

# **A SCIENTIFIC LOOK AT ALTERNATIVE MEDICINE**

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## ***Chiropractic, Osteopathy, and Massage***

### **CHIROPRACTIC**

#### Background

General technique of *spinal manipulation therapy* is of ancient origins, and in 19th Century U.S. was used by folk healers, "bonesetters," and early osteopaths. Today it is used by various health practitioners, including orthopedists, physical therapists, osteopaths, etc.

Specific technique of *chiropractic* was invented by Daniel David Palmer, 1895, following his alleged healing of a deaf man by spinal manipulation (but nerves involved in hearing do not emerge from spine).

Estimated 60,000 American chiropractors; licensed in all states. Estimated costs range from \$2 to \$8 billion/year. More than 25 million Americans visit chiropractors in a given year (nearly 200 million total visits), with the visits comprising about 30% of the visits to alternative practitioners. Most of these visits are for neuromusculo-skeletal problems; 30-45% are for low back pain (the total medical cost for low back pain is estimated to be \$26 billion/year; an estimated 25% of the population suffers from low back pain in a given year).

Trained in 4-year schools (14 of 17 federally accredited), which vary greatly in quality; D.C. degree

"As of 2002, more than 50 percent of health maintenance organizations (HMOs), more than 75 percent of private health care plans, and all state workers' compensation systems covered chiropractic treatment. Chiropractors can bill Medicare, and over two dozen states cover chiropractic treatment under Medicaid." (NCCAM, "About Chiropractic and Its Use in Treating Low-Back Pain") A 2004 survey found that 87% of employers offered coverage for chiropractic.

In 1999, HMO Illinois, with 700,000 members, included some chiropractors as possible primary care physicians.

Organizations (see web sites in reading list):

- International Chiropractic Association ("straights" - restrict practice to treatment of subluxations through manipulation)
- American Chiropractic Association (largest) ("mixers" - utilize other modes of treatment in addition to manipulation. About 4 times as many as "straights.")
- National Association for Chiropractic Medicine (reform). Has renounced subluxation theory. Limits scope to neuromusculo-skeletal problems. (Only about 100 members)

## Principles of chiropractic

According to traditional chiropractic belief, misaligned vertebrae (*subluxations*) are cause of, or a contributing factor to, most diseases (chiropractors like to use the word "dis-ease"). Can disturb nerves, immune system, and visceral organs. Thus, some chiropractors feel they are treating underlying *causes* of disorders when medical doctors treat *symptoms*. (Note: subluxation is also a medical term ("partial or incomplete dislocation"), but the medical usage refers to a much more severe abnormality than in the usage given by chiropractors.)

The body has an innate ability to be healthy, and thus can get well when subluxations are corrected. (Chiropractors refer to the "Innate Intelligence" of the body, or "the Innate.")

There is no consensus as to exactly what subluxations are and how they affect the body. Note the vagueness of the following "consensus definition" given in a publication of the Foundation for Chiropractic Education and Research: "A subluxation is a complex of functional and/or structural and/or pathological changes that compromise neural integrity and may influence organ function and general health." Medicare regulations (2000) define a subluxation as "a motion segment, in which alignment, movement integrity, and/or physiological function of the spine are altered although contact between joint surfaces remains intact."

"The theoretical basis is that hyper- or hypomobile joints produce local or distant effects as a result of abnormal afferent and efferent nerve irritation from joints, synovial membrane, and other soft tissue." (Curtis and Bove (1992) *J. Fam. Pract.* 35, 551-555)

Two hypotheses: 1. *biomechanical* - subluxations put mechanical strain on soft tissues of the spine, eventually producing pain and further abnormalities. 2. *nerve compression* - subluxations produce compression of spinal nerves at intervertebral foramina.

Subluxations said to arise from physical trauma, mental stress, or chemical causes (malnutrition or drug ingestion).

In addition to motor and sensory nerves, sympathetic nervous system is involved in controlling blood flow and can thus influence internal organs.

Shekelle (*Spine* 19, 858-861 (1994)):

There are four main hypotheses for lesions that respond to manipulation: 1) release of entrapped synovial folds or plica; 2) relaxation of hypertonic muscle by sudden stretching; 3) disruption of articular or periarticular adhesions; and 4) unbuckling of motion segments that have undergone disproportionate displacements.

Meeker and Haldeman (*Ann. Intern. Med.* 136, 216-227 (2002)) provide, in their Table 3, a list of five proposed mechanisms, with mechanical, anatomical, and neurological components.

Some chiropractors now speak of the "vertebral subluxation complex," which involves nerves, muscles, and spinal movement; some have abandoned the idea of subluxations entirely.

## What do chiropractors do? Who do they treat?

Treatment: manipulation of vertebrae, usually by hand. Curtis and Bove, *op. cit.*:

Manipulation is generally performed by taking joints to their end point of motion ("long lever" technique) and then isolating the joint to be manipulated by local pressure on prominences of the articulating bones within the stretched area ("short lever"). Once isolated, a high velocity but low

amplitude thrust is delivered to the joint, and an audible noise usually signifies that the manipulation has been successful. Done properly, the procedure is painless and the joint has moved past its passive range of motion but not outside its range of anatomical integrity.

#### *Manipulation vs. mobilization:*

Manipulation is a hands-on procedure used to restore normal movement by loosening joints and stretching tight muscles. In some cases, manipulation will restore normal movement by unlocking a joint or by breaking down adhesions. A popping sound often occurs when a spinal joint is stretched a little beyond its normal range of motion. Mobilization can increase the range of motion of the arms, legs, and shoulders, but manipulation may be more effective in relieving pain and restoring normal movement in the spinal joints. (Homola, "What a Rational Chiropractor Can Do For You")

Herzog et al. (*Spine* 26, 2105-2111 (2001)) found that the high force of specific manipulation was quickly spread over a larger contact area. They concluded, "...the beneficial effects of SMTs [spinal manipulation treatments] may be associated with a generalized, nonspecific force in the vicinity of the target point, rather than a well-defined force applied precisely to the target point."

Numerous (100-200) techniques practiced by various chiropractors (Activator, Diversified, Gonsted, Grostic, BEST, Network, NUCA, etc.)

Other treatments include heat therapy, ultrasound, electrical stimulation of muscles, dietary recommendations and vitamin supplements. May include other alternative therapies as well. A 1991 survey of 4800 chiropractors by the National Board of Chiropractic Examiners revealed that 51% of them employed "Activator Methods"; 37% applied kinesiology; 84% nutritional counseling, therapy, or supplements; 66% acupressure or meridian therapy; 37% homeopathy; 12% acupuncture. (Activator Methods and applied kinesiology are discussed below, under "Arguments against chiropractic.")

In a small number of states, chiropractors are allowed to carry out other procedures such as "specialty diagnostic procedures, pelvic and rectal examinations, venipuncture for laboratory diagnosis, signing of birth and death certificates, and acupuncture using needles."  
(<http://www.chiroweb.com/archives/ahcpr/chapter5.htm>)

A 1998 survey found that chiropractors saw an average of 108 patients per week, with the following distribution of conditions: 38% low back pain, 28% neck pain, 14% headache, 14% other neuromusculoskeletal, 6% non-neuromusculoskeletal (gastrointestinal, asthma, hypertension, other).

Recommend frequent checkups, X-rays (though the use of X-rays for diagnosis appears to be declining), maintenance treatments. Some chiropractors claim that nearly all infants have subluxations that must be treated, and that children need regular adjustments to prevent childhood disease.

Some degree of integration with conventional health care. Many orthopedic surgeons refer patients to chiropractors for treatment. Chiropractors are on staffs of some hospitals. Some clinics offer care by both M.D.'s and chiropractors.

#### Arguments in favor of chiropractic

Large number of *satisfied patients*. Seen as *more caring* than medical doctors. Effectiveness of "laying on hands." "...regardless of the objective clinical response, patients consistently express more satisfaction with chiropractic care than with other forms of treatment...They also return more often to chiropractors when their symptoms recur...This phenomenon does not appear to be related to manipulation per se...Rather, it seems to stem from the entire 'chiropractic encounter,' which includes sensitivity to patients as individuals, effective

communication, and a holistic approach to health and disease...Touch, empathy, and the transmission of positive expectations are critical elements..." (Cooper and McKee (2003) *Milbank Quart.* 81, 107-138; citations within the text omitted)

Hertzman-Miller et al. (*Am. J. Public Health* 92, 1628-1633 (2002)), in a study of patient satisfaction, concluded that "Communication of advice and information to patients with low back pain increases their satisfaction with providers and accounts for much of the difference between chiropractic and medical patients' satisfaction."

Patients may be able to get an appointment much more quickly than with a physician.

Acknowledged by scientists to relieve pain and secondary muscle spasms caused by restricted joint mobility. (However, the same can be accomplished by manipulation therapy by non-chiropractors.)

Some *key scientific studies and reports* (1995-present only):

- Carey et al. (*N. Engl. J. Med.* 333, 913-917 (1995)) - acute low back pain; compared primary care practitioners, chiropractors, and orthopedic surgeons. Patient satisfaction highest for chiropractors [see other conclusions below].
- Triano et al. (*Spine* 20, 948-955 (1995)) - chronic low back pain - chiropractic more effective than sham manipulation or back education.
- Bronfort et al. (*J. Manipulative Physiol. Ther.* 19, 570-582 (1996)) - chronic low back pain - chiropractic plus exercise was as effective as NSAID treatment plus exercise.
- Hurwitz et al. (*Spine* 21, 1746-1760 (1996)) reviewed the literature and concluded that "Cervical spine manipulation and mobilization probably provides at least short-term benefits for some patients with neck pain and headaches." (However, they also noted that "Although the complication rate of manipulation is small, the potential for adverse outcomes must be considered because of the possibility of permanent impairment or death.")
- Skargren et al. (*Spine* 23, 1875-1884 (1998)) compared chiropractic and physiotherapy for back pain. "Effectiveness and costs of chiropractic or physiotherapy as primary treatment were similar for the total population, but some differences were seen according to subgroups."
- Wiberg et al. (*J. Manipulative Physiol. Ther.* 22, 517-522 (1999)): spinal manipulation was effective in relieving infantile colic.
- Hsieh et al. (*Spine* 27, 1142-1148 (2002)) - subacute back pain - chiropractic manipulation brought about significant improvement (compared to myofascial therapy) (but these were no more effective than back school).
- Hurwitz et al. (*Spine* 27, 2193-2204 (2002)), in a trial concerning low back pain, concluded that "After 6 months of follow-up, chiropractic care and medical care for low back pain were comparable in their effectiveness."
- Giles and Muller (*Spine* 28, 1490-1503 (2003)) studied medication, acupuncture, and spinal manipulation for chronic spinal pain, and concluded that "manipulation, if not contraindicated, results in greater short-term improvement than acupuncture or medication." (They also noted that "However, the data do not strongly support the use of only manipulation...")
- Cochrane review (2004) found evidence for effectiveness of spinal manipulation for short-term treatment of migraine, short-term treatment of chronic tension-type headache, and short- and long-term treatment of cervicogenic headache (but ineffective when added to massage for episodic tension-type headache).
- A review by Bronfort et al. (*Spine J.* 4, 335-356 (2004)) found some value for spinal manipulation therapy in treatment of low back pain and neck pain.
- Cochrane review for mechanical neck disorders (2004): manipulation and/or mobilization plus exercise was of value.

## Arguments against chiropractic:

### 1. Issues concerning the definition, evidence for, and effects of subluxations

No evidence to support the existence of subluxations. A study on cadavers (Crelin) found that spinal misalignment cannot impinge on nerves. Minor nerve compression should have very little effect on nerve impulse transmission.

Chiropractors cannot define what aspect of nerve impulse is affected by subluxation.

“In fact, there is inadequate basic science data to substantiate the VSC [vertebral subluxation complex], and there are few (if any) randomized, controlled, clinical trials of spinal manipulation that have monitored presumed indicators of the putative VSC. Therefore, it is not appropriate to claim that by manipulating the VSC, a therapeutic benefit in humans or animals can be achieved. Furthermore, even if such lesions could be shown to exist, in the human spine, the commonly used diagnostic measures to detect them are not reproducible or reliable.” (D. Ramey et al., in *Complementary and Alternative Veterinary Medicine Reconsidered*)

Scientifically invalid view of the role of nervous system in all organ function.

Continuing progress in scientific medicine has led to more detailed explanations for the causes of disease, often at the molecular level, but no information emerges linking disease to subluxations.

Not all nerves appear to be within the scope of chiropractic manipulation. Twelve pairs of cranial nerves exit at the base of the skull and do not involve the spine; these are not only involved in the senses of the head, but also go to the neck and many abdominal organs. The five pairs of sacral nerves exit from fused vertebrae in the lower spine; these innervate pelvic organs and parts of the legs. The parasympathetic nervous system requires only the cranial and sacral nerves. Why should manipulation of the 26 pairs of more accessible spinal nerves have such profound effects compared to the other 17 pairs?

If subtle changes in spinal alignment (even caused by mental stress) can have profound health effects, how is it possible for the much larger bends and shocks encountered in everyday life (to say nothing about in athletics such as gymnastics) not to leave us all ill or disabled?

Medically recognized spinal disorders, which are much more severe than those alleged to occur in chiropractic subluxations, do not produce the effects on other parts of the body which are alleged to result from subluxations.

Chiropractors differ among themselves as to which areas of spine are important. Also differ widely in the techniques which they use.

Vertebrae differ considerably in their symmetry and mobility, both within and between individuals; difficult to assess abnormalities or "restricted mobility."

Chiropractors are not trained or permitted to use most sophisticated spinal diagnostic methods. Radiologists find it necessary to inject opaque dyes into the spinal canal in order to visualize changes involved in some serious spinal disorders. However, chiropractors claim to be able to assess much more subtle disorders by X-rays without using such enhancement.

## 2. Comments on back pain studies

Carey et al. study (see above): while satisfaction was highest for chiropractors, recovery was no better than with conventional treatment, and costs were higher than with HMO's or primary care physicians, due to the much larger number of visits per case.

Koes et al. (*Spine* 21, 2060-2073 (1996)) reviewed 36 clinical trials and concluded that "The efficacy of spinal manipulation for patients with acute or chronic low back pain has not been demonstrated with sound randomized clinical trials. There certainly are indications that manipulation might be effective in some subgroups of patients with low back pain." Another study by the same group (Assendelft et al., *J. Manipulative Physiol. Ther.* 19, 499-507 (1996)) concluded that "All RCTs had serious flaws in their design, execution, and reporting."

A more recent review (Assendelft et al., *Ann. Intern. Med.* 138, 871-881 (2003)) concluded that "There is no evidence that spinal manipulative therapy is superior to other standard treatments for patients with acute or chronic low back pain."

Cooper and McKee (*op. cit.*): "While randomized trials might have established once and for all that SMT is effective in the treatment of both acute and chronic low back and neck pain and that it is more effective in treating these disorders than other treatment approaches, the research to date has shown instead that SMT is effective in only a narrow subset of such patients and, in those circumstances, it is no more effective than other treatments."

Cherkin et al. (*New Engl. J. Med.* 339, 1021-1029 (1998)): "For patients with low back pain, the McKenzie method of physical therapy and chiropractic manipulation had similar effects and costs, and patients receiving these treatments had only marginally better outcomes than those receiving the minimal intervention of an educational booklet."

## 3. Chiropractic for conditions other than back pain:

Negative results from studies on problems other than back pain:

- **asthma** in children (Balon et al. (1998) *New Engl. J. Med.* 339, 1013-1020)
- episodic tension-type **headache** (Bove and Nilsson (1998) *JAMA* 280, 1576-1579)
- infantile **colic** (Olafsdottir et al. (2001) *Arch. Dis. Child.* 84, 138-141)
- **scoliosis** (Lantz and Chen (2001) *J. Manipulative. Physiol. Ther.* 24, 385-393)
- **hypertension** (Goertz et al. (2002) *J. Hypertens.* 20, 2063-2068)

Reviews and meta-analyses (bold not in original texts):

- Cochrane review (2002): "there is insufficient evidence to support or refute the use of manual therapy for patients with **asthma**."
- Balon and Mior (*Ann. Allergy Asthma Immunol.* 93(Suppl. 1), S55-S60 (2004)): "There is currently no evidence to support the use of chiropractic SMT as a primary treatment for **asthma** or **allergy**."
- Cochrane review on **carpal tunnel syndrome** (2003): "Trials of...chiropractic care did not demonstrate symptom benefit when compared to placebo or control."
- Canadian Coordinating Office for Health Technology Assessment (2003): "no convincing evidence that spinal manipulation alone can affect the duration of infantile **colic** symptoms."
- Astin and Ernst (*Cephalalgia* 22, 617-623 (2002)): "Despite claims that spinal manipulation is an effective treatment for **headache**, the data available to date do not support such definitive conclusions."
- Cochrane review (2004): spinal manipulation provided no benefit for treatment of **dysmenorrhea**.

Meta-analysis by Ernst (*Fam. Pract.* 17, 554-556 (2000)): "The results available to date suggest that the therapeutic success of spinal manipulation is largely due to a placebo effect."

A Rand Corp. study of manipulation and mobilization of the cervical spine judged that only 11% of indications for manipulation were appropriate, and that there was little evidence of the effectiveness of the procedure.

Pain arising from spinal problems may mimic symptoms of organic disease; "...it is not unreasonable that this somatic visceral-disease mimicry could very well account for the 'cures' of *presumed* organ disease that have been observed over the years in response to various somatic therapies (e.g., spinal manipulation, acupuncture, Rolfing, Qi Gong, etc.) and may represent a common phenomenon that has led to 'holistic' health care claims on the part of such clinical disciplines." (Nansel and Szlazak (1995) *J. Manipulative Physiol. Ther.* 18, 379-397)

Nansel and Szlazak (*ibid*): "At present, we are aware of not a single appropriately controlled study that has convincingly established that spinal manipulation represents a valid curative strategy for the treatment of any true visceral disease, even though scientifically unsubstantiated claims of such therapeutic efficacy continue to be all too prevalent throughout the chiropractic profession."

Nansel and Szlazak (*ibid*): "Indeed, current concepts regarding the physiology (and pathophysiology) of the autonomic nervous system do not support the notion that even sustained, maximal sympathetic activity involving various organs and tissues would create ischemic responses of any real consequence."

Homola (*Scientific Rev. Alternative Med.* 5(1), 45-53 (2001)): "Injury to a spinal nerve may result in some autonomic disturbance in the portion of the skin supplied by the damaged nerve, but visceral functions are protected by a widespread, overlapping nerve supply from a number of sympathetic (autonomic) ganglia located outside the spinal column."

#### 4. Side effects

Spinal manipulations have resulted in fractures, disk ruptures, strokes, even fatalities (though such complications are rare considering the enormous number of treatments). According to *Consumer Reports*, a major company insuring chiropractors paid, in 1990, for 140 claims for strokes caused by spinal manipulation.

A review by Ernst (*J. Pain Symptom Manage.* 21, 238-242 (2001)) concluded that "about half of all patients will experience adverse events after chiropractic SM. These events are usually mild and transient. No reliable data exist about the incidence of serious adverse events" (partly because only patients who return for treatment were questioned, and those experiencing serious complications would be unlikely to do so).

A review (Assendelft et al., *J. Fam. Pract.* 42, 475-480 (1996)) noted that there was a special danger to the cervical arteries during rotation of the head. It was recommended that practitioners employing rotary cervical manipulation be avoided. (However, chiropractors argue that the incidence of serious complication is only one in a million, much less than with drug treatment.) DiFabio (*Phys. Ther.* 79, 50-65 (1999)) reviewed the risks of manipulation of the cervical spine (MCS): "The literature does not demonstrate that the benefits of MCS outweigh the risks."

More recent studies of the incidence of stroke following chiropractic cervical manipulation have ranged from 1.3 per 100,000 visits (Rothwell et al., *Stroke* 32, 1054-1060 (2001)) to 1 in 6 million visits (Haldeman et al., *Can. Med. Assoc. J.* 165, 907-908 (2001)). In the former study, patients under 45 suffering vertebrobasilar accidents were five times more likely than controls to have visited a chiropractor in the preceding week. More recently, a Canadian study found that neck manipulations were responsible for 20% of strokes in patients under 45. A case-controlled study by Smith et al. (*Neurology* 60, 1424-1428 (2003)) concluded that "SMT is

independently associated with vertebral arterial dissection, even after controlling for neck pain.”

Hurwitz et al. (*Spine* 13, 1477-1484 (2005)) found that 30% of patients obtaining chiropractic treatment for neck pain had adverse symptoms as a result. “Given the possible higher risk of adverse reactions and lack of demonstrated effectiveness of manipulation over mobilization, chiropractors should consider a conservative approach for applying manipulation to their patients, especially those with severe neck pain.”

Patient may be delayed in or prevented from obtaining necessary medical care (see Butler, *A Consumer's Guide to "Alternative Medicine,"* pp. 83-4: given symptoms of ulcer and heart condition, chiropractors recommended manipulation rather than referring to physician).

Possibility that repeated forceful thrusts will continue to re-injure affected areas.

There is some concern that while the chiropractic adjustment may offer short-term relief, the repeated movements beyond the normal range of motion may eventually cause tissue damage.

Ernst (*Br. J. Sports Med.* 37, 195-196 (2003)): “Osteoporosis should be regarded as a contraindication for chiropractic spinal manipulation. Yet, in practice, no reliable diagnostic methods are available to chiropractors for identifying osteoporosis, and no threshold values have been determined for people at risk.”

Overuse of X-rays (radiation exposure)

Cost of unnecessary treatments

Psychological: dependence on "maintenance" treatments for continued health

## 5. Aspects of pseudoscience

Theory originated by a layman who engaged in quackery.

"Subluxation" vaguely defined (such that it cannot be measured) and not scientifically established. Definitions keep changing over the years.

Palmer referred to interference with "Innate Intelligence," a nonscientific and nonmeasurable entity.

Reliance on anecdotal claims rather than controlled studies

Promotional material filled with scientifically dubious statements

Remains isolated from the sciences. The concept of subluxations has not led to any advances in scientific knowledge.

No coherent theory of chiropractic has been developed which is modified to incorporate new findings in neurophysiology, endocrinology, and other areas. Rather, the original nonscientific "theory" is left intact, and a variety of scientific concepts are invoked as possible explanations even though the relationships of these to subluxations are dubious.

Flawed logic:

1. If medicine has deficiencies (doesn't know everything; some doctors engage in quackery; some doctors are not well trained in dealing with back problems; drugs, especially NSAIDs, have side effects) then an alternative (chiropractic) is valid.

2. Effects of known lesions and abnormalities of the spinal cord cited as evidence that subluxations could produce similar effects.

Several studies found that chiropractors gave a variety of inconsistent diagnoses (including frequent "short legs") for the same healthy subjects, and some used bizarre diagnostic techniques. Among invalid systems of diagnosis and treatment are: *applied kinesiology*, based on the concept that specific muscle weaknesses correspond to specific organic problems; and *Activator Methods*, in which corrections to spinal problems are made by small blows to the spine or elsewhere using a hand-held, spring-loaded hammer.

Use of other dubious treatments by some chiropractors

Inferior quality of professional training and continuing education compared to physicians

Some chiropractors attempt to undermine drug therapy and other aspects of scientific medicine. "A survey of American chiropractors found that one-third agreed that 'there is no scientific proof that immunization prevents disease; that vaccinations cause more disease than they prevent; and, that contracting an infectious disease is safer than immunization.' Most (81%) felt that immunization should be voluntary, and 46% support an official policy opposing the American Public Health Association's policy promoting immunization." (*NCAHF Newsletter 18(4)*, 3 (July-Aug., 1995), citing a study in *J. Manipulat. Physiol. Therapeut.* 17, 584-590 (1994))

Lee et al. (*Arch. Pediatr. Adolesc. Med.* 154, 401-407 (2000)) surveyed chiropractors in the Boston area, and found that "Seventy percent of the respondents recommended herbs and dietary supplements. For pediatric care, 30% reported actively recommending childhood immunizations; presented with a hypothetical 2-week-old neonate with a fever, 17% would treat the patient themselves rather than immediately refer the patient to a doctor of medicine, doctor of osteopathy, or an emergency facility...Pediatric chiropractic care is often inconsistent with recommended medical guidelines."

Campbell et al. (*Pediatrics* 105(4), e43 (2000)) reviewed chiropractic attitudes toward vaccinations: "...a vocal element of the chiropractic profession maintains a strongly antivaccination bias."

### Other aspects

Chiropractors have been adept at using political power to achieve favorable legislation. (Recent efforts include bills restricting the practice of spinal manipulation to those who have had extensive, specific training, effectively preventing MDs, ODs, and PTs from the method.)

The ACA has sued the Department of Health and Human Services for allowing, under Medicare, MDs and osteopaths to perform spinal manipulation aimed at correcting subluxations.

Successful lawsuit against AMA for restraint of trade, 1987 (*Wilk et al v. AMA et al*). AMA found guilty of anti-trust laws by its ethical prohibition against professional association with nonscientific health care providers. However, the ruling does *not* mean that the AMA or individual physicians cannot speak out against chiropractic. It also did *not* rule that chiropractic was scientifically valid. It agreed that the AMA was motivated by concern for patients, not for monetary gain.

Aggressive marketing, including (in some cases) deceptive and fraudulent practices. Faced with paying off student loans and intense competition, new chiropractic graduates may need to be aggressive in building business. The chiropractic profession has expanded much faster than the demand, and faces increased competition from acupuncture and massage.

Legislation in 1999 and 2000 increased access to chiropractic in the Veterans' Administration system, and directed that chiropractic care be made available to all U.S. military personnel on active duty.

Mainous et al. (*Arch. Fam. Med.* 9, 446-450 (2000)), reporting on a national survey of chiropractors and family physicians, noted that "care is fragmented between chiropractors and the general medical sector, with little information communicated between health care providers on issues with critical importance to quality of care."

**SUMMARY:** Chiropractic appears to be useful for dealing with some types of back pain, but it is not clear whether it is superior to other forms of treatment. It has not been shown to be useful for other conditions. The concept that subluxations are involved in a wide variety of diseases is inconsistent with medical knowledge. To a much greater extent than medical doctors, chiropractors are associated with pseudoscientific techniques and scientifically unsupported methods of treatment.

### ANTIVACCINATION EFFORTS

Some chiropractors and other alternative practitioners discourage the use of vaccines. In recent years many web sites attacking childhood vaccinations have appeared. Two claims are that vaccines are responsible for sudden infant death syndrome (SIDS), and that thimerosal (a mercury-containing preservative, which is being phased out) in vaccines can cause autism. However, recent studies have shown no connection between vaccinations and SIDS or autism. Meanwhile, the incidence of vaccine-preventable diseases is increasing because of parental decisions not to have their children vaccinated.

### OSTEOPATHY

#### Background

Invented by Andrew Taylor Still, a bonesetter, in the 1880's. Based in part on his own self-healing of headaches, etc., through neck manipulation. Established American School of Osteopathy in 1892. There are now 19 schools and 49,000 practitioners, with the number expected to double by 2020. Annual osteopathic graduates increased from 1534 in 1990 to 2628 in 2003.

Practitioners obtain D.O. degree; in general have same privileges as M.D.'s in prescriptions, surgery, etc.

Large growth in recent years. Provide care to 10% of Americans, constitute 20% of family practitioners. May be certified in every specialty. Licensed in all states, recognized by all insurance carriers.

Unlike chiropractic, osteopathy has advanced with advances in medical science. "While retaining a separate identity - in part because it used manipulative therapy and emphasized the muscles and skeletal system - osteopathy gradually adopted the concepts and practices of orthodox medical science as well." (Barrett, *Health Schemes, Scams, and Frauds*, p. 160) Preclinical training is same as medical students except for additional courses on manipulation and other subjects. For residency, many train in conventional medical programs. These programs are increasingly turning to osteopathic graduates to fill positions in primary care residencies.

## Principles of osteopathy

Emphasis on importance in vascular system, particularly arteries, in enhancing the body's functions and natural healing power. Seek to use manipulation to restore homeostasis. (However, Still's original theory was abandoned in 1948.)

"Rule of the artery" - manipulation improves circulation by reducing muscle spasms.

"The osteopathic goal is to prevent disease by identifying structural problems before they become chronically disabling." (Waldron (1997) *Discover*, Jan., 91-93)

While osteopathy takes a largely scientific approach, there does persist among some osteopaths a body of pseudoscientific concepts. Ideas of *craniosacral therapy* (discussed in the handout on holistic methods) are included in a leading osteopathic textbook, *Foundations for Osteopathic Medicine*.

## What special techniques do osteopaths use?

Use of palpation to assess musculoskeletal system and other aspects of physical condition.

In contrast to the "short lever high velocity" manipulations of chiropractors, osteopaths generally use "*long lever low velocity*" manipulations (using the femur, shoulder, head or pelvis to manipulate the spine) or more nonspecific manipulations.

"...we frequently use techniques of manipulation and stretching to help retrain muscles, joints, and connective tissue that have been stressed or damaged." (Waldron, *op. cit.*)

## Research

Andersson et al. (*New Engl. J. Med.* 341, 1426-1431 (1999)) compared osteopathic spinal manipulation with standard medical care for low back pain. "Osteopathic manual care and standard medical care have similar clinical results in patients with subacute low back pain. However, the use of medication is greater with standard care."

Licciardone et al. (*Spine* 28, 1355-1362 (2003)), in a study of chronic low back pain, concluded that "There were no significant benefits with osteopathic manipulative treatment, as compared with sham manipulations."

A study by Mills et al. (*Arch. Pediatr. Adolesc. Med.* 157, 861-866 (2003)) indicated a benefit of osteopathic manipulative treatment as an adjuvant therapy in children with recurrent acute otitis media. However, the parents were not blinded as to the treatment.

## Other aspects

Because of their emphasis on the whole body, in contrast to increasing specialization within the medical profession, osteopaths may be more likely than M.D.'s to choose more general areas such as family practice.

"Back door phenomenon" - many applicants to osteopathic schools may be ones not accepted to conventional medical schools, rather than being inclined toward the osteopathic approach.

The Pikeville College of Osteopathic Medicine was established in 1997, with the aim of increasing primary

care providers in eastern Kentucky.

Osteopaths have suffered from public misconceptions that their practice is limited to bone and muscle disorders, and that their training is inferior to that of M.D.'s. "They were physicians and surgeons, yet many confused them with chiropractors." (Gevitz, in *Other Healers*, p. 146)

Johnson et al. (*Acad. Med.* 76, 821-828 (2001)) surveyed osteopaths, and found that over 50% used osteopathic manipulative treatment (OMT) on less than 5% of their patients, and about one fourth did not use it at all. They concluded that "The evidence supports the assertion that OMT is becoming a lost art among osteopathic practitioners."

## MASSAGE

Various types of massage therapy range from standard treatments of conventional medicine and physical therapy, to bizarre and pseudoscientific approaches. We will also discuss massage in other areas, such as mind-body medicine (relaxation, stress relief); and in holistic approaches (bodywork, reflexology).

A survey found that 17% of adults had received a massage within the previous year, doubling the number from 1997. 35% of the treatments were for medical reasons.

There are 950 state-licensed massage schools, with 30,000 graduates annually. Instruction and certification exams may require "knowledge" of pseudoscientific concepts (such as from traditional Chinese medicine).

In a review of chiropractic, Cooper and McKee (*op. cit.*) noted that the form of manual treatment "that is most similar to chiropractic SMT in terms of both symptom control and cost is that provided by massage therapists..., who currently outnumber chiropractors by more than three to one and who are growing in both numbers and market share at more than five times their rate..." (references in text deleted). (In turn, more chiropractors are offering massage, either performing it themselves or including a massage therapist in their practice.)

Not covered by most health insurance plans. Some coverage if prescribed as part of physical therapy.

Therapists are licensed in many states, including Kentucky as of 2003.

In general, massage is suggested to produce relaxation, reduce stress, improve circulation, and help eliminate "toxins." Claims range from fairly reasonable (relief of muscle spasms, improved healing of injuries) to scientifically unlikely (improvement in organ function, fat reduction, better eyesight, reversal of balding).

Shoemaker et al. (*Med. Sci. Sports Exerc.* 29, 610-614 (1997)): massage does not increase blood flow to muscles. In another study, Hinds et al. (*Med. Sci. Sports Exerc.* 36, 1308-1313 (2004)) found no increase in arterial blood flow, and concluded that without such an increase, "any increase in SKBF [skin blood flow] is potentially diverting flow away from recovering muscle. Such a response would question the efficacy of massage as an aid to recovery in postexercise settings."

A trial by Cherkin et al. (*Arch. Intern. Med.* 161, 1081-1088 (2001)) concluded that "Therapeutic massage was effective for low back pain, apparently providing long-lasting benefits." A review that included three clinical trials also concluded that massage was useful for back pain (Cherkin et al. (2003) *Ann. Intern. Med.* 138, 871-881). An editorial by Ernst (*BMJ* 326, 562-563 (2003)) noted that "the evidence for massage as a symptomatic relief of back pain is encouraging but not compelling."

A study of massage for chronic tension headaches (Quinn et al. (2002) *Am. J. Public Health* 92, 1657-1661) was supportive.

Corbin (*Cancer Control* 12, 158-163 (2005)) wrote, "...the strongest evidence for the ability of massage therapy to decrease anxiety and distress is found in trials involving cancer patients. The ability of massage to decrease pain is likely, but the number of patients studied is small. The efficacy of massage on other symptoms associated with cancer as well as on the number of medications used for symptom control also warrants more study." A study by Cassileth and Vickers (*J. Pain Symptom Manage.* 28, 244-249 (2004)) found that "massage therapy is associated with substantive improvement in cancer patients' symptom scores."

A study of massage and stress (Hanley et al. (2003) *Br. J. Gen. Pract.* 53, 20-25) found no benefit compared to relaxation tapes.

Ernst (*op cit.*) discussed the risks of massage: "Too much force can cause fractures of osteoporotic bones; and even rupture of the liver and damage to nerves have been associated with massage. These events are rarities and massage is relatively safe, provided that well trained therapists observe the contraindications: phlebitis, deep vein thrombosis, burns, skin infections, eczema, open wounds, bone fractures, and advanced osteoporosis."

According to Corbin (*op cit.*), "There has been no evidence that massage therapy can spread cancer, although direct pressure over a tumor is usually discouraged."

A therapist writing on the Healthfraud e-mail discussion list noted that ordinary massage is physically demanding, and a therapist can only perform a limited number per work day. However, addition of techniques such as reiki, which require little physical effort, allows a therapist to greatly increase his or her income.