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Use of Primal Reflex Techniques in the Treatment of Chronic Pain: A Case Study

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ABSTRACT

Background and Purpose: Physical therapy has a role to play in the treatment and management of the chronic pain patient. Diagnoses in the chronic pain population can be varied and include fibromyalgia, functional bowel disorders, headaches and back pain. Evaluation and management can be difficult as multiple systems are often involved, and it is frequently confusing as to where, and how to start treatment. Successful long-term results in the medical and physical therapy management of these patients can be disappointing. **Case Description:** The patient was an 18-year-old female with a diagnosis of irritable bowel syndrome and ulcerative colitis. She had a 9-month history of chronic pain in multiple joints, which rendered her functionally incapacitated. **Intervention:** Primal Reflex Release Techniques (PRRT) were used to globally treat the patient in an effort to balance her autonomic nervous system and reduce muscle tone, guarding and thus pain. **Outcomes:** The patient reached a pain-free status after five treatments and a return to a fully functional pain free lifestyle after 9 sessions.

Key Words: chronic pain, PRRT, autonomic nervous system.

INTRODUCTION

The patient in this case study was referred to physical therapy with diagnoses of irritable bowel syndrome and ulcerative colitis. As discussed in the introduction, these diseases fall under the umbrella of chronic pain. The most familiar diagnosis under this umbrella is fibromyalgia, but can vary depending upon which medical specialist is seen first. It is vital, therefore, as healthcare professionals, to recognize the issues associated with gastrointestinal disorders, as they often coexist with fibromyalgia.

Gastrointestinal disorders fall under two main categories, inflammatory bowel disease (IBD) (ulcerative colitis or crohns disease) and irritable bowel syndrome (IBS). These diseases are chronic and

debilitating with no known etiology and diminish quality of life. Persons with IBD and/or IBS share similar signs and symptoms and often co-exist.[1-6]

Ulcerative colitis causes chronic inflammation of the large intestine and is characterized by abdominal pain and diarrhea. IBS is a condition affecting the large and small intestines and is characterized by alternating constipation and diarrhea, associated with bouts of cramping abdominal pain.[7] According to Dr. Michael Gershon, IBS is the 7th leading diagnosis in the United States and both IBD and IBS are the most common diagnoses reached by gastroenterologists.[1,8,9] Although progress has been made in the diagnosis, treatment and pathology of these conditions, much remains elusive and the financial burden on the healthcare system is immense. Under the umbrella of gastrointestinal (G.I.) disorders, healthcare costs are estimated to be $34 billion in the 7 largest western economies. [8,10-12] From this point on IBS and IBD will be grouped together under the term GI dysfunction.

While medical treatment for GI dysfunction is more effective for a single symptom, the more moderate to severe cases tend to present with multiple symptoms. Treatment is typically pharmacological and includes a multitude of drug categories including bulking agents, laxatives, antispasmodics and anti diarrheal agents. The disadvantages, however, are that the side effects of the drugs mimic the original symptoms.[10] Many physicians relate this disorder to stress and some studies of IBS have documented improvement with anti-anxiety and anti-depressant drug treatment.[13,14] So, along with traditional pharmacologic therapies additional measures include patient education and behavioral therapy such as hypnosis, biofeedback, relaxation and cognitive therapy.[10,15,16]

Fibromyalgia is estimated to affect 5 million U.S. adults and is a current term for patients suffering from chronic, widespread musculoskeletal pain for which no underlying cause can be identified.[17-22] It is evident in the literature that patients with fibromyalgia syndrome have comparatively high levels of co morbidities and healthcare utilization and cost [23,24] and that fibromyalgia and GI disorders often co-exist, sharing common symptoms including emotional issues, fatigue, sleep disturbance, soft tissue and joint pain, headache, migraines, backache, heart palpitations and anxiety. [4,13,15,17-19,21,26-32] A large number of chronic pain patients referred for physical therapy intervention fall under the diagnosis of fibromyalgia,

so it is necessary to recognize and understand that we may be dealing with undiagnosed extra-colonic symptoms of a GI dysfunction patient. Symptoms of GI dysfunction can be identified during the subjective part of the evaluation and include chronic constipation, diarrhea, bloating, cramping and use of medications to alleviate these symptoms. If a diagnosis of GI dysfunction is suspected, a referral to a GI specialist may be appropriate. The reality of the diagnosis of the chronic pain patient is dependent on which complaint is the most bothersome; this determines which specialist the patient sees first. GI doctors see these same patients and focus on their GI complaints and use terms such as IBS/IBD, neurologists see them for their headaches and /or unexplained facial pain, dentists for TMJ and so on. According to the literature, it seems that there is an underlying common pathology of insidious onset associated with all these syndromes.[17]

Physical Therapy and the Treatment of Chronic Pain.

Relief for the chronic pain syndrome patient remains elusive despite advancement in areas such as pharmaceuticals, knowledge of sensory physiology, anatomy and improved surgical interventions. It is estimated that over 60 million people are affected within the United States.[33]

Healthcare expenses are enormous and include costs not only for healthcare but also lost productivity, short and long-term disability and lost tax revenues.[12,16,23,24,33] One study estimated that healthcare costs incurred per person, ranged from $500 to $35,000 per year, not including the cost of surgical procedures, the growth of which has increased significantly in the Medicare population over a ten-year period. [34]

Physical therapy intervention plays a role in the management of chronic pain and this patient population can make up a large percentage of a facility's clinical caseload. Disappointingly, though, it seemed evident from the literature that the long-term benefits of physical therapy intervention were not particularly promising, especially, when the cause of the pain has not been identified.[19, 35-38] Some beneficial treatments included exercise,[21,33,39-41,] manual therapy[42] and specifically for chronic low back pain, it was apparent that motor control, exercise and spinal manipulative therapy compared to general

exercise alone, offered slightly better short-term improvements in function and perceptions of effect. There was no evidence, however, to support that these improvements were sustained in the chronic pain syndrome patient over the long-term.[43,44] Current research now supports a holistic mind and body approach to the conceptualization and management of pain[10,15,16,45]

Traditionally, as clinicians, the goal has always been to treat the underlying cause of pain expecting that it would result in it's resolution. Evidence suggests that pain can remain long after the original injury or illness has resolved and can cause more pain than the original insult. Chronic pain is known to compromise the immune system, can increase the risk of suicide especially when associated with depression, delay healing and now it is recognized that pain, in itself, can lead to death. These are strong implications but the treatment of pain must be given high priority. The American Board for Hospital Accreditation has now adopted pain as 'the fifth vital sign'[13,15,45,46]

Effects of Chronic Pain and Stress on the Autonomic Nervous System.

Individuals suffering from chronic pain conditions display diffuse hyperalgesia (increased pain to normally painful stimuli) and/or allodynia (increased pain to normally non-painful stimuli). This suggests that these individuals have a fundamental problem with pain or sensory processing rather than an abnormality confined to the region of the body where the person is currently experiencing pain.[17,22,26,47-50] Both fibromyalgia and GI dysfunction are now considered to be a syndrome of disrupted homeostasis with abnormal functioning of the autonomic nervous system.[13,17,18,20,21,52]

Stress is considered to denote any condition that disrupts this homeostatic balance or threatens the life of the organism, this includes chronic pain. The stress response enables predominance of the sympathetic portion of the ANS and is a general alarm that activates the neurophysiolgical system increasing the level of arousal.[13,46,53] The response is, therefore, essential and necessary as a form of protection. The unpleasantness of the alarm is of no health threat and the arousal response is gradually turned off when "coping" occurs. If not, this catabolic state may be sustained and the danger of a sustained response may lead to illness and disease.[13,46,52,53]

On a day-to-day basis, the stress response may be inadvertently triggered by a wide assortment of everyday events that do not pose a real threat to our survival. The cascade of the physiological response tends to occur more frequently than can be tolerated. Being exposed to a multitude of stressors simultaneously, or over a period of time, may be a significant risk for the later development of somatic symptoms such as muscle bracing and holding behaviors. [18,21,26] In his book "The Sensitive Nervous System" David Butler has illustrated the connection between the muscles, skin, joints and connective tissue sheaths of the nervous system and the sympathetic nervous system.[55]

A more common name for this stress response is "fight or flight" and is governed by the autonomic nervous system (ANS). The ANS has two halves known as the sympathetic (catabolic/ergotrophic/energy spending) and the parasympathetic (anabolic/trophotropic/energy storing) portions. For homeostasis to be present, a state of normal, stable cycling between these two halves of the system occurs.[13,54]

Chronic stress is associated with a low-grade activation of the sympathetic portion of the ANS, i.e. the fight or flight response and this creates an imbalance within the two halves of the system. It is conceivable that the decreased output from the parasympathetic influence of the vagus nerve could negatively affect the G.I. System.[11,13,46] It is documented that Raynaud's Syndrome, often found in patients with fibromyalgia, is a result of increased sympathetic activity[13,18] This theoretical link between stress and subsequent susceptibility to develop somatic symptoms or syndromes is also supported by studies showing that patients with fibromyalgia, IBS and chronic pain may be more likely than non-affected individuals to have experienced physical or sexual abuse in childhood.[13,17,27,46,56-59] Furthermore, studies have demonstrated that repeated stimulation can enhance the arousal response. This is termed "sensitization". An example of this has been described at the cellular level when the dorsal horn neuron becomes responsive to non-noxious stimulation. Sensitization has been suggested as an important underlying mechanism in disease development and conditions of chronic pain including fibromyalgia and irritable bowel syndrome.[18,20-22,26,60,61]

Primal Reflex Release Techniques (PRRT) - What is PRRT?

PRRT is a new, yet to be researched, method of treatment in the field of pain management, developed by John Iams, a physical therapist based in California. The basic theory behind PRRT is that pain in the periphery is influenced and controlled by the Central Nervous System (CNS). The CNS can be divided into 2 parts, the somatic and the autonomic nervous system; the somatic is primarily concerned with voluntary function, i.e. the musculoskeletal system, and the autonomic, predominantly automatic in nature, with involuntary function, i.e. digestion, blood pressure, heart rate etc. The autonomic nervous system is further divided into the sympathetic ("fight or flight"/stress response) and the parasympathetic portion. To generalize their function, the sympathetic mobilizes energy and the parasympathetic conserves and stores energy.[62] According to Iams, the startle and the withdrawal reflex are the main primal reflexes linked to the fight or flight/stress response of the autonomic nervous system and are called upon to protect the body when encountering a painful, startling, or stressful experience. He believes that these primal reflexes, hardwired in utero, influence motor behavior and can be sustained in a state of "hyper-readiness"/ "up-regulation" leading to patterns of pain. Based on this hypothesis, PRRT is a systematic approach to evaluate and treat these "up-regulated" reflexes".[62] Iams acknowledges the many components of the body that we have learned to treat and release such as joints, muscles, fascia and dura and questions why we have never learned to do the same with these reflexes. " Up- regulation" is associated with activation of the sympathetic portion of the ANS, i.e. the fight or flight response [13,46,53.] and thus creates an imbalance within the two halves of the system, disrupting homeostasis. It is interesting that years ago Pavlov described the fact that conditioned reflexes are easily reinstated and do not disappear without a trace.[13]

For the purpose of medical examination, reflexes can be enhanced by using the Jendrassik Maneuver, i.e. any method used to up-regulate reflexes such as pushing the hands together in front of chest, coughing or clenching the teeth,[64] so it is conceivable to presume the possibility that primal reflexes can also become up-regulated or sensitized,[65] by reinforcing the behaviors that activate the stress response.

Stimuli that can activate the Startle Reflex can be unexpected, visual, or auditory events and encompass responses throughout the body as a whole such as blinking, jumping, withdrawal, and

vocalization. It is noted in the literature that being frequently startled may lead to hyper-startling or as John Iams describes as being in a "pre-startle state" and the relationship of the startle reflex to post traumatic stress disorder (PTSD) is beginning to find it's way into the literature relating to past traumas.[66-69] The startle reflex is designed to be sensitive rather than selective so it demands a response before an assessment of the situation.[65] The withdrawal reflex is a protective reflex associated with pain and the example of withdrawing one's hand from a hot stove before the conscious mind even registers pain is a familiar one.

The theory behind PRRT is to address pain in the somatic nervous system by treating the autonomic nervous system that has become imbalanced by "up-regulation" of these conditioned reflexes. The main stimuli responsible for reinstating these reflexes are stress and pain.

The primal treatment techniques, as used in this case study, are global and focus on quick, light tapping and brushing movements to head, face and neck and involve positioning of the upper and lower extremities. Dr. Robert Scaer[13] supports the hypothesis for this treatment by recognizing that the muscles of the head and the neck, based on embryonic development, are intimately related to instinctual reflexive behavior as well as voluntary behaviors that are linked to survival. Like the facial muscles, the muscles of the jaw are also closely linked to emotions especially those associated with threat. A clenched jaw is a widely recognized sign of rage or frustration and the syndrome of bruxing (involuntarily clenching or grinding the teeth) is a reflex related to inordinate amounts of stress in one's life. We also know that contraction of the jaw muscles occur within 14 msecs of being startled.[65] In the neck; the sternocleidomastoid muscles display a basic instinctual motor response of the body to impending threat as the primary intrinsic function of these muscles is based on the orientating reflex. They position the head for optimal access to threat based messages through the primary senses of smell, vision, and hearing.[13] It seems that these reflexive behaviors could sustain us in a constant state of low-grade fight or flight.

Scaer documents that the muscles of the face, jaw, mouth and neck are the only voluntary muscles that are supplied specifically by the ANS and PRRT utilizes these voluntary muscles and knowledge of the body's physical response to startling stimuli to tap into this system.[13,53,65]

The purpose of this case study is to bring to light the existence of a new treatment technique that potentially treats a system that has never before been addressed by physical therapy. Research of the literature has shown that abnormalities within the balance of the autonomic nervous system play a major role in the physiology of the chronic pain patient. Chronic pain is a difficult and costly issue to address[33] and these techniques are worthy of further investigation to evaluate their effectiveness. Treating this system could potentially be the "missing link" of our "unsuccessful" cases.

CASE DESCRIPTION

Patient History: The subject was an 18-year-old girl that presented with a 9-month history of neck, back, bilateral hip, knee and ankle pain of insidious onset. Her gastroenterologist referred her to physical therapy with an order to evaluate and treat for multiple joint pain and functional decline. Her medical diagnosis was irritable bowel syndrome (IBS) and ulcerative colitis (IBD).

She was driven to the appointment by her mother and upon arriving requested to be allowed to lie down on one of the treatment tables, while waiting to be seen. It was explained that she had limited tolerance to being outside of her home and needed to be seen as soon as possible. The patient was unable to sit up during the interview process and maintained her supine position on the treatment table supported by pillows and covered with a blanket.

During the interview process her past medical history was discussed. As a child, she had been diagnosed with irritable bowel syndrome and ulcerative colitis and had undergone surgery for a temporary ileostomy as well as multiple colonoscopies. Current pain medications included steroid packs, birth control, hydrocodone and cipro and had a long history of steroid use. Multiple medical testing ruled out rheumatoid arthritis, systemic lupus erythematosis and ankylosing spondylitis. Her diet was varied with a particular love for chocolate milk, which she consumed several times a day.

Functionally, she was unable to attend her college classes and spent her days and nights moving between the couch and the hot tub resulting in temporary pain relief. This was the extent of her daily activities as movement exacerbated her pain. Sleeping was minimal and sporadic.

Before this 9-month episode, she had a history of single joint pain that occurred intermittently, randomly, and resolved spontaneously.

The patient's goal for seeking physical therapy intervention was to return to a normal lifestyle without pain. This included " resuming college, hanging out with friends, attending the gym for workout sessions and becoming independent and pain free with all daily activities".

EXAMINATION

Pain: Pain levels were based on a 0-10 pain scale.[70,71] She reported that she hurt from "head to toe" but predominant areas of constant pain were (L) shoulder and neck pain 10/10; bilateral hip and low back pain 10/10; left anterior knee pain 9/10; right ankle pain 9/10. She rated the rest of her body at a 4/10 level. Her pain was described as a constant deep ache that was eased temporarily by heat and aggravated by movement and complained of a constant headache. Further questioning ruled out any neurological involvement.

Observation: The patient was observed walking into the clinic and while transitioning on and off the treatment table. Her posture was guarded and held an overall flexed position. Her gait was slow with shuffle-type steps and appeared to have increased pain with movement. She transitioned slowly to sitting and then to lying and once supported with pillows and blankets was resistant to moving again. Observation of her painful joints revealed no redness or swelling in any region.

Objective Testing: Range of motion tests, active and passive to the neck, shoulders, hips, lumbar spine, knees and ankles were attempted, but deferred, as the patient was unable to tolerate movement or minimal pressure. It was, however, determined that no increased temperature was present in her painful joints. Muscle strength testing was also deferred for the same reasons. The author was unable to perform a traditional evaluation, as per the guide to physical therapy practice, so it was deferred until the patient's tolerance to movement and tactile pressure improved.

A quick palpatory examination to evaluate for nocioceptive startle reflexes (NSR's) was tolerated. This examination technique is based on the teachings of John Iams, founder of PRRT. It involves sliding

one's fingers over predictable areas, no inward pressure applied. Predictable areas are based on regions that John has found, through experience, to be frequently up regulated, have direct and indirect dural attachments, and are involved in reflexive activity. The typical positive result is one or several responses by the patient and is described by Iams as the 4 G's: gasp, grimace, groan and/or global withdrawal. Not all of the 4 G's will be present in all or every region. The more irritable the patient's pain pattern, the more prominent the 4 G's will be manifested. In this case study, all areas palpated as per the nocioceptive exam were positive bilaterally for NSR's. These areas included bilateral medial gastrocnemius, coccyx, S/I joint, L4/5/S1, $11^{th}/12^{th}$ rib, diaphragm, costosternal junction, upper thoracic spine, C7/T1, 1^{st} and 2^{nd} ribs, levator scapulae, infraspinatus, ligamentum nuchae, splenius capitus, rectus capitus posterior minor, occipitalis, sphenoid, zygomatic arch, masseter, anterior digastric, omohyoid, flexor pollicis longus. Iams describes these areas as "TriggeRegions" to differentiate an area from a point. These are areas of hyperesthia found when sliding one's fingers over these predictable regions and have been found to fit certain patterns. The closest similar protocol defined in the literature is trigger points, as described by Travell and Simmons. They describe a trigger point as a "focus of hyperirritability in a tissue that, when compressed, is locally tender and, if sufficiently hypersensitive, gives rise to referred pain and tenderness, and sometimes to referred autonomic phenomena and distortion of proprioception" [72]

PATIENT EVALUATION

The main impairment identified during the examination process was a severe decline in function secondary to multiple joint pain increased by movement. This was identified through questioning, observation of her posture, gait and transitional movement patterns.

Formal testing of joint range of motion, muscle strength and flexibility were deferred secondary to extreme pain. Palpation was positive for NSR's bilaterally, as described above, and there was no increased temperature or joint swelling to denote specific joint injury. This was supported by her history.

The diagnostic process did not yield an identifiable specific syndrome except for perhaps a severe case of fibromyalgia [21] coexisting with her diagnosis of GI dysfunction. The literature supports the typical co-existence of these 2 conditions.[18,27,28,30]

Plan of Care: A plan of care was established and involved the use of PRRT for 1- 4 sessions. According to John Iams, PRRT is effective within 1- 4 treatment sessions and if not, should be discontinued. The author's decision to use PPRT was based on lack of options. The patient was unable to tolerate pressure or movement to any degree which ruled out the majority of traditional physical therapy interventions, i.e. manual therapy, stretching, strengthening etc. According to Iams, chronic pain patients respond quickly to PRRT and it allows practitioners a place to start with difficult and involved patients. Treatment can be performed away from the painful areas, is gentle and non-invasive, and works quickly if appropriate.

The primary goal of these 4 treatment sessions was based on the hypothesis of why PRRT is effective, i.e. to calm down an up - regulated sympathetic nervous system, thus reducing muscle holding and guarding patterns leading to a reduction of the patient's pain levels. Lower pain levels would allow the author to carry out the deferred portions of the examination and formally test for restrictions in active and passive joint range of motion, muscle strength and flexibility, fascia and neural tension. Following a more in depth examination, the author planned to identify more concrete impairments, limitations and restrictions and re-establish a PT diagnosis with additional interventions strategies and discharge outcomes.

The treatment frequency following her initial evaluation was set at 2- 3 times per week for 30-minute sessions depending on her tolerance. Short-term goals were to decrease pain levels to an average of 5/10 intermittent, and to be able to perform a more in depth physical examination. The author expected to meet these goals by the fourth visit. Long-term goals were to be established following re-evaluation.

IMPLEMENTATION AND INTERVENTION

The first four treatment sessions consisted of performing a quick palpatory examination for NSR's pre and post treatment to evaluate for changes in eliciting the 4 G's.

The first 4 sessions used the following treatment techniques. 1) The palmar reflex 2) epicranial release 3) frontalis release 4) orbicularis release 5) tri-cranial release 6) rectus capitus posterior minor release 7) digastric/mylohyoid tap 8) diaphragm lift 9) plantar release. These techniques are described in the basic PRRT seminar manual,[73] however, due to an agreement signed between the author and Superspine Inc., it is illegal for students to teach or describe the techniques learned during these seminars. The author was denied permission to allow an exception to this rule for the purpose of this case study.

Following the first treatment session, the patient reported feeling more relaxed with no change in the visual analogue pain scale. Palpation for NSR's determined that although they were still present, however, the intensity of her response was lessened to a moderate response.

At the start of her second treatment session she reported that she felt much better and following her previous session had slept from 4-7pm and again from 10pm-6am. She also reported that she had less pain with walking. Pain levels were reported to be 5/10 constant. Pretreatment she was evaluated for NSR's and it appeared that she had maintained the gains achieved at the end of her last session. Post treatment, she had a minimal 4 G response to palpation. Upon leaving the clinic, it was noted that she ambulated with a normal gait pattern, speed and upright posture. She reported that she was pain free with ambulation.

At the start of her third treatment her only remaining complaints were bilateral foot pain 5/10 and stomachache. She also stated that since her initial treatment she has been sleeping consistently through the night. Pretreatment NSR's were noted but were extremely mild and difficult to detect.

Following treatment she rated her pain levels at 2/10 in her feet and NSR's were minimal though present in the coccyx, S/I joint and gastrocnemius bilaterally.

On attending her fourth session, she reported that she was pain free in all her joints, her only complaint being a stomachache. Pretreatment detected minimal NSR's in her S/I joint, coccyx,

gastrocnemius and diaphragm. Post treatment, no NSR's were noticeable. Her pain levels remained as they were at the start of the session at 0/10.

On her fifth treatment session, she continued to remain pain free. She was re-evaluated for joint range of motion, muscle strength, flexibility, endurance, and fascial restrictions. She was negative for any restrictions or pain with active and passive range of motion in her cervical spine, bilateral shoulders, lumbar spine, bilateral hips, knees, ankles and feet. She ambulated with a normal gait pattern and the protective, slow and guarded responses seen during transitional movements on evaluation were not present. The only objective limitation noted was with her level of endurance, and for this reason only, was having difficulty returning to her typical daily schedule.

Her treatment frequency was set at 2-x week for one more week and then to once a week for two more weeks. Her treatment plan consisted of monitoring her pain levels, her NSR's and implementing cardiovascular endurance program. Her home exercise program consisted of diaphragmatic breathing for stress management, digastric mylohyoid tap and a walking program.

OUTCOMES

The patient was discharged following 9 sessions. Her personal goal of being able to return to a normal pain free lifestyle had been achieved. From a physical therapy standpoint, she had full pain free range of motion in all joints, zero tenderness or pain on palpation of soft tissues, flexibility, strength and endurance were within normal limits for her age and she had a return to full function. This resulted in a 100% improvement.

Follow-up of this patient revealed that she held this status for 22 months before returning with a 2-month history of constant low back and bilateral ankle pain ranging from 4 – 10/10. On this occasion her intervention included PRRT as before but also incorporated stress management with a cardiac coherence monitor.[74] She was discharged after three sessions reporting that she was pain free. One year after her initial visit she was still pain-free. Telephone contact is made periodically to review her status.

DISCUSSION

As a traditional physical therapy examination was not performed, due to the patient's intolerance to direct palpation and movement, major clinical findings in this case study were difficult to establish. The only measurable clinical findings available were the reported pain levels and a description of the patient's functional status.

As noted in the literature, it is common to find extra colonic symptoms in patients with GI disorders such as those described in this case study. [13,15,25-27,29-31] So, had it been possible to execute a traditional physical therapy examination, it is probable that restrictions in active and passive joint ROM, muscle weakness, trigger points, soft tissue and fascial tightness would have been established, among others, within the list of clinical findings and the most effective treatment plan, based on these findings, would have been established.

Upon reviewing the literature, it seems that the diagnosis of this case study falls under the category of chronic pain, [17]so, regarding physical therapy intervention for this patient population some techniques have been shown to be more effective than others yet none show long-term success. [13,21,36-44] As a result of this elusive long-term success rate, the cost to society is enormous. [12,16,23,24,34]

The purpose of this case study was to discuss the new, yet to be proven, treatment intervention known as PRRT that resulted in a quick cost effective and successful outcome for this young patient suffering from chronic pain.

Case Study Outcomes: The outcome of this case study was surprisingly good and five sessions resulted in a 100% pain free status. Following nine sessions, she was discharged to a fully functional and pain-free lifestyle. The hypothesis for this successful result is as follows: GI dysfunction shares similar symptoms and underlying pathology as other chronic pain diagnoses such as fibromyalgia, chronic headaches and low back pain. These chronic illnesses have been noted to be a syndrome of disrupted homeostasis with abnormal central processing of pain and autonomic function.[13,17,22,26,47-50,52] Abnormal functioning can result in a chronic low-grade activation of the fight or flight response system influencing

the somatic nervous system resulting in muscle guarding and holding patterns, thus pain.[18,26,46,55] The primary goal of PRRT is to balance the two halves of the ANS. The primal techniques, as used in this case study, hypothesize to globally treat the system by using the muscles of the face and knowledge of the primal reflexes to calm down the sympathetic influence and enhance parasympathetic influence, restoring homeostasis, thus reducing pain. Based on the research by Dr. Scaer[13] this hypothesis is valid and worth further investigation. As previously noted, involuntary clenching of the jaw is a stress reflex involving the masseter muscle. One of the primal techniques is based on inhibiting this muscle using the agonist/antagonist relationship attempting to reduce this stress reflex. Is it possible that sympathetic output is decreased as this stress response is inhibited? The other techniques follow a similar thought process.

Clinical Relevance: The clinical relevance of PRRT is exciting. First of all, it offers a starting point when treating this very involved and difficult chronic pain population that are typically passed throughout the medical system until they end up in physical therapy as a last resort. Unfortunately, most therapists dread the process of treating the complaints of the multiple "nonsensical" aches and pains seen in the chronic pain population. Using PRRT, the evaluation and treatment techniques are quick, non-invasive, and appropriate for patients who cannot tolerate the traditional process, as occurred with the patient in this case study. Moreover, if a traditional approach can be taken, PRRT will integrate seamlessly with every other technique that is in our knowledge base.

A major benefit reinforced by Iams is that these techniques will "fail fast." There is no point continuing with this approach if results are not seen within 1-3 visits. Iams teaches that up to 50% improvement can be expected after the first session. This is cost effective, especially when treating a population of people that are responsible for a huge economic burden on the healthcare system. There is a benefit for the physical therapist too. PRRT techniques do not require straining forces on the part of the therapist. This is significant in light of a recent study in the Journal of Manual and Manipulative Therapy, which highlighted that 83% of physical therapists complain of thumb pain.[75]

Case Report Limitations: The most obvious limitation of this case report would have to be the inability to determine traditional objective clinical findings while examining the patient. Objective clinical findings were limited to observation of the quality of gait and transitional movements and evaluating treatment effectiveness by determining the patient's pain levels, which although subjective, are valid and reliable[70,71] Further limitations include the lack of disclosure to describe the specific treatment techniques employed during this case study, lack of direct research based evidence for PRRT although, the hypothesis for this new and exciting treatment is clearly supported in the literature.

In hindsight, it would have been beneficial to test this patient before and after treatment sessions, using the cardiac coherence monitor. Such monitors as discussed below, objectively measure the balance within the autonomic nervous system by plotting a graph of the variations in heart rate, which are influenced by the sympathetic and parasympathetic nervous systems. Such a graph is referred to as the heart rate variability (HRV) spectrum. It would have been possible to objectively evaluate if the reported objective results of the HRV spectrum coincided with the improvement noted in the patient's condition. This would have been true if PRRT truly does work to balance the autonomic nervous system.

However, even if we could prove that PRRT is an effective tool for restoring homeostasis within the ANS we would still need to look further into the tools available to address the issues that sustain stress, whether that stress arises from a past traumatic event, poor nutrition, environmental toxins, lifestyle, economic stresses or media influences. Maybe, then, we can learn to be more effective and efficient in the management of chronic pain.

Suggestions for Future Research: The Institute of the Heart Math Research Center (IHC) offers programs that can objectively measure the balance within the autonomic nervous system based on heart rate variability (HRV). [74] This program not only measures this balance but the patient can learn through biofeedback to alter their physiological state. The literature supports the use of biofeedback as a beneficial treatment for chronic pain patients. [10,16,18]

For years, the Heart Math Research Center has been exploring the physiological mechanisms by which the heart communicates with the brain and consistently discovered that HRV or rhythms display the most dynamic and reflective state of emotion and stress. HRV is described as moment-to-moment variations in heart rate that, at rest, should be surprisingly irregular (coherent). This contradicts what we used to believe to be a monotonous regular rhythm. Through research, that can be accessed on their website, they have determined that it is an important indicator of both physiological resiliency and behavioral flexibility reflecting the individuals capacity to adapt effectively to stress.[74]

Normal heart rate variability is due to the synergistic action between the two branches of the autonomic nervous system and at any given time represents the net effect of the parasympathetic (vagus) nerves, which slow heart rate, and the sympathetic nerves, which accelerate it. This balance can be displayed while using the Heart Math Program

The IHC focus on the connection between stress and physiological health and discusses the fact that stress is associated with a variety of pathological conditions including digestive disorders, chronic pain, fibromyalgia, PTSD etc and claim that Heart Math interventions have facilitated health improvements in these patients suffering from these conditions. In the research section of their website, the results of many studies can be found that demonstrate this connection. One of the more surprising studies was carried out over three ten-year periods, and concluded that emotional stress rather than smoking was more predictive of death from cancer or cardiovascular disease, and that due to ineffective management of their stress had a 40% higher death rate than their peers.

It would seem that a study using the Heart Math Program to determine the balance within the ANS before and after treatment with PRRT would be a valid tool to confirm the hypotheses upon which PRRT is based.

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