4,5] Factors such as pain catastrophizing, fear-avoidance, poor self-efficacy, and psychological distress are highly correlated with individuals suffering from chronic pain.[5] These factors may be further intensified by the client's inaccurate, deep-seated belief that painful tissues are still damaged and/or at risk. Psychosocial factors are known to significantly influence patient outcomes; therefore, they should be viewed as modifiable treatment objectives and not merely as barriers.[6] Treatment approaches should differ substantially when treating acute versus chronic pain.[2,5]

There were two treatment goals in this case study. The first goal was to decrease fear of pain by educating the client that her chronic pain was due to an extremely complex, protective brain and not damaged body tissues. This was accomplished through one-on-one pain neuroscience education, recommended reading materials, and reinforcing these principles throughout the plan of care.The second goal was to gradually expose her to activities previously avoided due to pain. The purpose of this case study is to demonstrate one successful way of using a simple, evidence-based approach for treatment of a client with chronic pain.

CASE DESCRIPTION

History

A 40-year-old, single female was referred to physical therapy from a podiatrist for ultrasound and iontophoresis for left foot pain. The injury to the dorsum of the left foot occurred from kicking a car door shut approximately 6 months ago. At the time of the initial injury, the client went to urgent care due to severe pain and swelling in her left foot. Radiographs were unremarkable. Urgent care personnel educated her to protect, ice, and elevate her foot and take ibuprofen.

In the six months preceding the initial physical therapy evaluation, the client went to an internist because of continued

Table 1. Home Exercise Prescription

	Session 1	2	3	4	5	6	7	8
Weight Shifts in Standing	1 min, 1x/hr	1 min, 1x/hr	1 min, 1x/hr	dc				
SL Balance (performed on right and left)	2x/day	3 x 30 sec, 2x/day	3 x 30 sec, 2x/day	3 x 30 sec, 2x/day	3 x 30 sec, 2x/day	3 x 30 sec, 2x/day	3 x 30 sec, 2x/day	3 x 30 sec, 2x/day
Graded Walking Program			1 min/2 hours, +30 sec every 2 days					
Body Weight Squats			3 x 1 min, 1x/day	3 x 1 min, 1x/day	3 x 1 min, 1x/day	3 x 1 min, 1x/day	3 x 1 min, 1x/day	3 x 1 min, 1x/day
SL Heel Raises (performed on right and left)			1 x failure, 1x/day	3 x failure, 1x/day	3 x failure, 1x/day	3 x failure, 1x/day	3 x failure, 1x/day	3 x failure, 1x/day

SL=single leg, dc=discontinued

pain and swelling. Radiographs were unremarkable. She was then referred to a podiatrist and a MRI was taken. The client reported that minor tendon damage was found on the MRI, but the podiatrist was not able to explain why her pain continued to be so severe.

She reported that her sedentary office job was highly stressful and she suffered from insomnia. The client was moderately obese. She reported that she was exercising regularly prior to her foot injury and that she had lost fifty pounds. After the injury, she had gained all the weight back due to her inability to exercise. This further increased her distress.

The client received some relief with acupuncture, but only for two days before pain returned to previous levels. She was only able to wear one pair of open-topped flats that prevent pressure to the top of the foot. Her foot pain was so intense a week prior to the physical therapy initial evaluation that she cried for two hours. Prior to that painful episode, she had not participated in any more activity than normal. She stopped taking prescribed narcotics because she did not like the way they made her feel. She also discontinued taking over-the-counter medications because they did not reduce her symptoms. She complained of limitation with all weight-bearing activities due to pain. Walking and stairs were highly aggravating.

Pain assessment was measured using a verbal 0-10 scale where 0 represents no pain and 10 represents the worst pain imaginable. Current and lowest pain was 2/10, in non-weight bearing. Worst pain was 10/10 with prolonged standing, walking, or stairs. Patient goals were to walk one to two hours daily, workout, and ascend and descend stairs with no pain or difficulty.

The client ambulated with antalgic gait with excessive right lateral shift, shorter stance time on left during walking over level surface and stairs. There was moderate edema throughout dorsum of left foot. Skin temperature and pallor appeared normal. Palpation revealed allodynia to light manual tapping near metatarsal-phalangeal joints 2-4. Hyperalgesia was evident with deep pressure throughout the dorsal and plantar surfaces of the left foot.

Ankle active and passive range of motion was within functional limits with minimal discrepancies comparing right and left. Gross strength measurements were 4/5 throughout left knee and ankle and 5/5 on the right. Minimal hypomobility was found with accessory movements of left foot and ankle joints that were similar to asymptomatic right foot. All joint accessory movements were painful on left foot and ankle, but did not reproduce worst pain.

Clinical Impression

Allodynia, secondary hyperalgesia, pain lasting 6 months, no evidence of tissue damage, maladaptive psychosocial factors, and pain and disability out of proportion with tissue injury were characteristic of a chronic pain syndrome. Minor strength and range of motion limitations were not viewed as a primary cause of pain. Therefore, a treatment plan consisting of pain neuroscience education, graded exposure, walking program, and basic lower extremity strengthening exercises was used.

Intervention

Approximately 25 minutes of one-on-one pain neurophysiology education on each of the first two sessions.The initial examination was one hour, with seven 30-45 minute follow-up sessions. In the remaining sessions, pain neurophysiology education was given and reviewed during manual therapy or therapeutic exercise interventions. Key topics addressed through education were that pain is an output of the brain, hurt does not equal harm, the complex multi-factorial nature of pain perception, peripheral and central sensitization, pain is the brain's tool to protect the body from real or perceived tissue damage, and the role of psychosocial factors such as hypervigilance, coping-skills, fear-avoidance, self-efficacy, and pain behaviors.[3] The books, *Explaining Pain* and *Dissolving Pain*, were recommended to the client. The client purchased and read *Dissolving Pain*.

On the sixth visit, the client was administered the Neurophysiology of Pain Test. A formal score was not recorded. The client was educated on incorrect answers and correct answers were reinforced using drawings and metaphors.

Table 1 outlines the client's prescribed home exercise program. Selection of type and dosage of therapeutic exercises during therapy and home exercise program were primarily aimed at graded exposure to pain provoking stimuli with less emphasis on strength training. The client tolerated manual therapy interventions, but reported that it was very unpleasant. Therefore, manual therapy interventions were discontinued due to minimal evidence of clinically significant effects.

A graded walking exercise program was initiated on the third visit. The therapist and the client discussed an acceptable dosage

Table 2. Outcome Measures

	Session 1	Session 8
PCOQ	See text	NT
Verbal Pain Scale		
1. Worst	10/10	0/10
2. Current	2/10	0/10
3. Best	2/10	0/10
CCHQ	31/50	45/50*
PSFS		
1. Walking 1-2 hours	2/10	10/10
2. Exercising 30 minutes	0/10	10/10
3. Ascend/descend 2 flights of stairs	3/10	10/10

PCOQ=Patient-Centered Outcomes Questionnaire, NT=not tested at discharge, CCHQ=Care Connections Health Questionnaire, PSFS=Patient-Specific Functional Scale

*Client reported that left foot was at full function and that remaining limitation was due to bilateral shin pain with moderate or high-intensity walking that she had for more than 20 years

and rate of increase of the walking program. The client could walk for one minute with minimal aggravation of left foot pain. The client was to walk for one minute every waking two hours of the day. Thirty seconds was added to the time walked every two days. When the time reached 5 minutes, the frequency was decreased to 3 times per day. When the time reached 15 minutes, the frequency was decreased to 2 times per day. The outlined walking program was followed during the first several visits, after which the client increased walking duration as tolerated because she did not have increased pain.

OUTCOMES

The Patient-Centered Outcomes Questionnaire (PCOQ) was administered at the first visit to evaluate levels of pain, fatigue, emotional distress, and interference with daily activities where 0 is none and 100 is worst imaginable. The client reported a usual pain level of 20, fatigue level of 40, emotional distress level of 50, and interference with daily activities of 50. This outcome measure was not re-tested at discharge.

The Care Connections Health Questionnaire (CCHQ) was used to assess lower extremity level of function. At initial evaluation, the client scored 31/50 where 0 is unable and 50 is full function. At discharge, the client scored a 45/50; however, her functional limitation was due to bilateral anterior shin pain with moderate to high intensity physical activity that she had for greater than 20 years and not from left foot pain.

The Patient-Specific Functional Scale (PSFS) was used to rate high-importance activities on a 0-10 scale where 0 is unable to perform activity and 10 is able to perform activity at the same level as before the injury or problem. Three activities were rated. Walking one to two hours was rated at 2/10 at initial evaluation, and 10/10 at eighth visit. Exercising 30 minutes was rated at 0/10 at initial evaluation, and 10/10 at eighth visit. Stairs (2 flights up or down) was rated at 3/10 at initial evaluation, and 10/10 at eighth visit.

A verbal pain scale was used where 0 is no pain and 10 is worst pain imaginable. At initial evaluation, current and best pain was 2/10 and worst pain was 10/10. At discharge, current, best, and worst pain was 0/10. Formal pain levels were not taken at follow-up visits other than discharge due to a purposeful focus on function rather than pain. However, the client reported consistent improvement of symptoms throughout the plan of care. Table 2 outlines outcome data collected.

DISCUSSION

The client in this case saw multiple health care professions who were not able to find the pain generator using the biomedical model. The client demonstrated maladaptive pain perceptions and behaviors that were not addressed prior to physical therapy. These perceptions and behaviors may have even been negatively influenced by interaction with other health care professionals the client came in contact with. The author believes that the use of the biopsychosocial model for evaluation of the acute injury may have prevented the transition to chronic pain. Based on the clinical findings from the initial physical therapy examination and the client's response to the treatment, central nervous system mechanisms played a primary role in the amplification and maintenance of the client's painful state and that no distinct peripheral physiological dysfunction was present.

This case highlights the efficacy of the biopsychosocial model that led the author to use pain neurophysiology education and graded exposure. Utilization of specific therapeutic exercise interventions was secondary to decreasing fear and promoting overall activity. It also suggests the inadequacy of the biomedical model for treating acute pain in some clients with maladaptive psychosocial factors.

Pain neurophysiology education was effective in reducing the client's fear of pain that promoted the client's compliance with the prescribed home exercise program. A graded walking program, basic balance exercises, and simple strengthening exercises were selected primarily to promote the client confronting previously feared activities.

The client was never formally diagnosed with complex regional pain syndrome (CRPS). In retrospect, the client did meet the International Association for the Study of Pain (IASP) diagnostic criteria for type I CRPS. It is unknown whether other evidence-based treatment approaches would have been more efficient; however, the treatment approach used in this case study had a positive patient outcome.

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