Conservative Treatment of Low Back Pain in the Older Adult: A Literature Review

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ABSTRACT

Objective

This review provides an overview and analysis of the most recent literature concerning the efficacy of the most common conservative and invasive treatments for low back pain. Emphasis was given to articles that focused specifically on the treatment of low back pain in the older adult, although studies focused on a younger adult population have also been included. Emphasis is given to an inter-comparison of the conservative care options as well as a comparison between conservative care and surgery for similar conditions.

Data Collection

Computer searches using GoogleScholar, PubMed, Index to Chiropractic Literature and MANTIS/ChiroAccess from 1999-2012, were searched with a combination of the following keywords: low-back, pain, aged or elderly or older adult along with a combination of the following terms: alternative treatment, conservative treatment, spinal manipulation, acupuncture, exercise, counseling, massage, and surgery. Sources were compiled from the searches as well as from Dr. Enix’s accumulated research articles and references within the articles.

Conclusions

A consensus of selective reviews and controlled studies, support the recommendation of a trial of conservative care in the treatment of low back pain. Emerging evidence shows that psychological factors such as anxiety, depression and fear avoidance all play a role in the propagation and perseverance of pain. There is no one strategy that has proven pain relief across the board, yet a combination of the following education/counseling, exercise/stretches, massage, spinal manipulation, and acupuncture elicits the best outcomes. Sometimes, a combination of drugs with conservative therapy is necessary. For those whose conservative treatments have failed, there are always more invasive options. More research is needed on the efficacy of specific interventions used to combat low back pain in the older adult.
INTRODUCTION

Low back pain is a common musculoskeletal disorder that affects 80% of the population during some point of their life.1 “More than 17 million people aged 65 years or older in the United States experience at least one episode of low back pain (LBP) in a calendar year2. Six million of those individuals suffer from compromised quality of life because of frequent episodes2. Consequences of chronic pain in those investigations highlight physical disability3,4,5,6, depression and anxiety5,7,8, sleep disturbance9,10, and increased utilization of health care resources11,12.

In the United States, low back pain is one of the most common reasons people miss work and it is the most common cause of job-related disability.13 Approximately 149 million days of work are lost per year specifically attributable to lumbar injuries; with approximately two thirds of these days lost due to occupational injuries.14 The annual productivity losses resulting from lost work days are estimated to be $28 billion, and “a small percentage of patients with chronic LBP accounts for a large fraction of the costs”14.

Although low back pain can originate from non-musculoskeletal etiologies, these will not be discussed in this paper. This review will focus on the most common etiologies of low back pain in the elderly, as well as efficacy of the following common conservative treatments employed for chronic or acute low back pain: spinal manipulation, massage, acupuncture, exercise therapy, electrical therapies, counseling and education.

The differences between the allopathic and alternative models of treatment for low back pain as well as cost effectiveness and patient satisfaction will also be discussed. Although there are thousands of research articles studying the treatment of low back pain in the general population, there are but a handful of studies focusing specifically on treatment of low back pain in the older patient.
DISCUSSION

Incidence and trends

“According to government reports, the US population of elderly citizens is increasing dramatically. In the 1900s, people over 65 comprised 4% of the US population. By 1968, this had increased to 12.4%, and by 2032, it is estimated that this proportion will increase to 22%. Foster et al2 noted that approximately 30% of people aged 65 or older used at least 1 alternative medicine modality in the preceding year.15 Chiropractic was the most frequent provider accessed at 11%. Del Mundo et al3 have reported that alternative medicine use in rural communities is significant.16 Seventeen percent of all respondents (all ages) indicated that they used chiropractic services in the past year.”17 A telephone survey performed of 4437 adults in North Carolina attempted to disseminate the incidence of low back pain and which treatments had been sought for the condition. Of the 73% “of those who sought care, 91% went to a medical doctor, 29% saw a PT, and 25% saw a chiropractor. 37% received a computed tomography scan, 25% received a magnetic resonance imaging scan, and 10.4% underwent surgery.”18 Approximately 12.5% of the 65 years of age and older population surveyed, reported low back pain at that time; with approximately 20% stating they had low back pain within the previous year.19 According to a survey performed of adults aged 70-79, 36% reported low-back pain.20 In two different British surveys of the general population, 38% of respondents reported a significant episode of low-back pain within the last year.21 Over the last 20 years, Britain has also noticed an exponential increase in the amount of disability benefits being paid due to back pain.21 Similar increases in the incidence of low back pain have also been seen in Australia and the United States. “By the age of 30 years almost half the population will have experienced a substantive episode of low back pain.”21 One could conclude that low back pain is becoming increasingly common throughout the world in both the young and old. Unfortunately, increasing age is a large predilector of having low-back pain.
Epidemiology of low back pain in older adults

“Care from doctors of chiropractic emphasizes spinal manipulation, which has been shown to be effective in several randomized trials.22 A study completed in North Carolina, demonstrated that 39 percent of persons seeking care for acute back pain go to a chiropractor first.23,24 Several studies concluded that being female was a common predictor of CAM use.25,26 One study, however, by Ness et al reported that men were more likely to go to chiropractors specifically, but less likely to go to a CAM practitioner in general.27 Other studies concluded that the more educated26,28,29 and those with a higher income27,29,30 were more likely to see a chiropractor. Greater than average use of alcohol27,30 as well as the ability to drive,30 also increased their chances of visiting a chiropractor. A study of older patients showed that those who self-reported that they are more spiritual,25,26,28 as well as those who were Caucasian,25,30 also had increased visits to CAM practitioners. The most common reasons the elderly seek out CAM providers were for pain-related symptoms26,30,31,32,33 usually due to arthritis31,32, or to improve their quality of life30, or for health maintenance30,32. The majority of older patients reported being satisfied with the care they received28,34 while others believed the care they received was beneficial31. Earlier studies done by Hawk et al.35 and Rupert et al.36 had similar findings.

Etiology of low back pain in older adults

Low back pain can be mechanical or non-mechanical. Non-mechanical low back pain can be from a neurologic syndrome, a systemic disorder, referred pain or a fracture. A 2001 statistic states that osteoporosis affects approximately 25 million Americans annually.37 Long term use of corticosteroids has been shown to increase the risk of osteoporosis. Low bone mass caused by osteoporosis increases the risk of skeletal fractures. Evidence of vertebral deformities were found in 39% of men and women.38

The following activities have been shown to increase the likelihood of low back pain; manual lifting, bending, twisting and whole body vibration.39 “Our data give strong support for a role of
regular heavy lifting in the etiology of low-back pain and add weight to the evidence implicating occupational driving as a risk factor. At the same time, however, they suggest that such activities account for only a small proportion of the total burden of low-back pain in the general population. Our estimates of the fraction of disease attributable to heavy lifting and car driving are 14 and 4%, respectively. Even if allowance is made for uncertainties in these figures, a substantial proportion of cases remain unexplained.”

Some of the most commonly diagnosed mechanical pathologies of the low back are lumbar herniated disc, lumbar spinal stenosis, degenerated discs, facet joint problems and sprains and strains. Mechanical low back pain is thought to occur from several different mechanisms. One of which is from direct compression of a nerve (which also usually presents with buttocks and or leg pain) by discal material, muscle, or new bone growth. Discs are particularly sensitive pain structures. One study revealed that “Pain was elicited by using blunt surgical instruments or an electrical current of low voltage in 30% of patients who had stimulation of the paracentral annulus fibrosis and in 15% with stimulation of the central annulus fibrosis. However, it is unclear why mechanical back pain syndromes commonly become chronic, with pain persisting beyond the normal healing period for most soft-tissue or joint injuries in the absence of nonphysical or operant influence.” The periphery of the disc has a small amount of blood supply and heals slowly. Although this is a possible explanation for how chronic pain begins, there is no “direct concordance between structural degeneration and spinal pain.” There is, however, an increased risk of low-back pain if one has had a previous episode of low back pain. “Research to date suggests that the cause of symptomatic radiculopathy is more complex than just neural dysfunction due to structural impingement….Neurotransmitters and biochemical factors may sensitize neural elements in the motion segment so that the normal biomechanical stresses induced by previously asymptomatic movements or lifting tasks cause pain. Furthermore, injury and the subsequent neurochemical cascade may modify or prolong the pain stimulus and initiate the degenerative and inflammatory changes described above, which mediate additional biochemical and morphologic changes. Whether the biochemical changes that occur
with disk degeneration are the consequence or cause of these painful conditions is unclear. However, chemical and inflammatory factors may create the environmental substratum on which biochemical forces cause axial or limb pain with various characteristics and to various degrees.”

The following research supports the hypothesis of central sensitization of the spinal cord facilitating the process of chronic pain.

Facet joint dysfunction is another common pain generator in approximately 15-45% of patients with low back pain. The capsule of the facet has many nerve endings, encapsulated, unencapsulated and free. Substance P (SP), is one of the neuropeptides that regulates nociception, and SP filled nerve fibers have been found in degenerated lumbar facets. There is a direct correlation between those facets with more severe arthritis and those with a larger amount of SP filled nerve fibers. The following statement supports the belief that there is an increase in nociceptive nerve fibers in areas where previous trauma has occurred.

Muscle strains, trigger points (TrPs) and myofascial pain syndromes are increasingly common diagnosis related to low back pain. “To date, research suggests that myofascial dysfunction with characteristic TrPs is a spinal segmental reflex disorder. Animal studies have showed that TrPs can be abolished by transecting efferent motor nerves or infusing lidocaine; however, spinal transection above the level of segmental innervation of a TrP-containing muscle does not alter the TrP response. Simons postulates that abnormal, persistently increased, and excessive acetylcholine release at the neuromuscular junction generates sustained muscle contraction and a continuous reverberating cycle.” The constant cycle of pain, segmental cord stimulation, pain, segmental cord stimulation, aforementioned, is thought to be the same cycle that chiropractic adjustments can interrupt. If not addressed, subconscious reflexive muscle contraction as a result of neuropathic pain can perpetuate the pain, spasm, pain cycle.

Older adults are at an increased risk for mechanical overload and spasmodic tissues due to a decrease in hydration, muscle mass and elasticity of connective tissues. Seven articles were found, detailing chiropractic management of the following conditions commonly faced by elderly that also present with low back pain; lumbar spinal stenosis, spondylolysis of a lumbar vertebrae, far lateral disc herniation, lumbar spinal synovial cysts, and “apparent
mechanical femoral neuropathy". There are many conditions that may present as low back pain.

Arthritis of the spine, such as osteoarthritis and rheumatoid arthritis, are commonly found in the elderly patient. Since most elderly are retired or do not perform jobs requiring manual labor, the causes of low back pain in the elderly can often be attributed to biomechanical adaptions due to degenerative changes in the spine and atrophy of soft tissues. Degenerative changes can lead to improper biomechanics and postural adaptions, such as anterior head carriage. Similarly, improper biomechanics can lead to musculoskeletal adaptions and degenerative changes. Whether the degenerative changes come first or last is debatable on a case by case basis; but what is known is that improper biomechanics can lead to low back pain. Only a qualified practitioner can perform the necessary history, physical and examination necessary to determine the etiology of pain.

**Low Back Pain and Falls**

Low back pain is a co-morbid factor directly related to the incidence of falls in the elderly. Low back pain in older adults doubles their risk for falls compared with people without low back pain. Falls are the leading cause of injury and accidental death in adults over the age of 65 years. The elderly represent more than one third of all hospital injury admissions, and more than 80% of these injuries are caused by unintentional falls. These falls are the leading cause of non-fatal injuries requiring medical attention in the United States. “Balance problems and falls are common among the elderly and are a leading cause of institutionalization in this group that result in over five million patient outpatient visits per year. It is estimated that between 28% and 35% of individuals over age 65 fall each year, with a fifth of those requiring medical attention. The number of fallers increases to over 40% for those 75 and older. A history of falling is also a robust predictor of morbidity among the elderly. Low back pain (LBP) is the most frequently reported musculoskeletal condition in the elderly, with a prevalence ranging from 19.7% in people over the age of 65, to as high as 40% for individuals over 75. LBP is a leading comorbid factor directly linked to the incidence of falls in the elderly and is sharply on
the rise; LBP prevalence has increased in the last fourteen years from 3.9% to 10.2%.\textsuperscript{54,55} LBP in the elderly can involve a wide range of possible diagnoses and co-morbidities, including a high incidence of malignant or visceral causes and therefore necessitate a close review of systems in addition to the usual musculoskeletal examination.\textsuperscript{55,56,50} One study attempted to understand the effect of chiropractic care on balance, chronic pain and dizziness in older adults. They found that 9 out of the 34 patients studied reported dizziness, all of those who were in the groups that received chiropractic care showed clinically significant improvement in Dizziness Handicap Index scores. Those in the non-treatment group had no significant improvement in Dizziness Handicap Index scores.\textsuperscript{34} A single-group, pretest/posttest design intervention study of patients 65 years and older revealed that the of 6 patients with significant dizziness at baseline, 3 had scores of 0 (no dizziness) on the DHI at visit 16.\textsuperscript{57}

**Effectiveness and clinical course of healing and prognostic features**

It has been demonstrated in several systematic review, that the rapid improvements in low back pain usually occur within the first three months after initial onset.\textsuperscript{58,59} After the first three months there is only a gradual decrease in pain. For example, 6 months after onset, anywhere from 3-40% of patients are still off -work, and at 12 months post-onset, anywhere from 42-75% of people still report pain. Recurrences occur often within a year, with approximately 60% with recurring pain and 33% with recurring absence of work.\textsuperscript{58}

The large population based study completed by Kroft, et al. revealed the following outcomes for episodes of low back pain seen in general practice. It should be taken into account that patients self-reported pain and disability and their consultations with providers. Although most people seeking care from their general practitioner for low back pain did not continue to consult their Dr. about their symptoms after 3 months, most still had a substantial amount of pain and related disability. In fact, only 25% of the patients had fully recovered 12 months later.\textsuperscript{21} It is a falsely held belief that “90% of episodes of low back pain seen in general practice resolve within one month.”\textsuperscript{21} It has been shown that effective early treatment of low back pain can reduce the
incidence and severity of symptoms as well as reducing the social, economic, and medical impact.\textsuperscript{21}

Annual cumulative consultation rate among adults in the practices was 6.4\%. Of the 463 patients who consulted with a new episode of low back pain, 275 (59\%) had only a single consultation, and 150 (32\%) had repeat consultations confined to the 3 months after initial consultation. However, of those interviewed at 3 and 12 months follow up, only 39/188 (21\%) and 42/170 (25\%) respectively had completely recovered in terms of pain and disability. The conclusion drawn from the above statistics demonstrates that that the results are consistent with the interpretation that 90\% of patients with low back pain in primary care will have stopped consulting their doctor with symptoms within three months. However, most will still be experiencing low back pain and related disability one year after consultation.\textsuperscript{21} Although the strongest predictor of a delay in the return to normal functioning was a high level of functional impairment at base line,\textsuperscript{60} increased age also has a negative impact on recovery.\textsuperscript{61}

\textbf{Allopathic vs Alternative}

The allopathic model’s treatment of low back pain consists of prescribing muscle relaxers and pain relievers. A physical therapy prescription for exercises is the allopath’s second line of defense. In the event that those interventions fail and the back pain does not resolve, then more invasive procedures such as cortisone injections or surgeries are recommended.

The alternative, or chiropractic method of treatment for low back pain normally consists of a sequential flow through the following stages of treatment: acute, subacute, and wellness. The commonly utilized stages of care documented by chiropractors are: acute, subacute, chronic, recurrent/flare-up, and wellness. During the acute phase, passive treatments such as spinal manipulation and physiotherapy (for example, ice, interferential, ultrasound) are used to help reduce pain. Patients are also educated on how to manage their condition independently.

A chiropractor will generally explain that the patient’s healing is going to require effort of their part and they must work together with the doctor to achieve their desired goals. In general,
passive care should lead to active care over the course of 1 to 2 months. During active care patients are given exercises with the goals of stabilization, and increased function. Upon return to regular activities it is very important to emphasize to patients that any residual pain they may feel, does not signify harm to the body.

Following a trial of care with no improvement, all systemic, organic and non-mechanical causes should always be ruled out before continuing the assumption that pain is of a mechanical nature. This is especially true in the elderly, for with increased age comes increased risk of co-morbidities such as cancers, diabetes, genitourinary infections and osteoporosis.

A study completed by Carey et al. compared the outcomes and costs of care for acute low back pain among patients seen by primary care practitioners, chiropractors, and orthopedic surgeons. The status at six months was ascertained for 1555 of the 1633 patients, or 95% of those enrolled in the study. The times to functional recovery, return to work, and complete recovery from acute low back pain were similar among patients seen by all six groups of practitioners, but there were marked differences in the use of health care services. The mean total estimated outpatient charges were highest for the patients seen by orthopedic surgeons and chiropractors and were lowest for the patients seen by HMO and primary care providers. Satisfaction was greatest among the patients who went to the chiropractors. Page 914 of the article cited previously states that the cost data were skewed, but does not mention how the data was skewed.

**Spinal manipulation**

There is debate over the ultimate goal of spinal manipulation as well as the definition of “manipulation” across various studies. “Traditional theories, although varied, have tended to focus on mechanical aspects of manipulation as central to their clinical impact including the disruption of “adhesions” or release of trapped intra-articular material in spinal joints, and the realigning of spinal structures. If reducing restrictions to motion and structural realignment are the goals of manipulation, the velocity and amplitude of the manipulation may be less important consideration than the specificity and direction of the technique used because of the importance of specifically directing the force to the involved spinal segment in the required
direction. More recent explanations, however, suggest that the mechanism of effect for manipulation may be related to the unique sensory input of a high-velocity, low amplitude thrust on afferent discharge, and the subsequent effects on motoneuronal activity and central motor excitability. Afferent response has been shown to vary based on the velocity and amplitude of the force applied. If the mechanisms underlying the clinical effects of manipulation are related to these neurophysio-logic responses, which are determined by the velocity and amplitude of the force, distinguishing between thrust and nonthrust techniques is likely to be critical. ”

The evidence supporting superior clinical outcomes with the use of manipulation for a subgroup of patients was corroborated by this retrospective review of patients with occupational low back pain. The use of thrust manipulation appeared to be more efficient than the use of nonthrust manipulation for these patients.” According to a randomized clinical trial comparing the effectiveness of thrust versus non-thrust manual therapy techniques, there was a statistically significant decrease in pain as demonstrated by both the Oswestry Disability Questionaire and the Numerical Pain Rating Scales at the one and four week follow-ups in the thrust group as compared to the non-thrust group. Although some believe thrust manipulation techniques are superior to non-thrust, according to Shearar’s and Hawks’ studies, no significant difference in efficacy was found between the two. The use of low-force adjusting techniques, in particular for the elderly and frail, can be beneficial for reducing low-back pain, while minimizing any risk for fracture or hematomas. Some of the most common low force techniques employed by chiropractors in the treatment of low back pain are (in no particular order): Logan Basic, B.E.S.T, Cox Flexion-Distraction (mechanized or non-mechanized table-assisted procedures), Activator and other instrument-assisted procedures, SOT (pelvic blocking), and Applied Kinesiology. Activator Methods is a technique that uses a small instrument to impart a quick and specific impulse to a bone or tissue. “Neither mechanical-force, manually-assisted nor high-velocity, low-amplitude adjustments were found to be more effective than the other in the treatment of this patient population.” A randomized controlled trial was done comparing cox flexion distraction with

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side posture diversified spinal manipulation and minimal conservative medical care for adults 55 years and older with subacute or chronic low back pain. The findings of this study were that “biomechanically distinct forms of SM did not lead to different outcomes in older LBP patients and both SM procedures were associated with small yet clinically important changes in functional status by the end of treatment for this relatively healthy older population.”

A subgroup of 26 RCTs that assessed manipulation as the sole or predominant component were chosen from the meta-analysis completed by Assendelft W.J. in 2003. The analysis on the subgroup of 26 RCTs found “statistically significant benefits only when spinal manipulation was compared with sham therapies or ineffective therapies. There is no evidence that spinal manipulation is substantially more or less effective than other conventional therapies for either chronic or acute back pain.”

The conventional therapies spinal manipulation was compared with were general practitioner care, analgesics, physical therapy, exercises and back school.

Although the mechanisms through which manipulative therapy exerts its effects upon the body is still in question, it is widely agreed that the desired goals of spinal manipulation include improved range of motion, decreased muscle spasm and decreased pain. In the treatment of acute low back pain, it has been shown that manipulation tends to shorten the episode of pain, particularly over the short term. Longterm follow-up suggests that the initial advantage of manipulation over other therapies is lost with time. “Spinal manipulation has small clinical benefits that are equivalent to those of other commonly used therapies.”

Eight articles were found that studied the effects of manual therapies on older patients.

The one study that utilized mobilization was performed by a physiotherapist. The manipulation studied in seven of the studies was performed by a chiropractor in four of them and an osteopath in three of them. Only two of the following eight studies were randomized clinical trials involving chiropractic adjustments/manipulation and older patients.
Interferential, TENS, traction therapy

Interferential electrical therapy, Transcutaneous Electrical Nerve Stimulation (TENS), and traction therapy are several adjunct modalities used often by physical therapists and chiropractors. The following are results of a study done by Werners, Roland MD. A total of 152 patients were recruited. The two treatment groups had similar demographic and clinical baseline characteristics. The mean Oswestry Disability Index before treatment was 30 for both groups (n = 147). After treatment, this had dropped to 25, and, at 3 months, were 21 (interferential therapy) and 22 (motorized lumbar traction and massage). The mean pain visual analog scale score before treatment was 50 (interferential therapy) and 51 (motorized lumbar traction and massage). This had dropped, respectively, to 46 and 44 after treatment and to 42 and 39 at 3 months. This study shows a progressive fall in Oswestry Disability Index and pain visual analog scale scores in patients with low back pain treated with either interferential therapy or motorized lumbar traction and massage. There was no difference in the improvement between the two groups at the end of treatment. Although there is evidence from several trials that traction alone is ineffective in the management of low back pain, this study could not exclude some effect from the concomitant massage.

TENS and interferential are the two of the most common electrical therapies used in the treatment of low back pain. A study by Facci concluded that there was no difference between TENS and the interferential current therapy for chronic low back pain. Although there are few studies to substantiate the benefits of electrical therapies in the treatment of low back pain, the study aforementioned showed mean reductions on the visual analog scale of 39.18 mm and 44.86 mm with the treatment of interferential current. 84% of the TENS group and 75% of the interferential current group stopped using their medications after the treatment.

Exercise (strengthening and stretching)

A study protocol titled Chiropractic and exercise for seniors with low back pain or neck Pain describes the design of two randomized clinical trials and states that “treatments for low back and neck conditions will not only aim to treat the pain specifically, but will also address
associated strength and motion in a manner that enhances general function and improves quality of life.”

Research indicates that most back injuries are not due to one specific trauma, but they are caused by a cumulative result of trivial traumas and associated improper muscle activation patterns and joint motion. Therefore a main focus of rehabilitation exercises for low back pain concentrate on lumbar spine extensor muscle endurance and motor control. Some believe that strengthening the core muscles, such as the transverse abdominis, obliques, and muscles of the pelvic floor provides the most benefit for lumbar spine stabilization. The quadratus lumborum is also an essential muscle used to stabilize the lumbar spine. It has been shown that stabilization of the low back should be acquired before and increase in strength.

To date, physical therapists’ protocols for treating low back pain often include the following exercise, “drawing in”, in their treatment protocol. Drawing in is where one lies on their back, with knees bent and attempts to approximate their belly button to their spine. This action is very similar to just sucking in ones’ belly. They believe that this movement tenses the transverse abdominis muscles and the tightening of the transverse abdominal muscles and its muscular and fascial attachments helps to provide stability to the spine. Other physical therapists and most chiropractors, believe that practicing abdominal bracing is a better way to help stabilize the spine. Recent research from McGill of the US, supports this later view. McGill believes that by bracing instead of hollowing, the obliques and transversus are activated together. This would lead to a wider base for the contraction thereby lending better support. Abdominal bracing is usually prescribed first, with exercises progressing to include abdominal bracing along with marching. It is well known that strength and balance training can improve physical function as well as help to reduce impairments in activities of daily living.

Stretches are a common home recommendation given by both physical therapist’s and chiropractors. “An RCT comparing chiropractic care and physical therapy found no difference in costs or effectiveness.” Stretches are given to lengthen chronically tight muscles, while exercises are given to strengthen weak muscles. Achieving an equal balance bilaterally within all of the planes of movement, allows for proper joint function and movement along the joints axis’.
There are several types of stretching techniques employed by chiropractors and PT’s to help loosen tight muscles. One of which is post-isometric-relaxation or PIR. PIR is a technique that uses reciprocal inhibition to enhance relaxation of the muscle being stretched. This can be a vigorous or gentle technique, depending on the practitioner. Myofascial release is also a common technique used by massage therapists, PT’s and chiropractors. There are several types of myofascial release with trademarked names such as John Barne’s Myofascial Release and John Upledger myofascial release. There are also techniques such as Muscle Energy Technique and Strain-Counterstrain that have been used for years by Osteopathic Physicians in the treatment of low back pain.91 “Strain Counterstrain (SCS) is the fourth most commonly used osteopathic manipulative technique following soft tissue techniques, high velocity low amplitude thrust, and muscle energy technique (Johnson and Kurtz, 2003). Also known as positional release, SCS is a passive positional technique aimed at relieving musculoskeletal pain and dysfunction through indirect manual manipulation (d’Amborgio and Roth, 1997).”92 “MET combined with supervised motor control and resistance exercises may be superior to neuromuscular re-education and resistance training for decreasing disability and improving function in patients with acute low back pain.”93 A study that used ultrasound to assess and monitor the effective sliding motion of fascial layers in vivo, found that myofascial release techniques “are effective manual techniques to release area of impaired sliding fascial mobility, and to improve pain perception over a short term duration in people with non-specific NP or LBP.”94 All of the aforementioned techniques can be used on people of all ages under the treatment by a qualified practitioner. “Although the elderly population appears to be under-represented in the pertinent LBP literature,95 there does not seem to be an age limit for strengthening back muscles. Even symptomatic geriatric women are able to increase strength with progressive resistance exercise, which subsequently reduces LBP.9697 An aerobic exercise program is as effective as more expensive exercise programs in the treatment of chronic low back pain.98 Five years after the supervised combined exercise and motivational program, patients had significant improvements in disability, pain intensity, and working ability.99 In the long term, the combined exercise and motivation program was superior to the standard exercise program.99 In terms of
costs for days on sick leave, the medical exercise therapy group saved 906,732 Norwegian Kroner (NOK) ($122,531.00), and the conventional physiotherapy group saved NOK 1,882,560 ($254,200.00), compared with the self-exercise group. According to Torstensen’s study, those performing exercises in the group setting have better results than those who performed self-exercise.  

**Acupuncture**

After herbal remedies, massage therapy, and chiropractic, according to patient reporting in one study, the CAM used next most often by older patients was acupuncture. Cherkin’s review concluded that the effectiveness of acupuncture is not clear, because the RCTs evaluating its effectiveness were deemed of low quality, stating “Recent studies suggest that acupuncture is more effective than no treatment or sham treatment, is as effective than no treatment or sham treatment, is as effective as other medical interventions of questionable value (for example TENS and non-steroidal anti-inflammatory drugs for chronic back pain), but is less effective than massage.”  

Other studies show that “Patients receiving acupuncture care reported a significantly greater reduction in worry about their back pain at 12 and 24 months compared with the usual care group. At 24 months, the acupuncture care group was significantly more likely to report 12 months pain free and less likely to report the use of medication for pain relief.” Although the literature supporting acupuncture’s benefits is limited, due to the low-risk of unwanted side and its potential to alleviate anxiety, acupuncture is an alternative therapy worth trying.

**Massage**

“Initial studies have found massage to be effective for persistent back pain.” Preliminary evidence suggests that massage, but not acupuncture or spinal manipulation, may reduce the costs of care after an initial course of therapy.” “Three trials designed to evaluate massage as a treatment for subacute and chronic back pain have all found positive effects, especially on patient function.” “Initial studies suggest that massage is effective for persistent back pain”  

A randomized controlled trial comparing Swedish relaxation massage with structural massage and a control group receiving usual care, produced favorable results for massage. There was
Counseling and education

Cognitive-behavioral and self-regulatory treatments were specifically found to be efficacious in the treatment of low back pain. Multidisciplinary approaches that included a psychological component, when compared with active control conditions, were also found to have positive short-term effects on pain interference and positive long-term effects on return to work. The results demonstrated positive effects of psychological interventions for CLBP. 103 It has been shown to be helpful for physicians to reinforce to their patients in the initial exam “that pain did not signal harm, to maintain a consistent activity pace, and to stay as active as tolerable.” 88

Chronic pain and depression are thought to go hand in hand. This is true for both the elderly and the non-elderly. The impact of pain on activities of daily living, functional abilities and perceived control over life should be considered when associating pain with depression. 82 “Interference in activities demonstrated the strongest relationship with depressed mood in both age groups.” 104 A randomized controlled trial performed by Francisco Kovacs, MD et al. showed that among three groups of institutionalized elderly subjects, the greatest improvement in disability (3.0 (95% CI 1.5–4.5) at the 180 day evaluation) was achieved by the group who received active education, as compared to the group who received a postural educational talk followed by a 20 minute group talk, and the control group who received no intervention. The

no significant difference between the relaxation massage and the structural massage in relieving disability of symptoms. 102 The results of the study are as follows. “The massage groups had similar functional outcomes at 10 weeks. The adjusted mean RDQ score was 2.9 points (95% CI, 1.8 to 4.0 points) lower in the relaxation group and 2.5 points (CI, 1.4 to 3.5 points) lower in the structural massage group than in the usual care group, and adjusted mean symptom bothersomeness scores were 1.7 points (CI, 1.2 to 2.2 points) lower with relaxation massage and 1.4 points (CI, 0.8 to 1.9 points) lower with structural massage. The beneficial effects of relaxation massage on function (but not on symptom reduction) persisted at 52 weeks but were small.” 102
intervention that focused on active management education also showed improved disability 6 months later and had an even greater effect on subjects with low back pain.\textsuperscript{105}

**Drugs, Surgery and Procedures**

When people do not receive timely and effective conservative care for their condition, they are left with much fewer treatment options. When conservative measures such as the ones discussed above are not sought or do not help to relieve low back pain, more invasive drugs, surgeries, and procedures are the next options. A common medical procedure for low back pain is injections. One study found that nerve-root injections were effective in preventing the need for an operation in more than half of the operative candidates.\textsuperscript{106} Twenty-nine of the fifty-five patients who had requested operative intervention and who were considered to be operative candidates by their treating spine surgeons avoided an operation.\textsuperscript{106} Compared with injection of bupivacaine alone, injection of bupivacaine with the steroids was significantly (p < 0.004) more likely to result in the avoidance of an operation.\textsuperscript{106} Interestingly, nine of the twenty-seven patients who had received bupivacaine alone still managed to avoid an operation.\textsuperscript{106}

For people with facet joint arthrosis, injection with depot methylprednisolone or a combination of a local anesthetic such as lidocaine or bupivacaine and the steroid medication methylprednisolone are often used. Short term effects of this procedure are a sore back for a day or two due to the inflammation process caused by the insertion of the needle and the steroid itself. It usually takes about 5 days or so before pain relief is noted. According to the MetroHealth Pain Management Group’s website, although the procedure is relatively safe, there can be some adverse side effects and risks. Several of these are “infection, bleeding, worsening of symptoms, spinal block, epidural block etc…The risks related to the side effects of cortisone include weight gain, increase in blood sugar (mainly in diabetics) water retention, suppression of body’s own natural production of cortisone etc.”\textsuperscript{107} They also state that “serious side effects and complications are uncommon.”\textsuperscript{107} Several other procedures used in the treatment of low back pain performed at this center are epidurolysis, corticosteroids, intrathecal pump implant (spinal
pain pump), lumbar sympathetic block, sacro-iliac joint injection, radio frequency lesioning, medial branch blocks for facet joints, spinal cord stimulator, and stellate ganglion injection. More invasive treatments of discogenic low-back pain include “ablation of intradiscal nociceptors, lowering intranuclear pressure, removal of herniated nucleus, and radiofrequency ablation of the nociceptors. Unfortunately, most of these strategies do not meet the minimal criteria for a positive treatment advice. In particular, single-needle radiofrequency thermocoagulation of the discus is not recommended for patients with discogenic pain (2 B-).

Interestingly, a little used procedure, radiofrequency ablation of the ramus communicans, does meet the (2 B+) level for endorsement. There is currently insufficient proof to recommend intradiscal electrothermal therapy (2 B±) and intradiscal biacuplasty (0). It is advised that ozone discolysis, nucleoplasty, and targeted disc decompression should only be performed as part of a study protocol.\textsuperscript{108} A separate study revealed that “When conservative treatment fails, in subacute lumbosacral radicular pain under the level L3 as the result of a contained herniation, transforaminal corticosteroid administration is recommended (2 B+). In chronic lumbosacral radicular pain, (pulsed) radiofrequency treatment adjacent to the spinal ganglion (DRG) can be considered (2 C+). For refractory lumbosacral radicular pain, adhesiolysis and epiduroscopy can be considered (2 B+/−), preferentially study-related. In patients with a therapy-resistant radicular pain in the context of a Failed Back Surgery Syndrome, spinal cord stimulation is recommended (2 A+). This treatment should be performed in specialized centers.”\textsuperscript{109} A concensus among literature states that surgery is often more risky for older individuals, and that conservative care of low back pain for that age group is a viable option.

**Surgery vs Conservative Care**

Lumbar spinal stenosis is a commonly diagnosed condition in the elderly. Below are results of two studies performed on the elderly, one study group was treated with conservative care and the other with surgery. Most literature agrees that conservative measures should be employed first. The study done by Murphy, Donald R. et al. studies 57 patients with diagnosed spinal stenosis. Although the age range of patients was from 32-80, this study was included because the mean
age was 65 years old. The interventions employed with all of the patients in the study included Cox flexion distraction technique and neural mobilization. Some of the patients were also given the “cat and camel” exercise as well as nerve flossing exercises to do at home. The study also states that some patients may have also “had other modalities included in their individual programs, such as mobilization exercises and spinal stabilization exercise”.

Outcomes were measured using the Roland Morris Disability Questionnaire and pain levels were obtained with the Three Level Numerical Rating Scale. Patients were also asked to estimate their percent of overall improvement. “The mean patient-rated percentage improvement from baseline to the end to treatment was 65.1%. The mean improvement in disability from baseline to the end of treatment was 5.1 points….improvement in disability from baseline to the end of treatment was seen in 66.7% of patients. The mean improvement in "at worst" pain was 3.1 points….The mean duration of FU was 16.5 months. The mean patient-rated percentage improvement from baseline to long term FU was 75.6%. The mean improvement in disability was 5.2 points…..improvement in disability was seen in 73.2% of patients. The mean improvement in "on average" pain intensity from baseline to long term FU was 3.0 points. The mean improvement in "at worst" pain was 4.2 points. Only two patients went on to require surgery.”

The only non-clinically meaningful improvement statistic was the mean improvement of 1.6 points in "on average" pain intensity.

When conservative care for lumbar stenosis fails to produces the wanted results, surgery can be an option. A study done by Shabat, Shay, concludes subjects with a “mean age of 83.7 years at the time of surgery, with a follow-up period of 36.8 months on average (minimal follow-up of 1 year), 76% of the operated patients reported that they were very or somewhat satisfied with the surgical results.” The study also states that 52% of the patients suffered complications from the surgery, but 48% of those who suffered complications, had only minor complications that did not extend their hospital stay. There were many limitations of this study, one of the greatest being that only 64% of the original 39 patients were able to be followed. “The patients reported VAS score of 8.84 + 1.91 prior to surgery, which improved to 3.6 + 2.35 on latest
follow-up (P < 0.001). Furthermore, patients reported a significant (P < 0.001) subjective improvement in the ability to perform daily activities (the Barthel index improved from 62.8 ± 11.46 points before the surgery to 77.0 ± 11.9 points after the surgery (P < 0.001). The number of patients who had limitation in walking distance up to 50 m decreased by 28% (v2 = 3.74, P = 0.053), and the number of patients having no walking limitation increased by 32% (v2 = 5.37, P = 0.02)."

Lumbar stenosis can be treated either surgically or conservatively. Although both studies report generally positive outcomes, it is not possible to statistically compare the results of the two studies. Different outcome measures were employed and each study reported several limitations. The conclusions of both studies state that conservative care should always be employed prior to surgical intervention. “It should be remembered that elderly patients might deteriorate following surgery. Therefore surgery should be done only after measuring the potential benefits of the surgery versus the potential risks.”

**CONCLUSION**

Over 100 articles consisting of literature reviews, systematic reviews, selective reviews and comparative studies, and case reports were reviewed. Conservative care for low back pain provides similar improvements in decreased pain as invasive care, with less cost to the insurance companies in the long run, and less risk to elderly patients for complications. According to the literature, the conservative care intervention for acute low back pain that offered the best outcomes, such as decreased pain and decreased numbers of subsequent visits to healthcare providers, was short term use of pain medicines and massage. The effect size of NSAID use and manipulation for acute low back pain was shown to be modest. Spinal manipulation was shown to decrease pain, mainly in the acute stages of low back pain, where-as education and exercise programs focusing on strengthening the core and lumbar spine extensors was most beneficial to chronic low back pain patients. Spinal manipulation is a slightly more expensive in the short-term but an equally effective option for treatment of acute low back pain as medicinal
interventions such as pain relieving medicine.\textsuperscript{113,114} Spinal manipulation has less unwanted side effects than pharmaceutical management of low back pain in the elderly.

According to the 2011 update of a Cochrane review regarding spinal manipulative therapy for chronic low back pain, as cited by the article “The Psychology of Chronic Back Pain – Psychological risk factors for chronicity and our challenge as clinicians: finding the right treatment mix by David J. Brunarski, DC, MSc, FCCS (C), states that “There was no clinically relevant difference between spinal manipulative therapy and other interventions for reducing pain and improving function in patients with chronic low-back pain.”\textsuperscript{115} Results from most studies suggest that 5 to 10 sessions of SMT administered over 2 to 4 weeks achieve equivalent or superior improvement in pain and function when compared with other commonly used interventions, such as physical modalities, medication, education, or exercise, for short, intermediate, and long-term follow-up.\textsuperscript{116} A recommendation, although weak recommendation, stated that chronic LBP patients with depression, neuroticism, and certain personality disorders should preferentially be treated nonoperatively.\textsuperscript{117}

A systematic review on the effectiveness of physical and rehabilitation interventions for chronic nonspecific low back pain, published this year in the \textit{European Spine Journal}, concluded that "only multidisciplinary treatment, behavioural treatment, and exercise therapy should be provided as conservative treatments in daily practice in the treatment of chronic low back pain."\textsuperscript{113} A June 2011 update of a Cochrane review regarding spinal manipulative therapy for chronic low back pain stated: "There was no clinically relevant difference between spinal manipulative therapy and other interventions for reducing pain and improving function in patients with chronic low-back pain."\textsuperscript{113,114}

“An understanding of the mechanisms behind MT could assist in the identification of individuals likely to respond to MT by allowing a priori hypotheses as to pertinent predictive factors for future clinical prediction rules and a better understanding of the factors which are determined as predictive. A second benefit of the identification of MT mechanisms is the potential for increased acceptance of these techniques by healthcare providers. Despite the literature
supporting the effectiveness of MT in specific musculoskeletal conditions, healthcare practitioners at times provide or refer for MT at a lower than expected rate (Jette and Delitto, 1997; Li and Bombardier, 2001; Bishop and Wing, 2003). The lack of an identifiable mechanism of action for MT may limit the acceptability of these techniques as they may be viewed as less scientific. Knowledge of mechanisms may promote more appropriate use of MT by healthcare providers.”

According to the clinical guidelines detailed by the National Collaborating Centre for Primary Care, a course of conservative management is recommended before considering surgery as an option. They recommend physicians or therapists to “provide people with advice and information to promote self-management of their low back pain…offer educational advice that includes information on the nature of non-specific low back pain…encourages the person to be physically active and continue with normal activities as far as possible.”

They also recommend offering “one of the following treatment options, taking into account patient preference: an exercise programme, a course of manual therapy or a course of acupuncture. Consider offering another of these options if the chosen treatment does not result in satisfactory improvement.” Those with low back pain should be advised to stay physically active or begin physical activities. Recommended exercise programs can include the following: aerobic activity, movement instruction, muscle strengthening, postural control, and stretching.

They also suggest offering a course of manual therapy, including spinal manipulation. They do not suggest offering patients laser or interferential therapy, therapeutic ultrasound, TENS, lumbar supports or traction. They also recommend offering a course of acupuncture needling. When conservative measures fail, injections of therapeutic substances are not recommended for non-specific low back pain. “Consider referral for a combined physical and psychological treatment programme, comprising around 100 hours over a maximum of 8 weeks, for people who: have received at least one less intensive treatment and have high disability and/or significant psychological distress….Combined physical and psychological treatment programmes should include a cognitive behavioural approach and exercise.”

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independent reviewers screened search results and extracted data. Data extracted included the type and perspective of the economic evaluation, the treatment comparators, and the relative cost-effectiveness of the treatment comparators. Twenty-six studies were included. Most studies found that interdisciplinary rehabilitation, exercise, acupuncture, spinal manipulation or cognitive-behavioural therapy were cost-effective in people with sub-acute or chronic LBP."

The following pharmaceutical interventions are recommended. “Advise the person to take regular paracetamol as the first medication option. When paracetamol alone provides insufficient pain relief, offer: non-steroidal anti-inflammatory drugs (NSAIDs) and/or weak opioids. Give due consideration to the risk of side effects from NSAIDs, especially in: older people and other people at increased risk of experiencing side effects. When offering treatment with an oral NSAID/COX-2 (cyclooxygenase 2) inhibitor, the first choice should be either a standard NSAID or a COX-2 inhibitor. In either case, for people over 45 these should be co-prescribed with a PPI (proton pump inhibitor), choosing the one with the lowest acquisition cost.”

“Consider offering tricyclic antidepressants if other medications provide insufficient pain relief. Start at a low dosage and increase up to the maximum antidepressant dosage until therapeutic effect is achieved or unacceptable side effects prevent further increase. Short-term use of strong opioids can be used for severe pain.” “Consider referral for specialist assessment for people who may require prolonged use of strong opioids. Give due consideration to the risk of opioid dependence and side effects for both strong and weak opioids. Base decisions on continuation of medications on individual response. They believe that selective serotonin reuptake inhibitors (SSRIs) should not be used for treating pain.”

“Consider referral for an opinion on spinal fusion for people who: have completed an optimal package of care, including a combined physical and psychological treatment programme and still have severe non-specific low back pain for which they would consider surgery. Offer anyone with psychological distress appropriate treatment for this before referral for an opinion on spinal fusion. Refer the patient to a specialist spinal surgical service if spinal fusion is being
considered. Give due consideration to the possible risks for that patient.“119 Their conclusion was that people should not be recommended for the following procedures: intradiscal electrothermal therapy (IDET), percutaneous intradiscal radiofrequency thermocoagulation (PIRFT), radiofrequency facet joint denervation.119 No matter the chosen therapy, it is important for doctors to take into account patient preference. “There is growing evidence that patient expectations affect outcomes121-123, allowing patients to choose the treatment they believe will be most helpful may improve results.” 76

“Evidence-based medicine is not kind to the elderly. This movement trusts only the products of randomized clinical trial or, preferentially, meta-analyses of those trials. But subjects over the age of 75 years are rarely found in such trials, thus rendering this population invisible to scientific medicine. If we teach only what we know, and if we know only what we can measure in clinical trials, then we can say little of importance about the care of the elderly. The most important resources required in caring for the old – sufficient time and empathy – are not included in the critical pathways of managed care”124
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