

Precision neuromuscular therapy reduces pain and increases range of motion in a client with chronic low back pain: A case report.

Precision neuromuscular therapy (PNMT) is a science based application of massage therapy used to assess and treat the true source of soft tissue dysfunction. This method allows the therapist to address multiple sources of soft tissue pain through a scientific process of testing for muscle weakness, muscle hypertonicity, range of motion (ROM) measurements, and visual assessment of bony landmarks. Using results from these tests, the therapist can then specifically treat the muscles or ligaments responsible for the pain and/or structural imbalance.

There is some disagreement on the definition of chronic low back pain (CLBP). For the purposes of this case study, it is defined as frequently recurring low back pain which affects the individual intermittently over a long period of time. There is no shortage of research available on the prevalence of low back pain. All of the studies show a high percentage of the population have been, or will be affected by low back pain. One study in particular, states that 70-85% of all people have back pain at some time in their life, with the annual prevalence ranging from 15-45%, with point prevalence averaging 30%. Some 31 million Americans experience back pain at any given time. Complimentary studies show that recurrence of low back pain has a high prevalence, with 1-year recurrences ranging from 20-44%, and lifetime recurrences of up to 85%. In this study, men were more affected by recurrence than women, and people between the ages of 25-44 years had the highest rate of recurrence.

In a study conducted in 1990, there were about 15 million office visits to physicians in the United States for mechanical low back pain, which accounts for about 2.8% of all office visits. Another study states that about 17.9% of all visits for chronic pain were for chronic back pain specifically. Of these, about 47% were prescribed an analgesic. In addition to oral drugs, some other common treatments for chronic low back pain include: bed rest, spinal manipulation, physical therapy, surgical procedures such as spinal fusion, injected drugs, acupuncture, massage therapy, inversion gravity traction, and trigger point injections.

I searched for articles relevant to my client using the following keywords: psoas, multifidus/multifidus, iliacus, yoga, and chronic low back pain. I found several articles significant to this case. One article was originally published in The Lancet by Gunnar BJ Anderson, MD, titled, "Epidemiological Features of Chronic Low-Back Pain." This article, in particular, provided the landscape for the scope of low back pain prevalence. Another article that was particularly pertinent to this case was titled, "The Evolution of Spinal Stability in the Physical Therapy Field" by Pete Emerson, PT, MMTC. This article outlines the functions of the psoas and multifidus of the lumbar spine, as well as defining their relationship to one another. It also establishes these muscles as the foundation of a healthy spine, stating that it is essential to have healthy firing patterns in the multifidus of the lumbar spine and psoas muscles before any other spinal exercises can be performed with any efficacy. Another crucial article to this case I found to prove the beneficial link between harmonious exercise such as yoga and pilates, and CLBP. This article is the

doctoral dissertation by University of Tennessee Graduate Student, Laura Horvath Gagnon, titled, "Efficacy of Pilates Exercises as Therapeutic Intervention in Treating Patients with Low Back Pain."

The client in this case is a 51 year old male who travels 2-3 times a week via airplane for work. He has no prior history of surgical interventions for musculoskeletal dysfunction. He has no history of cardiovascular or respiratory dysfunction. The client leads a moderately active lifestyle, and is an occasional smoker.

The client presented with a current episode of his recurring CLBP. He describes his pain as being in the low back, along the spine in a vertical pattern, and worse on the left side. This current episode started 3 weeks prior to his first session with me. He has sought care from another Licensed Massage Therapist twice a week for the past 2 weeks, with no noticeable improvement in pain or in ROM. At the start of our sessions, the client also started to have spinal manipulations under the care of a Doctor of Chiropractic. The client's goals at the beginning of treatment were: to increase ROM of spinal flexion, and decrease pain in lumbar spine.

The pre-treatment measurements were taken using a flexible measuring tape. I began by placing the zero of the measuring tape at the spinous process of C7 and holding it against the body, this is the fixed end. I placed my fingers at the junction of L5 and S1 and let the length of the measuring tape slide through my fingers. I made note of the measurement of the spine while the client was standing. I then instructed the client to try to touch his toes and stop at the point where he began to feel pain. I took note of this measurement of the spine. The difference of the measurement of the spine while standing and the measurement while in as much spinal flexion the client could do without pain is the measurement of spinal flexion ROM. The client's starting measurement was 8cm.

I then evaluated the balance of the client's pelvis by examining the bony landmarks of the pelvis, namely the Posterior Superior Iliac Spines (PSIS), the Anterior Superior Iliac Spines (ASIS), and the most superior aspect of the iliac crests. I noted that the left innominate was anteriorly inclined (unilateral flexion on the left.)

Taking into consideration his lifestyle, pain patterns, limited spinal flexion ROM, and pelvic imbalance, I decided to perform muscle tests on the psoas, iliacus, and lumbar multifidi. I tested the lumbar multifidi first. I tested this muscle with the client seated in a chair and instructing him to touch his toes. I visually assessed the curve of the lumbar spine, as well as running my fingers along the spinous processes of L1-L5 to palpate the curve. From my observations, I determined that instead of having the normal kyphotic curve in the lumbar spine during spinal flexion, my client's spine was restricted and was instead straight, along all segments of his lumbar spine. This confirmed that multifidi of the lumbar spine would need to be treated.

I then tested the iliacus and psoas muscles bilaterally using two versions of the modified Thomas test. The client was supine on the table with no supports or bolsters. On the side not being tested, the client's leg was flexed at the knee with the foot on the table.

I stood on the side being tested, facing the client. I took the leg on the side being tested into a passive 60°-70° of hip flexion, keeping the leg straight at the knee. After this, there are slight variations in the tests for the iliacus and psoas.

To test for iliacus restriction, I placed my other thumb on the inferior aspect of the ASIS and passively lowered the leg towards the table. Restriction of the iliacus was present on the right side only and indicated by movement of the ASIS inferiorly before the leg was lowered completely onto the table.

To test for psoas restriction, I placed my other hand, palm facing up, under the client's lumbar spine, flexing my fingers to make contact with the spinous processes. I then passively lowered the leg towards the table. Restriction of the psoas was present on the left side only and indicated by movement of the lumbar spinous processes anteriorly (out of my hand and up off the table.)

Session 1 - October 11, 2013: After testing, I began with a prone treatment of the lumbar multifidi. This consisted of small, scooping type motions in a superior to inferior direction against the lateral aspects of the spinous processes L1-L5; deep scooping motions with fiber direction to affect the mamillary processes of L1-L5 and the sacral surface down to the level of S3. I then continued the session with a treatment of the left psoas. This consisted of having the client in the supine position with knees bent and supported. Below the level of the belly button (about L4), and lateral to the rectus abdominus, I placed one hand over the other and circled into the abdomen to push internal organs aside, aiming for the anterior aspect of the spine. To ensure I was on the psoas, I asked the client to perform resisted hip flexion, by having them raise their knee into my elbow. Initially, the client was very reactive to pain in this muscle, so I only compressed it, then relocated to a more inferior aspect. I positioned my hands on the psoas 3 times to treat the entire muscle belly. During this session, I did not use any stroking on the psoas, or any pin and stretch applications, only segmental compression. I then treated the iliacus on the right. For this treatment, the client was still supine. I stood at the client's left side to treat across the table. The client's knees were flexed and supported so the abdomen could relax. I placed one hand over the other and examined the medial aspect of the iliac crest, slowly working posteriorly and maintaining contact against the bone. This felt less sensitive for the client than the psoas treatment did. I finished the iliacus treatment with a post treatment stretch. For the stretch, the client was lying on his left side, right side up, as close to the side of the table as possible, knees flexed, and a cushion under the neck for support. I stood behind the client and used my body to support him so he would feel secure. I placed the lateral aspect of my left hip against the posterior aspect of his right hip. I then supported his right leg by cradling the foot into the crease of my right elbow, using my forearm and hand to support his lower leg. I placed my left hand on the anterior aspect of his right leg, just superior to the knee. I then took his right hip into passive extension by rotating my own body to my right, supporting him as I turned. I then re-treated the left psoas using the same methods I had used earlier in the session, and paying special attention to the more superior fibers, which the client reported were most sensitive. At the end of the treatment, forward flexion was remeasured and found to be 9cm, and the client reported an improvement in pain.

Session 2 - October 14, 2013: The client reported still feeling restriction during forward flexion and moderate low back pain. He stated that pain had subsided for about 1 day after last treatment, but spinal flexion ROM was still limited. I began this session with a measurement of forward flexion, it was 8cm. I used the modified Thomas test to measure the restriction of the left psoas and right iliacus. The right iliacus had less restriction than at the beginning of the last treatment. I then treated the left psoas using the same method as the first session. The client's pain tolerance for the treatment was higher than in the first session, but still was very sensitive, particularly on the superior fibers of the muscle. I used a "fly under the radar" approach, gradually increasing my pressure, but the client having a sensation that it had stayed the same. This technique was very effective in releasing the psoas. I then treated the right iliacus while supine, the client reported that it did not feel as tender today. I finished this treatment with the post treatment iliacus stretch I had used in the first session. I re-treated the left psoas and the client reported a dramatic decrease in sensitivity from the earlier treatment during the same session. I then treated the lumbar multifidi, bilaterally. I used the same techniques as in the first session, with the exception of the position of the client. This time I had the client sit in a stool facing the massage table. I treated the muscle while he sat up straight, and also while he leaned forward to rest his head on the massage table. I finished this treatment with an active release of the multifidi. This consisted of a deep glide from the level of L1 to the level of S3 one side at a time, while the client bent forward into flexion. This was repeated 3 times on each side. Forward flexion was remeasured after treatment and was at 12cm. The client reported that this movement felt painless and that he felt an improvement in ROM, but not his usual ROM.

Session 3 - October 18, 2013: The client reported that his pain is about 75% improved, and that forward flexion ROM continues to improve but still not back to what he is used to. Measurement of forward flexion was 12cm at the beginning of this session. Modified Thomas tests still indicate left psoas and right iliacus, but with less restriction present in both muscles. I began with left psoas treatment, using the same methods as prior sessions. Client reported less sensitivity in psoas from prior treatments. I included a pin and stretch into the psoas treatment. This consisted of compressing each segment of the psoas and asking the client to slowly straighten the left leg to the table without picking up the heel of the foot. This was completed in 3 sections all the way down the muscle belly. I proceeded with the iliacus treatment on the right, the client reported that it felt a little more sensitive, almost like the first session. I concluded this work with a post treatment stretch for the iliacus using the same method as in prior sessions. I then treated the multifidi in the seated position using the same methods as in the second session, including the active release. Measurement of flexion at the end of the session was 14cm. The client stated that this felt like 85% of what he previously had, and had no pain during movement. At this point, I suggested implementing yoga poses at home, specifically child's pose flowing into cobra pose, and repeating.

Session 4 - October 21, 2013: The client reported that ROM was now 95% what he previously had and he was pain free since last treatment. He also stated that he did do the suggested yoga poses and he thought that they had helped. Pre-treatment

measurement of flexion was 14cm. Modified Thomas test for left psoas and right iliacus were both negative. Examination of the bony landmarks of the pelvis showed symmetry at the PSIS, ASIS, and iliac crests, bilaterally. I did a treatment of the left psoas and right iliacus, neither felt significant to the client, with no tenderness reported. These treatments utilized the same methods as in prior sessions, but because they did not feel significant to the client, and the tests did not show restriction, the duration of them was much shorter. I included the post treatment stretch for iliacus. I then treated the lumbar and sacral multifidi using the same methods as before, with the client seated, including active release. This treatment did still feel significant to the client, with some tenderness reported. At the end of treatment, client stated that forward flexion does not feel inhibited by lumbar spine, and is still pain free. My examination of lumbar multifidi found lumbar spine to have a normal, kyphotic curve, during flexion and is not restricted at any spinal segments. Post-treatment flexion measurement was 15cm.

This table outlines the results of the four sessions. The measurements provided are the pre-treatment and post-treatment measurements of spinal flexion ROM taken during each session. From the beginning of the first session, to the end of the fourth and final session, the client gained 7cm in spinal flexion ROM.

	Session 1	Session 2	Session 3	Session 4
Pre-Treatment measurements	8cm	8cm	12cm	14cm
Post-Treatment measurements	9cm	12cm	14cm	15cm

Throughout this case, I strived to achieve these goals: increase in spinal flexion ROM, decrease in CLBP, and balance the pelvis. I wanted to help the client achieve these goals with as little discomfort during the treatment process as possible. I maintained constant communication with the client and adjusted my approach as needed, such as treating the psoas muscle twice in the same session. The shorter treatments allowed the client a break from the intensely tender treatment, and gave me a way of measuring the effectiveness of the treatment within the same session.

The most significant challenge I faced in this case was keeping my results pure. The client received spinal manipulation prior to the first session, on the same day. He was seeing a Doctor of Chiropractic once a week, and seeing me twice a week. In order to maintain some consistency in the results, I asked that if he was to receive spinal manipulation, that it would always be before his session with me, just like his first session. I felt that this was beneficial to the client's understanding of the treatment he was receiving from his DC and also from our PNMT sessions. This also established a control in the case, however I can not state that his beneficial results were purely from PNMT.

I would suggest to other practitioners when they are following this case study with their own clients is to also establish a subjective measurement language, and not to

rely solely on scientific measurements. The one I established with my client was asking him what percentage of his original ROM he felt he had. We discussed what 100% felt like and how long ago he felt he had 100%. This worked for his situation, but may need to be varied from client to client. My client felt pain free in his spinal flexion ROM at the end of the third session. However, he also felt that he only had 85% of the ROM he had been used to. If we had not established a language for him to measure his progress, a fourth session could have gone unscheduled, changing his outcome of the entire treatment process. The importance of this case is that the client's goals were all met, and in two weeks of sessions. When I see this client for treatment in the future, I plan to write additional case studies in an effort to track the recurrence of his CLBP.

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