CASE STUDIES
in Lifestyle
Medicine

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The Complex Interplay Between Weight, Chronic Pain, and Mood: How Team-Based Care and Personalized Approaches Can Improve Function and Quality of Life

Abstract: *Patients presenting with a desire to lose weight often have underlying factors that complicate recommendations regarding diet and exercise. In this woman's story, a significant physical injury resulted in chronic pain and a loss in her ability to participate in activities she had previously enjoyed and which played a role in her self-identity. While her previous history of a mood disorder may have increased her risk of developing chronic pain, the impact her injury had on her sense of self was also a likely factor. A multidisciplinary approach that addressed her sense of loss; incorporated innovative adaptations that enabled her to exercise outdoors and led to a renewed sense of hope; helped her find creative outlets and increase her sense of self efficacy; and improve the quality of sleep was instrumental in supporting her ability to incorporate dietary change, lose weight, and*

improve her mood and well-being. The biopsychosocial model of pain provides a framework of understanding for the complex interplay between mood, pain, and social support, which in turn can impact weight and ability to incorporate lifestyle change.

young adult, her baseline weight was between 125 and 130 lbs. She gained weight while undergoing fertility treatments 18 years ago: she had 2 successful pregnancies. She was able to get her weight back down with regular running and completed 2 marathons.

Evidence supports a bidirectional relationship between mood and pain on a population level.

Addressing these underlying factors is a critical part of whole person health.

Keywords: chronic pain; depression; weight gain; team based care; self efficacy; biopsychosocial model

Case Report

SR was a 60-year-old woman who wanted to focus on weight loss. As a

She had also been an avid outdoors woman, actively skiing, sailing, and riding horses. Two years prior to her consultation, she sustained a trimalleolar fracture of her left ankle complicated by methicillin-resistant *Staphylococcus aureus* and then *Pseudomonas* infection requiring prolonged hospitalization, intravenous antibiotics, and eventual ankle fusion.

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She spent nearly 3 months in bed during her recuperation.

Pain management had been challenging. She was initially on opioids and worked with a pain specialist to taper off after being involved in a motor vehicle accident. She was using medical marijuana by vaping, topical cannabidiol, and high-dose ibuprofen to manage her pain. Her weight was now more than 200 lbs, and she was encouraged by her husband to try an immersive lifestyle approach to help her lose weight.

Past medical history was notable for osteopenia, hyperlipidemia, and “prediabetes.” Menarche was at 14 years, and she had had numerous miscarriages, infertility treatments, and 4 successful pregnancies. Her last menstrual period was in her early 50s, with few symptoms; she did not take hormone therapy. She had a complicated psychiatric history with a severe episode of depression in her teens, anxiety in college, and a hospitalization after her first husband left. She was eventually diagnosed with bipolar disorder, posttraumatic stress disorder related to physical abuse in her first marriage, and adult-onset attention-deficit hyperactivity disorder. Five years ago, she began working with a new psychiatrist who was concerned about overmedication and had been adjusting her medications. Current medications included venlafaxine, bupropion, prazosin, omeprazole, simvastatin, metformin, and fesoterodine fumarate for overactive bladder. She took clonazepam and zolpidem at night for sleep. Her aripiprazole was being tapered over the past month because of concerns it could be contributing to weight gain. She had recently started oxcarbazepine and gabapentin in increasing doses as off-label treatment for her bipolar disorder. She was taking a multivitamin, an omega 3 supplement, and vitamin D3.

Her family history was notable for mood disorders on both sides. She had remarried 20 years ago and described her husband as supportive, encouraging her to focus on her health and weight. She had previously worked as a lawyer and stopped when her 2 younger daughters were born. Her relationships

with them, now 16 and 18 years old, had been challenging with her prolonged hospitalization and recovery. She described eating 3 meals a day and 3 to 5 snacks, craving salty, sweet, and crunchy foods. She drank 3 diet sodas and 1 to 2 alcoholic beverages most days. Her exercise was limited to her physical therapy sessions.

Additional symptoms included falling asleep easily at 9:30 PM, waking up 1 to 2 times a night to urinate, snoring, and yet awakening refreshed at 6 AM. She would occasionally fall asleep in front of the television before dinner. In the past couple weeks, she had noted unsteadiness when standing, with 2 near falls. Her mood was “great/optimistic.” At her nursing intake, her weight was 205 lbs, with a waist to hip ratio of 0.85 and blood pressure of 118/78 mm Hg. On physical exam, she was alert with an initial slow, slightly unsteady gait, with a significant limp using a cane. Her speech was slow and hesitant, and she was frequently tearful as she relayed her history. Her left ankle had moderate swelling, a well-healed surgical scar, and minimal range of motion in all directions.

Ambulating to the exam room she felt lightheaded, leaned into the wall with her legs buckling but was able to be assisted into a wheelchair with no loss of consciousness. She was not hypotensive or orthostatic; her fingerstick blood glucose was 145 mg/dL, and her neurological exam was otherwise normal. Her electrocardiogram was normal, with scattered premature ventricular contractions (PVCs). Because her symptoms recurred on standing, she was transferred to the emergency room, where she was found to have a serum sodium of 125 mEq/L (normal 135-145 mEq/L). She was instructed to limit her water intake and was transferred back to our facility. Cross-referencing her medications showed that the combination of oxcarbazepine and venlafaxine can cause hyponatremia; there were 10 potential medication interactions associated with sedation and psychomotor impairment (not including the medical marijuana). In close consultation with her

psychopharmacologist, her oxcarbazepine was tapered. She had no further episodes, and her sodium normalized.

She met with a physical therapist who suggested that she may have a better functional outcome if she had an ankle amputation, then a prosthesis; she was upset and tearful after that conversation. She met with an exercise physiologist who modified the foot pedal on a rowing machine to accommodate her ankle and she was able to tolerate the exercise, gradually increasing the duration of her aerobic activity. She was eventually able to get into a sculling boat with assistance, describing tremendous joy at being able to be out on the water.

With the dietician, she focused on increasing her intake of fiber-dense plant foods, discontinuing her diet sodas, and reducing her portions and snacks. She found acupuncture helpful for her pain¹ and therapeutic qi gong for her pain and balance.²

Because of her history of snoring, nocturia, and daytime sleepiness, she underwent a full polysomnogram, which showed moderate obstructive sleep apnea with an apnea/hypopnea index of 18. She was started on continuous positive airway pressure therapy, which she tolerated well. She worked with a behavioral therapist around her sadness at no longer being able to do many of her former activities and passions and that her future would not be what she had anticipated. She also focused on setting boundaries with her family and asking for what she needed. She discovered jewelry making as a pleasurable creative outlet.

Four months later, she had lost 20 pounds. Her pain was much improved, and she was able to discontinue her medical marijuana. Although she was still using a cane, her gait was steadier, with much less limping. Her fasting glucose was 98 mg/dL, and her hemoglobin A_{1c} was 5.5. Five months later she had lost another 5 pounds, had successfully been able to go skiing twice, and no longer needed her cane. Her repeat fasting glucose was 92 mg/dL, and her

hemoglobin A_{1c} was 5.4. She was able to accompany her daughter on several college visits.

Discussion

SR's story, although complicated, illustrates some important challenges in working with patients articulating a desire to lose weight in the context of significant pain and physical limitations. It was clear that she had significant underlying stress, pain, sadness, and loss that needed to be acknowledged and addressed. Her acute symptoms were a reminder that it is crucial for practitioners working in a lifestyle medicine-based practice to both recognize when there might be a potential medical emergency and also work in conjunction with the patient's other practitioners, especially around medication changes in someone with a history of unstable mood. Evidence supports a bidirectional relationship between mood and pain on a population level.³ The development of enduring pain increases the risk of a mood disorder, and a history of depression, anxiety, and stress (including posttraumatic stress disorder) predicts a higher likelihood of someone transitioning from acute to chronic pain. For this given individual, it is not possible to know how much her previous history has affected her pain. What may be more clinically relevant is to recognize the impact her pain may have on her emotional well-being, mood, sense of self and identity, and personal and family relationships.^{4,5}

The biopsychosocial approach to understanding chronic pain helps practitioners view chronic pain as a complex, multifaceted experience influenced by a dynamic interplay among a person's physiological state and anatomy, thoughts and emotions, prior history, behaviors, social interactions and supports, and cultural influences.⁶ This awareness helps shift the goal from curing pain toward management of pain. Psychological approaches such as cognitive behavioral therapy,⁷ relaxation training, biofeedback,⁸ meditation,⁹ and diversion techniques may improve

self-management and efficacy, improve pain coping, and reduce disability and emotional stress. One study found that cognitive behavioral therapy can improve empathy in people with chronic pain, which may in turn benefit their relationships with friends and family members.¹⁰

The concept of hope in the setting of chronic pain is inherently a paradox: how do patients maintain enough hope to carry on and potentially try a new therapy while tempering expectations to avoid the possibility of despair? Hope can also be viewed as a dynamic, multifaceted mindset.¹¹ From a practitioner standpoint, it is important to be mindful of how we language recommendations with that same potential paradox in mind. Encouraging a modality or treatment based on reasonable likelihood of benefit/low risk of harm and articulating what that benefit may be (reduced pain, improved mobility, finding a new activity that is enjoyable) while not promising a miracle cure is paramount. It is equally important for practitioners to be aware of the potential impact our recommendations may have on a patient's sense of hope and sense of self.¹² Although the physical therapist may have had vast clinical experience underlying his recommendation for amputation for a better functional outcome, that statement compounded SR's acute sense of loss and despair. The creative approach of the exercise physiologist helped her regain a sense of hope and adaptability, eventually resulting in her ability to reconnect to her passion for the outdoors.

SR's experience with jewelry making mirrors what has been seen in studies. Functional magnetic resonance imaging has shown that mental distractions actually inhibit the response to incoming pain signals at the earliest stage of central pain processing.¹³ Engaging in music, art, dancing, and drama has been associated with reduced depression and stress, enhanced sense of self and mastery, improved processing of emotions, aesthetic pleasure, and

increased social skills and connection.^{14,15} In light of the growing awareness of the plasticity of neural circuits, some of these effects may result from a reversal of the blunting of pleasurable responses and enhancement of depressed ones that commonly accompany chronic pain.

There is evidence that a Mediterranean dietary pattern, with an emphasis on colorful fruits and vegetables rich in polyphenols and food sources of omega 3 fats such as fish and nuts (as opposed to a highly processed diet with refined carbohydrates) may improve inflammation and lessen chronic pain.¹⁶ Supporting a patient's ability to shift to a more whole-foods, high-fiber and less processed diet can also reduce the likelihood of developing common comorbidities such as weight gain and diabetes.¹⁷ Someone struggling with pain, fatigue, and depression may benefit from the engagement of family members who can take on the responsibility of shopping and cooking. Languaging the conversation around food in nonjudgmental terms, connecting food recommendations with the patient's stated goals, and starting with a few simple, practical tips on foods to include instead of emphasizing what one "should not be eating" may encourage more self-efficacy and engagement around diet change.

Identifying and treating underlying sleep disorders such as sleep apnea is a frequently overlooked aspect of managing chronic pain. Opioids can contribute to higher risk of both obstructive and central sleep apnea. Unrefreshing sleep and sleep apnea have both been associated with higher prevalence of widespread chronic pain, disability, and reduced quality of life, particularly in women.¹⁸ In addition, sleep deprivation and sleep apnea are associated with higher morning cortisol, glucose, insulin, and ghrelin levels and lower levels of leptin, which in turn has been associated with higher food intake (with a preference for high-fat, high refined carbohydrate foods), weight gain, and features of metabolic syndrome.^{19,20} Improving sleep quality and identifying and treating sleep disorders can improve

these metabolic and hormonal shifts, ultimately supporting one's efforts to stick to his or her intentions around diet change and movement.

Exercise has been associated with a reduction in anxiety and depression²¹ and an improvement in physical capacity, functioning, and independence in people living with chronic pain.²² The exact amount and type of exercise is unclear, and outcomes may be best when recommendations are tailored to the individual, progressed slowly over time, and take into account physical limitations, psychosocial needs, and available resources.²³

Nonpharmacological approaches to pain are urgently needed as we face the epidemic of opioid addiction, overdoses, and death.²⁴ There is increasing awareness of the important role that lifestyle and integrative approaches can play in helping manage chronic pain. The biopsychosocial model provides a helpful framework for a team-based approach in working with patients around chronic pain: lifestyle medicine practitioners working alongside psychologists and psychiatrists, exercise physiologists and physical therapists, yoga and tai chi practitioners, dietitians, and art therapists may help their patients improve their ability to manage chronic pain, improve their sense of self efficacy, reduce depression and stress, and improve their social relationships. Time, cost, access, and lack of insurance reimbursement are 4 potential barriers to implementing this type of approach.²⁵ Increasing the awareness of physicians, hospitals, and insurance systems in the efficacy of this multidisciplinary approach and the role of valuing patients' views and experiences are important first steps toward a better model to address the epidemic of chronic pain and improve patients' self-management, quality of life, and vitality.

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Trial Registration

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