Clinical Reasoning in Massage Therapy

Kim LeMoon

Freshman (2008), Rutgers University, New Brunswick, NJ, U.S.A.

Background: **Clinical reasoning has long been a valuable tool for health care practitioners, but it has been under-researched in the field of massage therapy. Case reports have been a useful method for exploring the clinical reasoning process in various fields of manual therapy and can provide a model for similar research in the field of massage therapy. A diagnostically challenging case concerning a client with low back pain serves as a guideline for examining the clinical reasoning process of a massage therapist.**

Methods: **A two-part methodology was employed:**

- **Client profile**
- **Reflective inquiry**

The inquiry included questions pertaining to beliefs about health problems; beliefs about the mechanisms of pain; medical conditions that could explain the client's symptoms; knowledge of the client's anatomy, assessment, and treatment choices; observations made during treatment; extent of experience in treating similar problems; and ability to recognize clinical patterns.

Results: **The clinical reasoning process of a massage therapist contributed to a differential diagnosis, which provided an explanation for the client's symptoms and led to a satisfactory treatment resolution.**

Conclusion: **The present report serves as an example of the value of clinical reasoning in the field of massage therapy, and the need for expanded research into its methods and applications. The results of such research could be beneficial in teaching the clinical reasoning process at both the introductory and the advanced levels of massage therapy education.**

KEYWORDS: Case report, low back pain, fibromyalgia, lumbar radiculopathy

INTRODUCTION

Clinical reasoning (CR) in massage therapy is the process by which a massage therapist, while interacting with a client, formulates meaning, goals, and treatment strategies based on client preferences, client history, and physical assessment, which are in turn informed by the depth and scope of the massage therapist's knowledge[1–3] and clinical experience[4,5]. Clinical reasoning is not a separate skill acquired independently of medical knowledge; instead, it suggests a continuum on the developmental spectrum of clinical mastery, in which the acquisition of knowledge and the development of clinical reasoning skills occur concurrently[2].

Clinical reasoning can be further understood by looking at four key components that constitute the CR of massage therapy practice:

- **The overarching philosophies of a massage therapist** regarding models of health and mechanisms of pain govern all of that therapist's clinical decisions[3,6]. These philosophies dictate the scope of CR and provide the lens through which the therapist views all other pieces of clinical information.
- **Hypotheses** provide a tentative explanation for the presenting complaints of a massage client. The hypotheses are based on a massage therapist's understanding of anatomy, physiology, kinesiology, and pathology[7], and can be tested by further investigation. They are modified when new information becomes available.
- **Assessment and treatment techniques** may be chosen by a massage therapist for a variety of reasons, including established protocols for specific modalities, successful outcomes in treating similar conditions, and client preferences[5,8].
- **Clinical expertise** can be developed only through experience[9], as a massage therapist develops professional judgment[3], technical proficiency[7], and pattern recognition ability[3,5,10–12] over time.

Clinical reasoning requires that a massage therapist be investigative. It is important to be watchful for clues that can guide assessment and treatment, and to continue to integrate new information as it appears. Using the information-gathering process, the massage therapist can discern between similar conditions and make sound decisions about treatment—or even decide not to treat the condition at all[5]. Being reflective is essential to improving CR skills[13–15]. When cases are reviewed, when conversations are remembered and when assessment and treatment choices are re-evaluated, alternate approaches can be considered.

Massage therapy might seem like an intuitive art, but through the process of reflection, the reasons for the choices made become available to conscious examination.

In the field of massage therapy, CR is a relatively under-researched topic. Researchers from other branches of manual therapy (for example, physical therapy) have been studying CR within their professions for some time[6,9,13,14,16,17]. One of the methods employed by these researchers is case reports. By design, case reports integrate the thought process of the therapist into the methodology of the report, so that the reader not only knows what was done, but *why* it was done. By structuring case reports that focus on the "why," previously tacit thought processes can become accessible to analysis[18,19].

The present report provides an example of how case reports can be used to study CR in the field of massage therapy. By examining four key components of the CR process, a rationale for the hypotheses that were generated and the choices that were made regarding assessment and treatment can be demonstrated. Through reflective inquiry, the present report describes how one massage therapist used a hypothetico-deductive reasoning strategy and pattern recognition[5,10,20] to influence outcome in a difficult-to-diagnose case of low back pain.

METHODS

Client Profile

By the time Louisa[a] was referred to the author's massage therapy practice in June 2004, she had already assembled a team of competent health care practitioners to help her manage the pain and dysfunction of fibromyalgia syndrome (FMS). This vibrant 50-year-old woman had become a model patient in the more than 10 years since she was first diagnosed. She had educated herself about FMS, and she relied on a combination of pharmacologic interventions, psychotherapy, exercise, massage therapy, and chiropractic treatments to keep most of her symptoms at bay[21]. Although she had improved dramatically, she still experienced "fibro flares," her descriptor for the bouts of fatigue, anxiety, and pain that would come and go as part of FMS.

I had been working with Louisa on a weekly basis for 2 months when she limped into the treatment room one day. While moving between postures in a gentle yoga class, she had twisted at the waist and heard what she described as a "loud pop" that seemed to come from her lower back. Initially she experienced no pain, but by the 3rd day, she felt pain in her right buttock and posterior thigh. She consulted with her chiropractor, who performed a straight-leg test and determined that the injury did not involve spinal pathology. Over the next few months, pain was intermittent and, when present, seemed to be relieved by massage treatments. However, by December 2004, the frequency and the intensity of the pain had increased.

Louisa reported the exacerbation of symptoms to several members of her care team and relayed that each had a different opinion about the problem. The rheumatologist thought that her symptoms were attributable to FMS. The primary care physician diagnosed her condition as trochanteric bursitis. The chiropractor identified the problem as sacroiliac dysfunction, but blamed FMS for the delay in healing.

Louisa's symptoms could be logically explained by collectively considering her presenting conditions, but I continued to observe her and to gather information, looking for clues that might help to understand why she was still in pain, even though she had been receiving what seemed to be ample and appropriate treatment for her known conditions.

The Clinical Reasoning Process

Overarching Philosophies

What are the massage therapist's beliefs about health problems and pain mechanisms, and how did those beliefs influence the treatment plan?

Health problems are multifactorial in nature and are best approached by looking at the combination of physical, environmental, and psychological factors. This paradigm takes into account the uniqueness of every client and every clinical situation and considers the biopsychosocial environment in which the situation occurs[1,22].

Pain is a subjective sensorial and emotional experience signified by an awareness of unpleasant bodily sensations. It is produced by the sum of complex neurologic mechanisms, not by a single stimulus. Nociceptive warning signals from body tissues are not necessary to produce pain; pain may occur even in the absence of tissue damage. The experience of pain may be induced or enhanced by both real and imagined threats to the organism. Conversely, the experience of pain may be inhibited or completely blocked by both pleasant and unpleasant mental distractions. The precursors to the experience of pain may involve an array of inputs to the central nervous system including sensory, motor, autonomic, endocrine, immune, cognitive, affective, and behavioral components. The output response is ultimately determined by the unique conditions, circumstances, and framework in which the situation occurs—and by the individual's interpretation of the experience[23].

Louisa's life circumstances and psychological state were viewed as important factors in designing her treatment plan. She was in the process of making significant personal and professional changes in her life, and in doing so, she was encountering some challenges. Even though her physical pain was often a prominent complaint, it was sometimes shadowed by life events.

[a] A pseudonym.

The massage sessions served as a therapeutic modality and as a form of social and emotional support.

Generated Hypotheses

What medical conditions could explain the client's symptoms?

The umbrella diagnosis that Louisa carried was FMS. This disorder is one of chronic widespread pain, with increased sensitivity and amplification of pain. It seems to involve genetic factors, biopsychosocial mediation, environmental stressors, non-restorative sleep, and central sensitization with peripheral pain generators[24,25]. It is not uncommon for FMS to manifest after a soft-tissue injury; however, pain is usually not felt until several days after the precipitating event[26].

Low back pain is a common complaint among FMS patients, and additional reports of pain may refer into the buttock and thigh, mimicking sciatica[21,26]. Louisa's symptoms could be entirely explained by this understanding of FMS; and yet, I suspected that FMS was not completely to blame. I thought it prudent to consider additional explanations.

When Louisa was examined by her primary care physician, he diagnosed her condition as trochanteric bursitis. Although Louisa would report lateral hip pain with tenderness upon palpation, her pain referral pattern was not consistent with the known pattern for trochanteric bursitis. Louisa's pain was primarily in the buttock and posterior thigh; pain referral in trochanteric bursitis typically radiates down the lateral aspect of the thigh[27]. If Louisa's greater trochanteric bursa was inflamed, it likely was a secondary problem. It did not explain the extent or distribution of her pain.

Another hypothesis to explain Louisa's symptoms was that of sacroiliac dysfunction. Hypermobility in her right sacroiliac joint could have created an imbalance in sacroiliac motion and pain in and around that joint[28]. The imbalance could have changed the biomechanics of her gait and could have overloaded the muscles of her pelvis, hip, and thigh.

The diagnosis of sacroiliac dysfunction has long been a subject of controversy because

- there are currently no widely accepted protocols for the diagnosis and treatment of sacroiliac joint dysfunction[29], and
- pain around the sacroiliac joint can be caused by a number of other structures in the area, making a precise diagnosis challenging[30].

There was no way of knowing if sacroiliac joint dysfunction was the cause of Louisa's symptoms.

In the examination that was performed by the chiropractor soon after the injury, a straight-leg test was used to determine[31] that Louisa's injury did not involve spinal pathology. I did not repeat the test, deferring to the chiropractor's greater experience in diagnosing disorders of the spine. In addition, I had been taught that the distribution of true sciatica is pain that refers from the back to below the knee[32]. Because Louisa's pain never reached beyond her posterior thigh, the possibility of lumbar radiculopathy was dismissed.

Assessment and Treatment Choices

Was anything about the client's anatomy notable?

The most notable thing about Louisa's anatomy was her generalized hypermobility. Excessive joint laxity is thought to be a risk factor for injury[33–37] and may have contributed to Louisa's history of a torn medial meniscus in each knee, requiring arthroscopic surgical repair to the left in 1989 and to the right in 2004. Although the method of diagnosis is uncertain, the first chiropractor mentioned in this report had ascertained that Louisa had ongoing sacroiliac instability. Louisa's generalized hypermobility and her susceptibility to injury remained an immeasurable factor, but worthy of consideration in her low back pain presentation.

What methods of assessment were used?

Manual therapy assessments commonly use physical examination to determine abnormal states of tissue texture, joint position, and tenderness as an indication of somatic dysfunction[38,39]. This author concurs with Lucas and Moran[40] that "somatic dysfunction may be neither necessary nor sufficient to produce symptoms"; therefore an assessment to observe changes during and between sessions was used to guide Louisa's treatment, without attaching absolute meaning to the results.

Assessment for thickening, noncompliance or edematous changes in tissue texture[39] was determined by palpating for limitations in passive mobility at three levels:

- The first level tested the mobility of the dermis upon the axial fascia. How easily did the skin glide in all directions over underlying structures?
- The second level tested the tangential mobility of a relaxed muscle in neutral position in relation to its anatomic neighbors. Was a muscle able to be passively mobilized from side to side or did it feel as if it was adhered to another structure?
- The third level tested accessory joint motion (also known as joint play) available in related articulations[41–43]. Did a joint in neutral position possess a small degree of passive mobility when challenged with compression?

Assessment included bilateral comparisons of tissue texture and joint position, using the non-painful side as a gauge of relative normalcy.

What were the findings of the assessments?

At the beginning of each massage session, Louisa was asked to rate her current level of pain intensity. A verbal rating scale was used in which, on a numeric scale from 0 to 10, 0 represented one extreme (that is, no pain), and 10 represented the other extreme (that is, the worst pain possible). Assessment for passive mobility limitations was consistent with Louisa's pain

ratings. Adverse tissue texture changes were palpable when she rated her pain intensity at greater than 6.

During these sessions, examination of Louisa in a relaxed prone position revealed limitations in dermal–fascial mobility over the lumbar vertebrae, along the right iliac crest, over the entire sacrum, and over the mid-portion of the right posterior thigh. Limitations in passive muscle mobility were palpable on the right side between gluteus maximus and gluteus medius, between gluteus maximus and the deep lateral rotators, between semitendinosus and biceps femoris, between semitendinosus and semimembranosus, between semimembranosus and adductor magnus, and between vastus lateralis and the femur. The right hip joint was assessed as having limited joint play and being resistant to passive internal rotation and extension. The tissue texture and joint position on the left side routinely assessed as normal.

What were the techniques employed?

Similar techniques were employed in all of Louisa's massage therapy sessions. They were chosen because they seemed to provide her with *some* pain relief, at least in the short term. Sherman et al.[44] identified 36 distinct techniques used by massage therapists who treat clients with musculoskeletal pain. Among the techniques listed in their taxonomy, a description for the mechanics of strokes that were used with Louisa could not be found. In the absence of nomenclature, the treatment construct and associated techniques are described in the next couple of paragraphs.

Normal organ intermobility is maintained by fascia, allowing optimal gliding to occur between the structures it connects, thus preserving mobility and independence between skin, nerves, muscles, tendons, bones, and viscera. One of the functions of fascia is to reduce friction and to enable structures to adapt to changes in the internal and external environments. Changes may occur to fascia and manifest as edema and inflammation, possibly compromising the gliding mechanism[45,46].

The aim of the treatment techniques was to restore the normal gliding mechanism. When limitations were found in passive mobility at the level of the dermal–fascial interface, slow skin stretching was applied using fingertips or palms; at the level of the muscles, cross-fiber mobilization was applied using fingertips or elbows; and at the hip joint, palmar compression was applied over the greater trochanter, and distal fingertip friction/distraction was applied along the ipsilateral sacral border. The areas were treated until palpable improvements were obtained in tissue texture and resting joint position, with an average response time of 20 minutes. The remainder of each 60-minute session was reserved for relaxation and nurturing, employing slow gliding strokes and gentle passive and active mobilization. Before the injury, Louisa had responded well to this approach, reporting relief from FMS symptoms. After the injury, she requested that some nurturing touch continue to be integrated into every session.

Clinical Expertise

What experience did the author have in treating this kind of problem?

By the time Louisa entered the practice, I had been providing therapeutic massage for 20 to 25 clients weekly for more than 7 years, and I had a fair amount of experience treating other clients reporting similar symptoms. The outcomes were generally good; however, several cases achieved no improvement.

Did the client exhibit any recognizable clinical patterns?

Treatment of Louisa's involved pelvis and leg included monitoring changes in tissue texture and hip position. Hip position, in particular, had become a marker of improvement during and between sessions. It was both palpable and visible in a relaxed prone position. When the treatment was successful, Louisa's femur would move out of a preference for external rotation, accessory hip motion would increase, and her greater trochanter would no longer be a visible prominence on her posterior landscape.

At about 4 months post injury, a phenomenon occurred during one of Louisa's sessions. After the desired changes were obtained in tissue texture and joint position of the involved pelvis and leg, treatment was directed to Louisa's back. After a few minutes, a noticeable change occurred in the position of Louisa's femur. It rolled back into external rotation so that the greater trochanter was visibly prominent again. The pelvis and leg were reassessed, only to find that the limitations in the dermal–fascial interface and in passive muscle mobility had returned. Treatment of the involved pelvis and leg was repeated, and the tissue texture and joint position improvements remained stable for the duration of the session. In the next two sessions, the same phenomenon occurred, except that on these occasions, despite several treatment attempts, no lasting improvements could be made. The area would become compliant and then return to its pre-treatment state immediately.

The phenomenon that was observed during Louisa's treatment was unusual. Among hundreds of clients, I could recall only 2 others that had responded similarly. In both cases, the clients' symptoms were subsequently determined to have been caused by lumbar radiculopathy attributable to a herniated disc for which surgical correction was required.

What were the follow-up recommendations?

In reviewing Louisa's case, the possibility of lumbar radiculopathy was reconsidered. A previously overlooked sign was that the injury had occurred during a twisting motion. The lumbar intervertebral discs are thought to be more vulnerable to herniation in rotation[47]. Between the clinical pattern recognition and Louisa's report of hearing a "loud pop"[48] during a twisting motion, the new hypothesis was that Louisa may have herniated a lumbar disc and that lumbar radiculopathy could be the source of her referred pain symptoms. I described the hypothesis to Louisa and advised her to seek the advice of an orthopedic surgeon.

During this time, for reasons unknown, Louisa had started working with a different chiropractor. She was asked to describe the hypothesis to the new chiropractor to solicit his opinion.

RESULTS

The chiropractor considered the new hypothesis plausible and referred Louisa to an orthopedic surgeon who specializes in treating low back pain. As a result of a magnetic resonance imaging investigation ordered by the surgeon, an L5-S1 herniation was found.

In February 2005, percutaneous microdiscectomy was performed and was successful in abolishing Louisa's local and referred pain symptoms. The chiropractor was invited to be present for the surgery. In personal correspondence, he reported to me that the conductivity of the S1 nerve root was immediately restored when the surgeon clipped away the part of the disc that was encroaching upon the nerve root.

When Louisa received massage therapy treatment 2 weeks after her surgery, the tissue texture and joint position of her right pelvis and leg assessed as normal. The right gluteus maximus, gluteus medius, and hamstrings were visibly and palpably less developed than those on the left, suggesting that some atrophy may have occurred. This bilateral discrepancy was not obvious before the surgery, presumably because the chronic contractures of the muscles had made them appear more developed.

Physical therapy was instrumental in Louisa's rehabilitation. Full recovery took twice as long as predicted by her surgeon, but by 6 months, most of her strength had been restored. At about this time, Louisa reported that she wasn't having as many "fibro flares." She believed that lumbar radiculopathy had been aggravating the FMS, rather than the other way around. I monitored her progress for 2 years following the surgery. Not once did she have a recurrence of her symptoms. At the time of this writing, Louisa remains pain-free.

DISCUSSION

Case reports that demonstrate good outcomes generally focus on efficacy of treatment. In this instance, however, the massage therapy treatment did not affect the outcome. Instead, it was the CR skills of a massage therapist that contributed to an orthopedic surgeon's differential diagnosis, which in turn led to a satisfactory treatment resolution.

Using an investigative approach, clues were continually gathered and used to guide treatment. Through a hypothetico-deductive reasoning strategy, various hypotheses were considered and evaluated by reviewing known client information combined with personal familiarity with the conditions. The process of reflection allowed for a review of the facts and a reconsideration of a previously dismissed hypothesis when an unusual response to treatment was noticed. Throughout treatment, the client's preferences were considered, with time allocated to address Louisa's injury as well as her pre-existing conditions. Experience in treating similar conditions ultimately proved to be the most valuable aspect of the CR process, because the pattern that was recognized during treatment provided an accurate clue for diagnosis.

Massage therapists are not licensed to diagnose, but when their hypotheses are based on sound CR, their contributions to the diagnostic process can be invaluable. This case represents an ideal interaction between clinicians. In some other cases, however, doctors may be unwilling to consider the hypotheses of massage therapists[49]. As massage therapists demonstrate competency in CR[50], other health care professionals may take their findings more seriously.

As massage therapy becomes more evidence-based[51], a critical analysis of the elements of competent practice is needed[52]. According to Jones et al.[3], "evidence-based practice requires professional judgment and sound clinical reasoning." How can another clinician know if a massage therapist is practicing sound CR? One way, as demonstrated in the present report, is to use reflective interviews[14] to deconstruct thought processes. By querying both novice and expert massage therapists[11,20,53], researchers can begin to discover the elements that constitute sound CR. The CR process of massage therapists can also be compared to the CR process used by manual therapists in other areas of health care. For example, Fleming[54] conducted a study comparing the CR in medicine to the CR in occupational therapy and found that both groups use a scientific model based on hypothetical reasoning.

Once the skills of sound CR are identified within the field of massage therapy, teaching strategies aimed at developing these skills can be implemented. The use of case reports can be instrumental in teaching the CR process[55–57] at both the introductory and advanced levels of massage therapy education.

ACKNOWLEDGMENTS

My thanks go the Massage Therapy Foundation for sponsoring the 2007 Practitioner Case Report Contest and for finding merit in my submission. I also thank both advisors who assisted with the contest submission, Thomas Parella, BA, and André Farasyn, PhD PT, DO, and "Louisa," who verified the accuracy of the events in this report and who gave me the opportunity to learn so much from her case.

REFERENCES

1. Jones MA. Facilitating application of biopsychosocial theory through transformative learning. In: Magarey ME, ed.

Proceedings of the 12th Biennial Conference, Musculoskeletal Physiotherapy Australia; Adelaide, Australia; November 21–24, 2001. Adelaide: Musculoskeletal Physiotherapy Australia; 2001: 17–28.
2. Boshuizen HP, Schmidt HG. The development of clinical reasoning expertise. In: Higgs J, Jones MA, eds. *Clinical Reasoning in the Health Professions.* 2nd ed. Oxford, UK: Butterworth Heinemann; 2000: 15–22.
3. Jones MA, Grimmer K, Edwards I, Higgs J, Trede F. Challenges in applying best evidence to physiotherapy practice. Part 2—Health and clinical reasoning models to facilitate evidence-based practice. *Internet J Allied Health Sci Pract.* 2006;4(4):1–9. http://ijahsp.nova.edu/articles/vol4num4/jones.htm. Published October 2006. Accessed September 27, 2007.
4. Higgs J, Jones MA. Clinical reasoning in the health professions. In: Higgs J, Jones MA, eds. *Clinical Reasoning in the Health Professions.* 2nd ed. Oxford: Butterworth Heinemann; 2000: 3–14.
5. Lowe W. Clinical reasoning skills. *Massage Today.* 2004;4(3):n.p. http://www.massagetoday.com/mpacms/mt/article.php?id=10891. Modified August 7, 2008. Accessed September 27, 2007.
6. Smart K, Doody C. Mechanisms-based clinical reasoning of pain by experienced musculoskeletal physiotherapists. *Physiotherapy.* 2006;92(3):171–178.
7. Farrell JP, Jensen GM. Manual therapy: a critical assessment of role in the profession of physical therapy. *Phys Ther.* 1992;72(12):843–852.
8. Smart K, Doody C. The clinical reasoning of pain by experienced musculoskeletal physiotherapists. *Man Ther.* 2007;12(1):40–49.
9. Schoen DC. Low back pain. *Orthop Nurs.* 2004;23(2):153–157. http://www.orthopaedicnursing.com/pt/re/orthonurs/fulltext.00006416-200403000-00017.htm;jsessionid=LgHRjlRcvVwcpwBncT96ng0JP8GnTW4s2yjsylM2ch7kw11BJsTG!1805002056!181195629!8091!-1. Accessed August 11, 2008.
10. James G. Diagnosis in physical therapy: insights from medicine and cognitive science. *Phys Ther Rev.* 2002;7(1):17–31.
11. Norman GR, Brooks LR. The non-analytical basis of clinical reasoning. *Adv Health Sci Educ Theory Pract.* 1997;2(2):173–184.
12. Schmidt HG, Boshuizen HPA. On acquiring expertise in medicine. *Educ Psychol Rev.* 1993;5(3):205–221. http://www.springerlink.com/content/l126580j8358k8l2. Accessed August 11, 2008.
13. Jensen GM, Gwyer J, Shepard KF. Expert practice in physical therapy. *Phys Ther.* 2000;80(1):28–43.
14. Noll E, Key A, Jensen G. Clinical reasoning of an experienced physiotherapist: insight into clinician decision-making regarding low back pain. *Physiother Res Int.* 2001;6(1):40–51.
15. Twomey L. Foreword. In: Jones MA, Rivett DA, eds. *Clinical Reasoning for Manual Therapists.* Oxford, UK: Butterworth Heinemann; 2003: ix.
16. Edwards I, Jones MA, Carr J, Braunack-Mayer A, Jensen GM. Clinical reasoning strategies in physical therapy. *Phys Ther.* 2004;84(4):312–330.
17. Jones MA, Jensen G, Edwards I. Clinical reasoning in physiotherapy. In: Higgs J, Jones MA, eds. *Clinical Reasoning in the Health Professions.* 2nd ed. Oxford, UK: Butterworth Heinemann; 2000: 117–127.
18. Fleming MH, Mattingly C. Action and narrative: two dynamics of clinical reasoning. In: Higgs J, Jones MA, eds. *Clinical Reasoning in the Health Professions.* 2nd ed. Oxford, UK: Butterworth Heinemann; 2000: 55–56.
19. Neistadt ME. Teaching strategies for the development of clinical reasoning. *Am J Occup Ther.* 1996;50(8):676–684.
20. Jones MA. Clinical reasoning in manual therapy. *Phys Ther.* 1992;72(12):875–884.
21. Chakrabarty S, Zoorob R. Fibromyalgia. *Am Fam Physician.* 2007;76(2):247–254.
22. Gifford LS. The mature organism model. In: Gifford LS, ed. *Whiplash—Science and Management: Fear, Avoidance Beliefs and Behaviour.* Topical Issues in Pain 1. Falmouth, UK: CNS Press; 1998: 45–56.
23. SomaSimple forum moderators. Discussion Lists > Physiotherapy/Physical Therapy/Manual Therapy/Bodywork > Barrett's Forums. Forum Moderators' Current Consensus on Pain: Nothing Simple—Ten Steps to Understanding Manual and Movement Therapies for Pain. SomaSimple website. http://www.somasimple.com/forums/showthread.php?t=4944&highlight=consensus. Published January 20, 2008. Updated February 24, 2008. Accessed April 5, 2008.
24. Huynh CN, Yanni LM, Morgan LA. Key practice points in the management of fibromyalgia. *Am Fam Physician.* 2007;76(2):195–196,202.
25. McMakin CR, Gregory WM, Phillips TM. Cytokine changes with microcurrent treatment of fibromyalgia associated with cervical spine trauma. *J Body Mov Ther.* 2005;9(3):169–176.
26. Meyer HP. Fibromyalgia syndrome—current concepts. *SA Fam Pract.* 2006;48(3):20–28.
27. Shbeeb MI, Matteson EL. Trochanteric bursitis (greater trochanter pain syndrome). *Mayo Clin Proc.* 1996;71(6):565–569.
28. Dreyfuss P, Dryer S, Griffin J, Hoffman J, Walsh N. Positive sacroiliac screening tests in asymptomatic adults. *Spine.* 1994;19(10):1138–1143.
29. Zelle BA, Gruen GS, Brown S, George S. Sacroiliac joint dysfunction: evaluation and management. *Clin J Pain.* 2005;21(5):446–455.
30. Calvillo O, Skaribas I, Turnipseed J. Anatomy and pathophysiology of the sacroiliac joint. *Curr Rev Pain.* 2000;4(5):356–361.
31. United States, Department of Defense, Veterans Health Administration. *VHA/DOD Clinical Practice Guidelines for the Management of Low Back Pain or Sciatica in the Primary Care Setting.* Washington, DC: US Government Printing Office; 1999.
32. Malanga GA, Nadler SF. Nonoperative treatment of low back pain. *Mayo Clin Proc.* 1999;74(11):1135–1148.
33. Baker P, Coggon D, Reading I, Barrett D, McLaren M, Cooper C. Sports injury, occupational physical activity, joint laxity, and meniscal damage. *J Rheumatol.* 2002;29(3):557–563.
34. Neely FG. Biomechanical risk factors for exercise-related lower limb injuries. *Sports Med.* 1998;26(6):395–413.
35. Russek L. Hypermobility syndrome. *Phys Ther.* 1999;79(6):591–599.
36. Simpson MR. Benign joint hypermobility syndrome: evaluation, diagnosis, and management. *J Am Osteopath Assoc.* 2006;106(9):531–536.

37. Stürup J, Iversen BF, Lauersen N. Abnormal knee mobility and meniscal injury. *Acta Orthop Scand.* 1987;58(6):655–657.
38. Licciardone JC, Nelson KE, Glonak T, Sleszynski SL, Cruser dA. Osteopathic manipulative treatment of somatic dysfunction among patients in the family practice clinic setting: a retrospective analysis. *J Am Osteopath Assoc.* 2005;105(12):537–544.
39. Williams N. Managing back pain in general practice—is osteopathy the new paradigm? *Br J Gen Pract.* 1997;47(423):653–655.
40. Lucas N, Moran R. What is the significance of somatic dysfunction in a multicausal model of aetiology? *Int J Osteopath Med.* 2005;8(2):39–40.
41. Byfield D, Kinsinger S. *A Manual Therapist's Guide to Surface Anatomy and Palpation Skills.* Oxford, UK: Butterworth Heinemann; 2002: 46.
42. Petersen CM, Foley RA. *Active and Passive Movement Testing.* New York, NY: McGraw–Hill Professional; 2002: 3–6.
43. Riddle DL. Measurement of accessory motion: critical issues and related concepts. *Phys Ther.* 1992;72(12):865–874.
44. Sherman KJ, Dixon MW, Thompson D, Cherkin DC. Development of a taxonomy to describe massage treatments for musculoskeletal pain. *BMC Complement Altern Med.* 2006;6:24.
45. Guimberteau JC, Sentucq-Rigall J, Panconi B, Boileau R, Mouton P, Bakhach J. Introduction to the knowledge of subcutaneous sliding system in humans [French]. *Ann Chir Plast Esthet.* 2005;50(1):19–34.
46. Guimberteau JC, Bakhach J. Subcutaneous tissue function: the multimicrovacuolar absorbing sliding system in hand and plastic surgery. In: Siemionow MZ, ed. *Tissue Surgery.* New Techniques in Surgery. London, UK: Springer–Verlag; 2006: 41–55.
47. Greenough CG, Fraser RD. Aetiology, diagnosis and treatment of low back pain. *Eur Spine J.* 1994;3(1):22–27.
48. Nedeljkovic SS. Minimally invasive approaches to the evaluation of low back syndromes. In: Morris CE, ed. *Low Back Syndromes: Integrated Clinical Management.* New York, NY: McGraw–Hill Medical; 2005: 512.
49. Derick L, Pecora R, Ramsby-Andrews S, Schrier M. The application of therapeutic massage for low back pain [French]. *Tech Orthop.* 2003;18(1):94–109.
50. Newble D, Norman G, van der Vleuten C. Assessing clinical reasoning. In: Higgs J, Jones MA, eds. *Clinical Reasoning in the Health Professions.* 2nd ed. Oxford, UK: Butterworth Heinemann; 2000: 156–165.
51. Holey EA, Cook E. *Evidence-based Therapeutic Massage: A Practical Guide for Therapists.* 2nd ed. New York, NY: Churchill Livingstone; 2003: vii,8.
52. Higgs J, Burn A, Jones MA. Integrating clinical reasoning and evidence-based practice. *AACN Clin Issues.* 2001;12(4):482–490.
53. Elstein AS, Schwartz A. Clinical reasoning in medicine. In: Higgs J, Jones MA, eds. *Clinical Reasoning in the Health Professions.* 2nd ed. Oxford, UK: Butterworth Heinemann; 2000: 95.
54. Fleming MH. Clinical reasoning in medicine compared with clinical reasoning in occupational therapy. *Am J Occup Ther.* 1991;45(11):988–996.
55. Neistadt ME, Wight J, Mulligan SE. Clinical reasoning case studies as teaching tools. *Am J Occup Ther.* 1998;52(2):125–132.
56. Prion S. The case study as an instructional method to teach clinical reasoning. In: Higgs J, Jones MA, eds. *Clinical Reasoning in the Health Professions.* 2nd ed. Oxford, UK: Butterworth Heinemann; 2000: 174–183.
57. VanLeit B. Using the case method to develop clinical reasoning skills in problem-based learning. *Am J Occup Ther.* 1995;49(4):349–353.

Corresponding Author: Kim LeMoon, 727 Raritan Avenue Highland Park, NJ 08904 USA.
E-mail: kimlemoon@msn.com

The author reports no sources of support for the work presented in this article.