Osteopathic manipulative medicine (OMM) is a physician-directed approach to patient care that incorporates diagnostic and therapeutic strategies to address body unity issues, enhance homeostatic mechanisms, and maximize structure-function interrelationships. Osteopathic physicians integrate a thorough medical history with palpatory examination of a patient to ascertain distinctive characteristics and origins of the patient’s pain, to evaluate how pain uniquely affects the patient, and to determine whether segmental, reflex, or triggered pain phenomena coexist in the patient. Osteopathic manipulative medicine expands differential diagnoses by allowing the physician to consider somatic dysfunction and implement treatment options via integration of specific aspects of complementary care into state-of-the-art pain management practices.

Prescriptions formulated through an OMM algorithm integrate each osteopathic tenet with biopsychosocial and patient education models, as well as manual medicine, pharmacologic, and rehabilitation techniques proportionate to individual needs. This “refreshed” version of an article originally published in September 2005 includes the addition of an anecdotal case scenario in which application of osteopathic principles and practice created a personalized, effective treatment plan for the described patient’s chronic pain.

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Chronic pain is a common medical problem with a relatively high incidence and a low recovery rate. Patients frequently relapse after initially successful treatment. Persistent or relapsing pain often results from misdiagnosis or inadequate treatment. In many instances, focusing on pain generators alone overlooks important patient-centered treatment strategies that are capable of modulating pain perception and quality of life. In other instances, patient noncompliance with otherwise successful treatment programs may result from inadequate patient education concerning the prognosis and management of chronic disorders such as arthritis.

Dissatisfied with ineffective, incomplete, and sometimes impersonal physician approaches to chronic disorders, a growing number of patients actively pursue complementary or alternative medical care, including manual modes of therapy and mind-body practices. If properly prescribed and delivered by professionals, such approaches—which are rapidly becoming an expected standard of care for patients with chronic pain—may confer some clinically significant benefits. Multidisciplinary pain clinics recognize that many hands-on approaches to patient care, including osteopathic manipulative treatment (OMT), chiropractic adjustments, and massage, can provide distinct solutions for individuals with chronic pain—solutions that would be unavailable from practitioners who ignore or dismiss non-touch modalities.

Osteopathic manipulative medicine (OMM) is the component of the osteopathic medical profession that approaches total patient care by emphasizing application of distinctive osteopathic principles and practice (OPP). Osteopathic manipulative medicine provides a patient-centered approach that integrates recognized and rational healing methods, including OMT, to improve the health and physiologic function of patients. It is the part of the osteopathic philosophy in which we discuss the physical spectrum that considers an individual’s “dis-ease to disease” and the body unity link of mental/emotional dis-ease that coexists with physical disease. Although OMM is recognized by the National Institutes of Health (NIH) in the United States as a mainstream medical discipline, OMT in isolation is classified by the NIH’s National Center of Complementary and Alternative Medicine (NCCAM) as one of several promising “complementary” procedures among a variety of other heterogeneous manipulative and body-based practices. Regardless of NIH classification, the use of OMT in OMM specialty clinics is commonplace and has been perceived by many patients as highly effective in decreasing their pain and in increasing their mobility.

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An OMM approach that integrates palpatory diagnosis and OMT provides the balance that patients with persistent nonmalignant pain seek between state-of-the-art interventions and individualized patient-centered care. Osteopathic manipulative medicine incorporates strategies to both decrease pain and to enhance physiologic function in patients. For such patients, treatment with OMM offers two major recognized advantages: an expanded differential of potentially treatable etiologies and an individualized, patient-centered pain prescription based on the application of osteopathic principles.

Many osteopathic physicians emphasize patient education and offer a pragmatic philosophy similar to that adopted by multidisciplinary pain management clinics. In addition, OMT offers patients an additional therapeutic option with a low risk-to-benefit ratio and a growing evidence base of efficacy.14,15

**General Osteopathic Manipulative Medicine Considerations in Patients With Chronic Pain**

Chronic pain mechanisms encompass a complicated array of different processes (eg, biomechanics, genetics, neurophysiology, psychology), each capable of contributing to clinical manifestations and symptoms. For OMM to be effective, similar symptoms in different patients may require dissimilar treatment plans that focus on various local, spinal, and supraspinal targets. For example, chronic pain initiated by peripheral trauma may result when supraspinal structures continue to respond as if peripheral tissues were actively injured. In such chronic conditions as fibromyalgia, the pathologic process may reflect an autonomic dysregulatory phenomenon or a dysfunction of descending antinociception pathways.16 Conditions involving myofascial trigger points (MTrPs) demonstrate specific peripheral dysfunction at a spinal level perpetuated by nonspecific biomechanical factors (eg, untreated postural strain, viscerosomatic reflexes).

In many cases, chronic pain pathways involving allodynia (generalized lowered thresholds to pain) develop when changing gene expression allows silent receptors to become active in the spinal cord, or when facilitatory modulation results in "spinal cord learning."17,18 In such cases, the patient may simply present with persistent pain.

The rational application of OMT for patients with persistent pain cannot have a singular focus, nor can it be considered a static phenomenon (ie, effects on gene expression as well as the changing face of pain and pain perceptions as chronicity alters the body unit).19,20 In formulating multimodal treatment plans, approaches based on OMM embrace principles of body unity and integrate palpatory and OMT techniques into each patient's prescription. Physician choices concerning OMT techniques and goals depend on each patient's unique pain presentation, suspected pathways involved in that presentation, and those body regions diagnosed as containing somatic dysfunction.

A complete review of diagnostic regimens and therapeutic options for patients with persistent pain is beyond the scope of the present article. Instead, this article provides a concise overview of the OMM paradigm and introduces a general algorithm for pain management (Figure 1). Discussion of persistent pain management is limited to generalities related to the integration of OPP in the application of OMT. Where pertinent, specific common chronic pain presentations are described as examples supporting the algorithm.

**Pain Management Algorithm: Applying Osteopathic Principles and Practice**

When patients present with chronic pain, especially pain that persists despite seemingly appropriate care, referring to an osteopathic algorithm (Figure 1) can suggest approaches and rationale for applying OPP and OMT to patient care. The pain management algorithm is structured to identify frequently overlooked underlying etiologies included in an osteopathic differential diagnosis, as well as to address the persistent tangible and holistic impact of pain on the body unit. Evaluation of two main factors guide the osteopathic physician's timing for implementing OMM treatment strategies: the patient's capability to mount a homeostatic response and the patient's underlying pathophysiologic status as interpreted by components of palpated somatic dysfunction.

Treatment protocols formulated from this algorithm incorporate the interdependence of all tenets of osteopathic medicine,21 resulting in an individually designed prescription to address each patient who has persistent pain. In applying this algorithm to patient care, osteopathic physicians may also choose to use some or all of the mainstream and/or complementary treatment modalities used by other healthcare professionals.

**Structure-Function Considerations: Somatic Causes of Persistent Pain**

Certain somatic findings have been consistently documented in various persistent pain conditions. Depending on the particular situation, somatic dysfunction may be causative, reflexive, reactive, or perpetuating (or some combination of these pathophysiologic mechanisms).22 Thus, differential diagnoses and treatment considerations depend on both the specific body region and underlying pathophysiologic mechanism involved. The algorithm (Figure 1) contains generalities taking these factors and structure-function interrelationships into consideration.

An osteopathic palpatory examination often provides clues to the underlying mechanism(s) of a patient's injury.2 Such palpatory insights can lead to further questions, examinations, and tests, each designed to identify structural factors associated with specific pain generators or factors that interfere with certain self-healing mechanisms. The resulting findings, in turn, can lead the physician to explore functional demand issues associated with potential mechanisms of repeated injury or cumulative microtrauma caused by habitual, occupational, or postural ergonomic stresses.

One way to determine whether a given structure or somatic dysfunction is a primary cause of significant discomfort in a patient is to determine if it is a "pain generator" tissue. Comparing the anatomic location, quality, and unique referral distribution of a patient's pain symptoms with known myotomal, neu-
logic, and sclerotomal pain maps increases the likelihood of locating pain generators. In many cases, such diagnoses can be confirmed by an effective therapeutic response—albeit even temporary—to local anesthetic injection or manual correction of dysfunction.

Sclerotomal tissues (ie, skeletal, arthrodial, and ligamentous generators) typically mediate pain described by patients as “deep, dull, and toothache-like.” Sclerotomal pain patterns are frequently overlooked because they may project some distance from their pain generators. In addition, these pain patterns are infrequently taught to physicians. The “Glossary of Osteopathic Terminology” contains sclerotomal maps relating spinal segmental levels to sclerotomal appendicular pain.23

Figure 2 illustrates segmentally
related sclerotomal examples of ligamentous pain patterns commonly seen in patients with low back pain (LBP). Patients with ligamentous pain generators often cannot find a comfortable position and are continuously shifting position—a presentation sometimes referred to as “theater-cocktail party syndrome.”

Myotomal (muscle) pain is poorly localized, and the patient may describe symptoms located at a substantial distance from the actual lesion. Patients typically describe myotomal pain as “crampy” or “stiff,” with the pain suddenly “grabbing” them during a particular motion. Muscle dysfunction may include latent and active MTrPs that, when overused, refer pain in recognizable patterns (Figure 3). Antigravity (postural) muscles harboring MTrPs are frequently hypertonic, whereas postural antagonist muscles harboring MTrPs demonstrate weakness upon strength testing.

Both antigravity and postural antagonist muscles are likely to contain taut bands that demonstrate a local twitch response within the affected muscle during perpendicularly applied snapping palpation examination. This phenomenon has been linked to the presence of segmentally related spinal reflexes (i.e., segmental facilitation).

Peripheral myotomal pain generators can originate in a single muscle. Alternatively, multiple peripheral inputs may establish more complex patterns of muscle dysfunction. Peripheral input can also produce a central imprint that persists as a primary source of pain-modifying peripheral referral patterns (i.e., somatosomatic reflex). Common myotomal patterns also include muscles sharing the same radicular innervation (as occurs in patients with discogenic disease) and muscles contributing to the same general function (as in the myotatic unit pattern occurring in patients with overuse syndromes).

In structure-function considerations, osteopathic physicians using osteopathic
diagnostic palpation seek to identify “any impaired or altered skeletal, arthrodial, and/or myofascial function” (viz “somatic dysfunction”)\(^2\) that adds to the nociceptive load, and to recognize any related lymphatic, neural, and/or vascular elements that might complicate underlying pathophysiologic conditions. The palpatory characteristics sought by osteopathic physicians include sensitivity to measured palpation (S), tissue texture changes (T), asymmetry (A), and restricted motion (R) (together known as STAR characteristics). Tissue texture changes often provide the most important information concerning the underlying pathophysiologic status of the patient’s periphery and homeostatic response status.

After weighing risk-to-benefit ratios associated with the tentative diagnosis of a patient’s condition, OMT may be delivered to reduce or remove the identified somatic dysfunction or to modulate central and peripheral mechanisms involved in pain generation. Currently, palpated peripheral tissue texture characteristics have the greatest influence on the osteopathic physician’s choice of an activating force for OMT. However, sophistication in making this choice should improve as studies reveal how differing manual forces affect mechanoreceptors and mechano nociceptors in the tensegrity-integrin model, spinal cord gating mechanisms, and synaptic plasticity.\(^29-33\)

**Exemplars: Low Back Pain and Headaches**—The two best-documented exemplars for application of structure-function approaches in diagnosis and treatment of patients with persistent pain symptoms are LBP and cervicogenic headache.\(^34-38\) These two high-incidence conditions are multifactorial, yet typically neuromusculoskeletal in origin, and they each have great propensity for disability. The evidence base is strongest in these two regions for interexaminer reliability of STAR objective findings in palpatory diagnosis,\(^34\) as well as for measurable benefit from manual treatment in reducing pain and disability.\(^35-38\) Furthermore, studies have identified a specific role for OMT in LBP management.\(^14,39\)

The beneficial role for manual modes of therapy, including OMT, has been documented for patients with acute, subacute, and chronic LBP.\(^35-38\) In patients with LBP, spinal manipulation generally—and OMT specifically—produce physiologic effects similar to efficacious prescription nonsteroidal anti-inflammatory drugs (NSAIDs), and effects more beneficial than either physical therapy or home back exercises.\(^13,36\) Beneficial long-term functional outcomes for manual therapy have also been demonstrated in patients with chronic LBP.\(^40\) Based on a review of the literature, Mein\(^41\) postulated that patient populations with subacute (secondary) and chronic (tertiary) LBP would benefit most from manipulative care, rather than from more costly behavioral modification, functional restoration, and chronic pain management programs.

Using a structure-function approach, Greenman\(^39\) examined 183 patients who had persistent LBP for an average of 31 months. With osteopathic palpation, he identified three or more of six common diagnoses of somatic dysfunction in 50% of this cohort (Table). Treatment with OMT to eliminate the identified somatic dysfunctions resulted in nearly 75% of the dysfunctional group returning to work or to their other activities of daily living.\(^39\)

The present author has also noted that undiagnosed somatic dysfunctions, particularly “nonphysiologic dysfunctions” (eg, traumatically induced pelvic shears), may result in several years of persistent pain (either locally or at distant sites linked through compensatory mechanisms) or the development of MTrPs.\(^42\)

Dysfunction of one sacroiliac joint due to nonphysiologic pelvic shear forces greatly increases functional demand on the other sacroiliac joint and its stabilizing ligaments.\(^42\) Shears or compression at the pubic symphysis are common dysfunctions that can happen postpartum, after a fall, and after a missed step.\(^42\) Yet, these dysfunctions are frequently overlooked because the pain associated with them is located in the frequently used sacroiliac joints. Pubic shears restricting motion at the pubic symphysis causes the two sacroiliac joints to overwork and therefore be painful.

Pain in the overworked sacroiliac joints posteriorly distracts the physician from looking for the cause coming from restricted motion of the pubic symphysis in front.

Removal of myofascial somatic dysfunction, including MTrPs, has been shown to be extremely effective in reducing or eliminating persistent LBP.\(^25,26\) Patients with the muscle trigger points displayed on common composite MTrP charts (Figure 3) responded well to a wide range of treatment modalities, including such OMT techniques as counterstrain, myofascial release variants, and post–isometric relaxation muscle energy.\(^25,26\) In addition, manual correction of articular or myofascial somatic dysfunction has proved to be an effective adjunct therapy, regardless of whether pain radiates into the lower extremities.\(^26,43\)

With recurrence of the same pattern of pain and somatic dysfunction in a patient after otherwise effective OMT, the osteopathic physician should consider dysfunctional homeostatic mechanisms and a range of perpetuating factors (eg, postural decompensation), as well as site-specific primary viscerosomatic reflexes (Figure 1).

Similarly, headache and neck pain have been extensively studied with respect to various somatic dysfunctions and manual approaches.\(^38,44,45\) For example, placebo-controlled diagnostic investigations have documented the association of cervical pain with dysfunction of zygopophysial joints in patients who have whiplash injury.\(^46\)

**Functional Demand and Somatic Perpetuating Factors**—Functional demand plays a precipitating and/or perpetuating role in various persistent pain disorders and recurrent somatic dysfunctions. Increased functional demand on somatic structures underlies repetitive strain/sprain injuries, ranging from carpal tunnel syndrome in keyboard operators and poultry-processing knife handlers\(^57\) to L5-S1 isthmic spondylolisthesis in individuals who must stand for extended periods.\(^24,28\)

Prolonged functional strain/sprain is known to activate fibroblast mechanochemical transduction, modulate gene
expression patterns, and introduce inflammatory and tissue remodeling processes.\textsuperscript{31,48,49} In this fashion, persistent strain and/or pain patterns lead to peripheral structural pathologic change. Postural strain/sprain is among the most frequent of functional demand conditions that create persistent pain from musculoskeletal sources.

Inattention to ergonomics at work or play increases functional demand, which can, in turn, perpetuate chronic or recurrent pain. Thus, osteopathic physicians should review occupational and personal biomechanical stressors as part of patient history. By providing education to patients suffering from such discomfort, osteopathic physicians can better address persistent pain resulting from various prolonged activities, including holding a phone between ear and shoulder, using a keyboard with improper seating relative to desk height, and falling asleep slumped forward in a recliner.

Otherwise effective pain management strategies aimed at peripheral pain generators often initially fail outright, or the pain generators will recur after these strategies if the presence of excessive functional demand, postural imbalance, or other perpetuating factors are not considered.\textsuperscript{27,50} Unfortunately, prior failure of pain management strategies may prompt osteopathic physicians to eliminate such strategies from their rightful place among approaches to be considered in the early stages of treatment programs. Prior failure of pain management strategies may also cause physicians or patients to dismiss the strategies later in treatment programs, after complicating postural stress or adjacent dysfunctions have been addressed.

Timing, tissue response, and multifactorial conditions within the body unit affect OMM treatment strategies that are prompted by applying the structure-function principle. These conditions can both affect and be affected by other portions of the proposed algorithm (Figure 1). Physical examination of patients with persistent pain must go beyond identification of peripheral pain generators and screening for other perpetuating causes of pain. A properly constructed OMM approach rarely focuses on only one principle.

### Body Unity Considerations: Tangible Impact of Persistent Pain

Although acute pain provides essential information for survival, persistent pain often results in anxiety, depression, and a reduction in the quality of life. Such body unity (or mind-body-spirit) effects of persistent pain can best be evaluated by carefully performing a traditional patient history and physical examination, supplemented by palpation. The resulting findings can provide diagnostic clues, as well as targets of opportunity, to reduce precipitating, perpetuating, and magnifying factors associated with persistent pain.

Discovery of a body unity dysfunction in a patient with chronic pain often shifts the treatment focus from simply identifying and removing the underlying organic disease (i.e., pain generator) to adding strategies designed to empower the patient to modify environmental factors and cognitive processes associated with the disability. Well-established behavioral interventions, including patient education, are commonly used in body unity approaches to managing chronic disabling pain.

#### Mind-Body Unity and Persistent Pain—Chronic persistent pain is not simply acute pain that has lasted a long time. Positron emission tomography scans of the brains of patients with chronic neuropathic pain reveal a shift of acute pain activity from the sensory cortex to regions associated with affective-motivational processing, such as the anterior cingulate gyrus.\textsuperscript{51} For this reason, patients with chronic pain often attempt to describe their “suffering” and its

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### Table

**“Dirty Half-Dozen” Dysfunctions in Persistent Low Back Pain (PLBP)**

<table>
<thead>
<tr>
<th>Somatic Dysfunction (SD) in PLBP</th>
<th>SD in PLBP, % (n = 183)</th>
<th>Key Palpatory Findings\textsuperscript{a,b}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonphysiologic pelvic SD (public shears)</td>
<td>76</td>
<td>Palpatory &quot;step off&quot; between pubic rami at the pubic symphysis; tenderness</td>
</tr>
<tr>
<td>Nonphysiologic pelvic SD (sacroiliac shears)</td>
<td>15</td>
<td>(1) iliac crest-ASIS-PSIS-ischial tuberosity all elevated on one side; or (2) dramatically inferior and slightly posterior inferolateral sacral angle on the side of the deep sacral sulcus</td>
</tr>
<tr>
<td>Sacral nutation failure (including nonneutral and backward sacral torsion SD)</td>
<td>49</td>
<td>+ Sphinx test; + Spring test (particularly painful with type II LS SD rotating in opposite direction from S1)</td>
</tr>
<tr>
<td>Pelvic tilt/&quot;Short leg with syndrome&quot;/unlevel sacral base</td>
<td>63</td>
<td>After treatment + standing combined – seated flexion tests; standing unlevel iliac crests and greater trochanters; possible functional scoliosis</td>
</tr>
<tr>
<td>Muscle imbalance (including psoas syndrome)</td>
<td>90</td>
<td>Asymmetric muscle balance; psoatic or sciotic posturing; + sharp tenderness over iliaca or psoas muscles</td>
</tr>
<tr>
<td>Type II lumbar SD</td>
<td>85</td>
<td>Typically a single lumbar segment demonstrating F R Sx or E R Sx</td>
</tr>
</tbody>
</table>


\textsuperscript{b} Note: In PLBP, patients had between three and six of these diagnoses; osteopathic manipulative treatment corrected 75%.

\textsuperscript{c} ASIS indicates anterior superior iliac spine; PSIS, posterior superior iliac spine; F R Sx, E R Sx, where E indicates extension; R, rotation; S, side bending, and x, left or right.
impact on their lives, rather than simply providing a location and quality description of their pain.

An osteopathic palpatory examination will also aid physicians in eliciting a thorough chronic pain history of a patient by helping to gain the patient’s trust. An integrated patient history is essential in determining the impact of pain on physical, mental, emotional, and spiritual functions unique to each individual. Physician training for understanding patients’ physical limitations (the most obvious manifestations of persistent pain) is part of standard medical education. However, nonphysical limitations in the mental and emotional realms are less often articulated by patients and, therefore, greater effort is required by physicians to recognize these limitations.

Consideration by osteopathic physicians of mind-body connections in patients with persistent pain closely parallels biopsychosocial models embraced by multidisciplinary pain clinics. In such models, chronic pain is a frequent, well-established cause of depression, impacting both the central and autonomic nervous systems. Furthermore, these models empirically recognize that physical pain and connective tissue plasticity mechanisms may be temporarily linked to anger, fear, or loss. An example of this connection is pain that was traumatically introduced in an individual during a traffic accident when there was enough time to hopelessly anticipate the oncoming car’s approach. Both fascial dysfunction and emotions associated with the physical injury serve to anchor pain in such individuals, who may require additional counseling to deal with subsequently expressed nonphysical factors.

Conversely, hands-on management of somatic dysfunction offers osteopathic physicians a unique and often valuable access to patients’ mind-body connections. Effects of OMT are occasionally dramatic, as in the catharsis effect of certain somatoemotional releases or the beneficial effects of the Fulford percussion hammer technique in patients with chronic posttraumatic dysfunctions. Treatment of patients with somatic dysfunction often offers opportunities for osteopathic physicians to discuss strategies with patients for reducing mental, spiritual, and emotional pain.

**Persistent Pain, Somatic Dysfunction, and Homeostatic Responses**

Various homeostatic coping and regulating mechanisms influence the physiologic processes responsible for maintaining pain. Homeostasis may be altered through focused biochemical, biophysical, neuroendocrine, and/or psychosympathetic mechanisms that affect specific structures or target receptors. Furthermore, an integrated series of homeostatic mechanisms may provide for panstructural biomechanical changes, such as shifting weight-bearing responsibilities away from painful sites. This process creates easily recognizable patterns associated with certain pain syndromes.

Osteopathic manipulative treatment has long been noted to produce independent beneficial effects on certain autonomic, circulatory, neuroendocrine, postural, and respiratory mechanisms. Therefore, it is rational to consider that influencing these mechanisms may also have a beneficial impact on pain modulation, as depicted in Figure 4.

**Autonomic System Homeostasis: Pain and Osteopathic Manipulative Medicine**—The importance of sympathetically stimulated autonomic nervous system involvement in chronic pain syndromes has long been noted to produce independent beneficial effects on certain autonomic, circulatory, neuroendocrine, postural, and respiratory mechanisms. Therefore, it is rational to consider that influencing these mechanisms may also have a beneficial impact on pain modulation, as depicted in Figure 4.

**Respiratory-Circulatory Homeostasis Role in Pain**—Controlled breathing (ie, focused respiration) and relief of pain have long been linked. The ancient Chinese prescribed controlled breathing for reducing arthritic pain, while lay and professional people in modern times have used it to reduce the pain of labor and delivery. Beyond the mind-body effect of focused respiration as used in meditation and in lowering blood pressure, heart rate, and pain perception, the respiratory-circulatory model popularized by Zink and Lawson is characterized by reduction of edema and associated peripheral biochemical molecules linked to nociception.

Treatment goals associated with the Zink-Lawson respiratory-circulatory model are traditionally administered in the following sequence:

- **1. Opening fascial pathways.** Somatic dysfunction associated with fascial restriction to fluid flow is corrected with OMT at four regional transition zones of the body.
- **2. Maximizing primary-secondary respiration.** Effective, deep synchronized respiration is sought using a variety of osteopathic manipulative techniques, including doming of the thoracoabdominopelvic diaphragms.
- **3. Augmenting lymphaticovenous drainage.** Homeostatic OMT is applied (often using one or more rhythmic lymphaticovenous pumps) to effect pressure changes between the thorax and adjacent regions. Recent literature suggests that such rhythmic motion may also have
a beneficial effect on increasing release of endothelial nitric oxide synthetase, a homeostatic molecule.44,72

4. Enhancing cellular level health. Local tissue techniques (eg, effleurage) are used to mobilize local edema.

Deep breathing creates obvious motion in at least 136 joints and is palpable in all body tissues.73 It is a continuous movement with active and passive components. Through tensegrity relationships, the patient or osteopathic physician can focus deep breathing to remove motion restrictions or engage neuromuscular reflexes to achieve tightening or relaxation of selected tissues.73

Postural Homeostasis in Pain and Dysfunction—Chronic or recurrent pain syndromes have been linked to conditions predisposing patients to postural stress (eg, altered lordotic-kyphotic curves, lower extremity asymmetry, postural muscle imbalance, scoliotic changes, unlevel cranial base, unlevel sacral base). Travell and Simons26 note that postural decompensation is the most common precipitating and perpetuating cause of MTrPs. These MTrPs are implicated in many chronic pain syndromes, ranging from LBP and headaches to carpal tunnel syndrome, temporomandibular joint dysfunction, and pain perceived as angina.27

Pain associated with postural stress and strain can be sclerotomal (ie, postural ligaments) or myotomal (ie, postural muscles). It can also have a significant role in radiculopathies associated with osteoarthritic and discogenic conditions.50 Irvin74 demonstrated that chronic pain throughout the body could be attributed to an unlevel sacral base, and reestablishing postural homeostasis removed most of the symptoms.

The OMM approach to postural care is described thoroughly in Foundations for Osteopathic Medicine and consists of patient education, OMT, exercise, and sometimes an appropriate orthotic regimen.28 In addition, the Zink-Lawson respiratory-circulatory approach71 is applicable in preparing tissues for postural homeostasis because of a biologic tendency to compensate for postural imbalance at regional transition zones.

The following anecdotal case vignette typifies presentation of a patient who seeks treatment for chronic back pain.

Case Presentation
Chuck, a 45-year-old farmhand, was seen in the clinic with the chief complaint of chronic back pain for 3 years. This discomfort, present on his right side, was described as deep, nagging, and constant, with periods of acute exacerbation into the right hip, groin, and down the back of the leg to just above the knee. Full symptoms would occur with prolonged walking or standing and would persist for several weeks. The patient was unable to lift more than 25 pounds (11 kg) without
aggravating his symptoms. His back took
several hours to fully relax after lying down,
even on “good” days.

Pain onset had first occurred while the
patient carried a small bale of hay in front of
his body. He had stepped in an unseen pothole,
stumbled, and fell. The next day, he noticed
full symptoms, which persisted as recurring
episodes for several months. Between and
during episodes, he achieved only partial relief
with ibuprofen (800 mg/d). Physical therapy
reportedly aggravated his pain.

During the next 3 years, the patient vis-
ited several physicians, visits that were
prompted by three to four substantial recur-
rences of pain radiation per year. Negative
results from electromyographic, magnetic res-
onance imaging, and radiographic studies—
coupled with negative results from tests of
reflex changes and nonspecific, nonradicular
patterns of muscle weakness—during these 3
years left the patient with no specific diagnosis
beyond “low back pain with recurrent lum-
bosacral sprain.”

Chuck was unable to work on the farm
and said that he had the impression that physi-
cians believed he was “malingering,” or
“lazy.” He was depressed because he thought
his family also shared these beliefs, and he
became concerned about his marriage.

Clinical findings revealed a slim white
ma who denied smoking or illicit drug use.
Review of his nonmusculoskeletal systems
was noncontributory. Results of deep tendon
reflexes, pathologic reflexes, straight leg-
raising testing, Chapman’s viscerosomatic
reflex screen, and Lloyd’s kidney punch were
all negative. The result for a Trendelenburg
test (a test to determine any weakness of hip
abductors) of the right leg was questionable.
Somatic dysfunction included reduced lumbar
lordosis, left iliaca tender point, right sacral
shear, and tenderness over the right ilulumbo-
ligament and posterior sacroiliac ligament,
as well as tenderness and hypertonicity in
the right piriformis muscle. Flexion tests and
measurements of iliac crest height suggested
a possible “short leg syndrome.” The common
compensatory pattern noted by Zink and
Larson21 was violated by the lumboverte-
bral junction, and the pelvic floor was tight. The
patient was informed that this constellation
of somatic dysfunction could cause chronic
low back pain that often responded favorably
to OMT.29

Osteopathic manipulative treatment
given to the patient consisted of applying the
springing technique to the right sacral shear,
counterstrain to the iliacus and piriformis
tender points, and indirect balanced liga-
mentous tension to the thoracolumbar and
sacral regions. Fascial patterns were treated
with high velocity low amplitude (HVLA)
techniques aimed toward symmetry, and
abdominal and pelvic diaphragms were treated
with indirect and direct myofascial release,
respectively. Post-OMT iliac crest heights
and flexion measurements were normal. The
patient left with instructions to drink lots of
fluid, switch to acetaminophen as needed,
avoid jumping or lifting until his next visit,
and return in 1 week for follow-up examina-
tion.

At 1-week follow-up, the patient noted
that both his acute and nagging pains had
been relieved for nearly 4 days, but mild nag-
ging pain had since recurred. A recurrence of
sacral shear (approximately 40% of original)
and piriformis muscle dysfunction were also
noted and re-treated with OMT. Two weeks
later, the patient returned with no symptoms
and no recurrence of pain. He was instructed
to make an appointment for 1 month later, but
to cancel the appointment if he remained
symptom-free. He phoned 1 month later,
reporting that he was without pain and able
to function normally at home.

Comment
Persistent nonmalignant pain is not a
single entity. It has many different causes
and manifestations, each with varied
characteristics and names. In OMM, a
complete patient history and physical
examination are used to reveal any pre-
viously unidentified pain generator or
underlying cause for persistent pain. In
addition, osteopathic physicians often
screen patients for signs of depression
or other significant nonphysical links
contributing to pain. Based on OMM
patient histories and examinations, osteo-
pathic physicians can develop individ-
ualized osteopathic prescriptions to
address their findings, with the goal of
decreasing biomechanical and biochemical
stressors and empowering patients to
reduce the impact of persistent pain on
quality of life.

In addition to providing appropriate
strategies for management of pain, the
OMM pain management algorithm
incorporates osteopathic principles to
identify and address a variety of host
factors directed toward both the under-
lying cause and tangible impact of per-
sistent discomfort in patients. These
principles provide a framework for patient
education to foster compliance built on
an understanding of complex interrela-
tionships among many different factors.

Each osteopathic prescription seeks
to discover and incorporate those factors
needed to address a patient’s unique
response to pain. The emphasis in
treating patients who have persistent
nonmalignant pain should be on
improving function, decreasing periph-
eral nociception and central facilitation,
and empowering individuals to move
forward in resuming their normal activ-
ities of daily living.

When osteopathic principles and
practice are actively applied to create a
treatment plan for a patient with chronic
pain, the result is a personalized, effective
care plan typically combining nonphar-
macologic treatment strategies with
appropriate types and levels of pharma-
cotherapy. The inclusion of patient edu-
cation in a comprehensive treatment plan
helps to improve quality of life and to
break the vicious cycle resulting from
pathophysiologic mechanisms of persis-
tent pain.

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