ORIGINAL RESEARCH

A COMPARATIVE STUDY OF CHIROPRACTIC AND MEDICAL EDUCATION

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Background • *Chiropractic is the largest of the alternative/complementary health professions in North America. However, little attention has been given in the health sciences literature to the formal curriculum of chiropractic education or to its similarities to and differences from the curriculum of allopathic medical education. This lack of information precludes extensive referrals and interaction between the 2 professions, even when historical and political barriers can be overcome.*

Method • *This is a descriptive, comparative study of the curriculum content of North American chiropractic and medical colleges, supplemented by in-depth data obtained through site visits with 6 institutions (3 chiropractic and 3 medical).*

Discussion • *Considerable commonality exists between chiropractic and medical programs. Regarding the basic sciences, these programs are more similar than dissimilar, both in the types of subjects offered and in the time allotted to each subject. The programs also share some common areas in the clinical sciences. Chiropractic and allopathic medicine differ the greatest in clinical practice, which in medical school far exceeds that in chiropractic school. The therapies that chiropractic and medical students learn are distinct from one another, and the settings in which students receive clinical training are different and isolated from one another. With these similarities and differences established, future studies should examine the quality of the 2 educational programs in detail. (Altern Ther Health Med. 1998;4(5):64-75.)*

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Although an extensive literature exists on medical education, there is no comparative body of literature on chiropractic education. In a search performed by the authors, only 6 articles could be found explicitly comparing the 2 educational programs.[1-6] Following are brief summaries of the contents of the articles:

- Two were based on a comprehensive 1-year participant-observation study and surveys of 1 chiropractic college, with no comparable analysis of a medical school.[1,2]
- Two were based on a review of institutional catalogs and compared only the crude classroom hours listed (an approach that assumes the accuracy of the catalogs).[3,4]
- One compared the performance of applicants at a single chiropractic college on the Myers-Briggs type indicator (dealing with personality types and career choice) with that of people in other health professions.[5]
- One was an historical analysis of curriculum development in medical and chiropractic education.[6]

None of the studies provided a comprehensive description of a "medical" or "chiropractic" education per se, and all were limited either by methodology or sample. A report prepared by the Corporate Health Policies Group[7] for the chiropractic profession and an earlier preliminary report by the current authors[8] provide the only substantive data comparing medical and chiropractic education.

More recently, entrance requirements were compared on factors such as credit hours and grade point average (GPA) for chiropractic, allopathic, osteopathic, podiatric, dental, and optometric education.[9] According to the survey, a bachelor's degree was required for 99% of applicants in medical school and 42% of applicants in chiropractic school. The minimum GPA required for entrance was 3.16 for medical students and 2.38 for chiropractic students, whereas the average cumulative GPA on entrance was 3.56 and 2.90, respectively. Medicine required an average minimum of 100.94 semester hours for entrance, whereas chiropractic required 64.06 hours.

According to a recent survey,[10] studies on chiropractic education are largely descriptive in nature, usually presented at chiropractic conferences, and published in chiropractic journals. Little of this research has focused on the *quality* of the education; when it has, it has been at the conceptual rather than the empirical level.[11]

The earlier part of the century saw numerous writings on chiropractic education in the medical literature, most of which was unflattering and written as part of the medical opposition to chiropractic. Brennan,[12] who analyzed studies conducted from 1910 to 1933, notes that until 1915 little interest was shown in chiropractic by medical writers. This was followed by a flurry of articles until 1925 that tapered off around 1935. Some of the most critical comments came from a 1927 on-site inspection of chiropractic schools, which was conducted by the Council on Medical Education and published in *JAMA*.[13] Although extremely critical, this article must be viewed in the context of Flexner's own devastating report of North American medical schools 16 years earlier. During the 30 years following 1935, the medical profession made virtually no comment in print about chiropractic education.[12]

Researchers such as sociologists and educators have rarely chosen to focus on chiropractic education; when they have, they have been more interested in examining the esoteric features of this system of therapy than describing its educational program.[14-16] Most studies of social sciences focusing on chiropractic education have been concerned with its professionalism—or lack of it.[17-20] Researchers Lin[21] and Leis,[22] though focusing on professionalization, chose chiropractic as a case study because of its supposed deviancy. Sternberg[23] examined how students of this branch of alternative healthcare cope with the problem of stigma. The most detailed sociological account of chiropractic education was in the study conducted by Kelner and colleagues.[24] This research was based on a 1-year observational study of a single chiropractic college, extensive surveys of students and faculty, and documentary analysis of the curriculum, course outlines, and class participation.

ALTERNATIVE HEALTHCARE

There has been increasing interest in alternative healthcare—and chiropractic in particular. In the United States, the scholarly study of unconventional healthcare has at last achieved a measure of scientific respectability due to the January 1993 establishment of an Office for the Study of Unconventional Medical Practice—now called the Office of Alternative Medicine—by the National Institutes of Health.[25]

Also, there is increasing recognition that alternative healthcare is the beneficiary of considerable expenditure by the public. In a national survey of adults in the United States, Eisenberg et al[26] found that 1 in 3 (34%) respondents used at least 1 unconventional therapy in 1990. A total of 25% used unconventional therapy for the 10 most common medical conditions. Among these conditions, unconventional therapy was more common than conventional therapy for the following: back problems, insomnia, headaches, anxiety, and depression. The 3 most common unconventional therapies used were relaxation techniques, chiropractic, and massage. A survey[27] of 233 patients from a general practice in Great Britain found that 35% of the men and 46% of the women had used some form of alternative healthcare in the preceding 10 years. Again, physical treatments—particularly manipulation—were the most commonly used therapies.

Research conducted by institutions such as RAND[28-30] and funding of chiropractic research by the Agency for Health Care Policy and Research reflect the increasing interest in chiropractic. The agency recently published guidelines for low-back pain[31] in which manipulation was listed as an acceptable therapy. Furthermore, there is an increasing body of literature on chiropractic in health services research.[32-63] One major area of interest has been the comparison of medical and chiropractic care, including management of low-back pain,[32-34] perceptions of chiropractors and physicians by these practitioners,[35] and evaluation of chiropractic and medicine by patients.[36,37] Data from chiropractic studies[52,53] show that such alternative healthcare is not used instead of medical care, but in addition to it. These studies also clearly establish that medical and chiropractic doctors are linked by common patients. Furthermore, as the editor of the *American Journal of Public Health* noted in 1980,[54] the studies suggest that health planners and health professionals must be better informed about chiropractic care.

Despite this work, however, there exists no established body of research literature that can be accessed by the nonchiropractic community regarding what type of education a chiropractor receives. Although information may be obtained from institutional catalogs and such bodies as the national chiropractic associations, the Foundation on Chiropractic Education and Research, and the National Chiropractic Examining Board, these data are not readily accessible like published articles, nor are they independent sources. The lack of knowledge about chiropractic education may contribute to health professionals' reluctance to refer patients to chiropractors, even when the use of chiropractic care would be beneficial.

METHODS

The overall purpose of this study was to describe the content of chiropractic education and compare it with that of medical education. The results of this work should help health professionals, healthcare managers, and the public understand the education and training of medical and chiropractic doctors, enabling them to appreciate the tasks of each provider. Evaluating the *quality* of the respective programs was not within the scope of this study.

Design

The study employed a combination of quantitative and qualitative methods,[55] an approach Jick[56] termed "triangulation." Basic quantitative data came from existing sources on medical and chiropractic schools in America, supplemented with documentary analysis of material provided by the 6 institutions involved in the study. Qualitative data were collected from site visits to these institutions, using interviews and small focus groups.

Interviews were conducted with (1) key individuals involved in curriculum development and administration, (2) faculty members, and (3) students. Although the positions of these individuals varied in each institution, a typical site visit for medical schools included meeting any of the following: the associate

dean of education, the associate dean for students, the chair of the medical education committee, the director for undergraduate education, the director for clinical practice, and the chair of basic sciences. For chiropractic schools, the key individuals included the dean of clinical science, the director of clinics, the chair of the curriculum committee, the vice president for education, the director of the instructional program committee, the vice president for academic affairs, and the dean of basic science. In each institution student representatives from each year of the program were included.

Although all medical and chiropractic schools in the United States must meet certain curriculum requirements to be accredited, they are permitted a wide latitude regarding what is emphasized and how it is taught. Because curricula vary from school to school, whether chiropractic or medical, a sampling frame allowing us to generalize about all schools could not be devised. On the other hand, collective data on all US schools would indicate averages without giving a detailed picture of the curriculum. This study attempts to overcome both problems by combining collective data on all schools with in-depth data from the 6 selected schools.

Sample

Three states providing a broad geographic representation were chosen: California, Iowa, and Texas (states accounting for 47% of the chiropractic colleges in the United States). In each state a single chiropractic college and a school or faculty of medicine were chosen. The sites were Los Angeles, Calif; Davenport and Iowa City, Iowa; and Houston and Pasadena, Tex. The medical schools were chosen on the grounds of proximity to the chiropractic schools.

Data Sources and Analysis

Data exist on medical education and, to a lesser extent, on chiropractic education. Two major sources on curricula were used: the *American Medical Colleges Curriculum Directory* and the *Chiropractic College Directory*, both of which give detailed descriptions of all medical and chiropractic programs in the United States and Canada. A second data source was provided by the Center for Studies in Health Policy Analysis in Washington, DC, which has assembled extensive data concerning the curricula of all health professions. Additional data on medical education were obtained from *JAMA*'s 1995 *Medical Schools in the United States*[57]; data on chiropractic education were derived from the Council on Chiropractic Education. These quantitative data enabled us to compare the institutions in the study with other schools in the United States.

Each of the 6 institutions was requested to provide documents describing the curriculum (eg, course outlines, syllabus, notes). These materials were coded for descriptive analysis (eg, number of hours for specified subjects). Such data have been termed by Coles and Grant[58] the "curriculum on paper," and also included materials used in the courses such as handouts. A second part of this analysis involved the "curriculum in action," which included timetables, lectures, seminars, practicals, and rounds. Other materials collected included entry requirements. Analysis of these documents was used to generate a comprehensive description of each institution's program.

From the above material we assembled a description of the essential educational programs in the schools as reflected in their own documents as well as in public documents. Completed reports were circulated to each institution for review during site interviews. The interviews were used to validate the description and test conclusions among individuals who were selected based on their knowledge of and involvement in the program. Although they were structured, the interviews were composed of open-ended questions. Their purpose was to explore with the participants the unique features of their institution. A major objective was to determine whether it was possible to characterize the programs based on the perspectives of participants.

Descriptive statistics were used if appropriate (eg, regarding course hours and length of program). However, much of the information, including qualitative data, consisted of words rather than numbers.

In each site the team included at least 1 physician, a chiropractor, and a sociologist who was a health policy analyst. The chiropractor was an educator with advanced qualifications in education and the medical physician was 1 of 2 medical educationists, one of whom had advanced qualifications in education and the other of whom had experience in health services research (ie, each visitation team was composed of 3 individuals: 1 sociologist, 1 chiropractor, and 1 of 2 possible physicians). Both physicians had extensive experience in medical education and had held senior administrative positions in medical schools. The sociologist had taught in both medical and chiropractic schools and had held a senior administrative position in health sciences education as well as an executive position in a chiropractic school.

RESULTS

To provide a succinct comparison between the institutions studied, results were organized based on size, selection of students, and curriculum. When applicable, results were compared with national data on all chiropractic and medical schools. The study was conducted in 1995; the period under study was 1994 to 1995.

Institutional Size

Table 1 presents data on the relative size, in number of students, of the 6 institutions in the study. Among the 3 chiropractic schools studied, enrollment size ranged from 521 to 1880 students, whereas the mean class size ranged from 144 to 572. The entering class size ranged from 125 to 570. The average number of enrollment and class size for accredited chiropractic schools in the United States were 706 and 225, respectively. The 3 institutions in the study therefore cover the spectrum of sizes of chiropractic schools (1 small, 1 large, and 1 medium-sized school).

The medical schools in the study were more similar in their sizes, ranging from 691 to 795 in enrollment and 168 to 202 in

TABLE 1 Total enrollment and class size of sample institutions

Characteristics	Chiropractic schools				Medical schools			
	Average*	Calif	Iowa	Tex	Average*	Calif	Iowa	Tex
Total enrollment	706	773	1880	521	536	734	691	795
Average class size	225	229	572	144	134	168	175	202

* Average number of students at all chiropractic and medical schools in the United States

incoming class size. According to national data on US medical schools,[57] the number of enrollees at all medical schools ranges from 151 to 1270, averaging 536; 36% have an enrollment range of 600 to 800 students. The 3 medical schools in the study lie in the upper-middle range of all medical schools in the United States.

All chiropractic schools in the study were private institutions, because there are no completely publicly funded chiropractic schools in the United States. The medical schools in the study were completely publicly funded institutions. There are currently 16 chiropractic colleges in the United States, all of which are accredited by the Council on Chiropractic Education. During this study only 15 colleges were accredited; the data used in this report were therefore based on those 15. There are 125 medical schools in the United States, all of which are accredited by the Liaison Committee on Medical Education.

Program Length

A major difference exists between the length of the 2 educational programs. A chiropractic program consists of 3.3 years of undergraduate education, totaling approximately 4800 hours (Table 2). A medical program consists of 4 years of undergraduate education—approximately the same number of hours (4667), but with an additional 3 years of graduate education to meet the requirements for practice. As discussed later in the article, the largest difference occurs in clinical clerkship, which in medicine is both broader in scope and longer (3467 hours for medicine vs 1405 for chiropractic). However, chiropractic students take 1975 hours in chiropractic clinical sciences that, when combined with their clerkship, total 3380 hours of clinical education. In medicine, clinical sciences are combined with clinical clerkships, totaling 3467 hours. The medical clinical clerkship presents a breadth of clinical conditions that for the most part are not encountered in chiropractic education.

Selection Criteria

Selection of students involves 2 criteria: requirements for entry in the program and GPA. Medical schools require a higher minimum college education for admittance (Table 3). Although 3 years is the minimum standard for medical school, most students entering have completed 4 or more. Acceptance to a medical

TABLE 2 Comparison of overall curriculum structure

Characteristics	Chiropractic schools		Medical schools	
	Average*	Percentage†	Average*	Percentage†
Total contact hours	4826	100	4667	100
Basic sciences	1420	29	1200	26
Clinical sciences	3406	71	3467‡	76
Chiropractic sciences	1975	41	NA	NA
Clerkship	1405	29	3467‡	74

* Average number of curriculum hours at all chiropractic and medical schools in the United States
† Expressed as percentage of total contact hours
‡ In medical schools, clinical sciences and clinical clerkship are combined

NA, not applicable

TABLE 3 College admission requirements and GPA of entering class at sample institutions

Characteristics	Chiropractic schools			Medical schools		
	Calif	Iowa	Tex	Calif	Iowa	Tex
Minimum college requirement (y)	2.5	2	2	3	3	3
Mean GPA*	2.78	2.95	2.50	3.50	3.60	3.44

* The mean GPA of the most recent entering class

GPA, grade point average

school is more competitive than acceptance to a chiropractic school. The average GPA of the most recent entering class was 2.7 for chiropractic schools and 3.5 for medical schools. National data on graduate chiropractors show that 77.8% have degrees other than chiropractic, 53.7% of which are bachelor's degrees or higher and 46.5% of which are associate's degrees.[59] Although most chiropractors would have completed these degrees prior to obtaining the chiropractic degree, some chiropractic colleges offer a bachelor's or associate's degree concurrently with the chiropractic degree. This sharply contrasts with medical schools, which only accept students who hold these degrees. The minimum entrance requirements, therefore, may be an incomplete indicator of the qualifications of those who are admitted. Medical schools use a standardized examination called the Medical College Admission Test in the selection process. There is no equivalent in chiropractic.

Regarding prerequisite courses, considerable overlap exists among the 6 institutions studied. All required prerequisites in biology, general inorganic chemistry, organic chemistry, and general physics. All chiropractic schools and 1 medical school required a credit in humanities and a credit in social science/psychology. One additional medical school required the humanities prerequisite, but not the social science/psychology prerequisite. However, all 3 medical schools required mathematics, whereas none of the chiropractic schools did. All 6 schools required competency in English, but none required any other language credit.

Curriculum

Two questions are of paramount importance when comparing the curricula of these 2 professions: what subjects are taught and how much is taught. In the following discussion these questions will be examined in the context of the basic sciences and the clinical sciences.

In terms of overall student contact hours, the programs are relatively similar (Table 2). Compared with medical schools, chiropractic schools have 159 more student contact hours (4826 hours vs 4667). However, there are distinct differences in how those hours are allocated. Table 4 compares the 6 institutions in this study; contact hours ranged from 4365 to 5713.

Basic Sciences

The medical school with the highest number of contact hours (Los Angeles, Calif) had fewer basic science hours than did the chiropractic school with the lowest number (Pasadena, Tex). The chiropractic schools in the study taught an additional 290 hours of the basic sciences on average. Looking at all the schools and colleges, basic sciences comprised 29% of the program in chiropractic, whereas in medical institutions they comprised 26% (Table 2). Among the *selected* institutions, the ranges were 29% to 31% for chiropractic and 19% to 28% for medicine (Table 4).

The selected basic science courses for all the schools—anatomy, biochemistry, microbiology, public health, physiology, pathology—were compared in terms of contact hours. Percentages of the total number of hours spent in the basic sciences were calculated (Table 5). Although some of the following results were predicted, others were unexpected given the clinical differences of chiropractic and medicine: (1) the programs teach the same amount of microbiology (despite the assumption that medicine would place more importance on microbiology, therefore offering more hours in it); (2) chiropractic schools teach more hours in pathology than do medical schools (205 vs 162); (3) anatomy and physiology are emphasized more in chiropractic schools, an expected finding given chiropractic's therapeutic and clinical focus on neuromusculoskeletal problems; and (4) public health is offered more in medical schools than in chiropractic schools: 289 versus 70 hours, respectively. This finding may reflect the greater role the physician is expected to play in public health once he or she is in practice.

The above predictions may be based on the false assumption that more hours are devoted to more important subjects. The number of hours given to a course in any program is the result of a complex process that may include institutional politics, and is seldom a simple reflection of weighted subjects. Furthermore, the number of hours does not reflect new modes of teaching in which less time may be required to impart knowledge. For example, although the number of didactic hours in pathology may be greater in chiropractic schools than in medical schools, the amount of time allotted to this subject in clinical clerkships will differ considerably because medical students encounter more serious as well as more varied pathologies than do chiropractic students.

TABLE 4 Comparison of the basic curriculum of the sample institutions*

Characteristics	Chiropractic schools			Medical schools		
	Calif	Iowa	Tex	Calif	Iowa	Tex
Total contact hours	4860	4365	4995	5200	5713	4981
Basic sciences	1485 (31%)	1515 (35%)	1470 (29%)	1440 (28%)	1102 (19%)	1174 (24%)
Clinical sciences clinical internship	1230 (25%)	675 (15%)	1335 (27%)	3760 (72%)	4611 (81%)	3807 (76%)
Chiropractic clinical science	2145 (44%)	2175 (50%)	2190 (44%)	NA	NA	NA

* Expressed as number of hours and as percentage of total contact hours

NA, not applicable

TABLE 5 Comparison of medical and chiropractic education in selected basic sciences*

Subject	Chiropractic schools		Medical schools	
	Hours	%	Hours	%
Anatomy	570	40	368	31
Biochemistry	150	11	120	10
Microbiology	120	8	120	10
Public health	70	5	289	24
Physiology	305	21	142	12
Pathology	205	14	162	14

* Expressed as number of hours and as percentage of total contact hours in basic sciences, which are 1420 for chiropractic and 1200 for medical

Clinical Education

In clinical clerkships/internships, the contrast between the 2 programs is dramatic (3467 hours in medicine vs 1405 hours in chiropractic). In medicine this area comprises an average of 74% of the program, whereas in chiropractic it comprises 29% (Table 2). The range is 15% to 27% among the chiropractic schools and 72% to 81% among the medical schools (Table 4). Program structure may be a factor. Forty-four percent to 50% of the chiropractic program is dedicated to chiropractic clinical sciences, which have no equivalent in medicine. Combining chiropractic clinical sciences with clinical clerkships, the percentage of a chiropractic program dedicated to clinical education is 65% to 71%, compared with 72% to 81% among the medical institutions. The major difference therefore lies between didactic teaching in clinical sciences and clinical experience.

One way of looking at this is to examine the number of contact hours in lectures, laboratories, and clinics. Table 6 shows that medical students receive twice the number of hours in clinical experience, but receive more than 1000 fewer hours in lectures and laboratory education. Clinical experience does not include medical residency, which takes place after graduation. If medical residency is included, the total number of hours dedicated to clinical experience becomes 5227 minimum for medicine and 1405 for chiropractic. At the undergraduate level, this difference in clinical clerkship is 87 weeks in medicine compared to only 35 weeks in chiropractic. The postgraduate residency in

TABLE 6 Comparison of medical and chiropractic education on lecture, laboratory, and clinic time

Variable	Medical schools			Chiropractic schools		
	Total	Basic science	Clinical science	Total	Basic science	Clinical science
Lecture (h)	2048	600	1448	2675	1020	1665
Laboratory (h)	600	600	NA	1115	400	715
Clinic (h)	2020	NA	2020	1010	NA	1010
Total	4668	1200	3468	4800	1420	3390

NA, not applicable

medicine adds the equivalent of 44 weeks of clinical experience at 40 hours per week minimum; many graduate residency programs require in excess of this. Such a figure does not factor the number and types of patients seen, the problems encountered, or the types of treatments used.

A distinction can be made between areas that the 2 programs teach and those that are offered only in the chiropractic program. In chiropractic 4 major areas—adjustive techniques/spinal analysis, principles/practices of chiropractic, physiological therapeutics, and biomechanics—are distinct from the subjects offered in medicine. Regarding subjects unique to chiropractic, the variation among the chiropractic colleges is modest (Table 7). It was not possible to construct an equivalent table for medicine. Subjects dealing with diagnosis are allotted the most time followed by nutrition. However, 3 areas in the chiropractic clinical sciences—adjustive techniques/spinal analysis, physical/clinical/laboratory diagnosis, and diagnostic imaging—account for 52% of the education in the clinical sciences, in which subjects devoted to diagnosis make up 29% of the total. Data show that the emphasis in chiropractic clinical sciences is on diagnosis and manipulative therapy (Table 7).

Although quantitative data give an overview of the major components of the curriculum, they fail to indicate how the total curriculum is sequenced. Because curriculum sequence varies from 1 institution to another, the following discussion will focus on only 2 institutions in California—1 medical and 1 chiropractic—chosen due to the in-depth information with which they provided the researchers. The results cannot be generalized to other schools. The comparison between these schools and the others in the study is shown in Table 8.

Curriculum Sequence of Chiropractic College

The minimal requirements students must complete are discussed below. Table 8 provides the overall summary of curriculum hours for the chiropractic and medical schools in California. The largest difference in hours occurs in the fourth year, in which chiropractic students have a total of 450 hours and medical students 1507 hours. In the first year chiropractic students have a total of 1515 hours compared to 890 for medical students.

The program of the chiropractic college is spread over 4 years in 10 trimesters. The first 2 years of the program are heavily focused on the basic and clinical sciences.

Year One. The following subjects are taken: general anatomy (210 hours), functional anatomy and biomechanics (210 hours), histology (90 hours), human biochemistry (105 hours), chiropractic principles (90 hours), clinical chiropractic (60 hours), palpation (120 hours), neuroscience (120 hours), normal radiological anatomy (90 hours), human physiology (135 hours), fundamentals of nutrition (60 hours), introduction to physical examination skills (120 hours), and chiropractic procedures (105 hours). The total student contact hours are 1515 (585 hours in lectures, 930 hours in laboratory), which represent an average of 34 contact hours per week.

Year Two. Again, the focus is on the basic and clinical sciences. The following are taken: pharmacotoxicology (30 hours), clinical microbiology (90 hours), pathology (135 hours), chiropractic principles (60 hours), chiropractic procedures (300 hours), physics and clinical imaging (90 hours), clinical orthopedics and neurology (180 hours), nutritional assessment (60 hours), community health (60 hours), physiological therapeutics (105 hours), clinical nutrition (60 hours), research methods (30 hours), practice management (30 hours), imaging interpretation (75 hours), differential diagnosis (90 hours), and clinical chiropractic applied (90 hours). The total contact hours for year 2 are 1485 (795 in lectures, 690 in laboratory) and the average contact hours per week are 33.

Year Three. With the following subjects, the program moves from a focus on the basic sciences to one on the clinical sciences: integrated chiropractic clinical application (90 hours), physiological therapeutics (30 hours), chiropractic principles (75 hours), practice management (75 hours), imaging interpretation (90 hours), radiological position and technique (30 hours), differential diagnosis (90 hours), clinical application of manual procedures (60 hours), clinical internship (390 hours), dermatology (15 hours), clinical psychology (15 hours), obstetrics/gynecology (15 hours), pediatrics (15 hours), geriatrics (15 hours), and clinical laboratory clerkship (15 hours).

TABLE 7 Chiropractic clinical subjects in the sample institutions*

Characteristics	Chiropractic schools			
	Average†	Calif	Iowa	Tex
Adjustive techniques/spinal analysis‡	555 (23%)	660 (26%)	622 (25%)	576 (24%)
Physical/clinical/laboratory diagnosis	410 (17%)	285 (11%)	350 (14%)	375 (15%)
Diagnostic imaging, radiology	305 (12%)	375 (15%)	400 (16%)	270 (11%)
Principles/practices of chiropractic‡	245 (10%)	150 (6%)	224 (9%)	90 (4%)
Orthopedics	135 (6%)	180 (7%)	70 (3%)	195 (8%)
Physiological therapeutics‡	120 (5%)	135 (5%)	120 (5%)	120 (5%)
Nutrition/dietetics	90 (4%)	180 (7%)	55 (2%)	90 (4%)
Biomechanics‡	65 (3%)	45 (2%)	95 (4%)	90 (4%)
Professional practice and ethics	65 (3%)	105 (4%)	35 (1%)	30 (1%)
Gynecology/obstetrics	55 (2%)	45 (2%)	70 (3%)	45 (2%)
First aid and emergency	45 (2%)	30 (1%)	45 (2%)	30 (1%)
Research methods	50 (2%)	30 (1%)	45 (2%)	30 (1%)
Clinical pediatrics and geriatrics	50 (2%)	30 (1%)	70 (3%)	45 (2%)
Psychology	55 (2%)	15 (1%)	85 (3%)	45 (2%)
Dermatology	30 (1%)	15 (1%)	12 (0.5%)	30 (1%)

Continued

Year 3 offers a total of 1410 contact hours (330 in lectures, 300 in laboratory, 780 in clinic). Each student has an average of 31 contact hours per week.

Year Four. The last year is dedicated to a clinical internship for 15 weeks (1 trimester) for a total of 450 hours or 30 hours per week.

TABLE 7* *Continued*

Characteristics	Chiropractic schools			
	Average†	Calif	Iowa	Tex
Otolaryngology	25 (1%)	15 (1%)	7 (0.5%)	0 (0%)
Other	160 (7%)	240 (9%)	150 (6%)	375 (15%)
Total hours of clinical lectures	2460	2535	2455	2436

* Expressed as number of hours of lectures not including laboratories and as a percentage of the total hours spent in didactic clinical education
† Average for all chiropractic schools in the United States
‡ Courses unique to chiropractic schools

NA, not applicable

Curriculum Sequence of Medical School

The medical school curriculum in many ways follows a similar format (Table 8). In the first year the basic sciences comprised 79% (706 hours) of the program, whereas the clinical sciences comprised 21% (184 hours). However, in year 2, the basic sciences decreased to 64% (590 hours) and the clinical sciences increased to 36% (335 hours). In years 3 and 4, the students are in a series of clinical clerkships.

Year One. The following program is included in the first year: microscopic anatomy (129 hours), biological chemistry (144 hours), gross anatomy (178 hours), physiology (136 hours), basic neurology (95 hours), biomathematics (24 hours), clinical sciences doctoring (129 hours), clinical sciences interactive teaching (32 hours), clinical application (23 hours), and assignments (100 hours). The total contact hours in year 1 are 890 (184 in clinical sciences, 706 in basic sciences) with an additional 100 hours in assignments. The scheduled hours per week are 30 (for 33 weeks).

Year Two. In the second year, the curriculum includes the following: microbiology and immunology (151 hours), pathology (140 hours), pharmacology (83 hours), pathophysiology of diseases (246 hours), psychopathology (41 hours), doctoring/clinical fundamentals (212 hours), genetics (35 hours), and clinical pharmacology (17 hours). The total contact hours in year 2 are 925 (590 in basic sciences, 335 in clinical sciences). An additional 100 hours are spent in assignments, and the scheduled hours per week are 30.

TABLE 8 Comparison of the California chiropractic and medical school programs in terms of basic and clinical education by year*

Placement	Schools			
	Chiropractic		Medical	
	Basic sciences (h)	Clinical education (h)	Basic sciences (h)	Clinical education (h)
First year	960	555	706	184
Second year	375	1110	590	335
Third year		1410		1878
Fourth year		450		1507
Subtotals	1335	3525	1296	3904
Total	4860		5200	

* Clinical education includes clinical sciences and clinical clerkships

Year Three. The third year of the medical program involves 52 weeks of core clinical clerkships for a total of 1878 hours. The average number of hours scheduled per week is approximately 36.

Year Four. The fourth year is also dedicated to clinical activities and composed of required student selected electives (selectives) for 26 weeks with a total of 936 student contact hours. An additional 571 hours are spent in electives, which on average add 16 weeks to the program. The contact hours scheduled per week are 36. The total program is 5200 hours.

Limitations of the Study

The use of secondary analysis of existing data and institutional documents is problematic. In the former case, accuracy of data cannot be assured. However, because it can be assumed that institutions have an interest in presenting correct data—particularly for accreditation purposes—it is not likely that such information is greatly inaccurate. Similarly, it is debatable whether course syllabi and handouts accurately describe what is actually taught at the institution.

The use of site visits allowed us to test the accuracy of some of the above data. However, the qualitative methods used in interviewing key informants are themselves subject to methodological criticisms.

This study focused in-depth on only 6 institutions, so caution should be exercised in generalizing from these results. However, we were able to draw some conclusions by using the method of triangulation, checking our conclusions with data drawn from many sources and comparing the data of the 6 institutions to those on all chiropractic and medical schools in the United States.

Although the selected chiropractic colleges provide a broad representation in size, the choice of the medical schools was dictated by their proximity to the former. Because these were all medium-sized institutions, the extent to which the results can be generalized may be limited. However, based on available medical school data, the 3 medical institutions in our study did not appear anomalous on important variables.

DISCUSSION

Although the data presented in this report do not allow us to evaluate the quality of the programs, they do show that both programs are demanding in the number of hours devoted to basic sciences and the number of student contact hours per week. An intriguing result is that chiropractic education devotes more time to the basic and clinical sciences than does medical education. This finding may reflect the fact that, over the last decade, medicine has responded to the new demands placed on its education at the expense of didactic programs and laboratories in the basic and clinical sciences. Traditional subjects such as anatomy have seen significant reductions in time allotment. In our interviews with medical school faculty, it was noted that curriculum innovations have meant reductions in the hours given to traditional didactic teaching (among the institutions studied, these reductions ranged from 10% to 30%). This cutback can also be seen in laboratory education. At least 1 of the medical schools eliminated lab time more than 15 years ago, and all seem to place less emphasis on lab time than do chiropractic institutions. Our interviews included those teaching the basic sciences in chiropractic schools who had also taught in medical and other health science programs. Many of the chiropractic students had also completed university science degrees before enrolling in a chiropractic college. People in both groups indicated that the chiropractic schools in the study had established comprehensive science programs.

The types of subjects taught vary from chiropractic to medical programs. Chiropractors spend more time in nutrition than do physicians, whereas physicians spend more time in public health. On the other hand, there is a large difference in the amount of practical clinical education received by medical and chiropractic students even in the 3- and 4-year programs. When the residency programs of medicine are added to the total, the difference is drastic, resulting in medical students receiving much more practical clinical education. The clinical settings in which medical students receive their education also differ; in chiropractic, clinical education takes place in ambulatory settings.

One conclusion that can be drawn from this study is that the educational training of medical and chiropractic doctors has much in common, despite what those in either program would acknowledge or what would be expected from prevailing stereotypes in the healthcare delivery system. In terms of basic science (ie, the types of subjects covered and the amount of time allotted to each subject), the programs are more similar than dissimilar. Chiropractic and medical education share common areas in the clinical sciences as well. They differ most in clinical practice: therapies students learn in either program are distinct, and the settings in which they are clinically trained are different and isolated from one another.

In our interviews with medical students, 2 things became clear: (1) these students spend little time studying the neuromusculoskeletal system and its health-related problems, the subjects of most concern to chiropractors, and (2) they receive little or no education in alternative healthcare and no education in chiropractic care. However, we also noted in talking to medical students that they had no overt hostility to chiropractors, an attitude that had historically marked the relationship between the two professions. The position taken by these medical students was one of benign neglect—chiropractic or any alternative healthcare is not among the subjects they must learn, and thus it cannot be given a high priority. Chiropractic students, though similarly isolated from medical students, are more likely to encounter physicians as part of their faculty. It is not uncommon for the basic-science faculty in a chiropractic school to have taught in a medical school. In addition, many basic textbooks and course articles are medical in context. The chiropractic colleges we visited carried the leading medical journals in their libraries; the reverse was not seen.

Despite such isolation, 1 chiropractic school in the study has initiated an unusual program requiring all students to do a medical

clerkship rotation. In this highly innovative program, which was made possible by committed physicians, chiropractic students can do up to a 4-week hospital rotation or 1-week rotations in orthopedics, rheumatology, neurosurgery, or family medicine.

Among providers of alternative healthcare, chiropractors are by far the most numerous and most firmly entrenched. Increasing scientific evidence suggests that manipulation, the most common chiropractic therapy, has clinical efficacy.[44,60-65] This leaves medicine in an unusual position. Physicians can expect that at any given time a sizable number of their patients will be using chiropractic care. In this respect, chiropractors and physicians are linked by common patients, whether this is acknowledged by either practitioner. If evidence-based medicine is to have any real meaning in education, ignoring the evidence presented by manipulation becomes increasingly untenable.

Although chiropractors are not the only providers who manipulate the body, they are responsible for more than 80% of the manipulations billed in the United States.[46] A case could be made that they are the most extensively trained in a formal curriculum to apply this method. However, assuming that a reconciliation between medicine and chiropractic is either possible or probable, the following major ethical issue still confronts the physician: Is it ethical to recommend to your patients a type of therapy or therapist about which you know nothing? On the other hand, is it ethical to neglect to inform your patients of a therapy that may be appropriate and beneficial for the health problem they have?

The solution to this dilemma involves knowing not only the literature on the therapy, but something about the training and education of the therapist. Until chiropractors and physicians are educated together—and such knowledge is shared—the best option is to provide information for the medical doctor regarding the education and training of chiropractors. The present article has isolated what is similar, different, and unique in the 2 educational programs. Future research should examine the *quality* of educational programs in chiropractic and medicine.

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