

# Chiropractic

## *History and Overview of Theories and Methods*

*Samuel Homola, DC*

**Chiropractic is one of the most controversial and poorly defined healthcare professions with recognition and licensure in the United States. Chiropractic was started by D. D. Palmer, a magnetic healer who formulated the vertebral subluxation theory. The profession was developed by his son, B. J. Palmer. Although the definition of chiropractic as a method of correcting vertebral subluxations to restore and maintain health is questionable, spinal manipulation is of value in the treatment of some types of back pain. The chiropractic profession is still based on the vertebral subluxation theory, and has the confusing image of a back specialty capable of treating a broad scope of health problems. Despite opposition to use of spinal manipulation as a method of treating a broad scope of health problems (as opposed to the generally accepted use of manipulation in the treatment of back pain), chiropractors seek support as primary care providers in alternative medicine. It is essential to understand the theories, philosophies, and methods of chiropractic for an objective evaluation.**

In 1895, D. D. Palmer, a magnetic healer, announced “Ninety-five percent of all diseases are caused by displaced vertebrae, the remainder by luxations of other joints.”<sup>25</sup> Palmer claimed he had cured deafness by using his hands to push a displaced fourth thoracic vertebra into alignment.<sup>50</sup>

Believing that all bodily functions are controlled by the flow of nerve vibrations from the brain to the spinal cord and out through openings between the vertebrae, Palmer claimed that adjusting the vertebrae to remove interference with this flow of nerve energy would allow the body to heal most diseases.<sup>38</sup> In 1897, he opened the Palmer School and Cure in Davenport, Iowa, offering a 3-week study course.<sup>50</sup>

It was not until Bartlett Joshua Palmer graduated from his father’s school in 1902 that chiropractic became rec-

ognized. Promoting the idea that correcting subluxations in the spine would cure virtually every disease, B. J. Palmer’s slogans and advertising strategies attracted many students to the Palmer School, by then named the Palmer School of Chiropractic.<sup>50</sup>

When World War I ended in 1918, many veterans who could not find employment were attracted by Palmer’s ads (my father among them). “Do you want to follow manual labor or a profession?” the ads asked.<sup>25</sup> “The common labor field is crowded. There are many persons who want to do hard work. Let those who are anxious have it. You fit yourself for a profession.”<sup>25</sup>

B. J. Palmer took advantage of ignorance and desperation. “Give me a simple mind that thinks along single tracts,” he said, “give me 30 days to instruct him, and that individual can go forth on the highways and byways and get more sick people well than the best, most complete, all around, unlimited medical education of any medical man who ever lived.”<sup>37</sup>

Today, the chiropractic profession continues to cling to the vertebral subluxation theory despite a progressive increase in the educational standards of its schools.<sup>27</sup> According to the Council on Chiropractic Education, the minimum requirements for admission to a doctor of chiropractic program are 90 semester hours (3 years) of undergraduate study leading to a bachelor’s degree and a grade point average of at least 2.50.<sup>15</sup> A few states and colleges require a 4-year bachelor’s degree. Chiropractic school is a 4-year course with approximately 4800 study hours.<sup>1</sup>

Scientific consensus does not support the theory that nerve interference caused by vertebral misalignment or subluxation is a cause of organic disease.<sup>12,16,32,36</sup> Spinal nerves primarily supply musculoskeletal structures. Organ function is governed by the autonomic nervous system in concert with psychic, chemical, hormonal, and circulatory factors. The sphincter muscles involved in voluntary control of bladder and bowel functions are supplied by spinal nerves and sympathetic fibers that exit well-protected sacral foramina.

Correspondence to: Samuel Homola, DC, 1307 East Second Court, Panama City, FL 32401. Phone: 850-763-1591; Fax: 850-763-1586; E-mail: samhomola@comcast.net.  
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Spinal nerves are commonly compressed by bony spurs and herniated discs. Even the most severe compression of a spinal nerve which cripples the supplied musculoskeletal structures does not cause organic disease.<sup>12,16</sup>

### What Is a Chiropractic Subluxation?

An orthopaedic subluxation is a painful partial dislocation.<sup>41</sup> A chiropractic subluxation is an asymptomatic misalignment or a “vertebral subluxation complex” thought to be a cause of disease.<sup>41</sup> Such a subluxation has never been proven to exist.<sup>12,16,34</sup>

The illusive and often undetectable chiropractic subluxation, considered to be a factor in the development of visceral disease and back pain,<sup>41</sup> has been defined by as many as 100 different names, such as a manipulable lesion or a neurobiomechanical lesion.<sup>41</sup> Symptoms resulting from vertebral misalignment caused by degenerative changes, disc thinning, or structural abnormalities sometimes can be relieved temporarily with manipulation. Such subluxations are not correctable and are not often significant. In rare cases, binding or locking of overriding vertebral facets can be dramatically relieved by one manipulation that restores mobility.<sup>42</sup>

In 1995, in a landmark and largely ignored study of the literature by two chiropractors, Nansel and Szlazak suggested that there are no appropriately controlled studies to indicate that dysfunction in structures of the spinal column could cause organic disease.<sup>34</sup> They reported that, “it has now been firmly established that somatic dysfunction is notorious in its ability to create signs and symptoms that can mimic, or simulate (rather than cause), internal organic disease.”<sup>34</sup> However, Rosner, in a report published by the Foundation for Chiropractic Education and Research, contends that these findings are contradicted by studies supporting the concept of subluxation.<sup>41</sup>

In July 1996, the Association of Chiropractic Colleges (ACC), representing 16 North American chiropractic colleges, reached a consensus and stated that “Chiropractic is concerned with the preservation and restoration of health, and focuses particular attention on the subluxation. A subluxation is a complex of functional and/or pathological articular changes that compromise neural integrity and may influence organ system function and general health.”<sup>5</sup> This theory seems to ignore autonomic cranial and sacral nerves which do not pass through movable articulations.<sup>12</sup>

The ACC’s paradigm and its views on subluxation were endorsed by the International Chiropractic Association and the American Chiropractic Association in November 2000 and by the World Federation of Chiropractic in May 2001. The document was included in Appendix A of the 2005 edition of *Job Analysis of Chiropractic*,<sup>11</sup> published by the National Board of Chiropractic Examiners. In 1997, the Foundation for Chiropractic Education and Research

(FCER) published the monograph by Rosner titled “The Role of Subluxations in Chiropractic.”<sup>41</sup> A subluxation was described as a vertebral subluxation complex that “embraces the holistic nature of the human body, including health, well-being, the doctor/patient relationship, and the changes in nerve, muscle, connective, and vascular tissues which are understood to accompany the kinesiological aberrations of spinal articulations.”<sup>41</sup> In this monograph, Rosner also stated that “slight misalignments may not be detectable by any of the current technological methods.”<sup>41</sup>

It is unreasonable to assume that slight misalignment of a vertebra or an undetectable subluxation complex can cause disease or ill health when those effects do not occur because of gross vertebral displacement or by impingement of a spinal nerve.

Many of the immunologic and physiologic effects attributed to the spinal adjustment are temporary, such as production of endorphins, a decrease in prostaglandin levels, and an increase in leukocyte respiration.<sup>8,41</sup> They have never been shown to be related to the cause and cure of disease. Numerous forms of physical stimulation, such as deep massage, hydrotherapy, or acupuncture, can produce similar biochemical effects.

According to a 2003 random survey of 1102 active North American chiropractors, 88.1% of 687 respondents thought that the term vertebral subluxation complex should be retained by the chiropractic profession.<sup>33</sup> The respondents also thought that vertebral subluxation is a significant contributing factor in 62.1% of visceral ailments.<sup>33</sup> The majority (89.8%) thought that the adjustment should not be limited to musculoskeletal conditions.<sup>33</sup> At least one chiropractic journal, the *Journal of Vertebral Subluxation Research*, is devoted to preserving and promoting the subluxation theory. Articles on spinal adjustments as effective treatments for conditions such as multiple sclerosis, otitis media, and infertility are published in this journal.

Goertz, in an article published by The American Chiropractic Association in 1998, reported that 94% of chiropractic patients were treated for neuromusculoskeletal conditions.<sup>21</sup> Yet, chiropractic colleges, associations, and research organizations continue to promote chiropractic as a method of adjusting the spine to improve general health.<sup>22,47</sup>

There is no proof that subluxations cause organic disease,<sup>12,16,34</sup> but chiropractic theory and philosophy support different spinal adjustive procedures that allegedly are effective in restoring and maintaining health by removing nerve interference (Fig 1). Christensen et al, in a survey analysis published by the National Board of Chiropractic Examiners in 2005, rated 15 adjustive procedures commonly used by chiropractors. Most chiropractors (96.2%)



**Fig 1.** Manual thoracic manipulation is being performed on this patient.

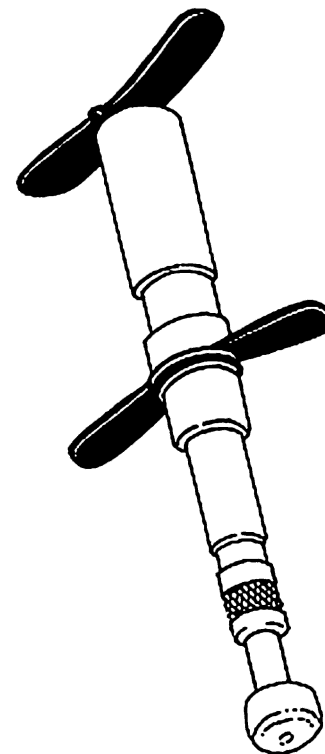
use a diversified full spine approach and various techniques.<sup>11</sup> They reported that 25.7% of chiropractors use the Palmer upper cervical technique; 26% use a Logan basic technique (a method of adjusting the sacrum); 38% use cranial adjusting; 49.6% use a sacro-occipital technique (a method that requires adjusting the upper cervical area and the sacrum); and 61.3% use the Thompson Terminal Point Technique (a method in which leg length is checked to determine subluxations in the pelvic and cervical regions).<sup>11</sup> More than 15% of chiropractors use the MERIC System (a method of adjusting a specific vertebra for a specific illness). Individual practitioners use six techniques in their practices.<sup>11</sup> A few specialize in only one technique, such as the orthogonal atlas specialists who are members of the National Upper Cervical Chiropractic Association (NUCCA).

Upper cervical chiropractic is the most dangerous and nonsensical of all the chiropractic techniques as it routinely is applied to the vulnerable atlantooccipital area. Specialists who use this method think that nerve interference caused by misalignment of the atlas causes most ailments, requiring atlas adjustments for preventing and

treating disease. The treatment poses a risk of injury to the vertebrasilar arteries.<sup>48</sup> Although the incidence of stroke caused by neck manipulation may be low, risk outweighs benefit<sup>14,32</sup> when the upper cervical spine is routinely manipulated to restore and maintain health. Coulter et al reported an incidence of 1.46 vertebrasilar injuries per 1,000,000 neck manipulations, noting that only 11.1% of reported indications for cervical manipulation could be labeled appropriate.<sup>14</sup> Another estimate placed the number of strokes caused by neck manipulation at 1.3 per 100,000 persons receiving such treatment.<sup>7</sup> The true incidence of vertebrasilar injuries caused by neck manipulation is not known since “they are probably unreported in the literature.”<sup>4</sup>

The Activator (Activator Methods Int, Phoenix, AZ), a spring-loaded stylus which some chiropractors claim is safer than manual manipulation (Fig 2), is used by 69.9% of chiropractors to tap misaligned vertebrae back into alignment.<sup>11</sup> Acupuncture was used by 13.6% of survey respondents, acupressure or meridian therapy by 58.2%, and homeopathic remedies by 46.4%.<sup>11</sup>

The 1995 edition of *Chiropractic: An Illustrated History* lists 97 techniques used by chiropractors.<sup>40</sup> Applied kinesiology, a nonsensical method of testing muscle strength to



**Fig 2.** This is a schematic of a hand-held spring-loaded stylus used by some chiropractors to tap vertebrae into alignment.

detect the presence of disease, deficiencies, and subluxations, is used by 37.6% of chiropractors.<sup>11</sup>

Some chiropractors use thermography or a thermocouple device, such as a nervoscope (Nervoscope, Electronic Development Labs, Inc, Danville, VA) to detect heat thought to be associated with subluxations that cannot be seen radiographically. Such devices do not have any proven value as a method of locating subluxations. Thermography has not been found to be accurate in detecting the presence or absence of nerve root compression.<sup>6</sup>

Although some chiropractors use appropriate physical treatment methods along with spinal manipulation, the absence of an evidence-based approach causes a mixing of science and pseudoscience. Some misguided chiropractors are exploited by practice-building entrepreneurs who offer instructions in how to use a subluxation-based approach to attract patients for lifelong care, which endangers the public's health.<sup>29</sup> The subluxation theory provides a convenient shortcut for chiropractors who may be diagnostically incompetent or who may want a high-volume practice without any associated responsibility.

Despite the prevalence of unsupportable claims in chiropractic, there are good chiropractors who offer valuable manipulative services that are not available in a general medical practice.<sup>26</sup> One must find a good evidence-based chiropractor who knows his or her limitations<sup>26</sup> and who does not speculate too far beyond what is scientifically known about manipulation.<sup>23</sup>

### Limitations of Spinal Manipulation

Reviews of the literature indicate that spinal manipulation is helpful in treating some types of back pain.<sup>6,45</sup> Shekelle et al had a report published in 1991 by RAND, a nonprofit research organization, that was one of the first credible studies to support the use of spinal manipulation for patients with acute, uncomplicated low back pain.<sup>45</sup> They stated, however, that "No evidence to date conclusively proves the effectiveness or lack thereof for the use of spinal manipulation to treat back pain."<sup>45</sup>

In 1994, the Agency for Health Care Policy and Research (AHCPR) of the US Department of Health and Human Services published "Acute Low Back Problems in Adults."<sup>6</sup> In the study, Bigos et al reported that, "Manipulation seems helpful for patients with acute low back problems without radiculopathy when used within the first month of symptoms."<sup>6</sup>

These studies<sup>6,45</sup> were simply reviews of the literature, but they offered a clear indication that spinal manipulation might have a place in the treatment of back pain. There is no evidence, however, that spinal manipulation is more effective than other forms of treatment.<sup>20</sup> Cherkin et al, in a series of trials using various methods of treating acute and subacute low back pain, reported similar outcomes for

spinal manipulation, massage therapy, standard medical care, or self-help care aided by back school or instructional booklets.<sup>10</sup> It is my experience that spinal manipulation often is more effective than other methods of treatment in providing short-term relief of back pain. Anyone who offers treatment for back pain should have access to various treatment methods and not rely only on manipulation.

Many chiropractors used the studies published by RAND<sup>45</sup> and AHCPR<sup>6</sup> as proof that chiropractic treatment is efficacious over a broad scope of ailments. This prompted Shekelle to issue a statement explaining that back pain studies published by RAND were being seriously misrepresented by chiropractors, as the studies were about spinal manipulation and not about chiropractic.<sup>43</sup> In both studies,<sup>6,45</sup> the use of manipulation as a treatment for back pain, not as a method of restoring and maintaining health, was reviewed. Subluxations were not mentioned.

Although only a few of the studies cited in the article by Shekelle et al involved manipulation done by chiropractors, an analysis of a community-based sample of patients showed that 94% of all reimbursed manipulation in the US is provided by chiropractors.<sup>45</sup> Only 27% of all reported indications for use of spinal manipulation as a treatment for back pain were labeled "appropriate,"<sup>45</sup> which may be congruent with other forms of treatment for back pain.<sup>46</sup> But, when spinal manipulation based on the vertebral subluxation theory is used routinely for general health problems, it is almost always inappropriate.

Paradoxically, the chiropractic profession has not taken advantage of the back pain market by making the changes needed to specialize. Instead, the chiropractic profession wants recognition as a form of alternative medicine for a broad scope of health problems. According to a listing of chiropractic colleges<sup>15</sup> by the Council on Chiropractic Education, three US chiropractic colleges are now called a "University of Health Sciences," retreating somewhat from the subluxation theory and incorporating such procedures as acupuncture, homeopathy, oriental medicine, massage therapy, and health and wellness subjects.

Some chiropractic schools are more fundamental or straight, adhering to the vertebral subluxation theory. One chiropractic college is known as a "college of straight chiropractic."<sup>15</sup> Most chiropractic colleges are more liberal and teach various adjunctive procedures. Straight chiropractors treat only with spinal adjustments, other chiropractors treat using multiple procedures. Straight chiropractors do not diagnose; instead, they analyze the spine. Both types of chiropractors support the fundamental belief that spinal manipulation improves health in some mysterious way by correcting a mysterious lesion (a subluxation complex) in the spine. An evidenced-based chiropractor will renounce the subluxation theory, limit treatment to back pain and mechanical-type problems, combine the use

of manipulation with physical therapy modalities, and seek the cooperation of medical practitioners.

### Mobilization versus Manipulation

The manipulative treatments provided by chiropractors and physical therapists are similar, but their goals may be different. Physical therapists use joint manipulation/mobilization to relieve and prevent physical disability. Chiropractors use adjustment/manipulation over the spine to restore and maintain health. Physical therapists base their manipulative treatment on loss of mobility. Chiropractors may focus on correcting and preventing vertebral subluxations. A physical therapist will discontinue use of manipulation when mobility is restored and symptoms are resolved. A chiropractor who follows the subluxation theory may continue manipulating the spine of an asymptomatic patient for preventive maintenance purposes.

Mobilization occurs when a joint is passively moved through its normal range of movement. Manipulation moves the joint a little farther than normally possible. When a joint is forced to move beyond its normal anatomic limits into the parapsysiologic space, there may be a popping sound when cavitation pulls in nitrogen gas to fill the vacuum between the separated joint surfaces.<sup>1</sup> Perfectly normal joints can be made to pop. However, adjusting or popping a normal spine to correct subluxations can have nocebo and placebo effects. The placebo effect is evident by patients who feel better because they believe that a vertebra has been realigned when manipulation pops the spine.<sup>30</sup> The nocebo effect is shown by patients who believe that vertebrae are constantly slipping in and out of place, producing fear in the patients that they will become ill if subluxations are not corrected or prevented by regular adjustments.<sup>30</sup>

Some chiropractic patients have preventive maintenance spinal adjustments to correct what they believe is a constant cause of disease in their spine. James Cyriax, a prominent English orthopaedist who specialized in spinal manipulation, referred to such fear as chiropractogenic neurosis.<sup>17</sup>

### The Future of Chiropractic

Chiropractic is not easily defined. Chiropractors are perceived as back specialists, but few chiropractors specialize in the treatment of back pain. Most use spinal manipulation as a method of restoring and maintaining health.<sup>5,33</sup>

Back pain is one of the most common medical problems in the US population, accounting for \$50–100 billion in health costs annually.<sup>39</sup> The chiropractic profession seems to be shooting itself in the foot by promoting chiropractic as an alternative health care for a broad scope of ailments rather than as a back pain specialty. Such an approach creates suspicion and alienates the scientific community.

A survey by Hawk and Dusio revealed that 90% of US chiropractors considered themselves primary care providers.<sup>24</sup> While the chiropractic profession struggles to gain recognition and support as general healthcare providers, literature supporting the use of spinal manipulation in the treatment of back pain is growing.<sup>6,45</sup> Manipulation is attracting the attention of orthopaedists, physical therapists, osteopaths, massage therapists, and other practitioners who could provide such services.<sup>31</sup> Physical therapists who already are using manipulation and mobilization techniques are acquiring Doctor of Physical Therapy (DPT) degrees. Of the 209 physical therapy programs in the US, 111 now offer DPT degrees.<sup>31</sup> Approximately 35 states grant physical therapists direct access to patients. There are now twice as many physical therapists (137,000) as chiropractors.<sup>9</sup>

The percentage of the population seeing chiropractors annually may be decreasing (from 9.9% in 1997 to 7.4% in 2002<sup>49</sup>), whereas massage therapy and other methods of treating back pain are becoming more popular.<sup>49</sup> During this period, use of complementary and alternative medicine remained stable.<sup>49</sup> Low use of chiropractic services may reflect public suspicion of the profession because of unsubstantiated claims,<sup>22,47</sup> or it may represent a market share best served by fewer more specialized practitioners. Despite claims by chiropractic colleges, state and national associations, and research organizations that chiropractic care is effective for care of general health problems,<sup>22,47</sup> only 6% of the 7.4% of the population seeking chiropractic care each year<sup>49</sup> is treated for nonneuromusculoskeletal conditions (such as asthma, hypertension, or gastrointestinal disorders).<sup>21</sup> This would seem to indicate that while some people would trust chiropractors to treat back pain, most do not trust them to treat a health problem.

There is no evidence to indicate that chiropractors will succeed in their drive for support as primary care providers for a broad scope of health problems. Enrollment in chiropractic colleges has decreased. According to the National Center for Education Statistics, fall enrollment for 16 US chiropractic colleges decreased 39.9%, from 16,500 in 1996 to 9921 in 2002.<sup>35</sup> The chiropractic college at Marycrest International University in Denver, Colorado, closed in 2002. On January 27, 2005, Florida's Board of Governors overseeing the state universities voted 10–3 to reject a proposed chiropractic college at Florida State University. The University of South Florida and Nova Southeastern University also rejected affiliation with a chiropractic school, perhaps reflecting the resistance of academia and medical science to chiropractic principles. The rejection of chiropractic by Florida State University was a replay of a 2001 incident in which York University in Toronto, Ontario, rejected a proposed affiliation with Canadian Memorial Chiropractic College, despite the chiro-

practic college's offer of \$17 million to fund infrastructure.<sup>19</sup> There are 17 US chiropractic colleges accredited by the Council on Chiropractic Education.<sup>15</sup> The chiropractic college at D'Youville College in Buffalo, New York, is waiting for approval.

The Bureau of Labor Statistics reported that approximately 49,000 chiropractors had jobs in 2002.<sup>9</sup> Other estimates place the number of practicing chiropractors at greater than 61,000.<sup>31</sup> It is thought that approximately 15% of all licensed chiropractors in the US do not practice.<sup>31</sup>

Chiropractors are licensed in all 50 states, the District of Columbia, Puerto Rico, and the US Virgin Islands.<sup>1</sup> Workers' compensation plans and most third party payers offer limited reimbursement for chiropractic care, more often because of politics than science. Some government plans, such as Medicare and federal workers' compensation, adhere to the basic definition of chiropractic and pay only for manual manipulation of the spine to correct a subluxation. This is limiting for chiropractors who include use of physical therapy modalities and other appropriate treatment methods.

The Department of Veterans Affairs has announced plans to include chiropractors in its network of healthcare providers. Patients first must see a Veterans Affairs physician or be referred by a primary care provider. Chiropractors with professional service contracts with the Veterans Administration will be allowed to provide "chiropractic manipulative therapy for musculoskeletal problems of the spine."<sup>2</sup> According to a July 2004 Directive from the Veterans' Health Administration (VHA), chiropractic care provided by VHA "shall include a variety of chiropractic care and services for neuromusculoskeletal conditions, including subluxation complex,"<sup>18</sup> leaving the door open for chiropractors who adjust subluxations to restore and maintain health.

In a 2005 report by the Institute for Alternative Futures, it was stated that the future of chiropractic is uncertain because of the economic challenges and limitations in chiropractic science and methods. Four possible scenarios are predicted for chiropractic: (1) slow, steady growth as support increases for the use of manipulation for treatment of back and neck pain; (2) a downward spiral from competition and healthcare costs; (3) evidenced-based collaboration in the care of patients with neuromusculoskeletal conditions; and (4) chiropractors will become healthy life doctors "specializing in preventing disease with health-management plans."<sup>31</sup>

It is difficult to imagine that the chiropractic profession cannot or will not attempt to take advantage of the growing back pain market by specializing. There are no indications that the profession will voluntarily limit its scope of practice. It seems that it instead will choose alternative medicine,<sup>28,31</sup> which offers a broad scope of practice, continued

independence, and a way to avoid becoming a subspecialty of medicine. In an editorial by Shekelle published in a 1998 issue of the *New England Journal of Medicine*, he offered no encouragement for chiropractors' aspirations to be primary care providers in alternative medicine, stating that "... there appears to be little evidence to support the value of spinal manipulation for nonmusculoskeletal conditions. For this reason, I think it is currently inappropriate to consider chiropractic as a broad-based alternative to traditional medical care."<sup>44</sup>

Cooper and McKee, in a study published in *The Milbank Quarterly* in 2003, summarized the predicament of chiropractic as a form of alternative health care.<sup>13</sup> "The profession's efforts to establish a role in primary care are meeting resistance, and its attempts to broaden its activities in alternative medicine have inherent limitations. Although patients express a high level of satisfaction with chiropractic treatment and politicians are sympathetic to it, this may not be enough as our nation grapples to define the health care system that it can afford."<sup>13</sup>

If chiropractors want recognition from the scientific community, the future of chiropractic should not be based on the belief-driven subluxation theory or on unproven claims of alternative medicine. To fit in with mainstream healthcare, the definition of chiropractic would have to be changed in state laws and catalogs of chiropractic colleges, requiring chiropractors to give up their unique subluxation-based independence. The chiropractic profession might be more accepted and better used if it specialized in the use of manipulation and other physical therapy modalities for treatment of neck and back pain and related problems, seeking support as a form of physical medicine or as a subspecialty of medicine.

According to the American Physical Therapy Association, "Physical therapy, by 2020, will be provided by physical therapists who are doctors of physical therapy and who may be board-certified specialists. Consumers will have direct access to physical therapists in all environments for patient/client management, prevention, and wellness services. Physical therapists will be practitioners of choice in patients'/clients' health networks and will hold all privileges of autonomous practice."<sup>3</sup>

Without change leading to proper limitations and a better image for the chiropractic profession, future chiropractors may find it difficult to compete with physical therapists who offer manipulative services.

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