Analysis of low back pain evaluation and treatment comparing chiropractic and conventional medical care

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Dedication

This paper is dedicated to my future low back pain patients for whom I will now be able provide appropriate care and advice, and to my husband who first introduced me to chiropractic.

"I will keep you strong to the end…" 1 Cor. 1:8

Acknowledgements

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Introduction

Low back pain (LBP) is the most frequently reported form of pain and is a widespread problem that the majority of adults will experience within their lifetime (Deyo, Mirza, & Martin, 2006). In 1990, LBP became the 5th leading cause of office visits (Hart, Deyo, & Cherkin, 1995) and currently accounts for about 3% (31 million visits) of all visits to conventional physicians (Licciardone, 2008). As the primary cause of occupational disability, LBP has resulted in many days of employment absenteeism, consequently consuming 75% of the overall funds directed toward LBP (Frymoyer & Cats-Baril, 1991; National Institute of Neurological Disorders and Stroke, 2008). Patients with LBP are more likely than the general public to regularly experience feelings of depression, nervousness, anxiety, and restlessness. Smoking, heavy drinking, and obesity are also seen more frequently in this population (Strine & Hootman, 2007). LBP affects women more severely than men, leaving them with a worse prognosis due to an increased number of recurrences and co-morbid depression (Chenot et al., 2008).

In an effort to find relief for their pain, 70% of patients with LBP schedule an appointment with either a chiropractor (DC) or a medical physician (MD), with 58.6% seeking care from a general medical practitioner, and 30.8% from a DC (Deyo & Tsui-Wu, 1987). DCs lead in the frequency of visits from patients exploring alternative medicine (Druss & Rosenheck, 1999), especially when seeking therapy for LBP (Sherman et al., 2004). From 1990-1997, alternative medicine practitioners experienced an increase of office visits from 425 million to 629 million, with chronic back pain patients leading the way (Eisenberg et al., 1998). During that period, the overall number of visits to alternative practitioners exceeded the number of visits to primary care physicians (PCPs) by 243 million (Schappert, 1992; Woodwell, 1997). There are many factors involved in a patient's decision of who to see for their LBP.

Examining the most cost-effective care for LBP can aid an individual patient and potentially lead to substantial savings in the general public's health care costs in view of the greater than $50 billion per year directed toward LBP (National Institute of Neurological Disorders and Stroke, 2008). When calculating the overall cost of treatment for a patient with LBP, the duration of treatment, imaging utilization, cost of additional referrals (to surgeons, physical therapists, or orthopedists), as well as costs of prescribed medications must be taken into consideration. Insurance coverage of chiropractic and medical care must also be factored into the overall costs and how this potentially influences patients' choices for health care and referral patterns.

Patient satisfaction should be of the upmost importance to health care practitioners in any field. Patient satisfaction is what maintains and increases patient volume giving yield to their profession. It is evident that when treating a LBP patient, this goal remains, and may influence the diagnostic plan and/or therapeutic actions. Patient satisfaction also factors into the type of health care professional patients choose. Realizing possible reasons why satisfaction may be higher in one profession or for a particular health issue can aid in improving professionalism and communication skills between MDs and DCs.

Ultimately, the goal of any health care provider is to provide LBP patients, or any patient, with the most relief and elimination of their pain as possible. As health care professionals, whether DCs, MDs, or physician assistants (PAs), it is paramount to recognize the most effective way to eradicate this prevalent and debilitating problem. Currently, the most effective health care provider in the management of LBP is unclear. The purpose of this study is to compare, by way of a literature review, MD and DC evaluation and treatment of LBP based on duration of care, cost, patient satisfaction, methods, therapeutic effect, and referral patterns.

Definitions

LBP is defined as pain located at the lumbar and sacral regions of the spine (Poitras et al., 2008), not extending below the buttocks or above the lumbar vertebrae. Chronic is defined as an episode of pain greater than 3 months in duration according to the US National Center for Health Statistics (Stedman, 2008). Spinal manipulative therapy (SMT) performed by chiropractors is defined as the application of a manual high-velocity, low amplitude thrust to spinal joints, extending them past the normal range of motion (Swenson & Haldeman, 2003). SMT is a form of therapy performed manually that moves a joint past the usual range of motion but not beyond the joint's anatomic range of motion. An audible cracking or popping can accompany such movement.

Methodology

A search for relative articles was performed using MEDLINE/PubMed (1949-present) and related articles. Search keywords [MeSH terms] used were “low back pain” combined with the terms “chiropractic,” “family physicians,” “primary health care,” “recurrence,” “diagnostic imaging,” and “treatment.” Other keywords [MeSH terms] used were “chiropractic” combined with “health insurance.” Many of the articles were found in the reference lists of articles applicable to the topic.

Inclusion criteria consisted of studies performed on adults age 18 or older that were written within the last 21 years. Studies from countries other than the United States (US) were included in the review, but the focus revolved around those performed in the US. Studies involving chronic LBP patients presenting with or without leg pain were included as were studies with patients experiencing acute LBP only. Research articles written by MDs and DCs individually were included but were interpreted under careful scrutiny to avoid any bias of either profession.

Exclusion criteria consisted of articles that were not in English. Studies of pain in areas other than the lower back such as mid/upper back, shoulder, hip, or neck were excluded. Research on LBP related topics other than those specifically examined in the paper such as patient satisfaction, therapeutic methods, patient volume, office visits, cost, treatment type and outcome, guidelines, provider education, referrals, and imaging interventions were excluded. The focus was on primary care MDs and DCs consequently excluding MD subspecialties. Studies which involved surgical treatment for LBP were excluded. Articles that contain guidelines for evaluating and managing LBP that are no longer current were excluded.

Scope

The different aspects of care that are crucial in providing the LBP patient with maximum results include the cost-effectiveness of treatment, patient satisfaction with the care provider as well as the outcome, amount of pain relief and reduction in disability that is expected and achieved, and the overall efficacy of various treatment methods. Potential reasons causing differences that occur among these categories based on provider type, whether a DC or a MD, were examined. The issues explored were referral patterns between the two and accompanying perspectives regarding the cause and management of LBP. Additional areas accounted for were education, attitudes toward the other medical professional, and communication skills.

In an attempt to identify the most advantageous techniques involved in LBP management, numerous aspects were considered. The patient volume seen by each profession was compared in order to acknowledge the common usage of both professions. The available guidelines on LBP treatment were included to enable comparison of the professions' guidelines and therefore the recommended approach to treatment for MDs and DCs. The methods of treatment used by MDs and DCs and their accompanying results were evaluated as this is the most crucial area of care because outcomes can provide valuable information. Patient satisfaction was also evaluated to determine whether one provider is preferred over another by patients and to find the role that patient satisfaction has in the LBP management process. Cost of care often determines types of treatment as well as providers, so it was researched to determine if either form of provider was more cost efficient than the other. The number of office visits to MDs and DCs were taken into consideration as this may affect cost and provider use. The use of imaging interventions was compared as were referral patterns.

The objective of this article was not to determine which profession is better than the other in managing LBP but to identify which presentations, characteristics, and aspects of LBP that each is best equipped and able to manage.

Results

Education

In an effort to understand the similarities and differences between MDs and DCs, it is imperative to start with the educational and training processes that form the foundation of the professions. Although both DCs and MDs require graduate level education, the duration and methods differ.

The American Medical Association defines the education of physicians in the US to consist of undergraduate education, medical school, a residency program, and an optional fellowship (American Medical Association, n.d.). The medical school criterion is four years at an accredited US medical school (of which there are currently 146) (Bureau of Labor Statistics, n.d.-b) that consists of preclinical (first two years) and clinical components (last two years) (see Table 1) (American Medical Association).

In addition to didactic and clinical components, medical students must pass a series of national board exams. The United States Medical Licensing Examination (USMLE) consists of three parts, which are termed "steps." Step 1 is taken following the second year of medical school. Step 2 includes a clinical skills exam and a written exam. These exams are taken during or following the third and fourth years of medical school (United States Medical Licensing Examination, 2009). After successful completion of the pre-clinical and clinical years as well as the passing of Step 1 and Step 2 of the USMLE, students receive a degree in MD or DO (doctor of osteopathy), but must continue in their training before they are able to practice as a physician on their own (American Medical Association, n.d.). Step 3 can be taken only after Step 1 and Step 2 have been passed and the student has obtained either a MD or DO degree. It is recommended that students wait until they have completed one year of post-graduate training

(residency) before they attempt Step 3 (United States Medical Licensing Examination). The post-graduate training is termed a residency program and is three to seven years in length, varying depending on specialty, and involves professional training under senior physicians (American Medical Association). For example, a residency in family practice is three years (Duane et al., 2002) and a residency in orthopedic surgery is five years with a minimum of 250 surgical procedures yearly (American Osteopathic Association, 2008). A fellowship of one to three years may then be completed by MDs or DOs who wish to extend their level of specialty in a certain field (American Medical Association).

Following the completion of all education requirements and exams, the physician must obtain a license to practice medicine from the state in which they plan to practice (American Medical Association, n.d.). Board certification for physicians is optional and involves oral and written examinations as well as peer evaluation by members of the American Board of Medical Specialties (American Board of Medical Specialties, 2006-2009; American Medical Association). Board certification identifies expertise of a physician in a particular specialty of medicine (American Board of Medical Specialties).

Continuing medical education (CME) is necessary yearly to ensure a physician's knowledge remains current (American Medical Association, n.d.). These required hours vary by state of licensure ranging from 12-50 hours needed yearly for license renewal. Requirements for specific CME content are authorized by individual states. For example, California mandates 20% of CME hours be in geriatric medicine for physicians caring for a large percentage of patients older than 65 years. Other topics such as the risk management of AIDS/HIV or pain management for terminally ill patients are required by Florida, Kentucky, and Rhode Island (Duke University Office of Continuing Medical Education, 2005).

Chiropractic education also commences after obtaining a four year pre-medical undergraduate college degree (minimum of 90 semester hours) (American Chiropractic Association, n.d.; Bureau of Labor Statistics, n.d.-a) and entering an accredited chiropractic college (18 in the US) for three to five years depending on the institution (Bureau of Labor Statistics, n.d.-a). At the chiropractic college, in addition to the didactic training, a total of 4,200 hours of clinical time is amassed (see Table 2). A minimum of one year spent focused on patient care is required as part of their professional training which is included in the three to five year chiropractic college education (American Chiropractic Association).

During the course of their schooling, chiropractic students must pass each of four parts of a national board exam (National Board of Chiropractic Examiners, n.d.). Part 1 is taken during the students' sophomore year after satisfactory completion of the subjects to be tested and with authorization by the dean or registrar of an accredited college. Part 2 is taken during the students' junior year with the same required criteria as Part 1. Part 3 cannot be taken until the student has completed Part 1 and is within nine months of graduation. The student is able to take Part 3 before Part 2 has been passed, but the score results for Part 3 are withheld pending successful completion of Part 2 (National Board of Chiropractic Examiners, 2009). Part 4 of the exam is required by all states except Florida and Illinois and is a practical, hands-on examination consisting of case management, chiropractic technique, and x-ray interpretation and diagnosis. For the diagnostic imaging portion of the examination, students have a limited time to complete 10 stations in which they must review diagnostic images, identify findings, and answer multiple choice questions based on the cases. Chiropractic technique is evaluated through five stations each of which have a written description of subluxations and chiropractic techniques. The examinees must perform the correct set-up on the correct area of subluxation. There are 20

stations for the case management portion of the exam which requires the examinees to perform histories and physical exams and identify the appropriate diagnosis and management procedures (National Board of Chiropractic Examiners, 2006).

After successful completion of course work and all parts of the national board exam, the students become DCs. DCs may then apply for licensure to practice nationwide as well as in numerous locations worldwide (American Chiropractic Association, n.d.). Select states such as Ohio and Texas, require a passing score of 75% on an additional test, the Jurisprudence Examination, in order for DCs to obtain a license (Ohio State Chiropractic Board, n.d.-b; Texas Board of Chiropractic Examiners, 2007). Most states however require no additional testing, only a monetary fee (Kentucky Board of Chiropractic Examiners, 2009a; Michigan Department of Community Health, 2008; Ohio State Chiropractic Board, 2007, n.d.-b; Texas Board of Chiropractic Examiners). Optional postdoctoral training in various fields is offered by select chiropractic schools. After completing postdoctoral training and passing an examination, the DC is given a "diplomate" status in a specific specialty (Bureau of Labor Statistics, n.d.-a).

The continuing education requirements vary by state of licensure ranging from twelve to fifty hours needed annually (Civil Administrative Code of Illinois, n.d.; Kentucky Board of Chiropractic Examiners, 2009b; Michigan Department of Community Health, n.d.; Ohio State Chiropractic Board, n.d.-a; Texas Board of Chiropractic Examiners, n.d.). Limitations and requirements are placed on the approved topics, sources, and categories of continuing education by the chiropractic board of examiners of each state. An example of a limitation determined by a state is Texas, where the amount of continuing education hours that can be obtained online is limited to six out of the 16 hours required annually (Texas Board of Chiropractic Examiners). Kentucky requires education in HIV/AIDS courses every 10 years and also mandates that six of

the 12 continuing education hours needed annually be obtained within Kentucky (Kentucky Board of Chiropractic Examiners, 2009b).

Based on the above classroom and clinical experiences from which MDs and DCs learn, their approaches to low back pain are determined. DCs focus the majority of their attention on one particular therapeutic technique, SMT, whereas MDs encompass many due to the broad nature of their training (Cherkin & MacCornack, 1989).

Patient Volume

There have been studies of both DCs and MDs regarding their patient volume. Coulter and Shekelle (2005) examined 131 DCs across North America (five US states and one Canadian province) and estimated the average number of patients seen daily to be between 10 and 50; with 28% of DCs seeing 10-20 patients, 31% seeing 21-30 patients, and 13% seeing over 50 patients daily. The total number of patients seen by DCs weekly averaged between 50 to more than 200; with 21% of DCs seeing less than 50 patients, 22% seeing 50-70, 57% seeing more than 71 patients with 12% of the 57% seeing more than 200 patients weekly. The mean number of patients seen weekly was not able to be determined as the study only provided ranges of patients seen rather than exact numbers.

In a survey of 1,054 of their members, the American Academy of Family Physicians found the average number of patients seen weekly by family physicians in 2008 to be 84.9. This number however is slightly skewed as it only accounts for the patients seen in the office during a one week interval, whereas many other patients are seen by some family physicians that round at hospitals, nursing homes, and other facilities (American Academy of Family Physicians, 2008).

Guidelines / Clinical Approach

LBP can present in a variety of ways and is most commonly caused by abnormalities of the musculoskeletal structures, although discogenic abnormalities and osteoarthritis among other things can cause symptoms (Deyo & Weinstein, 2001). LBP can be classified into two broad categories, mechanical (or nonspecific) and nonmechanical, which can then be further divided into subcategories (see Table 3) (Aminoff, 2008). These categories are based on accompanying symptoms and the anatomical structures that are involved (see Table 4 and Table 5) (Deyo & Weinstein). Mechanical is the most common category of LBP, which is understandable as it encompasses many well-known conditions such as muscle sprains and strains, degenerative disc disorders, herniated discs, and spinal stenosis (Aminoff).

DCs and MDs each have guidelines to follow in determining the diagnosis and treatment of LBP. The American College of Physicians together with the American Pain Society developed seven recommendations for MDs to follow when faced with this common complaint (see Table 6). The guidelines are geared particularly to clinicians working in primary care settings that deal with acute and chronic LBP with or without associated leg pain. The recommendations for MDs are to first perform a focused history and physical exam in order to categorize the patient into the type of pain they are experiencing, whether nonspecific, related to spinal stenosis or radiculopathy, or due to another condition related to the spine (see Table 3) (Chou et al., 2007). The physical exam for LBP should consist of a generalized observation of the patient looking for scoliosis or obvious deformities as well as a focal back examination of the painful area including palpation for spasm and testing for symmetric range of motion (Harper, 2005; U.S. Agency for Health Care Policy and Research, 1994). Deep tendon reflexes and a sensory exam of the lower extremities should also be performed (Harper). Sciatic nerve root tension is then tested with the straight leg raise test while the patient is supine and then sitting,

and lastly the patient is observed while heel and toe walking (Harper; U.S. Agency for Health Care Policy and Research). Imaging and other diagnostic tests are not recommended for patients with nonspecific LBP, rather only for patients with severe LBP or when progressive neurologic deficits or underlying conditions are present. The third recommendation is that patients with unrelenting LBP and signs and symptoms of radiculopathy or spinal stenosis be evaluated using MRI and CT imaging when the clinician is considering surgery or epidural steroid injections for the patient. Such imaging may also be performed based on the patient's level of pain severity, previous radiograph findings, as well as patient and clinician preferences. The fourth recommendation states that MDs inform their patients on the anticipated course of their LBP as well as self-care options and encourage them to continue to be active. The use of medication that has proven benefits should only be considered when used in combination with self-care and the distribution of LBP information, and only after baseline pain severity and functional deficits have been determined. Further, the potential risks and benefits of taking medications must be weighed to determine if medications such as acetaminophen or NSAIDs would be advantageous for the patient's condition. Patients who fail to improve with self-care, which are interventions that patients can put into practice individually after advice is given by a clinician, should additionally use a form of nonpharmacologic therapy that has proven health benefits (see Table 7) (Chou et al.).

The National Guideline Clearinghouse also has guidelines available for the treatment of LBP, but specifically acute LBP. The major recommendations are to avoid bedrest, use ice on the focal area of pain, stretch the back, prescribe NSAIDs or acetaminophen for pain relief, and very importantly, reassure the patient. Although not considered one of their major recommendations, the National Guideline Clearinghouse suggests that diagnostic imaging is not

typically required for acute LBP, but a clinician may want to consider its use if there has been no improvement within six weeks (Michigan Quality Improvement Consortium, 2008).

DCs utilize consultation, case history, physical exam, laboratory tests, and the use of radiographs in evaluating patients (see Table 8). The patient's history is used to obtain a description of the LBP. When a DC examines the spine, it should be done in great detail, evaluating spinal structure and ability to function, resulting in focusing the treatment of LBP on the spine. The majority of the examination relies on palpation and consists of a combination of static and motion palpation techniques, aiding in the identification of spinal segments that may require manipulation (Yeomans, 2001a). Areas in need of manipulation are locations of subluxation. Subluxations are malpositioned vertebra in which there is an incomplete separation between the articular surfaces of a joint resulting in loss or change in function and consequently neural disturbances (Yeomans, 2001c). A chiropractic treatment plan is then determined based on the problematic spinal issue discovered. Radiographs or other devices may also be used to determine locations along the spine that manipulation would benefit. DCs are recommended to identify areas of the spine that are weak, even those that are distant from the site of the LBP complaint, in an effort to align the spine in its optimal position resulting in alleviation of the LBP. The specialty of chiropractic strives to initiate patient education, including the importance of exercise and activity modification, and a treatment plan consisting of three to five visits per week for one to two weeks (Yeomans, 2001a).

Cherkin, MacCornack and Berg (1988) carried out survey research involving questionnaires sent to family physicians (MDs and DOs) and DCs to determine if the professions differed in their beliefs and attitudes toward LBP, including determination of cause, diagnosis, prognosis, treatment and prevention. Perspectives were obtained from 476 MDs and 208 DCs

through their answers to clinical vignettes. The vignettes were clinical cases of patients presenting with LBP and clinicians were asked to choose their management plan as if the patient were in their office, including testing, therapy and follow-up. Additional questions were also included in the questionnaire, one of which asked the clinicians' perspectives on the cause of the LBP experienced by patients in the vignettes. Family practitioners (47%) most commonly identified the cause of back pain as being muscle strain, and DCs (55%) most often noted the cause to be the result of vertebral subluxations. It was not stated whether there was a statistically significant difference between these. This belief of the underlying cause of LBP may give reason to why DC patients agreed significantly more (84% vs. 57%) with their provider on the declared underlying cause than patients seeking care from an MD (Cherkin & MacCornack, 1989). The majority of family MDs (88%) reported that they thought LBP was a self-resolving matter in which no medical intervention was necessary. Less than a third (28%) of DCs shared this opinion with them, some offering that unless the underlying cause of the LBP was corrected, the issue could not be resolved without help. Consequently, DCs were more likely than family MDs (91% vs. 31%) to agree that in order to provide the most suitable treatment for a patient, a specific diagnosis is needed. According to the authors of the study, DCs believed that they could attend to not just the symptoms, but also the underlying problem (no data was provided to identify exactly how many DCs held this belief), leading them to state that making a patient comfortable was not of utmost importance, but rather it was providing effective therapy. Family MDs thought differently, reporting that the most important aspect was to enable the patient's comfort while the body naturally healed itself of the pain. An apparent greater amount of family MDs disclosed feelings of frustration when patients requested their backs be 'fixed' than did the number of DCs when faced with the same situation (59% vs. 23%). In addition, it appears more

family MDs reported feeling inept in their ability to provide sufficient care for LBP patients than did DCs (22% vs. 2%) (Cherkin et al.), leading to a decreased amount of confidence in diagnosing and treating LBP. It was not stated as to whether statistical significance was reached (Cherkin & MacCornack).

Treatment Type

A multitude of treatments for LBP have been researched in an effort to discover if any are explicitly beneficial over others. Physical therapy (PT) is one treatment commonly used in the care of LBP patients by MD referrals (25.2%) and to a lesser degree by DC referrals (0.8%) (Nyiendo, Haas, Goldberg, & Sexton, 2001b). Referrals for PT are commonly recommended by MDs for patients with subacute LBP, which is LBP lasting for four to eight weeks (Chou et al., 2007). The goal of PT is to work with patients that are suffering with physical issues, such as LBP, enabling their ability to return to appropriate functioning and mobility while providing pain relief. Physical therapists (PTs) evaluate the strength, balance, posture, coordination, range of motion, and muscle performance of their patients. To accomplish this, PTs utilize modalities such as stretching, massage, traction, hot and cold compresses, electrical stimulation, exercises, ultrasounds, and assistive device education (Bureau of Labor Statistics, 2009). Another form of treatment most utilized by DCs and to a lesser extent by PTs and DOs, is SMT. SMT is primarily utilized for its pain relieving effects. Pain relief is believed to be achieved by releasing entrapped synovial folds, disrupting articular and periarticular adhesions, relaxating hypertonic muscles, and realigning displaced spinal areas. The SMT that PTs or DOs use compared to that performed by DCs is different as DCs perform short lever, high velocity thrusts to specific areas of the spine whereas PTs and DOs perform long lever, low velocity thrusts that are nonspecific (P. Shekelle, 2008).

Nyiendo et al. (2001b) found that chiropractic therapeutic care for chronic low back pain (CLBP) consisted of SMT as the greater part of care (83.7% of all DC patients received), as well as physiotherapy modalities (48.8% of all DC patients received), providing the patient with a home exercise plan (57.0% of DC patients), and giving self care education (50.1% of DC patients). The physiotherapy modalities offered by DCs incorporated electrotherapy, massage, heat/cold application, traction, mobilization, and ultrasound. Fitting to the common idea that conventional medical care aims mostly at reducing the amount of pain while increasing functioning levels more willingly than curing the underlying condition (Schofferman & Mazanec, 2008), it was found that the mainstay of MD treatment includes prescription drugs (80%), providing the patient with a home exercise plan (49.4%), giving self-care advice (39.7%), and referring to a physical therapist for further treatment (25.2%) (Nyiendo, Haas et al., 2001b).

In a separate study, relating to self-care, including weight loss (39.1% vs. 30.9%), cessation of smoking (19% vs. 7.5%), and job modification (25.8% vs. 14.9%), patients of MDs with CLBP and sciatica demonstrated a greater improvement when experiencing an LBP attack than did patients of DCs (MD, n=64; DC, n=68). This was in spite of DCs suggesting self-care to their patients more frequently than MDs (57.1% vs. 28.9%). In addition, there was a statistically significant difference (p=.007) between patients of MDs and DCs when comparing the use of bed rest, with 73% of MD patients recommending it. When evaluating DC and MD patients with CLBP and sciatica, similar results were noted for recommending exercise activity (34.3% of DC patients vs. 25% of MD patients) and supplement use (51.5% of DC patients vs. 38.7% of MD patients) during and between episodes of LBP (Nyiendo, Haas, Goldberg, & Lloyd, 2001).

The most commonly prescribed medications by MDs for LBP were nonnarcotic analgesics (56.7% of patients) with the majority being non-specific NSAIDs. Only 20% of MD patients received no prescriptions at all, while another 20% received more than five prescriptions. The average number of prescriptions given to MD patients was 3.3 (SD = 4.8) (Nyiendo, Haas et al., 2001b), but it is unclear as to whether the number of prescriptions patients were documented receiving included refill prescriptions. A study focusing on the use of analgesics in LBP management based on insurance claim information from the University of Pittsburg Medical Center Health Plan found that 55% (9,517 out of 17,148) of patients had one or more claims for analgesic medications in which 68% (n = 6,645) of those were for an opioid and 58% (n = 5,538) were for NSAIDs with some patients being prescribed a combination of opioids and NSAIDs. Of the patients prescribed opioids, the majority of them (70%) were taken for one month or less but some use of the medication lasted as long as 6 months (9.2%). Further, Vogt et al. (2005) identified that patients were 58% less likely to visit a DC if they had an opioid claim than if they did not. Opioid costs for the University of Pittsburgh Medical Center Health System in 2001 were $1,795,375, of which, 48% ($861,779) was for patients with LBP claims compared to 21% ($377,029) being spent on cancer patients. A systematic review of 150 randomized trials focusing on common interventions used in the treatment of LBP, found no additional benefit for patients taking narcotic analgesics when contrasted with those taking NSAIDs (van Tulder, Koes, & Bouter, 1997).

In an effort to heal the body through natural and conservative means, DCs feel that the use of prescription medication is unnecessary. Believing that many medications are simply treating symptoms rather than the underlying cause of a problem, DCs offer a non-drug alternative approach to treatment (American Chiropractic Association, 2008). Nyiendo, Haas,

Goldberg, and Lloyd (2001) found 51.5% of DC patients to use supplements but it is not stated whether or not their use was recommended by the DC. Some states, such as Wisconsin, have laws that do not allow DCs to counsel patients on supplement use unless they have a nutrition counseling certificate while other states do not have such a restriction (State of Wisconsin Department of Regulation and Licensing, 2008). It is uncertain how often DCs recommend the use of supplements or nonprescription medications to their patients.

Therapeutic Effect

As the previous section centered on the types of treatment used for LBP, the therapeutic effects of such treatments were also examined. In a randomized trial performed in the United Kingdom with 1,334 participants, authors concluded that SMT is effective at improving back function levels at three months (a 1.57 point benefit, according to the Roland disability questionnaire, which is significant at a 0.1% level) and sustains this function at a slightly decreased level for up to one year (a 1.01 point benefit which is significant at a 5% level). Improvements in disability (5.65 point benefit, significant at 1% level), pain (5.87 point benefit, significant at 1% level), the patient's general health condition (1.68 point benefit, significant at 5% level), and adverse beliefs about back pain (1.43 point benefit, significant at 5% level) occurred with the use of SMT and were maintained for a 12 month period (UK Beam Trial Team, 2004).

In a different study, 58 patients with acute and chronic LBP were treated with chiropractic care for four weeks and statistically significant improvement from baseline was observed in their levels of pain (52.5% average reduction) and disability (52.9% average reduction). The chiropractic care given was a combination of SMT and soft tissue techniques delivered over four weeks with each patient receiving an average of 12 treatments. A control

group was not identified. When analyzed separately, it was the acute low back pain patients that benefited the most from SMT in regards to pain (66.8% reduction) and disability (62.5% reduction) in comparison to patients with CLBP who had more modest improvements (19.7% reduction in pain; 19.8% reduction in disability) (McMorland & Suter, 2000). Exercise, when added to SMT, resulted in similar effects functionally (1.87 point benefit, significant at 0.1% level) to SMT alone, but improved the patient's beliefs about back pain to a greater extent (3.28 point benefit, significant at 0.1% level). When used alone, exercise improved function of the back but only by a small amount (1.36 point benefit, significant at 1% level) and for only three months (at 12 months the benefit decreased to 0.39 points with no statistical significance present) (UK Beam Trial Team, 2004). Although exercise has not been found to be of greater benefit for acute LBP compared to other conservative treatments, there is strong evidence, defined as being determined in high quality randomized clinical trials, that when treating CLBP, exercise can be effective (van Tulder et al., 1997).

Eight hundred and thirty five patients (309 MD patients, 526 DC patients) involved in a self-referral, observational study had similar outcomes, with improvement at six and 12 months in both pain and disability. The study aimed to determine pain and disability benefits of treatment by MDs and DCs based on the patients' levels of leg pain. DC patients had less pain and disability below the knee after treatment (VAS/RODQ >40 for MD patients, <30 for DC patients; P=.000), but according to the authors this might be accounted for as a result of MD patients beginning the study at a level of greater severity (MD: VAS 54.1/RODQ 49.7; DC: VAS 47.7/RODQ 38.3) (Nyiendo, Haas, Goldberg, & Sexton, 2001a).

Bronfort et al. (1996) conducted a randomized clinical trial comparing three LBP treatment combinations for a period of 11 weeks using a total of 174 respondents of a newspaper

advertisement who agreed to become patients and try one of the predetermined treatments. The treatment categories were SMT combined with trunk strengthening exercises (TSE) (n = 71), SMT combined with trunk stretching exercises (n = 51) and NSAID therapy used in conjunction with TSE (n = 52). The SMT was provided by DCs and the exercise was provided by trained and certified research assistants. The suppliers of the NSAID therapy were not mentioned. There were not any statistically significant differences between the regimens for pain, disability, or functional status. At the one-year follow up, there was still no statistically significant difference between the treatment regimens. Overall, disability (mean reduction of 37-53% by week 11) was statistically significantly ($p<.000001$) reduced as was pain (mean reduction of 35-50% by week 11) for patients treated with any of the combined therapies.

Another randomized controlled clinical trial in 2003, involving 115 patients, compared medications (n = 43), either celecoxib, rofecoxib, or paracetamol, with SMT (n = 36) and acupuncture (n = 36) to determine their efficacy when used for chronic spinal pain. Patients assigned to the SMT group had the greatest relief of symptoms (n = 9, 27.3%) compared to the other two groups (acupuncture n = 3, 9.4% and medication n = 2, 5%) after nine weeks of treatment despite the fact that the SMT group had experienced the longest average of pretreatment pain duration of all groups (SMT = 8.3 years, medication = 6.4 years, acupuncture = 4.5 years), with two patients having spinal pain symptoms for greater than 30 years. The most improvement was also noted in the outcome measures such as pain, disability, general health status, and increased flexibility of the spine for patients in the SMT group. Giles and Muller (2003) suggested that SMT be used in patients with chronic spinal pain unless it is specifically contraindicated as it was shown to yield the most beneficial results in a short duration.

In contrast, Assendelft et al. (2004) in their meta-analysis of SMT's effectiveness compared to other therapies using 53 articles, found no statistically significant difference related to pain and disability for patients treated with SMT rather than analgesics, exercise, or PT except for the improvement seen in patients with short-term pain. The authors stated that it is doubtful that SMT is effective, yet no evidence was found to suggest that the other therapeutic methods were of greater benefit. In contrast, van Tulder et al. (1997) found moderate evidence (defined by the author as a conclusion reached by the data of high quality randomized clinical trials as well as at least one low quality randomized clinical trial) of the superior effectiveness of SMT over that of the care given by MDs; consisting of bed rest and analgesics for patients with CLBP. A recent systematic review dealing with this issue found a statistically significant benefit of NSAID use over a placebo for both acute and chronic LBP patients (Roelofs, Deyo, Koes, Scholten, & van Tulder, 2008).

Patients who seek care from health professionals want their problems alleviated permanently which can be challenging for patients with LBP as most experience at least one recurrent episode within one year (Pengel, Herbert, Maher, & Refshauge, 2003). Therefore, when comparing treatment methods it is imperative to examine the associated recurrence rates.

A prospective cohort study of 443 patients with LBP seeking treatment from general practitioners revealed evidence that up to three fourths of patients experience LBP recurrences. The median number of relapses per patient was two with the median time to relapse being seven weeks. The pain and disability associated with the relapse was typically less than that of the initial presenting LBP episode, and the median duration of each relapse was three weeks but decreased with each recurrent episode (van den Hoogen, Koes, van Eijk, Bouter, & Deville, 1998). The authors failed to mention if these findings were statistically significant. In a one

year observational study of 2,775 patients self-referred to DCs or MDs, Nyiendo et al. (2001b) reported that patients under chiropractic care had a higher amount of LBP recurrences on average (6.1) than those seen by MDs (5.1). However, the recurrences experienced by DC patients did not persist as long as did the recurrences experienced by patients of MDs. Of the patients with recurrences of LBP continuing for more than one month, 11% were MD patients and 4% were DC patients. It was not stated whether any of the above numbers were statistically significant findings.

Patient Satisfaction

Patients tend to remember their experience and either recommend it or advise against it to others based on their satisfaction of their encounter. This section aims to identify the role of patient satisfaction in LBP care and which provider, MD or DC, patients find more satisfying in regards to the care they receive.

In a study of 835 patients (309 MD care, 526 DC care) Nyiendo et al. (2001a) found patient satisfaction of DCs was higher than MDs and remained increased in all areas of care at one year (an average of 58.5% for MD patients and 85.9% for DC patients; $p<.0000$). In agreement, Cherkin and MacCornack (1989) found that the number of chiropractic patients that were highly satisfied was three times greater than the those for patients of family MDs (66% vs 22%, $p<.001$), suggesting that chiropractic patients are more inclined than patients of family MDs to report a high level of satisfaction with the care they received for their LBP. This study was based on patients within a particular health maintenance organization (HMO) with 718 people enrolled as family practice patients and 348 enrolled as chiropractic patients. Factors that culminated to result in increased satisfaction for DCs in comparison to family MDs, were that the patients felt their DC demonstrated concern, confidence in the ability to handle their health care

problem, and provision of a sufficient amount of information in regards to the causative agent of the pain, recovery time, and instructions for at home management. The ability of the health care provider to obtain a thorough patient history, perform a physical exam, and provide reasoning behind their pain and therefore the reason for their visit were among the highest links to patient satisfaction (Carey, Garrett et al., 1995).

Hertzman-Miller et al. (2002) found greater patient satisfaction for DCs (36.1) than MDs (30.6) after four weeks of treatment and felt this was the result of the treatment explanations and the advice given for ways to continue care at home, which consequently resulted in the patients returning to the same providers repeatedly ($p<.001$). Proposed reasons for increased satisfaction among DC patients are DCs being viewed as specialists by their patients, the idea that chiropractic involved hands-on treatment, the effect that being a new patient to a provider can have, and the possibility that DCs perform physical exams proficiently in the eyes of patients. When asked to what level family MDs felt DCs' ability to care for patients with musculoskeletal issues, the mean response was a 2.5 (1 = strongly agree, 5 = strongly disagree), but when asked about DCs' ability to handle nonmusculoskeletal issues, the mean response was 4.25 (1 = strongly agree, 5 = strongly disagree) (Mainous, Gill, Zoller, & Wolman, 2000).

Patients of family physicians (MDs and DOs) were significantly less likely than DC patients to experience satisfaction based on the quantity of time the provider was available to listen to them, the likelihood of their provider believing the reality of their pain, understanding their concerns about the possible underlying causes of it, and subsequently sharing in that concern (Cherkin & MacCornack, 1989). Although DCs provided information more often to their patients on the cause of their pain, it still remained the area that patients reported being least satisfied with in both provider groups (Nyiendo, Haas et al., 2001a). In agreement, Bush et al.

(1993) determined that the area in which patients of family physicians were least satisfied had to do with the amount of information given by the provider. This was in comparison to the satisfaction patients had toward a physician's caring nature and effectiveness of treatment. Bush et al. found a statistically significant correlation between provider confidence and the amount of information a patient received from their provider ($p=.018$). Such information included an explanation for and possible causes of the patient's LBP as well as ways in which the patient could prevent recurrences. Hertzman-Miller et al. (2002) offer that chiropractic confidence may be a product of a tendency to "express greater conviction than MDs about the reasons for their patients' problems and what can be done to help them." When the attitudes of providers toward their LBP patients were compared with patient satisfaction, no association was found (Bush et al.). Patient preferences and attitudes appear to lend themselves to the definitive choice in treatment for LBP. When surveyed on which care provider they would choose, DC or MD, based on believing they possessed equality of skills, patients were more likely to obtain care from MDs (Sharma, Haas, & Stano, 2003).

Hurwitz et al. (2005) conducted a randomized observational trial to evaluate the extent to which patient satisfaction can affect changes in LBP and associated disability. After evaluating 681 patients, the researchers concluded that the greater the patient satisfaction early on in treatment, the more likely the patient was to feel a decreased amount of pain. This perception of decreased pain was maintained throughout the entire 18-month observation. An increase in satisfaction was noted for MD patients when their health care provider explained the needed treatment and recommended four or more self care items resulting in equal satisfaction to that of chiropractic patients.

Cost – Insurance / Office Visits

The three main components that must be considered equally by health care organizations are the cost, quality, and access to care (The Center for Health Affairs, 2008). When weighing the efficacy of LBP treatment, health care organizations may need to consider these components when comparing reimbursement for one provider type to another. In a comparison of insurance health care costs between patients with chiropractic coverage (707,690 health plan members) and those without (1,001,995 health plan members), it was found that for patients with chiropractic coverage, the average total health care expenditure per episode of back pain was $289. This was $110 less than the cost per episode of back pain for patients without chiropractic coverage ($p<.001$). These rates remained similar over the four-year study period with patients without chiropractic coverage paying 8% (the study did not mention if this was statistically significant) more than patients with chiropractic coverage (Legorreta et al., 2004). Jenson, Roychoudhury, and Cherkin (1998) found that chiropractic benefits were included in 75% of private insurance plans, but many of those plans had limitations on cost and coverage. Similarly, using data collected from 131 DCs within the United States and Canada, it was estimated that 23% of chiropractic patients had all of their care covered under their health insurance plans, while another 36% did not have any chiropractic coverage through their health insurance (Coulter & Shekelle, 2005). Sharma et al. (2003) stated that despite DCs' effort to remain cost efficient for the uninsured by having reduced fees in comparison to those of MDs, they end up being more costly for insured patients because of the benefit restrictions in place by insurance coverage. Jensen el al. (1998) stated that patients may be led to conventional medical care for their LBP treatment due to the cost of care and not because it is associated with a better therapeutic outcome than chiropractic or another form of care. Recently, third party payers have taken a step

to expand access and increase benefits for chiropractic and other forms of alternative care (Sharma et al.).

In addition to the direct cost of seeing a clinician, other statistically significant differences noticed between DC and MD care included fewer inpatient stays (9.3 vs. 15.6 stays/1,000 patients, $p<.001$), lower MRI (43.2 vs. 68.9 MR images/1000 patients, $p<.001$) and radiograph (17.5 vs. 22.7 radiographs/1,000 patients, $p<.001$) rates, a decreased number of lower back surgery (3.3 vs. 4.8 surgical procedures/1,000 patients, $p<.001$), and 6% fewer presentations of back pain to MDs. The researchers stated that the decrease of back pain complaints to MDs could indicate that when patients have the financial funds enabling them to choose between chiropractic or medical care without regard for cost, they are more likely to choose chiropractic care for their back pain (Legorreta et al., 2004).

Limitations placed on chiropractic coverage are usually listed separately from those for medical care and include a limited number of office visits, a certain dollar amount, chiropractic specific deductibles and coinsurance, and specification that only certain services provided by DCs are covered. Fifty to 69% of plans studied in a 1993 survey of 68.8 million workers had at least one limitation in chiropractic benefits; with dollar amounts (7-42%) and office visits (27-34%) being the most common. Further, of workers who had a fringe benefit health insurance, 51.6 million (75%) of them had plans in which chiropractic care was included, while 13 million (19%) had insurance in which chiropractic care was excluded. Persons with HMO coverage were less likely to have chiropractic coverage than those covered by a preferred provider organization (PPO) or a point-of-service (POS) insurance plan. In addition, virtually all patients (90%) that did have DC coverage through an HMO required preauthorization prior to seeking chiropractic care. People that worked at companies with fewer than 200 employees were also

less likely to have chiropractic coverage than persons working at companies with greater than 200 employees (62% vs. 80%) (Jensen et al., 1998). In 2000, according to Caplan and Griffin (2000), commercial insurance coverage for chiropractic services was required in 41 states; offered through either benefit packages or riders. Washington state was the first to enter this trend in 1995 with the initiation of the "Every Category of Provider" law requiring private commercial health insurance companies to cover services provided by every licensed professional that was working within their correct scope of practice. Government programs such as Medicaid and Medicare as well as self-insured individuals were excluded from this. Another bill was passed on the first day of 2000 that allowed patients in the state of Washington to seek care from DCs without prior referral (Watts, Lafferty, & Baden, 2004).

Chiropractic treatment tends to include significantly more office visits (6.70) on average than the number of visits scheduled for patients of MDs (1.88) (Nyiendo, Haas et al., 2001b). In agreement, Carey et al. (1995) found the mean number of visits for acute LBP patients to be significantly higher for chiropractic patients (10.1-15.0) than those seeking care from primary care (4.4-5.5). After assessing the experiences of 1633 patients, Carey et al. suggest that DCs are among the providers with the highest charges due to the frequent use of radiographs and numerous office visits despite charges per visit being less than MDs. Conversely, Stano and Smith (1996) found that despite an increased length of chiropractic care for LBP, the cost of care does not subsequently increase because of their lower cost per visit. The numerous office visits were found by Haas, Groupp, and Kraemer (2004) to be related to the pain outcome that a patient experiences. In a different randomized clinical trial, it was determined that it was not the physical modalities that affected the improvement in pain that a patient experienced, but was correspondent to the number of visits in which they received SMT.

This difference in cost between the provider types included both initial visits and subsequent LBP episodes (Smith & Stano, 1997). Shekelle, Markovich, and Louie (1995) noted that although their findings indicated DCs cost less per visit than MDs, LBP patients of DCs have significantly more office visits than those of MDs which would result in overall higher costs for DC patients. When considering this, outpatient costs may be high for DC patients, but there are no additional costs including medications and hospitalizations, as there can be for MD patients.

Imaging Interventions

Imaging is widely used in all areas of medicine. It is beneficial in both ruling out and ruling in diagnoses and guiding the appropriate next step in the care of a LBP patient. The most commonly used imaging interventions for LBP are plain film radiographs, computed tomography (CT), and magnetic resonance imaging (MRI).

Imaging interventions utilized by both providers were of equal amount in regards to radiographs (26.2% for MDs vs. 25.6% for DCs), but may vary when comparing the use of CT (1.3% MDs vs. 0.4% DCs) and MRI (8.3% MDs vs. 1.5% DCs). It was not indicated if any of the above mentioned statistics were statistically significant (Nyiendo, Haas et al., 2001b). However, Carey et al. (1995) found DCs to utilize radiographs at a greater rate (67% of patients) than PCPs (26% of patients). In a recent survey of chiropractic educators worldwide, 55% felt that DCs over utilize radiography (Ammendolia et al., 2008). Carey et al. also noted that the amount of patients receiving an MRI or CT were of similar values between those seen by a DC (8% in urban setting, 7% in rural setting) and those by a PCP (9% in urban setting, 11% in rural setting), although orthopedists surpassed them both in the amount that they ordered (17%).

Despite their obvious use and the high patient preference for having them done, plain radiography of the lumbar spine has been found to exhibit little benefit in the outcome of LBP. No differences were found between the patients that received radiographs and those that did not in the areas of length of work absenteeism, hospital admissions, or levels of satisfaction, pain, and disability at three and nine months. The utilization of radiography also resulted in an increased number of visits with the clinician within the first three months of care, of which some may have been due solely to the discussion of the radiograph results (Kendrick et al., 2001). In a controlled trial attempting to find if patients with LBP benefited more from rapid MRI or radiographs, 380 patients were randomized to receive one of the two testing methods. Despite the patients who received the rapid MRI having a statistically significant increased mean Roland Scale score, which is a measure of function, at three months compared to that of patients receiving radiographs (10.4 rapid MRI vs. 8.6 radiograph; p=.03), this difference decreased at 12 months to the point of no longer being statistically significant (9.34 rapid MRI vs. 8.75 radiograph, p=.53). The authors stated that both groups trended toward improvements in areas such as function, pain, and disability, but there were no statistically significant differences found between the two groups. The authors suggest that due to the rapid MRI patients not having significantly better results and having a higher cost burden associated with its use, there is no benefit in using the rapid MRI as the initial imaging test in patients with LBP (Jarvik et al., 2003).

Yelland (2004) believes that imaging interventions continue to be performed in an effort to detect pathology by identifying the causative factor of the back pain, all the while seeking to increase patient satisfaction. In an effort to find out the role that radiology plays in primary care patients with LBP, Kendrick et al. (2001) found Yelland to be at least partially correct in the idea

that imaging interventions and patient satisfaction are linked. Kendrick et al. discovered that patients with LBP are less likely to be satisfied with their care if they believe that more tests should be done and that x-rays need to be obtained on all patients that present with LBP ($p = .01$). The number of individuals who held this opinion increased from 28.6% before they were given treatment to 44.2% at three months post-treatment. Likewise, Jarvik et al. (2003) found an association between patient satisfaction and the amount of reassurance they felt after receiving imaging interventions ($p<.001$). Ash et al. (2008) suggest that the most efficient way to satisfy a patient while avoiding unnecessary imaging is to educate the patients on the back pain that they are experiencing.

Referrals

Referrals are a frequently utilized aspect of patient care within and even outside of each health care profession. Patients can be referred to other physicians, such as from a PCP to another PCP or to a surgeon, an oncologist, etc. Patient referrals can also occur outside of one's own discipline, such as to PT, speech therapy, psychologists, podiatrists, or to DCs. In a study examining referral patterns, Greene, Smith, Allareddy, and Haas (2006) surveyed 513 patients of MDs and DOs and found that despite MDs having 75-87% of their patients express interest and make an effort to seek out chiropractic care via a request for a referral while the patient was in their office, only 24-29% actually made a formal referral to a DC on behalf of the patient. According to Greene, Smith, Allareddy, and Haas, a slight majority (65%) of MDs and DOs would provide recommendation for chiropractic care to their patients, but most (87%) preferred to forgo a formal referral and have the patient contact the DC directly. This contradicts the type of referrals that MDs and DOs prefer within their same profession as 99% said they would make a formal referral for the patient.

Mainous et al. (2000) reported that unlike DCs of which virtually all (98%) have referred patients to family physicians (MDs and DOs), fewer family physicians (65%) have referred their patients to DCs ($p<.001$). Despite the lower number of referrals stated to have been made by family physicians for chiropractic care, 78% of DCs reported receiving patients from referrals made by family physicians whereas fewer family physicians (56%) documented having received chiropractic patients through referrals. In a survey of 245 PAs regarding utilization of CAM, it was found that PAs were more likely to recommend CAM use to their patients if they themselves had used CAM than if they had not ($p=.0009$) (Houston, Bork, Price, Jordan, & Dake, 2001).

Of patients referred to MDs and DOs from a chiropractic office, most were accepted (55.4-82.5%) and those that were not were due to the lack of the patient's clinical background information sent with the referral (18-19%) or the MD or DO's feelings that the patient's health situation was out of their level of comfort and expertise. Only four percent ($n = 17$) of DCs reported refusing a patient referred for their care from a MD. Reasons for refusal included that they felt they would be unable to help the patient as their situation was out of the chiropractic realm, they identified the patient as needing the care of a specialist, or there were problems with the patient's insurance (Smith, Greene, Haas, & Allareddy, 2006).

When referring patients to a DC, MDs and DOs included a synopsis of the patient's condition 73% of the time whereas when referring to another MD or DO, the same information was included 95% of the time ($p<0.001$) (Greene et al., 2006). A separate study averaged the occurrences when a patient's information was sent with the referral and found there to be no statistical significance ($p=.73$) for those sent from DCs and received by family physicians (26.5%) compared to the average when sent from family physicians and received by DCs (25%) (Mainous et al., 2000). In a survey of DCs in Iowa, most admitted to sending information with

the patient cases more frequently when referring to other DCs (‘always’ send, n = 116, 41.9%) than to MDs (‘always’ send, n = 111, 31.2%) (Smith et al., 2006).

Another area of concern between the medical professions is the availability and comfort of asking another health care provider for clinical advice on a patient’s situation since doing so may provide the patient with better care. This is concerning because Greene et al.’s (2006) study revealed that there is a lack in this curbside consultation between MDs/DOs and DCs. Although a common occurrence intra-professionally with 97% of PCPs obtaining such advice from other PCPs, only 8% had ever approached a DC and received curbside advice ($p<.001$). Similarly, DCs are not seeking out advice from MDs and DOs as only 22% of MDs and DOs reported giving advice to DCs. These numbers varied slightly in another study that found that 84.6% of DCs had obtained advice from other DCs whereas only 48.4% had been given such informal advice from a MD. Approximately 30% of DCs reported that they had participated in curbside consultation with a MD in which they were the one providing the advice (Smith et al., 2006).

It is questionable as to why MDs and DOs are hesitant to refer to DCs and vice versa. Nyiendo et al. (2001b) found that MDs referred their patients after their initial visit for LBP 16% of the time to various providers. The majority of referrals (61.5%) were to PTs followed by neurosurgeons (8.8%), orthopedic surgeons (6.6%), and DCs (4.4%). Much speculation for the reasoning behind a lack of referral success between the two professions is that PCPs feel they have insufficient knowledge of chiropractic or they disregard the ability of its therapeutic effect (Greene et al., 2006). However, after analysis of a survey sent to 360 DCs and MDs, 68.4% of MDs felt as though they were relatively knowledgeable of chiropractic medicine (Mainous et al., 2000). Despite the increasing popularity of chiropractic with patients, there is a hesitancy of MDs to approve and incorporate it into their therapeutic routine and therefore referrals (Greene

et al.). A trend toward patients accepting care from non-MDs for primary care is beginning with 54.5% of patients (out of 400 total) with previous chiropractic exposure being willing to do so, making them 48% more likely to do so than patients who had not had exposure to chiropractic. Patient education may increase the amount of patients willing to seek LBP care from non-MDs. Currently, many patients report being unaware of what a DC's scope of practice entails, such as if DCs can perform surgery or prescribe medications. The patient could be informed through patient education of the training, skill, and abilities that goes into the DC's career (Gaumer & Gemmen, 2006).

Discussion

Education

In reviewing the extensive education and training processes of both MDs and DCs, it is evident that both careers have a solid foundation of learning allowing them to appropriately practice in their chosen fields. Although MDs training is longer in duration than chiropractic school, both must adequately complete their course work and successfully pass a series of exams. The examinations that DCs take are similar to those taken by MDs during their medical school with the exception that MDs have three parts and DCs have four parts. For a primary care MD, the typical complete length of training, which includes undergraduate, medical school and a residency, is 11 years. For DCs, the length of training including undergraduate and chiropractic school, is much less, ranging from seven to nine years depending on the institution from which it is obtained. Another commonality between the professions is the option for further education. MDs can enter a fellowship and DCs can participate in postdoctoral training in a specific field. Both professions must have licenses to practice. Both professions must also meet required hours of CME which range between 12-50 annually for both MDs and DCs.

It appears that the main difference between the two professions is their length of training. In general, the didactic portions are similar but it is the clinical portion in which MDs gain more experience. DCs however are more focused in their abilities and techniques as they deal mostly with dysfunctions of the spine, so perhaps any additional training would be unnecessary for them.

Patient Volume

The average number of patients seen by a majority of DCs weekly is greater than 71 whereas the average seen weekly by family MDs is 84.9. The difference in volume may be

related to the time spent with each patient as DCs are known for spending more time with their patients and having longer office visits.

Guidelines/Clinical Approach

Recommended guidelines for the management of LBP are necessary and are published for both health care professions (Chou et al., 2007; Yeomans, 2001a), but comparing the MD and DC guidelines is difficult. Although the framework for both is similar (see Table 6 and Table 8), the integrity behind them is not. The guidelines given for MDs were written by a panel of MDs belonging to the American College of Physicians and the American Pain Society (Chou et al.) whereas those for DCs were written by a single DC and then reviewed by peers (Yeomans). Further, the MD guidelines set forth by the Agency for Health Care Policy and Research in 1989 are no longer recognized as the most strategic methods of treating LBP, yet numerous studies still showed evidence of their utilization by DCs and MDs (Ammendolia et al., 2008; Di Iorio, Henley, & Doughty, 2000). It is evident that guideline adherence is not always present as current guidelines do not regularly recommend radiographs for LBP on initial presentation, yet imaging is a mainstay of LBP care for both professions.

The history and physical exam structure recommended for DCs and MDs appear to be very similar in nature except for the exaggerated detail given by DCs when examining the spine (Yeomans, 2001a). Although DCs fail to see themselves as specialists, in light of such an in depth spinal examination it suggests that they are indeed spinal specialists.

The study by Cherkin, MacCornack, and Berg (1988) that identified differences between MDs and DCs in their beliefs and management of LBP, was not only an older study (1988) but was also not controlled in any way to verify that the responses given by practitioners were accurate. Although a fairly large sample size returned the questionnaire, it was only

representative of Washington state and therefore may not be representative of feelings and actions of global DCs and MDs. Despite their positive findings in favor of chiropractic, bias was minimal since the authors, who were all affiliated with medical schools, approached the issue from a medical standpoint.

After reviewing guidelines of both professions, neither appears to be more efficient in their approach to managing LBP.

Treatment Type

Although many studies identified that medications are widely prescribed by MDs for treating LBP, Nyiendo et al. (2001b) reported a drastic utilization (20% of patients received greater than five prescriptions). It was not made clear by the authors as to whether the number of prescriptions included refills or if they were each for different medications. The study also had nearly twice as many chiropractic patients as medical patients. All of the techniques, with the exception of bedrest, that were found to be used by DCs and MDs fell within the guidelines for appropriate LBP care developed by the American College of Physicians and the American Pain Society (Chou et al., 2007), with the majority of chiropractic patients receiving SMT and the majority of medical patients receiving medications (Nyiendo, Haas et al., 2001b). However, since the opposite of bedrest, resumption of normal activity, is what medical professionals are supposed to recommend for their LBP patients (Michigan Quality Improvement Consortium, 2008), it is disconcerting to find out that MDs were advising their patients to do the wrong therapeutic technique and at a higher rate than DCs. DCs were found to be more frequent providers of patient education regarding self-care than MDs, which probably was not affected by sample sizes as the number of chiropractic and medical patients that completed the questionnaires were similar (Nyiendo, Haas, Goldberg, & Lloyd, 2001). Additionally, the

authors of these studies consisted of both MDs and DCs, reducing the opportunity for bias (Nyiendo, Haas, Goldberg, & Lloyd, 2001; Nyiendo, Haas et al., 2001b).

The importance of thoroughly examining the data was evident in the analysis of the results of Nyiendo et al's (2001) study comparing exercise activity and supplement use between DC and MD patients. Given the percentage differences between the professions it appeared as though DC patients utilize exercise and supplement use more often than MD patients, but when the data was further examined, despite the appearance of greater percentages of one over the other, these findings were not statistically significant and therefore carry no merit.

In the analgesic claim information given by Vogt et al. (2005), a standard coding system was used, but the authors were unable to verify that the correct codes were used by each office when billing for each LBP visit leading to the possibility of unknown error. A strength of the study was its large sample size of 17,148 health plan members who had experienced LBP in 2001. Opioids had a higher claim rate than NSAIDs which could either be because the LBP that patients experienced was severe and so a medication stronger than a NSAID was necessary or that claims were not filed for as many NSAIDs because patients were purchasing them over the counter. Vogt et al.'s finding on patients being less likely to visit a DC if they had an opioid claim, may be accounted for in the fact that DCs do not prescribe and therefore patients would need to seek medical care to receive medications.

Based on the feelings and foundation of chiropractic regarding their drug free approach to health care (American Chiropractic Association, 2009), patients that have personal feelings or medical conditions prohibiting the use of medication may prefer chiropractic care. This opinion on medication use may also apply to patients who cannot afford the cost of medications used in the treatment of LBP or to those patients that feel that medications are too frequently utilized in

health care. Both professions supplement their care with exercise and self-care plans so no difference would be found in relation to choosing a certain professional based on those issues alone.

Therapeutic Effect

The UK Beam Trial (2004) involved a large sample size and long duration (one year). One area that may skew the results for applicability in the US is that it was performed in the United Kingdom and so their definition (which was not stated) and use of SMT may vary slightly from that used here. Although McMorland and Suter (2000) found similar positive therapeutic results for chiropractic patients to those of the UK Beam Trial, their sample size was small and the study was only carried out over a four-week period. Exercise was not found to be effective for reduction in LBP other than when used in addition to SMT (UK Beam Trial Team) unless used solely in the treatment of CLBP (van Tulder et al., 1997).

Bronfort et al. (1996) essentially determined that NSAIDs combined with TSE is equal in pain and disability reduction to SMT combined with TSE or SMT combined with trunk stretching exercise. Preference, however, was given to the non-NSAID groups of treatment (SMT combined with TSE and SMT combined with trunk stretching exercise) due to the associated side effects of NSAIDs. Although no adverse side effects occurred for the SMT and exercise patients, the author fails to mention the possible side effects that can occur with their use, such as muscle and joint soreness, temporary vertigo, transient ischemic attacks, and rib fractures (Dvorak J, Kranzlin P, & Muhleman D, 1992). Despite severe complications of SMT being rare, cauda equina syndrome and paralysis can also occur (Haldeman & Rubinstein, 1992). Patients should be educated of both medication side effects and possible side effects of SMT, enabling them to effectively decide on their provider type for their LBP treatment.

Giles and Muller (2003) also found SMT to have therapeutic benefits with their main study limitation being a small sample size. Both the Bronfort et al. (1996) and Giles and Muller studies used randomized controlled studies, but bias may be present in that the authors were all DCs. Assendelft et al. (2004), of which the authors are all MDs, found SMT to improve patients' pain and disability only in the short term when compared to therapeutic methods regularly utilized by MDs. Assendelft et al. did not recommend SMT for LBP, and reported that the treatment methods used by family physicians were superior to those of SMT. Analyzing all of the studies on this topic, (Bronfort et al.; Giles & Muller; van Tulder et al., 1997), SMT appears to be effective at reducing levels of pain and disability in LBP patients. NSAIDs and acetaminophen should be included in LBP treatment as they both demonstrate pain relief benefits, with the order of commonality of side effects, listed from greatest to least, being traditional NSAIDs, COX-2 inhibitors, and acetaminophen. Roelofs et al.'s (2008) systematic review consisted of 28 studies, but the authors felt that despite the low number of studies that fit their inclusion criteria, and thus were included in their review, the data was still accurate and representative. For studies by both van Tulder et al. and Roelefs et al., it would have been beneficial to know which specific NSAIDs were studied in order to understand what was being compared.

Since neither of the mainstays of treatment for LBP, prescription drugs or SMT, was repeatedly proven to be superior to the other, patients may choose a successful treatment provider based on their individual preference.

Patient Satisfaction

With all studies in agreement, patients seeking care from DCs feel more satisfied in the care they receive than patients of MDs. MDs could improve the satisfaction of their LBP

patients by showing more concern, having confidence in their LBP evaluation, and explaining to the patient what is happening with their body, what to expect, and how they can work to improve the pain themselves (Carey, Evans et al., 1995; Cherkin & MacCornack, 1989). Although time may be minimal, the time spent with the patient has also been found to be proportional to the amount of patient satisfaction. Although the information presented by Cherkin and MacCornack was published twenty years ago, it still has merit as more recent studies remain in accordance with their results. It is also important to note that Cherkin and MacCornack are associated with medical facilities, yet reported that patients are less satisfied with such professions, limiting the amount of author bias.

Perhaps the reasoning behind the patients of family physicians (MDs and DOs) feeling that they are receiving inadequate information does correlate with the provider's level of confidence as 42% of family physicians (which was three times that of DCs – 15%) felt they did not have enough training to treat patients with LBP. The idea that MDs feel they lack sufficient training to treat LBP patients (Cherkin et al., 1988) may provide a basis for medical schools to increase the didactic and/or clinical exposure to the topic of LBP. If patient satisfaction is confirmed to be associated with a decreased perception of pain as found in one study (Hurwitz et al., 2005), then it is an area that necessitates change since the patient's outcome is affected. If satisfaction is what a patient is seeking from their LBP provider, then DCs would be the optimal choice.

Cost-Insurance / Office Visits

While chiropractic coverage by health insurance plans remains less than that of traditional medical coverage (Coulter & Shekelle, 2005; Jensen et al., 1998), third party payers have made efforts to change (Sharma et al., 2003). If such actions continue to increase and

chiropractic coverage becomes more widespread, the number of patients seeking chiropractic care will inevitably increase. If such strict coverage was lifted, patients would be able to receive wider varieties of treatment modalities as well as longer treatment time from DCs without worry of reimbursement failure or capped office visits (Jensen et al.).

Although the information presented by Coulter and Shekelle (2005) on the lack of chiropractic coverage appears to be recent because of its publication date, it is not as the data was collected in 1994. Since third party payers have improved their coverage recently (Sharma et al., 2003), the aged data of Coulter and Shekelle's study can be misleading in making a consumer believe that even after insurance companies have improved, only 75% of patients have chiropractic coverage when in reality coverage has likely improved further since their study was performed in 1994.

Stano and Smith (1996) had striking data from a large sample size; however the method used to obtain the information made it impossible to verify the accuracy. The information was gathered from insurance claims that MDs and DCs had billed, but the authors did not verify that correct diagnoses and coding were used consistently. Despite this, the overwhelming cost difference between the two professions would likely not be changed drastically since there was such a large difference between them, even if these possible errors were taken into account.

LBP patients of DCs clearly tend to have more appointments than those of MDs (Carey, Garrett et al., 1995; Nyiendo, Haas et al., 2001b; P. G. Shekelle et al., 1995). It appears likely that DC patients have additional visits due to the wellness and ongoing prevention treatment that is offered to them by DCs. Not only are additional funds necessary for the increased number of chiropractic appointments, there is an additional time commitment involved to attend the appointments. However, when all things are considered for LBP patients that seek care from

MDs, there may be significant additional, uncalculated time and money spent outside the office in facilitation of their treatment. This time includes trips to pharmacies which chiropractic patients do not have, trips to hospitals to have imaging studies done that are beyond the scope of family practice, and consultations with other providers, all of which Shekelle et al. did not consider in their study. It may not be that DCs are overtreating their patients, but that MDs are sending their patients to other sources for aspects of their care.

In regards to the number of office visits, the patient's personal schedule may be able to easily determine the form of treatment that would work best for them. DC appointments are more frequent so patients that are on a limited time schedule or very time conscious should obtain treatment from MDs. If a patient's schedule is flexible, allowing them to go to office visits more frequently, and financial health coverage is provided so that they would not have to pay out of pocket, then treatment may be best obtained from a DC. Patients that need to be seen solely for their LBP may best be treated by DCs since neuromuscular complaints are issues DCs most commonly treat (American Chiropractic Association, 2009). Likewise, patients with numerous comorbidites may be better treated by MDs due to the complexity of the care needed by such patients and the inability of DCs to prescribe medication as well as their lack of surgical utilization (American Chiropractic Association; Yeomans, 2001b).

Imaging Interventions

Kendrick et al. (2001) suggest that radiographs have no benefit when used for LBP and that radiography increases the number of office visits. Although written based on the United Kingdom studies and data collected from an unblended study, the methods used appear accurate with limited room for error or bias. Jarvik et al. (2003) evaluated rapid MRI benefit for LBP and although no benefit was found, it would be helpful to have follow-up studies comparing the

radiation exposure rates as well in order to truly determine the long-term benefit of the imaging intervention.

Although an increased usage of radiographs by DCs was found (Carey, Garrett et al., 1995), chiropractic schools acknowledge this: (Ammendolia et al., 2008) however, it is unclear whether the overuse is being addressed at the schools.

Many imaging interventions are done simply because patients ask for them and feel as though the care they are receiving is efficient (Yelland, 2004). It is disheartening yet understandable to see evidence that patients link their provider satisfaction to receiving imaging as well as other diagnostic tests (Jarvik et al., 2003; Kendrick et al., 2001). Health care providers need to be careful to not order unnecessary tests simply to increase their patient's satisfaction as this would be considered unethical. Patient education will be very important in reversing patients' feelings that the care they receive is more complete when imaging is done. Providers, whether DC or MD, need to inform their patients on the guidelines set forth for handling LBP and why imaging is not always needed or beneficial as well as educating them on LBP itself (Ash et al., 2008).

Referrals

In regard to interdisciplinary referrals, improvement is needed on behalf of both provider types. Although chiropractic has been a form of treatment for greater than a century, it was not until recently that the medical profession began to accept it. The American Medical Association (AMA) stated in 1966 that it was unethical for MDs to consult or participate in referrals with DCs, calling chiropractic an unethical cult that was undereducated. The AMA even tried to abolish chiropractic through the Committee on Quackery, pushing the ability of chiropractic to join main stream medicine further away. Due to this required lack of interaction, the two

professions worked independently of one another and failed to intertwine and participate in interdisciplinary patient care. In 1980 the AMA changed their previous policy, allowing MDs and DCs to consult and refer patients to one another (Gevitz, 1989). Perhaps any bias present between the two professions, in which one provider type feels superior to the other in either education or clinical skill, was culminated by this poor past relationship. Such bias can result in an improper functioning relationship. A poor relationship between the professions then leads to poorer patient care. When bias is eliminated, the patient's needs are put first, allowing more focus to be put on what is best for the patient with disregard for the personal opinions of provider or treatment methods.

For patients that are requesting referrals to DCs from MDs, they should only be denied a form of care if there is evidence showing more risks than benefits. If this occurs, the reason for denying the desires of a patient, such as refusal to refer to either a MD or DC, should be clearly explained to the patient. Greene et al. (2006) reported on referral patterns of PCPs, consisting of both MDs and DOs, and definitely had harsher findings for PCPs and their referral patterns than they did for chiropractic. The study had a good sample size with 517 participants (33% of all PCPs in the state surveyed), but as it was only a survey of one state it may not be representative of the habits of PCPs nationwide. Despite the critical view of referral patterns found by Greene et al., Mainous et al.(2000), of which the authors were either MDs or individuals working in relation to family medicine, found similar data. They found that family physicians referred fewer patients to DCs than DCs referred to them. Since this was a survey, the respondents could have been dishonest in their responses resulting in invalidity of the resulting data. The discovery made by Houston et al.'s (2001) research recognized the importance of being educated and aware of nonconventional care. Houston et al. found that providers, specifically PAs, are more

likely to recommend CAM use to their patients if they themselves had used CAM. When a health care provider has experienced CAM treatment they may be more understanding of what is involved and the outcome of the care; leading to increased referral rates, rather than basing their actions on what they have heard from the experiences of others.

Case description and documentation included in patient referrals is also an important matter as both DCs and MDs send incomplete reports to the referring provider (Mainous et al., 2000). By failing to include pertinent health information, the disadvantage is for the patient and is a careless act of both MDs and DCs that can lead to increased cost for patients if imaging or additional testing needs to be performed because the record was not included in the case report. Communication is a large part of what patients base their provider satisfaction on (Hertzman-Miller et al., 2002), so if DCs and MDs are unable to communicate with one another effectively, they cannot expect to communicate to an appropriate level with their patients.

Obtaining clinical advice from other disciplines was found to be another area that is lacking between these two professions (Greene et al., 2006). It would be beneficial to a patient's care for MDs and DCs to discuss basic aspects of cases to determine what would be the best treatment. Patient care, which should be the top priority, could be more complete and well-rounded if health care professionals would readily accept and share their insight with one another. In strong support of integrative medicine, the Consortium of Academic Health Centers for Integrative Medicine aims to improve patients' healthcare by demonstrating the importance and availability of diverse therapeutic techniques. Students of allied health care programs, including PA students at Wake Forest University, Duke University, and the University of Colorado are also welcome to participate in this educational opportunity (Consortium of Academic Health Centers for Integrative Medicine, 2004). Some chiropractic schools have also

taken steps to familiarize themselves with the medical field by participating in hospital tours and rounds and observing surgical procedures as well as the interaction between residents and their patients (Dunn, 2007; Texas Chiropractic College, n.d.). In an effort to improve patients' healthcare, the Consortium of Academic Health Centers promotes and offers a combination of clinical experiences with DCs as well as elective classes taught by an interdisciplinary faculty which includes DOs, MDs, DCs, and acupuncturists at 42 medical universities (Consortium of Academic Health Centers for Integrative Medicine).

Conclusion

Randomized clinical trials evaluating the details of LBP management by MDs and DCs are lacking. Given that the majority of adults experience LBP at some point in their life, the topic of how to care for it should be greatly examined and widely known. The objective of this article was not to determine which profession is better than the other in managing LBP but to identify which presentations, characteristics, and aspects of LBP that each is best equipped and able to manage. Tables 9 and 10 identify specific conditions and situations in which a certain LBP patient may benefit more from one profession than the other.

The evidence of this article supports that determining care providers and treatment methods for LBP should be based on individual patient characteristics including one's desire for fewer office visits, hands on care, or patient satisfaction, etc. No one provider or treatment was found to be consistently superior over the other when compared collectively. While MDs and DCs approach and treat LBP differently, either profession can provide adequate management of LBP.

A patient that chooses to seek care from a MD should expect their first line treatment to be the use of NSAIDs and a patient making a visit to a DC should plan on undergoing multiple sessions of SMT. Each method has its adverse effects of which patients should be made aware.

Patient education is the area in need of biggest improvement for both MDs and DCs regarding the management of LBP. All medical clinicians need to be honest and let the patient know that it may take interdisciplinary action to alleviate their LBP. The patient should be informed of the current guidelines for treating LBP and why imaging is not necessary in certain situations. Health care providers should reassure patients by providing ways to decrease pain and increase levels of function. MDs and DCs should encourage patients to make lifestyle

modifications including being conscientious of one's posture and increasing one's amount of exercise. The education that primary care MDs receive on LBP and its management is also an area that apparently needs improvement. An increase in primary care MDs' knowledge of different conditions causing LBP and the guidelines of how to care for it, would likely improve their confidence and thus increase patient satisfaction. The education of MDs and DCs should involve information about the other healthcare professions that encounter LBP including their approach, limitations, and general cost, enabling each other to feel comfortable referring or seeking advice from one another when necessary.

Future research should focus on interdisciplinary relationships between MDs and DCs, centering on how LBP is managed. In regards to low back pain, additional studies are needed on direct comparisons between the two professions and treatments collectively. It would also be beneficial for LBP patients to know the role that subspecialties play in LBP management. Further research on how PAs manage their LBP patients should be studied, determining if PAs follow the pattern of supervising physicians or if PAs are more willing than MDs to refer to DCs.

As an increasing force in medicine, PAs have a key role in providing education to patients. It is crucial for PAs to increase their knowledge about the interdisciplinary care options for LBP. PAs should be aware of the current medical guidelines about the treatment of LBP and should also be aware and open to other health care professions that successfully manage LBP. PAs should follow the guidelines for LBP treatment and if no improvement occurs they should attempt to provide care from a different approach which may involve interdisciplinary care.

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Tables

Table 1
MD Hours of Education

Medical schools	Year	Hours*	Semester credit hours*
Pennsylvania State University College of Medicine	1	1080	
	2	1010.5	
	3	1104	
	4	42	
	Total	**3236.5**	
University of Oklahoma College of Medicine	1	788.5	
	2	678.5	
	3	3571	
	4	476	
	Total	**5514**	
University of Arkansas College of Medicine	1	645	
	2	653.5	
	3	769	
	4	352	
	Total	**2419.5**	
John Hopkins University School of Medicine	1	1069.5	
	2	844	
	3	5456	
	4	3686	
	Total	**11055**	
Chicago College of Osteopathic Medicine	1		69.5
	2		67.7
	3		48
	4		47
	Total		**232.2**

* Individual medical schools determine their own criteria for semester hours, not allowing for a standard comparison between the hours of education at medical schools.

Note. Adapted from "Curriculum directory," by Association of American Medical Colleges, 2009, http://services.aamc.org/currdir/section2/courses.cfm; "Curriculum," by Chicago College of Osteopathic Medicine, 2009, http://www.midwestern.edu/Illinois%20Catalog/2561.htm.

Table 2
DC Hours of Education

Chiropractic schools	Year	Hours	Semester credit hours*	Quarter credit hours*
Life University	1			102.4
College of Chiropractic	2			102.7
	3			99.8
	4			37
	Total			**341.9**
University of Bridgeport	1	1044	48	
College of Chiropractic	2	1084	46.5	
	3	1044	47	
	4	1302	32.5	
	Total	**4472**	**174**	
Western State	1		1001	91
Chiropractic College	2		1144	104
	3		1089	99
	4		1342	122
	Total		**4576**	**416**
National University	1		103	
Health Sciences DC Program	2		110.5	
	3		34.5	
	Total		**248**	
Palmer College of Chiropractic	1		119	
	2		124	
	3		65	
	Total		**308**	

* Individual chiropractic schools determine their own criteria for semester and quarter hours, not allowing for a standard comparison between the hours of education at chiropractic schools.

Note. Adapted from "Degree requirements: college of chiropractic-curriculum," by Life University, 2008, http://www.life.edu/College%20of%20Chiropractic%20-%20Student%20Curriculum%20-%20Degree%20Req; "DC program curriculum," by National University of Health Sciences, 2009, http://www.nuhs.edu/show.asp?durki=507; "DC curriculum-courses by trimester," by Palmer College of Chiropractic, 2009, http://www.palmer.edu/pcc_current2.aspx?id=960; "Accredited doctor of chiropractic programs," by the Council on Chiropractic Education, 2009, http://www.cce-usa.org/Accredited_Doctor_Chiro.html; "Semester based curriculum," by University of Bridgeport, 2009, http://www.bridgeport.edu/pages/2858.asp; "Curriculum," by Western States

Chiropractic College, 2009,
http://www.wschiro.edu/index.php?option=com_content&task=view&id=28&Itemid=44.

Table 3
Low Back Pain Categories

Category	Cause
Mechanical	Muscle strains
	Osteoarthritis
	Spinal stenosis
	Discogenic disk disorders
	Spondylolisthesis
	Vertebral fractures
	Congenital disorders (i.e. scoliosis)
	Spondylosis
Nonmechanical	Ankylosing spondylitis
	Neoplasms (i.e. multiple myeloma)
	Infections (i.e. osteomyelitis)
	Atherosclerosis
	Visceral diseases (i.e. pyelonephritis)
	Paget's disease of bone
	Scheuermann's disease

Note. Adapted from "Mechanical and other lesions of the spine, nerve roots, and spinal cord," by M. Aminoff, 2008, Philadelphia: Saunders; "Low back pain: causes," by B. Israel, 2009, http://www.healingchronicpain.org/content/backpain/causes.asp; "Low back pain," by R.A. Deyo and J.N. Weinstein, 2001, *The New England Journal of Medicine, 344,* p. 363-370.

Table 4
Categories of LBP Based on Signs and Symptoms

Category	Sign/Symptom
Spinal infection	Fever/Vertebral tenderness
Infection/Cancer	LBP unrelieved with lying down
Ankylosing spondylitis	Limited chest expansion
Sciatica/Pseudoclaudication	Numbness/Paresthesias/SLR <60°
Disk herniation	Sciatica worsened with a cough, sneeze, or the Valsalva maneuver
Cauda equina syndrome	Bowel/Bladder dysfunction
Failed treatment for previous LBP episode/ Depression/Somatization	Prolonged LBP
Nonspecific LBP	Quick recovery (< 2 weeks) of LBP
Substance abuse/Dissatisfaction with job/ Pursuit of disability compensation/ Involvement in litigation	Persistent unexplained symptoms

Note. Adapted from "Back pain prevalence and visit rates: estimates from U.S. national surveys," by R.A.Deyo, S.K. Mirza, and B.I. Martin, 2006, *Spine, 31*, p.2724-2727; "What can the history and physical exam tell us about low back pain?" by R.A. Deyo, J. Rainville, and D.L. Kent, 1992, *JAMA, 268*, p.760-765.

Table 5
Categories of LBP with Associated Symptoms

Category	Cause	Signs/Symptoms
Mechanical	Muscle strains	Quick recovery of LBP (<2 weeks)
	Osteoarthritis	Pain (deep ache) with joint stiffness – initially relieved with rest but becomes persistent
	Spinal stenosis	Pain begins with activity and is relieved by rest; persistent pain in the buttocks; loss of feeling in lower extremities; limp
	Discogenic disk disorders	Sciatica worsened with a cough, sneeze, or Valsalva manuever
	Spondylolisthesis	LBP, especially after exercise; pain/weakness in one or both thighs
	Vertebral fractures	
	Congenital disorders (i.e. scoliosis)	
	Spondylolysis	Pain across lower back; may feel like a muscle strain
Nonmechanical	Ankylosing Spondylitis	Limited chest expansion
	Neoplasms (i.e. multiple myeloma)	
	Infections (i.e. osteomyelitis)	LBP that is not relieved with lying down; fever/vertebral tenderness
	Visceral diseases (i.e. pyelonephritis) and Atherosclerosis	
	Paget's disease of bone	Bone pain; skeletal deformity; pathologic fractures; deafness
	Scheuermann's Disease	Poor posture due to kyphosis; fatigue and mild pain

Note. Adapted from "Spondylolysis and spondylolisthesis," by American Academy of Orthopaedic Surgeons, 2007, http://orthoinfo.aaos.org/topic.cfm?topic=a00053; "Mechanical and other lesions of the spine, nerve roots, and spinal cord," by M. Aminoff, 2008, Philadelphia: Saunders; "Low back pain: causes," by B. Israel, 2009,

http://www.healingchronicpain.org/content/backpain/causes.asp; “Low back pain,” by R.A. Deyo and J.N. Weinstein, 2001, *The New England Journal of Medicine, 344,* p. 363-370; “Back pain prevalence and visit rates: estimates from U.S. national surveys,” by R.A.Deyo, S.K. Mirza, and B.I. Martin, 2006, *Spine, 31,* p.2724-2727; “What can the history and physical exam tell us about low back pain?” by R.A. Deyo, J. Rainville, and D.L. Kent, 1992, *JAMA, 268,* p.760-765; “Scheuermann’s kyphosis (Scheuermann’s disease): abnormal curvature of the spine,” by K. Bridwell, 2009, http://www.spineuniverse.com/displayarticle.php/article593.html; “Osteoarthritis,” by N. Lane and T. Schnitzer, 2008, Philadelphia: Saunders; “Spondylolisthesis: back condition and treatment,” by M. Rodts, 2008, http://www.spineuniverse.com/displayarticle.php/article114.html; “Paget’s disease of bone,” by G. Roodman, 2008, Philadelphia: Saunders; “Spinal stenosis,” 2004, http://www.spinalstenosis.org/index.php.

Table 6
Recommendations for MDs in the Management of LBP

1. Perform a focused history and physical exam, categorizing the patient's LBP.
2. Do not obtain imaging or further tests on patients with nonspecific LBP.
3. Obtain imaging and further tests on patients with unrelenting back pain and those with progressive neurologic deficits or serious underlying conditions.
4. Obtain an MRI or CT on patients with suspected radiculopathy or spinal stenosis and if considering surgery or epidural steroid injection.
5. Inform LBP patients about the course of their LBP and self-care measures.
6. Consider NSAIDs as first line medication therapy. Measure the patient's baseline function before beginning treatment.
7. If there is no improvement with self-care, add on a form of nonpharmacologic therapy (See Table 2).

Note. Adapted from "Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society," by Chou et al., 2007, *Annals of Internal Medicine, 147,* p. 478-491.

Table 7
Nonpharmacologic Therapies Utilized for LBP

Types
SMT
Interdisciplinary rehabilitation
Exercise therapy
Acupuncture
Massage therapy
Cognitive-behavioral therapy
Progressive relaxation

Note. Adapted from "Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society," by Chou et al., 2007, *Annals of Internal Medicine, 147,* p. 478-491.

Table 8
Recommendations for DCs in the Management of LBP

1. Elicit the patient's history
2. Perform a physical exam – identifying spinal segments that may require manipulation
3. Determine a treatment plan based on the areas of the spine that are weak– may need to use imaging or other devices
4. Provide patient education, informing LBP patients about the importance of exercise and activity modification
5. If there is no improvement after treatment, either discharge or refer the patient or try a different approach to treatment

Note. Adapted from "Chiropractic treatments for low back pain," by S.G. Yeomans, 2001, http://www.spine-health.com/treatment/chiropractic/chiropractic-treatments-back-pain.

Table 9
Recommended LBP Situations to be Managed by a Family Practice MD

1. Desire for time efficacy with fewer office visits
2. Lack of health insurance that covers DC care
3. Multiple comorbid medical conditions including conditions that may require surgical utilization or prescription medication
4. Patients interested in obtaining care from clinicians with more years of health care training
5. Provision of patient comfort with pain medication while the body naturally heals itself of the pain
6. LBP that fails to subside with chiropractic care

Table 10
Recommended LBP Situations to be Managed by a DC

1. Feels that hands on care would satisfy and aid them more in the improvement of their LBP
2. Views patient satisfaction as important
3. Health insurance with DC coverage or lack of a health insurance policy with pharmaceutical coverage resulting in the inability to pay for prescription medications
4. Interest in patient education information and instruction
5. Non-pharmacologic methods of treatment for patients with medical conditions or personal feeling prohibiting their use
6. Time available for multiple office visits
7. Spinal examinations by 'spinal specialists'
8. LBP that fails to subside with conventional medical care
9. Patients requesting evaluation and treatment solely for their LBP
10. Patients with LBP as a result of subluxations or areas of spinal weakness

Abstract

Objective: Compare MD and DC evaluation and management of low back pain (LBP) based on duration of care, cost, patient satisfaction, methods, therapeutic effect, and referral patterns.

Method: MEDLINE and Pubmed were searched using the terms *Low Back Pain; Chiropractic; Family Physicians; Primary Health Care; Recurrence, Diagnostic Imaging; Health Insurance;* and *Treatment* in various combinations. Reference lists were searched for additional publications.

Results: One hundred six published articles were evaluated. Minimal differences were found between MD and DC management of LBP regarding duration of care, cost, methods, and therapeutic effect. Patient satisfaction was consistently found to be greater in DC patients. MD and DC referrals to the other profession are infrequent and often incomplete.

Conclusion: Both MDs and DCs can evaluate and manage LBP effectively. There are certain patient characteristics that may influence which provider to choose for LBP treatment. Further research on healthcare providers' treatment of LBP is necessary.