A CASE STUDY:

Finding a solution at the "wrong" end of the body: A case series using the MyoKinesthetic System to resolve biomechanical dysfunctions

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KEY POINTS

1) MyoKinesthetic (MYK) is a system that theoretically treats both postural and movement imbalances at the spinal nerve root level.
2) Because many chronic conditions are difficult to understand, they may also be difficult to treat.
3) Injury or stressors can affect the body and all its systems, therefore evaluation and treatment of regions outside of the location of injury may be warranted.

KEY WORDS

Posture, Balance, Regional Interdependence, Cross-Education

BACKGROUND

Traditional treatments to various conditions often have mixed outcomes across various patients. Within standardized therapeutic interventions there are always patients who do not respond to treatment as expected. It is also common for some treatments to have very little effect at all. Despite this, treatments are often standardized based on applied theories that lack full understanding of the mechanisms of recommended protocols, or of the actual origin of the condition being treated. Many syndromes are notorious for this, as the very name implies a lack of exact or unified mechanism or origin. Patellofemoral pain syndrome (PFPS), snapping hip syndrome, and various other conditions fit into this category of vague descriptors for symptoms and conditions that are not well understood.

Chronic leg pain is a common condition in the physically active population, particularly among weight bearing sports (Brewer & Gregory, 2012). Estimated to affect up to 84.2% of all athletes during activity at some point (Burrus, 2015; Rajasekaran, 2012), Chronic leg pain manifests in the foot, ankle, calf, or shin, and can easily hinder participation in activities (Brewer & Gregory, 2012; Edwards, 2005). Chronic leg pain is challenging because of overlapping signs and symptoms of an ambiguous nature (Brewer & Gregory, 2012). Chronic exertional compartment syndrome (ECS), stress fractures, medial tibial stress syndrome (MTSS), nerve entrapment, and popliteal artery entrapment syndrome (PAES) are just a few possible diagnoses within the chronic leg pain classification (Brewer, 2012; Edwards, 2005; Krenner, 2002; Reinking, 2007a).

Because of the ambiguous nature of these and other chronic pathologies, recommended treatments are often also vague. Most treatments focus on the local region of complaint and positive outcomes are slow and inconsistent. Although some theorize that this is due to a poor understanding of the local pathology, Moen (2012a), Newman (2012), Raissi (2009), and Yagi et al. (2012) suggest that these pathologies may stem from other general or more systemic issues including: poor biomechanics, nutritional deficiencies, congenital predispositions, or other factors. Regional interdependence theory, cross education principles, central sensitization, and referred pain theories all support the use of a global assessment and approach to treatment (Cook, 2010; Dalonzo-Baker, 2015; Horak, 1991; Iams, 2015). MyoKinesthetic (MYK) is one treatment paradigm that follows these principles.

The MYK system approaches diagnosis and treatment globally. The system is used to evaluate for static postural compensations, revealed through a postural analysis. These compensations are then traced to a specific spinal nerve root level. In theory, posture is the basis of movement, and if it does not fall within norms bilaterally, then movement becomes dysfunctional. The goal when using MYK, is to correct and balance postures by treating muscles bilaterally along specific nerve root pathways. An advantage of the MYK system is its ability to match a treatment to an individual's needs, based on their own postural imbalances revealed in the initial assessment. (Brody, Baker, Nasypany, May, 2015)

METHODS

Over a six month period, including two months that the Memorial Gym Research Clinic at the University of Idaho was closed, five patients presented with a variety of conditions, including: hip pain, shoulder pain, hamstring pain, general leg pain, and shin splints (See Table 1). Using the

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postural exam to dictate nerve root treatment, each patient was treated with MYK. Data was collected on each patient, and post hoc analysis of the outcomes was conducted. The uniqueness of these cases, lies in the fact that each one was resolved using a treatment at the opposite end of the body from the location of symptoms. All lower body injury cases were treated and resolved from a cervical nerve root level, and the one upper body (shoulder) case was treated and resolved through the S1 nerve root protocol.

CASE DESCRIPTIONS

HISTORY

As this was a post hoc analysis of a variety of patients, the amount of information available in each case will vary, and a complete description of each case is included in Table 1. All patients reported to the clinic with their own individual complaints, and the only consistent outcomes measure used to evaluate every patient was the Numeric Pain Rating Scale (NPRS), where they were asked on a scale of zero to ten, zero being no pain at all, and ten representing the worst pain imaginable, where they would rank their pain.

Aside from the initial history, an MYK postural analysis was performed pre MYK treatment, and patients were treated based on the primary nerve root level imbalance and/or based on symptoms experienced.

TABLE 1. SUMMARY OF PHYSICAL EXAM AND TREATMENT

PATIENT 1		
60 YEAR OLD MALE	**CHEIF COMPLAINT**	**NERVE ROOT TREATMENT LEVEL**
RETIRED, ARMY	**HIP PAIN**	**C5**

Patient was hit by a car about two and a half years previously, while helping someone out of a ditch. Since this event, he had experienced a consistent, if periodic, unexplained pain in the right hip, and was told that it may be permanent. Physical examination revealed unequal lateral flexion of the spine, the left side being limited because of pain on the right. His pain was 2 NPRS, and had been consistently experienced at that level on a daily basis for several weeks. He rated his disability on the disabilities in the physically active scale (DPA scale) at a 57 out of 64.

The patient initially received treatment after the accident, from an Emergency Room, with follow-up visits with a physician, and later physical therapy. After extensive treatment and rehabilitation, he was left with unresolved symptoms of pain in the right hip, and periodic unexplained pain in other locations of the body.

After an MYK posture analysis, he was treated at the C5 nerve root level (the primary imbalance). Following the initial evaluation and treatment, the patient reported a 0 NPRS, which then continued for one day. Pain returned in the afternoon of the following day, and he was treated a second time after two days. After the second treatment, he again received full resolution of symptoms, and he returned for a third treatment 5 days after the second visit, having been a total of one week after the first visit. Since the second treatment, he had experienced one 10 minute bout of low level pain, which was eliminated after standing and walking around. His DPA scale score was a 23 out of 64, which is with normal limits (Vela, 2010), and after the third visit, the patient experienced full resolution of pain, and had not yet experienced that pain again. ROM was also restored bilaterally, and the patient, though not officially discharged, did not return for further treatment.

PATIENT 2

40 YEAR OLD FEMALE	**CHEIF COMPLAINT**	**NERVE ROOT TREATMENT LEVEL**
DISTANCE RUNNER, RECREATIONAL WEIGHT LIFTER	**HIP PAIN**	**C5/S1**

Patient reported never having experienced severe unexplained pain, in her entire career of nearly 20 years. She was referred to the clinic for an informal assessment prior to opening in the fall, in hopes of resolving an issue in her hip before her race in 1.5 weeks. Pain with palpation was present over the left quadratus lumborum, and it was highly debilitating.

After a lower body posture analysis only, she was treated at the S1 level. After the treatment, all symptoms were completely resolved. At a follow-up the next day, all symptoms had returned. The same treatment was used two more times, with no progress, and even reduced effectiveness during subsequent treatments.

On the third visit, a Mulligan SI Joint glide, and a Lumbar SNAG were added to the treatment, achieving a level of success again, though not a full resolution. With this protocol on the third and fourth visits, she was able to become functional and mostly pain free for her race that weekend. However, the symptoms continued to return.

Three days after her race, a full postural assessment was made, and she was treated at the C5 level (primary imbalance). All symptoms disappeared, including one she hadn't mentioned previously, in her right shoulder. (Apparently, three months previously, she took a fall, and torqued her shoulder. It had pain for a while, but was never treated.). At this point a DPA scale questionnaire was given and she scored 19 out of 64.

After two treatments of C5, all original symptoms were eliminated permanently. On treatment day 7, with a third treatment of C5, she had been pain free for five days, and she returned one week later for a follow-up. She reported only a mild achiness in her right shoulder in the mornings when she woke up, but otherwise no other discomfort had returned, and she was in full activity.

On treatment day 8, a new postural assessment revealed a near resolution of all upper body imbalances, and all symptoms were eliminated. Her new DPA scale score was a 0 out of 64. Though symptom free, another follow up was made to restart S1 treatments in an effort to resolve the lower body imbalances, and to resolve occasionally reappearing shoulder achiness. S1 level was treated two more time every other day, completely resolving the issue, and the patient was discharged, having achieved a full recovery.

PATIENT 3

20 YEAR OLD FEMALE	**CHEIF COMPLAINT**	**NERVE ROOT TREATMENT LEVEL**
DANCER	**RIGHT SHOULDER PAIN**	**S1/C5**

Patient presented with pain in the right shoulder. She had been using a pick axe with repetitive motion, a few days previously, but no specific mechanism of injury was discovered. Her breathing was only sometimes partially impaired. At first glance, it would appear to be a simple "over-use" injury. The empty can test, apprehension relocation test, Speeds test, Neers and Hawkins tests were all negative. Scapula and trapezius muscles were tender to palpation. Her DPA scale score was 30 out of 64.

MYK postural exam revealed a clear S1 imbalance, with C6 and C7 nerve roots being next, but with only half as many imbalances. Her pain was a 6 NPRS. The initial S1 treatment eliminated all pain and symptoms, and she returned two days later with a 4 NPRS. She was treated with the same nerve root 3 more times in the next week, and received a near full recovery. After four treatments, she was reassessed and presented with a C5 predominant imbalance. She received two treatments of C5, and was discharged, having experienced a full recovery. Her DPA scale score at discharge was a 6 out of 64.

PATIENT 4		
30+ YEAR OLD FEMALE	**CHEIF COMPLAINT**	**NERVE ROOT TREATMENT LEVEL**
UNIVERSITY FACULTY MEMBER	**RIGHT GENERAL LEG PAIN**	**C8/SI**

Patient presented with general R leg pain (hip, knee, and ankle) after one of her regular runs, with no mechanism of injury. Her pain was a 5 NPRS, and she could not run. Her DPA scale score was a 26 out of 64.

After a MYK postural analysis, the patient was treated at the C8 nerve root level, (primary imbalance). After treatment, her pain level dropped to a 3 NPRS, and then a muscle energy joint mobilization was performed on her SI joint. No further changes in pain took place in this treatment.

A follow-up treatment was performed three days later, when she presented with a 3 NPRS, and after this treatment of MYK, her pain dropped to a 1 NPRS. No further paradigms were used in this treatment session. She was treated again two days later, after presenting with only knee pain of 3 NPRS. Hip and ankle discomfort were eliminated. Post-treatment, her pain reduced again to a 1 NPRS.

In a new postural analysis, almost all imbalances in the C8 region were completely eliminated in this treatment. She was treated five more times over the next two weeks at the S1 nerve root level (the new primary imbalance), until it too stabilized. Pain remained localized at the knee and never rose above 2 NPRS, and by the fourth treatment of S1, it was eliminated. Her DPA scale score was reduced to a 2. A final treatment was scheduled to teach the patient Total Motion Release, as a self-treatment, in case symptoms returned, and the patient was then discharged, with full resolution.

PATIENT 5		
20 YEAR OLD FEMALE	**CHEIF COMPLAINT**	**NERVE ROOT TREATMENT LEVEL**
ROTC STUDENT	**BILATERAL "SHIN SPLINTS"**	**L4/C5**

Patient presented with bilateral "shin splints." It was difficult to classify her as MTSS, as her pain was generalized over both lateral and medial tibias. She presented in the clinic with only mild discomfort, 1 NPRS, but when she ran, it would rise considerably, causing her to buckle under the pain. The DPA scale was not used on this patient.

MYK postural analysis presented only mild imbalances at the L4 and S1 nerve roots. Her upper body screen presented primarily a C5 imbalance. After consideration, she was treated at L4, due to symptoms, and received a complete resolution of symptoms. The following day, she was asymptomatic but had not yet run, since her last visit. After treatment of the L4 nerve root, her symptoms returned with more intensity, a 2 NPRS.

She returned 5 days later presenting with a 1 NPRS, and she still could not run. Nothing had changed. She was treated again at the L4 nerve root, receiving two treatments in the same day. No change took place with either treatment.

She returned for a fourth treatment session, two days later, and having received no change in symptoms, a new postural evaluation was performed. It was determined that no significant change was taking place posturally or symptomatically. Her treatment was changed to a C5 nerve root (the primary upper-body imbalance). All symptoms were eliminated, and after a second treatment on the same day, another two were performed the following day. Symptoms never returned, and with a final analysis, most postural imbalances had been resolved. She was then discharged, and with a two week follow-up, her condition remained resolved.

RESULTS

From initial treatment to discharge, all patients received a full resolution of symptoms, which remained resolved after at least one week. (Not all patients received a one week follow-up). Numeric Pain Rating Scale was the only consistent outcomes measure reported across all patients, and minimal clinically important differences (MCID), 2 or greater, were achieved (Krebs, 2007). The Disabilities in the Physically Active Scale was used on four of the six patients, with significant changes that meet MCID, 6 or greater in patients with chronic conditions and 9 or greater in patients with acute conditions (Vela, 2010), and resolution was attained in all patients. An average of 25.25 change was attained in these four patients. Though the MyoKinesthetic Postural Analysis has potential for bias and subjectivity, visible changes did take place with most patients. All patients were treated using a nerve root level distal to the primary region of complaint.

DISCUSSION

In every case, a treatment for the opposite end of the body to the chief complaint was used to ultimately resolve the condition. Multiple biomechanical models have demonstrated the concept that every movement has an effect on the whole organism (Cook, 2010; Dalonzo-Baker, 2015; Heriza, 1991; Horak, 1991). The regional interdependence model used by Gray Cook and his team in the Functional Movement System, demonstrates imbalances and compensations do not effect only local regions of the body. (Cook, 2010) One point of guarding or tension can change an entire kinetic chain, and thus change the entire body's movement patterns. When the condition resolves and guarding is no longer needed, these changes are supposed to return to normal biomechanics, but this does not always take place. When these postural and movement patterns are adopted as a new norm, they may predispose the body to injury.

Tom Dalonzo-Baker, founder of the Total Motion Release (TMR) paradigm, cites cross-education principles as a means for the body to balance itself. By treating parts of the body, other than the sight of injury, the brain and nervous system can use that information to restore balance to multiple systems and kinetic chains. (Dalonzo-Baker, 2015) As kinetic chains run throughout the body in all planes of movement, it stands to reason that with these two principles, treatment of another region can have a major effect on all other aspects of the body.

The systems model of biomechanics theorizes that multiple interactive systems coordinate to create and control behavior and movement. These systems may include, but are not limited to regulatory, environmental, comparing, sensory-motor, musculo-skeletal, and commanding systems. Another version of this model categorizes systems differently as follows: the sensory organization, motor coordination, environmental adaptation, predictive central set, perception of orientation, and musculoskeletal system. The theory it builds off of earlier reflex and hierarchal models of movement behavior, but as seen above, it is difficult to place a label on specific systems, because they are integrated as a whole. Likewise, each system is built upon smaller sub-systems, such as neurological pathways, kinetic chains, and reflex arcs. In this model, compensations are not solely neuromuscular in nature, and every system can supplement or react to compensations. With this in mind, it is easy to see how making changes in one area, can affect, not only multiple regions, but multiple systems. (Heriza, 1991; Horak, 1991)

LIMITATIONS

This case series arose from a post hoc analysis of practice. A trend was found common among these patients, but because of the nature of this study, much of the patient outcomes instruments were inconsistent across all patients, making a more thorough comparison difficult. Having no control group and small population sample makes it impossible to determine a frequency of such occurrences where the treatment does not match the region of complaint. Because certain cases also included other treatments, it is difficult to determine that the main effect of MYK was not supplemented by other treatments. Clearly, more research is needed to determine the efficacy of MYK, and the frequency of cases where treatments are inconsistent with the region of complaint.

CONCLUSION

Clinicians have many tools and treatment options inside and outside of the standard entry-level training, some of which may be more effective than others, and/or may be unique to individuals. The results of this case series demonstrates the importance of taking into account the body as a whole, when considering treatment and care for patients. It is important for clinicians to recognize the uniqueness of the individual patient and their needs, and to remember that the body is the perfect compensator. Every biomechanical movement in the body will have an effect on the whole organism, sometimes even in unexpected ways. As clinicians seek more effective strategies to treat patients, with any pathology, it is important that they have multiple tools to choose from, in order to customize treatments to the individual. They must also remember that not every condition is a local condition. If a treatment does not work, it is important to consider other possibilities. Evidence shows MYK to be a valuable tool in this process.

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