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CHAPTER 1

History of the Grostic/ Orthospinology Procedure

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LEARNING OBJECTIVES

After studying this chapter, the reader should develop a better understanding of the history and development of the Grostic/orthospinology procedure as it relates to the following:

- Prechiropractic history of spinal manipulation
- Events in the life of D. D. Palmer before his discovery of chiropractic
- D. D. Palmer's discovery of chiropractic and establishment of chiropractic education
- Dr. B. J. Palmer's contributions as the *developer of chiropractic* and leader of the Palmer School of Chiropractic
- Dr. B. J. Palmer's development of the hole-in-one (HIO) technique and establishment of the Palmer Research Clinic
- Events that led John Francis Grostic to enter chiropractic school
- Dr. Grostic's initial research and chiropractic involvement before teaching seminars
- Development and teaching of what eventually became known as the Grostic procedure
- Involvement of various doctors in the advancement of the work and of the chiropractic profession
- Death of Dr. John F. Grostic and the development of Grostic Chiropractic Presentations, Inc. and the Society of Chiropractic Orthospinology, Inc.
- Development of National Upper Cervical Chiropractic Association, Inc. (NUCCA), Atlas Orthogonality (AO), and the Academy of Upper Cervical Chiropractic Organizations (AUCCO)
- Contributions of Dr. John D. Grostic

This chapter reviews the history of the chiropractic profession and the development of the Grostic procedure, as well as the eventual establishment of the Society of Chiropractic Orthospinology, Inc. It includes the origin of the ideas and principles from Drs. D. D. and B. J. Palmer. Chapter 1 also discusses the revolutionary advances by Dr. John F. Grostic to upper cervical chiropractic care in detecting, quantifying, and correcting the upper cervical subluxation complex. All of these events have led to what is known as orthospinology and orthogonally based upper cervical care.

HISTORY OF SPINAL MANIPULATION

Spinal manipulation is one of the oldest and most widely practiced of all health-care methods. Early societies—such as the ancient Chinese, Egyptian, Indian, Japanese, Polynesian, Tibetan, and various indigenous tribes—have been practicing manipulation for hundreds of thousands of years. Manipulations have been depicted in European cave paintings during the Paleolithic period. Hippocrates (460–377 B.C.), recognized as the "father of medicine," counseled his followers to "Get knowledge of the spine, for this is the requisite for many diseases." He practiced and taught spinal manipulation as a means of reducing spinal distortion. In *Corpus Hippocraticum*, he described how assistants could aid the doctor by providing spinal traction to the patient. The doctor could then administer a directional force into the "spinal hump" with either a manual thrust or pressure, or by means of a board acting as a lever.[1–3] He devised two apparatuses, known as the Hippocratic ladder and the Hippocratic board, to reduce displaced vertebrae. Hippocrates also observed the relationship between spinal distortion and various forms of organ system dysfunction. For example, he says, "Cases when the (spinal) curvature is below the diaphragm are

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sometimes complicated with affectations of the kidneys and parts about the bladder . . ."[4]

Galen (130–200 A.D.), known as the "prince of physicians," also understood the relationship between the spinal vertebrae and the nervous system. He was thought to be the first to formulate the concept of the central nervous system, as well as the first to differentiate between nerves, tendons, and ligaments.[5] He also successfully treated a prominent Roman scholar who was suffering from paralysis of the right hand with cervical manipulation.[6]

Captain James Cook is best known for his voyages in the Pacific Ocean and his discovery of the Hawaiian Islands; however, he was also known to suffer from crippling rheumatism. Cook reached Tahiti in 1777, and a local chief brought 12 large women to his aid. They had the captain lay on a mattress, and blankets that were placed on the floor. The treatment of Cook is described as follows:

> The twelve giantesses immediately fell upon him pummeling and squeezing unmercifully with their plump, lively hands, until his joints cracked and all his flesh felt like misused blubber. After fifteen minutes of this, the released victim got up. To his astonishment he felt immediate relief. "More?" asked the ladies, smiling. "Indeed." Agreed the captain. Three more treatments ended his pain.[7]

Schiotz[2] describes a witchcraft trial in Norway that took place in 1662. The accused explained her method for treating low back pain since she was a young child. She had previously trodden on the backs of sufferers from rheumatism, but now she felt that it could be done better with her hands. Spinal manipulation was practiced by "bonesetters" during the Middle Ages and the Renaissance. Practitioners typically learned the skill through apprenticeship, which was usually handed down from generation to generation. This art was predominantly practiced in most communities in Europe, North Africa, and Asia, and it is still practiced today to some extent.

Spinal Irritation

In 1828, Thomas Brown coined the term *spinal irritation* in the *Glasgow Medical Journal*[3] for ailments originating from the spine. J. Evans Riadore, author of *Irritation of the Spinal Nerves* (1843), is quoted as saying, "if any organ is deficiently supplied with nervous energy or of blood, its functions immediately, and sooner or later its structure, become deranged."[8] He advocated the use of manipulation to reduce irritation of nerve roots, as evidenced by his statement:

> The cause is never suspected to be in the spine, and the latter is never examined; the subluxated vertebra is never replaced in its original linear direction though easily effected in the first instance, and in all cases may in time be insured and quickly to a degree sufficiently to prevent the spinal cord or a nerve to be unduly pressed at its exit, to cause constitutional or local irritation in some organ to which the irritate nerves are distributed.[9]

Spinal irritation was eventually replaced with the term *neurasthenia,* although this original concept would be combined with the bonesetter's subluxation terminology in the development of chiropractic.[10] The clinical success of bonesetters helped to rekindle interest in spinal manipulation in Europe during the 19th century. This dynamic type of care was attractive to some medical doctors because they were able to have a more active role. These sentiments are summed up in Dailly's introduction to his article on *manipulations thérapeutiques:*

> Therapeutic manipulations are of value in the treatment of organic systems, and indications for their use can be found in almost all chronic illnesses. They are an important part of the system of functional therapy, where the aim is to restore correct function to the affected part, which enables normal physiological processes to be resumed, and the normal form and composition of the tissues to be restored. . . . For although manipulation has always given excellent results in the treatment of disease, it is only very recently that science has been able to explain its effects, take possession of its techniques, and provide a theory and method for its use.[11]

Dailly goes on to say,

> Mellet, Bouvier and Werner say that where the deviation is not very advanced a degree of correction can be obtained by grasping the spinous processes with the fingers; Werner attached considerable importance to this procedure which, if frequently repeated with the patient lying prone in a suitable position can momentarily straighten a spine that is still very flexible, and help to prevent deviations which, if they are not corrected, can lead to changes of shape, consistency and length in the intervertebral discs and in the spinous ligaments.[11]

Nineteenth-Century Medical Care

Medical care and education left much to be desired in the 19th century and up to the publication of the Flexner Report of 1910. A wide variety of practitioners with conflicting theories on health were available to the public by the late 1800s (see Table 1-1). In the 19th century, orthodox medical physicians were commonly referred to as regulars, whereas nonmedical doctors were known as irregulars.[10] A widely adopted school of thought among regulars of the time was that of heroic medicine. This philosophy held that the harshness of a remedy should be proportional to the severity of the patient's illness. Indeed, the sickest patients received the strongest doses of medicines, often with deleterious results.

Medical doctors used a smorgasbord of drugs and treatments in the 1800s (see Table 1-2). Cocaine was

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TABLE 1-1

Various Health Care Options Available for Americans in the 19th Century

Bonesetting	Homeopathy
Chiropractic	Magnetic healing
Christian science	Native American remedies
Eclectic medicine	Naturopathy
Electromedicine	Osteopathy
Folk medicine	Patent medicines
Herbalism	Phrenology
Heroic medicine	Thomsonianism

TABLE 1-2

Popular Drugs and Treatments Used by Medical Doctors in the 19th Century

Baths	Exercise
Bed rest	Fumigations
Blistering	Massage
Bloodletting	Mercurial preparations
Cathartics	Mineral/plant-derived drugs
Counterirritation	Opiates
Cupping	Purges
Diet	Scarification
Emetics	Sweating

[??48] Adapted from Lyons AS, Petrucelli RJ. *Medicine: An Illustrated History*. New York: Abradale Press, Harry N. Abrams, Inc.,
[??49] Publishers, 1987.

used in the late 19th century for its medicinal properties. William Halsted investigated the use of this drug as an anesthetic by injecting it into the nerve trunks to block pain.[12] In 1898, cocaine was the first drug injected into the spinal cord to produce anesthesia.[13] Heroic medicine was on the decline by 1850, although it was used to some extent through the rest of the century.[14,15]

OSTEOPATHY

Andrew Taylor Still (1828–1917)—and later D. D. Palmer—was way ahead of his time when one considers the medical treatment for spinal irritation during the late 19th century. Medical treatment included cauterization and the application of leeches to the tender dorsal region.[3] Still was motivated by the loss of four of his children to infectious diseases in February 1864. Three
[??1] children (ages 11, 12, and 9) died rapidly over 3 days from a spinal meningitis epidemic, and his year-old daughter died of pneumonia later that same month.[16] Still's helplessness during these devastating illnesses and frustration by what he felt was the indiscriminate use of drugs by medical doctors drove him toward discovering what would later be known as osteopathy. In his research during the 10 years after the death of his children, he began to observe patterns of spinal reflexes that correlated with specific illnesses. He noted that there were predictable changes in skin temperature that went along with certain diseases and that applying deep pressure to the spinal reflexes shortened the course of an infection.[17] Still surmised that muscle contraction and obstruction of nerve and blood circulation to and from the brain was the cause that produced ill health in patients.

Still, a medical doctor, became convinced that optimum function was greatly influenced by the body's structural integrity. He focused on spinal manipulation to treat the "osteopathic lesion" to relieve mechanical pressure on blood vessels and nerves. Still opened a school of osteopathy at Kirksville, Missouri, in 1892 to teach his new health-care discipline. However, by 1968, the American Medical Association began the amalgamation of medicine and osteopathy that eventually lead to osteopathic physicians receiving a full license to practice medicine in most American states.[2] As a result, most osteopaths have opted to practice medicine and no longer use manipulation in their clinical practices.

DANIEL DAVID PALMER

Daniel David Palmer was born March 7, 1845, to Thomas and Catherine McVay Palmer near Port Perry, Ontario, just outside of what is now Toronto. D. D. Palmer lived in Canada until moving to the United States when he was 20 years old. At the age of 21, he became the schoolmaster of a one-room schoolhouse in Muscatine County, Iowa. He remained a teacher for 6 years, and during this time married his first wife, Abba Lord, in 1871. Palmer thought it was time to move on to a more profitable occupation because teachers of that time were paid about the equivalent of a skilled farmhand. The newlywed couple purchased 10 acres of land located in Eliza Township, Mercer County, Illinois. D. D. cultivated more than 30 varieties of fruit trees and a wide variety of evergreens not indigenous to the region.[6] He was also involved with cultivating bees for honey, which proved to be quite lucrative at times, with earnings of up to $5,000 per year at its peak.[5] However, after about 18 months of farming, the marriage ended in divorce.

Six months later, D. D. Palmer married Louvenia Landers, who had an infant son (Frank) from a previous marriage. The Palmers had two daughters (May and Jessie) and one son (Joshua Bartlett). Joshua was born in What Cheer, Iowa, in 1882, and became known as Bartlett Joshua or B. J. The family settled in What Cheer

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[??45] **FIGURE 1-1** Dr. D. D. Palmer, the founder of chiropractic. His new form of health care was based on current scientific knowledge but was influenced by spiritualistic and vitalistic beliefs as well. (From Leach RA. *The Chiropractic Theories.* 4th edi. Baltimore: Lippincott Williams & Wilkins, 2004:14.)

after the beekeeping venture failed and D. D. had sold his orchard. He opened up a grocery store and taught part-time at the nearby community of Letts. Tragedy struck in 1884 when Louvenia died, leaving D. D. with three children to raise, a business to run, and teaching duties to uphold. Six months later at age 40, Palmer married 26-year-old Martha Henning.[6]

D. D. Palmer the Healer

[??2] Palmer was a perpetually curious man with a voracious appetite for books (Fig. 1-1). His personal library what thought to encompass much of what was required reading for medical students at the University of Iowa, as well as books on spiritualism, theosophy, and various alternative health-care methods. His future writings would demonstrate that very few medical practitioners of his time in America could claim to be as well read or have as much knowledge of the medical literature.[18] D. D. was also known to be a deeply religious man who read the Bible frequently, so it is interesting to see how he became intrigued with spiritualism during this time. Spiritualism was an offshoot of Christianity that taught that as the body dies, the spirit lives on and is able to be contacted through mediums at sittings. This was particularly appealing to people in the late 1800s, as many yearned to make contact with loved ones lost during the Civil War and other tragedies.

It is thought that Palmer's study of this religious sect eventually led him to study magnetic healing, which originated from the work of Anton Mesmer, M.D. (1734–1815) in the late 18th century. Mesmer believed that there was a fluid or force that filled the universe but was concentrated in the nervous system of animals (animal magnetism) and magnets. His 1776 doctoral dissertation was titled "On the influence of the planets upon the human body by means of a magnetic force." Mesmer's method of treatment included laying on of hands over various aspects of the patient's body and the use of magnetic iron rods to increase what he felt was the vital forces that were depleted in sick patients.[10,19]

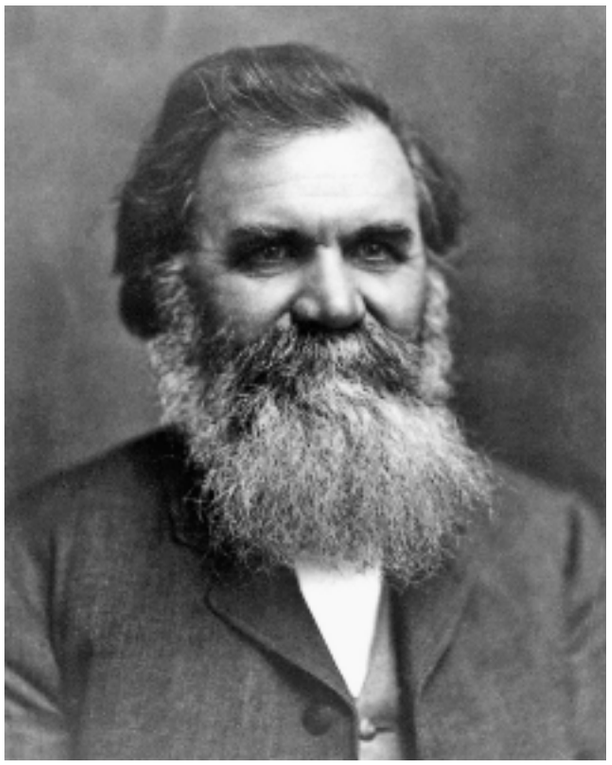

FIGURE 1-2 The Ryan Building (by Paul Norton), where D. D. Palmer practiced magnetic healing and developed his theory of chiropractic.

Charles Poysen introduced magnetic healing to the United States in the late 1830s. D. D. Palmer became intrigued with this form of healing, particularly after studying the work of Paul Caster. Caster was a well-known magnetic healer who practiced in Ottumwa, Iowa, which was close to Letts. In 1886, Palmer decided to open up a magnetic healing practice called "D. D. Palmer, Vital Healer" in Burlington, Iowa. The next year, the 42-year-old Palmer moved to Davenport, Iowa, and opened his practice in the Ryan Block Building (Fig. 1-2). By 1888, his practice was flourishing, and he was able to lease additional rooms in the building. That same year he married his fourth wife, Villa Amanda Thomas. She helped manage his practice and assisted patients who required overnight care and accommodations.[6]

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FIGURE 1-3 Harvey Lillard.

D. D. Palmer: The Discoverer of Chiropractic

Harvey Lillard (Fig. 1-3) had previously been under Palmer's care for magnetic healing. D. D. had noticed a "peculiar bump" on his upper back after a series of magnetic healing passes with his hands over Lillard's spine. Palmer tried to reduce the spinal distortion over a period of time with no success until he used a specific force that enabled the vertebra to slip into place. Palmer described the following event that took place on September 18, 1895:

> Harvey Lillard, a janitor in the Ryan Block, where I had my office, had been so deaf for 17 years that he could not hear the racket of a wagon on the street or the ticking of a watch. I made inquiry as to the cause of his deafness and was informed that when he was exerting himself in a cramped, stooping position, he felt something give in his back and immediately became deaf. An examination showed a vertebra racked from its normal position. I reasoned that if that vertebra was replaced, the man's hearing should be restored. With this object in view, a half-hour talk persuaded Mr. Lillard to allow me to replace it. I racked it into position by using the spinous process as a lever and soon the man could hear as before. There was nothing "accidental" about this, as it was accomplished with an object in view, and the result expected was obtained. There was nothing "crude" about this adjustment; it was specific, so much so that no Chiropractor has equaled it.[20]

This spinal adjustment caused what appeared to be an astonishing change in the patient's ability to hear. After a couple of minutes, Lillard was able to hear the ticking of a watch that was held a foot and a half from his ear with the other ear covered. However, there has been some contention in reference to the exact spinal level that was adjusted. B. J. Palmer and other sources state that the upper cervical spine was adjusted.[10]

FIGURE 1-4 Dr. D. D. Palmer demonstrating an adjustment.

Palmer's next patient to receive a spinal adjustment was suffering from heart trouble, and a successful outcome was also achieved. D. D. felt that he was making a profound breakthrough in health care, and he was determined to keep it a secret. The treatment of his patients was conducted in dimly lit rooms with drapes covering the windows. He also developed other ways to prevent patients or possible observers from determining what he was actually doing with his palpation and adjustments (Fig. 1-4).

Soon after his discovery, D. D. Palmer sought to name his new health-care science. Reverend Samuel Weed was a patient and friend of Palmer, and he provided a few names for the new method of treatment. D. D. chose the word *chiropractic* from the Greek *cheir*, which means "hand," and *praktos*, which means "done." This new name was coined on January 14, 1896. Palmer's practice continued to flourish. One account tells of 91 patients being seated in his reception room waiting for the 1:00 P.M. treatment session to begin (he did not practice in the morning). He charged $10 for a week of treatment, and $5 per week for continued treatment, if necessary.[6] D. D.'s chiropractic practice was very successful, with an income of more than $9,200 in 1898—this is at a time when medical doctors were making between $1,000 and $1,500 annually.[21]

The Spinal Adjustment

D. D. Palmer readily acknowledged that spinal manipulation had existed for thousands of years. His contribution

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was the specific spinal adjustment and later the development of a profession and its clinical philosophy. He described the administration of the adjustment this way:

> The basic principle, and the principles of Chiropractic which have been developed from it, are not new. They are as old as the vertebrata. I have, both in print and by word of mouth repeatedly stated, and now most emphatically repeat the statement, that I am not the first person to replace subluxated vertebrae, for this art has been practiced for thousands of years. I do claim, however, to be the first to replace displaced vertebrae by using the spinous and transverse processes as levers wherewith to rack subluxated vertebrae into normal position, and from this basic fact, to create a science which is destined to revolutionize the theory and practice of the healing art.[20]

Palmer's claim of being the first to adjust misaligned vertebrae by using the spinous and transverse processes as levers may be open for debate. Dechambre's 1887 *Dictionary* made a similar claim (see [??3] page xxx), and it is unknown if D. D. was aware of this statement. It should be known that the word *rack* means, among other things, a toothed wheel or notched rail. Palmer was describing the adjustment of the vertebrae as getting the wheels of a watch or gears of a machine to mesh together. This describes a precise corrective procedure as opposed to a nonspecific manipulation used to treat restricted joints. D. D. also had a significant appreciation for the importance of the top portion of the spine:

> The more I practice chiropractic, the more I study, the more I know about and think about this subject, the more I become convinced that if you will give me the 5 upper dorsals and the cervicals, you can do what you please with the rest of the body and I will bring the fellow through without them.[20]

Chiropractic Philosophy

Dr. A. T. Still shared D. D. Palmer's background interest with spiritualism and magnetic healing. D. D. Palmer was likely influenced by his experience as a magnetic healer when he developed his theories related to chiropractic care. Magnetic healers believed that the unimpeded flow of energy contributed to health, whereas obstructed flow resulted in disease. D. D. Palmer merely directed these theories to the nervous system and toward concepts like innate intelligence, which referred to the body's inherent healing ability. D. D. claimed that the nervous system was the pathway through which innate intelligence flowed and functioned. His philosophy stated that all life contains innate intelligence and that this force is responsible for the organization and maintenance of bodily health. The purpose of chiropractic care was to remove interference to the nervous system (caused by subluxations) by way of vertebral adustments. It was proposed that this enabled innate intelligence to function at optimal capacity by way of the nervous system to enhance healing. Mainstream chiropractors view innate intelligence as the body's intrinsic healing ability as opposed to a spiritual life force.

It appears that he adopted the theory of magnetism and combined it with the bonesetter's concept of subluxation. This resulted in a form of health care that proposed that misaligned vertebra(e) impinge the flow of innate intelligence and cause illness, or what B. J. Palmer later referred to as *dis-ease.* D. D. also hypothesized that disease had three general causes: mechanical, chemical, and autosuggestion (psychic irritation) of the nervous system. He further theorized that the nervous system should have a normal or optimal tone, and any alteration in this tone could be a cause of disease or illness.[22] One of D.D. Palmer's earlier theories was that inflammation was at the core of most human illness.[23] This is consistent with current medical thinking with respect to many diseases.

Chiropractic Education

The state of health-care education in North America was deplorable during the time that D. D. Palmer was a practicing magnetic healer and through his development of chiropractic as a profession. The Carnegie Foundation's Flexner Report[24] of 1910 highlighted the fact that there were too many medical schools with substandard curricula that required meager prerequisites for admission. At the time of the report, out of 155 medical schools in the United States and Canada, only 16 required 2 or more years of college education for entrance. The Midwest was particularly known for medical schools with low standards, and many were essentially little more than "diploma mills."

It was in this setting that D. D. Palmer decided to educate others about his health-care discovery. He was further motivated after being involved in an accident at Clinton Junction, Illinois, that almost took his life. Palmer feared that his discovery of chiropractic might die with him. As a result, he began to teach. His first student was LeRoy Baker, although he did not complete the course of study. His first official student was William A. Seeley in January 1898.[6] The Palmer School and [??4] Infirmary of Chiropractic was located at the corner of Second and Brady Street in Davenport, Iowa. The 6-month program cost $500 and taught students how to adjust all the articulations of the body, with a particular emphasis on the spine.[25] Students were also instructed how to correct chemical imbalances and adverse mental thoughts.[22] It is interesting to note that the first 12 students to graduate from the Palmer school were medical doctors and osteopaths. In 1899, Palmer explained his new profession in his journal, titled *The Chiropractic*.

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It is a scientific method of treating diseases. It is a new and radical departure from all other known methods. Chiropractic healing uses no drugs or chemicals, no surgical operations. . . .

Chiropractic healers need knowledge of the anatomical construction of the human body and the physiological laws governing the distributing of its vital fluids and forces. Chiropractic healing simplifies the treatment of the most painful and prostrating forms of diseases. The human body is a very sensitive and delicately constructed piece of machinery. As the good book says: "We are fearfully and wonderfully made." There are numerous accidents which are liable to injure and misplace the various parts of this highly sensitive nervous system.[6]

B. J. Palmer Becomes a Chiropractor

Four students graduated as Doctors of Chiropractic on January 6, 1902. One of these doctors was D. D.'s son, Bartlett Joshua. B. J. had previously worked as a sales clerk at St. Onge's Department Store, which was located on the ground floor of the Ryan Block Building. He had also practiced chiropractic before receiving degrees in the states of Iowa, Michigan, and West Virginia. Upon graduation, B. J. Palmer practiced in his father's school and infirmary. However, on April 16, 1902, B. J. was indicted for making claims to the public to cure and heal without having a medical license.[6]

During the period of B. J.'s legal battle, D. D. surprisingly packed up all of his belongings and left Iowa. He may have feared a similar legal maneuver against him, although he did receive an urgent message from the family of Dr. Tom Storey. They were requesting help to find. Storey, who had disappeared suddenly. Storey had been one of Palmer's early graduates. D. D. eventually found him in California. Palmer decided to stay in California and founded a chiropractic school in Santa Barbara. Dr. Oakley Smith (eventual founder of naprapathy) and Dr. Minora Paxson (the first female chiropractor) joined D. D. as the school's faculty. B. J. was young and inexperienced but had to take over the chiropractic school until D. D. returned to Davenport in late 1903. The father and son formed an equal partnership with the school, which lasted until May 1906.[6]

The Palmer Infirmary moved to 828 Brady Street in 1905. In October of that year, D. D. was indicted for practicing medicine without a license. This year proved to be very tragic for D. D. as his wife, Villa, died suddenly in November from an overdose of morphine. During an illness before her marriage to D. D., she had been treated with opiate drugs. As a result, she became addicted to cocaine. This was not a rare occurrence at the time because cocaine was not an illegal drug. Villa also previously sustained a fracture of the spine as the result of an accident, which caused her to take morphine for the pain.[5,6]

FIGURE 1-5 D. D. Palmer, B. J. Palmer, Mabel Heath Palmer, and early graduates in 1906.

During this time, two rival chiropractic schools had opened in nearby towns. Three former Palmer graduates—Dr. Solon Langworthy, Dr. Oakley Smith, and Dr. Minora Paxson—started the American School of Chiropractic and Natural Cure in Cedar Rapids, Iowa. The other school, Parker School of Chiropractic, opened in Ottumwa, Iowa. Langworthy, Smith, and Paxson were the first to publish a chiropractic textbook, *Modernized Chiropractic*.[26] This book was published several weeks before B. J. Palmer's *The Science of Chiropractic*,[27] although this has been contested by Palmer. Langworthy was the first in the profession to use the term *subluxation* and emphasize the importance of the intervertebral foramen.

On May 30, 1904, B. J Palmer married Mabel Heath. Mabel obtained her chiropractic degree in 1905 and eventually became known as the first lady of chiropractic. She also became a recognized authority on anatomy and was a professor at the Palmer School of Chiropractic (Fig. 1-5). D. D. Palmer married his fifth wife, Mary Hudler, in January 1906, and his grandson (David Daniel) was born to B. J. and Mabel Palmer that same year. This promising year was tainted, thought, because of the previous legal indictment still hanging over D. D.'s head. His trial began March 27, 1906. Willard Carver was retained as D. D.'s attorney at the urging of B. J. At the time, Carver was finishing up school at the Parker School of Chiropractic. The attorney made several suggestions to the Palmer family to help his defense, including hiring a medical doctor to manage the school's business affairs and edit publications sent out from the Palmer School. Carver also recommended that the school and its contents be transferred to B. J. Palmer's wife, Mabel Heath. He even made an attempt to meet with the governor of Iowa to arrange a pardon for D. D., but this was apparently unsuccessful.[6]

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Statements that D. D. had made in print were used against him, and he was convicted and fined $350. Before receiving his sentence, Palmer launched into a dramatic speech about the discovery and merits of chiropractic, as well as how these laws were made for the benefit of medical doctors and not the public. In fact, if he had begun his career as a magnetic healer in 1881, as opposed to 1886, he would have been grandfathered in and had the legal right to practice. D. D. chose to serve out his prison sentence instead of paying his fine. He was allowed to bring his typewriter, and he produced 40 column inches of newspaper copy related to chiropractic topics. However, he eventually grew tired of his prison cell, and his wife paid his fine so he could be released. He returned to teach at the chiropractic school for a few days and then sold his half of the institution for $2,196.79, although he had originally asked for $3,500. D. D. then moved to Medford, Oklahoma, where he opened a successful grocery store.[6]

[??5]

D. D.'s Departure from Davenport

In 1906, Dr. Willard Carver (1866–1943) and Dr. L. L. Denny opened a chiropractic school in Oklahoma City. Carver (Fig. 1-6) was the first to develop a structural approach to chiropractic technique that he named *relatology*. He looked at the spine as a weight-bearing, gravity-resisting structure that tended to adapt to different stresses placed on it, which led to subluxations. Carver's approach was based on the laws of mechanical engineering, and his postural/regional approach contrasted with Palmer's segmental views of the subluxation.[19] His seminal textbook, *Carver's Chiropractic Analysis*,[28] was published in 1921. Carver favored a physiological theory of nerve function as opposed to the concept of innate intelligence.[10] The Carver-Denny school was the first institution to introduce minor surgery to chiropractic education, and the curriculum was increased from 9 months to 3 years. After Carver's death, the school was absorbed by Logan College of Chiropractic.

Because Medford was located close to Oklahoma City, D. D. was invited to come lecture at the chiropractic college. But Palmer eventually decided to open his own school with Dr. Alva Gregory, a recent graduate of the Carver-Denny school. Gregory was a medical doctor who believed that restoring normal motion to the vertebral segments restored normal function. This is in contrast to Palmer's original theory that restoring spinal alignment restored normal function. The Palmer-Gregory affiliation only lasted 3 months, so Palmer decided to open the D. D. Palmer School of Chiropractic (PSC) in Oklahoma City. He published the first issue of the *Chiropractic Adjustor* in October 1908. The publication included the following famous quote by D. D.: "The most WONDERFUL study of mankind is man. Relieving human suffering and diffusing universal knowledge is humanitarian."[6]

FIGURE 1-6 Dr. Willard Carver was a lawyer and a chiropractor who was known as the constructor of chiropractic. His lectures and books added a scientific dimension to the profession, and he was influential with adjusting techniques as well. Carver established four separate schools of chiropractic in Oklahoma, Colorado, New York, and Washington, DC. (From Leach RA. *The Chiropractic Theories.* 4th ed. Baltimore: Lippincott Williams & Wilkins, 2004:20.)

The Oklahoma school venture was short-lived as D. D. Palmer moved to Portland, Oregon, in November 1908. He started the D. D. Palmer College of Chiropractic with Dr. Leroy Gordon. The school was initially located in the Oregonian Building but was moved to the fourth floor of the Drexel Building at Southwest Second Avenue and Yamhill. Palmer originally developed an 18-month curriculum that included dissection, minor surgery, and obstetrics. The annual tuition was $250. Once again, the restless D. D. left the school in 1910 and settled in southern California in the spring of 1911. He continued to write and lecture extensively, particularly after the

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[??46] **FIGURE 1-7** Three generations of Palmers taken in Davenport in the summer of 1913.

FIGURE 1-8 The 1913 Palmer Lyceum parade in which the "patricide controversy" began. Marchers can be seen from the PSC student body with flags representing various countries (i.e., Denmark, Norway, Great Britain, Sweden, United States, and possibly France).

publication of his book, *Text-Book of the Science, Art and Philosophy of Chiropractic* (also known as *The Chiropractor's Adjustor*).[20] D. D. also taught at the Ratledge College of Chiropractic, which was located in Los Angeles.[6]

Patricide Controversy

D. D. Palmer never fully reconciled with B. J., and he appeared to be increasingly resentful of his son's accomplishments. This was evident in his public lectures (which appeared to become more erratic since striking his head while he confined in the Scott County jail in 1906 for practicing medicine without a license).[29] D. D. Palmer aligned himself with the Universal Chiropractic College and its president, Dr. Joy Loban. D. D. gave lectures from this rival college as "Old Dad Chiro." Students from PSC also attended these lectures, although many walked out in disgust after D. D. launched personal attacks on B. J.[30] However, D. D. accepted an invitation to visit the PSC campus and B. J.'s home. It had been speculated that an attempt at reconciliation was made given that he posed for a photograph that included three generations of the Palmers (Fig. 1-7).[29]

D. D. Palmer's last trip to Davenport in the summer of 1913 will be remembered as a bizarre series of events. He was invited to take part in the annual lyceum that was taking place in Davenport. The homecoming parade was to be the first large public display for the young profession. The procession was to begin from the top of Brady Street hill and go to the Davenport business section at the banks of the Mississippi River.[31] D. D. Palmer was supposed to ride in an open car with other school faculty. B. J. Palmer was set to ride in another open car with Wisconsin's lieutenant governor, Thomas Morris (Fig. 1-8). Apparently, D. D. grew restless waiting for the parade to begin, so he got out of the car and strode to the front of the procession to order the band to begin their march. Dr. Frank Elliott (registrar for PSC and friend of both Palmers) rushed to D. D.'s side after noticing the confusion and encouraged him to return to the car with the faculty.[6] According to Elliott, D. D. Palmer responded by saying, "Damn the faculty. I will call the police and see if I cannot walk in the streets where I want to."[32]

Upon noticing what was taking place, B. J. Palmer drove his car out of its parade position and up to the position of the two men. Elliott commented later that the car came close but did not touch either of the men. D. D. rejected Elliott's plea to return to the car, and he ran across the street and strode down Brady Hill Street. As the parade passed in front of the Universal Chiropractic College, D. D. darted in front of the procession to lead the parade. Shortly thereafter, the police removed D. D. Palmer from the parade.[6] Universal College faculty observed what took place, and after Palmer's death, they claimed that B. J. had actually struck his father with his car. Allegedly, this injury weakened D. D. to the extent that he was more susceptible to the illness that caused his death. However, other witnesses testified that B. J.'s car never came in contact with D. D. and that the elder Palmer deliberately ran out in front of the vehicle right before he was escorted away.[32]

Joy Loban filed suit against B. J. Palmer on two counts and asked for damages amounting to $52,000. B. J.'s uncle, Thomas J. Palmer (D. D.'s brother), stepmother (Mary Hudler Palmer), and other family members joined in on the civil suit. This prompted B.J. to

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FIGURE 1-9 Formal photograph of B. J. Palmer *ca.* 1910.

later write, "The devil gave us our relatives, but thank God we can choose our friends. As ever, the nephew you despise, all for which I am sorry, but don't give a damn."[30]

Three grand juries refused to indict B. J., and all charges were dropped by December 1914, although this would prove to be a black cloud over B. J. Palmer for years to come.[31] Loban had originally objected to B. J.'s introduction of x-ray assessment to the chiropractic curriculum. He left his philosophy class with 50 of his students to start the Universal Chiropractic College down the street of Palmer College. Loban likely had an axe to grind against B. J., and the parade incident involving D. D. was his opportunity.[6]

D. D. Palmer died on October 20, 1913, in Los Angeles, California, at his residence at 420 West Vernon Avenue. He had been ill for 28 days, and his death certificate stated that the cause of death was typhoid fever. Daniel David Palmer's legacy will show that he was a genius way ahead of his time, as well as an eccentric. He was a restless man who was obsessed with finding answers to the ills and conditions that plagued mankind. D. D. was consumed with the scientific development of his profession right up to the end of his life. This is evident by this quote from 1910:

> This book has been written for the purpose of teaching chiropractic as a science, making the art of adjusting specific, giving a special location and adjustment for each disease so far as we know. Any person can learn to hit the high places, replace and displace vertebrae, relieve one disease and cause others. Let us, as chiropractors, show the world that chiropractic is a science.[20]

B. J. PALMER: THE DEVELOPER OF CHIROPRACTIC

Palmer School of Chiropractic

B. J. Palmer (1882–1961) began his career, like his father, with the understanding that chiropractic care involved adjusting by hand all subluxations of the approximately 300 articulations of the skeleton, with particular emphasis on the 50-plus spinal articulations (Fig. 1-9). However, by 1911, he began to change his viewpoint. This was probably influenced by evaluations made after the purchase of x-ray equipment between 1908 and 1911. A Scheidel-Western unit was installed at PSC with the main purpose to "verify or deny palpation findings and to verify or deny proof of the existence of vertebral subluxations." Beginning in 1918, Dr. Ernest A. Thompson became the head of the first spinographic department at PSC, which lasted some 20 years.[33] [??6]

B. J. Palmer was the clear leader of the chiropractic profession in the years following his father's death. However, he was faced with many challenges and spent much of his time building the legal apparatus to defend the many thousands of chiropractors who were arrested for practicing medicine without a license. B. J.'s strategy, in part, was for the chiropractic profession to stick to its vitalistic philosophy and to remain "separate and distinct" from medical care. However, chiropractors continued to be prosecuted, and many refused to pay fines and chose to serve jail terms as a form of protest. Indeed, it has been estimated that at least 30,000 jail terms had been served by chiropractors by 1930.[34] This was a major challenge to the profession until states provided licensure for chiropractors. This process began in 1913, with Kansas providing the first chiropractic license, although it would take until 1974 for the last state (Louisiana) to provide licensure.

The PSC expanded phenomenally in the post–World War I era, as the student body was supported by veteran benefits. The student enrollment at PSC reached a record of more than 3,100 in 1922. B. J. Palmer became a wealthy man, particularly after investing in the new field of radio in 1924. Palmer acquired the nation's second commercial radio station west of the Mississippi River. The Davenport station was WOC (Wonders of Chiropractic), and in 1928 he purchased WHO (With Hands Only) in Des Moines. The 50,000-watt WHO

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station became the western relay for the National Broadcasting Company (NBC) and brought Palmer and his message of chiropractic to millions in the "unseen audience." (Both WOC and WHO employed a young sports announcer who would move on to Hollywood and the White House: Ronald Reagan.) B. J. Palmer was also a pioneer in television; he founded one of the first television stations west of the Mississippi when WOC-TV went on the air from Davenport.

Ironically, while chiropractic was continually faced with oppression by the medical establishment, the majority of the profession discriminated against black would-be students by denying them enrollment into chiropractic colleges. This is particularly disheartening in light of the profession's first patient being a black man (Harvey Lillard). The PSC catalog blatantly stated "Negroes not accepted" from the 1920s through 1950. The school also maintained a separate clinic to treat African American patients. This position was inconsistent with B. J. Palmer's public statements on racial tolerance. A correspondence between a potential student and Palmer reiterated his abhorrence of racial discrimination, but he explained that accepting black students into PSC would drive away his southern students and put the school out of business. This was evident in 1944 when the southern contingent of PSC students threatened to walk out as a group if the school admitted a young black woman named Dorothy Clark. Fortunately, [??7] this black mark on the profession began to diminish in 1950 after pressure from state legislatures, such as New Jersey.[35]

THE NEUROCALOMETER

D. D. Palmer believed that nerve pressure created an increased amount of heat. However, a heat-measuring device was not built until Dossa Evins invented the neurocalometer (NCM) in 1924. This instrument was made up of two thermocouples—thermoelectric devices used to measure temperature. They consist of two dissimilar wires joined so that a potential difference generated between the points of contact is a measure of the temperature difference between the points. The NCM was used to detect differences in bilateral paraspinal tem- [??8] perature (see Chapter 10). Evins brought the new device to PSC, and it was used to research skin surface temperatures before and after spinal adjustments with great success. Palmer decided to combine the use of the NCM and x-rays to develop a more accurate method of detecting vertebral subluxations. In the 1930s, Otto Schiernbeck developed technology that enabled the NCM to produce a graph printout of the results. This new and improved device was called the neurocalograph (Fig. 1-10).[19]

FIGURE 1-10 The neurocalograph instrument.

B. J.'s passion for this new technology led to much contention within the profession because of various statements made by the chiropractic leader. One of his assertions was that no chiropractor could practice honestly without using a NCM in his or her practice. These types of strong sentiments were delivered during Palmer's talk at the 1924 PSC lyceum titled "The Hour Has Struck." Unfortunately, many doctors felt that B. J. Palmer was disingenuous with his stance on the use of the NCM because he had a financial interest in the instrument. The NCM had to be leased through PSC (B. J. owned the patent). The $3,500 instrument could not be purchased outright, but the lease cost the doctors $5 per month. Unfortunately, B. J.'s hard-line stance caused him to lose influence over the profession for decades.[19] These and other issues resulted in four of PSC's leading instructors leaving the school and founding Lincoln Chiropractic College in 1926. This school later merged with National College and was the first chiropractic institution to require four academic years of instruction.[22]

HOLE-IN-ONE UPPER CERVICAL TECHNIQUE

In 1931, B. J. Palmer presented the hole-in-one (HIO) upper cervical technique to the profession with much controversy and acclaim (Fig. 1-11).[36] Palmer described

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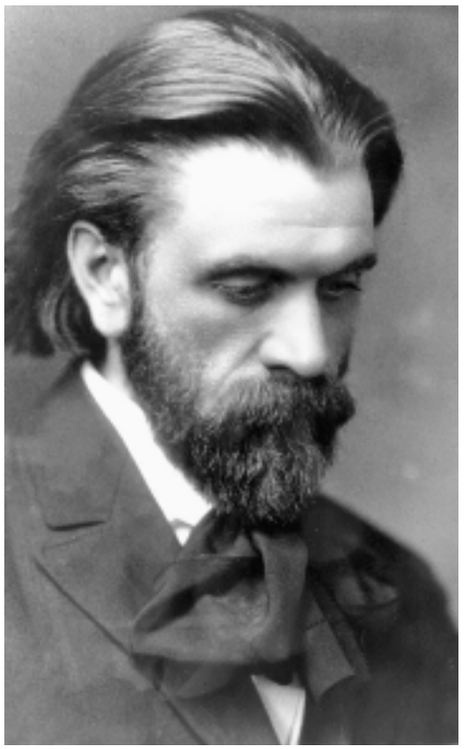

FIGURE 1-11 Dr. B. J. Palmer, the developer of the chiropractic profession.

this new chiropractic innovation during his famous speech at the PSC lyceum, "The Hour Has Arrived."

> The adjustment with the extra something is the subluxation that is adjusted which remains in normal situ for an extended period of days or weeks; which makes possible a continued open foramen, which permits a long continued flow of mental impulse supply; which gets cases well quicker and reduces the number of places necessary to adjust; proves that each adjustment is such in fact, and makes possible a definite knowledge of where, when, and how to "adjust." The adjustment with that extra something releases interference at one place without creating more at others; thus making it the Hole-In-One Adjustment.[36]

The first mention of the HIO technique by B. J. Palmer is in a 1930 issue of the *Fountainhead News*.[37] He originally felt that the HIO subluxation could be located at any vertebra of the spine, as well as the sacrum and coccyx. However, Palmer believed from the beginning that the vast majority of HIO subluxations occurred in the cervical spine, specifically involving the atlas or axis. He stated that the spinograph and NCM should be used to indicate the location of the subluxation. Atlas laterality (or side slip) was determined from the antero-posterior (AP) open-mouth view. An initial plane line was drawn by choosing like points on the atlas (i.e., superior or inferior tips of lateral masses, tips of transverse processes). A skull plane line was drawn through bilateral similar points as well (i.e., inferior tips of mastoids, medial tips of occipital condyles, jugular processes, like points on eye orbits). The side that these lines converged indicated atlas laterality. Atlas rotation was typically measured on the base posterior view. However, it should be noted that the HIO x-ray analysis involved other aspects and that it evolved over time.

B. J. Palmer defined vertebral subluxations to include the following criteria: (i) misalignment of the vertebra in relation to adjacent segments, (ii) occlusion of a foramen or spinal canal, (iii) pressure or tension on spinal nerves or spinal cord, and (iv) interference to transmission of mental impulses.[36] Palmer also made the clear distinction that chiropractors do not treat the diseases of patients; rather, the care is focused on adjusting vertebral subluxations. After various research studies conducted at PSC, B. J. Palmer declared that the only region of the spine in which a subluxation can occur is the upper cervical spine. However, in later years it appears that the PSC relaxed their position on upper-cervical-only teaching. On January 4, 1956, Dr. Herbert Himes (of PSC technique department) gave a lecture that became known as the "Green Light Speech."[38] Himes indicated that PSC was beginning to move away from exclusive teaching of HIO and that segmental adjusting of the entire spine could be addressed. Indeed, HIO would remain the focus of the school's curriculum until B. J.'s death in 1961.

CONTRIBUTIONS OF ALECK WERNSING

Dr. Aleck August Wernsing was a 1926 graduate of PSC and practiced in Oakland, California. Wernsing had developed a chronic illness in 1932 that he was convinced was due to a problem in his upper cervical spine. He observed that applying pressure on his neck over his atlas transverse process provided instant relief. This motivated him to research the joint mechanics of the upper cervical spine and worked to improve the radiographic analysis of the subluxation. His initial work developed from 1930 to 1932 and would be called specific atlas correction or atlas specific.[39,40] Wernsing's work was focused on the misalignment between the atlas and the occipital condyles and how "The atlas moves laterally on its condyles as if on the rim of a circle."[40]

Wernsing did not believe that the atlas could misalign in a rotatory fashion in relation to the occiput because of the anatomical shape of occipito-atlantal articulations. He felt that atlas rotation measured on radiographs was usually due to one occipital condyle being located anterior or posterior to the opposite condyle. This was a significant departure from the HIO technique, which took base posterior or vertex views to

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measure this rotational component of the atlas subluxation. Wernsing's work was well known at the time, particularly among doctors specializing in the upper cervical region. However, it was slow to catch on because of B. J. Palmer's influence over the HIO work. On a side note, it is interesting how Wernsing believed that the neurological component of the subluxation resulted from pressure or tension applied to the spinal cord and/or its meninges.[40]

Some historians believe that B. J. Palmer actually obtained much of his upper cervical care concept from Wernsing. This is based in part on meetings Wernsing had with Drs. Palmer, William "Laddie" Heath, and Herb Hender on January 5, 1934, when Wernsing traveled to Davenport to share his research of the upper cervical spine. Incidentally, Dr. Glen Loomis (Wernsing's friend) cautioned him against turning his research over to anyone. However, Wernsing provided a typed set of records related to his work to the PSC faculty.[41] He also agreed to send every new idea to PSC as soon as it was perfected. Wernsing claimed that during his meeting with Palmer, Heath, and Hender, he discovered that they were working on an upcoming book titled *The Atlas Subluxation and the Axis Adjustment*. This book dealt with the HIO principles that were being presently taught.[42] However, in the fall of 1934, Palmer's book came out with a new title: *The Subluxation Specific—The Adjustment Specific*.[43] Wernsing felt that his ideas, which were included in B. J.'s book, were presented in a "rather confused manner."[41] It is thought that Wernsing influenced later revisions of HIO to involve adjusting in the side posture position.

Wernsing's standard set of x-rays included the scout AP, true lateral, scout lateral, true AP, AP 45, and a superior inferior view. These were used to perform accurate true plane radiography. Wernsing developed the first orthoprotractor instrument in the fall of 1934, which enabled him to measure the subluxation in degrees; however, he stated that he did not claim to measure the position of the atlas in fractions of a degree. A second orthoprotractor was later developed that made it unnecessary to draw lines on x-rays. He measured atlas laterality on the AP true and the AP 45 views. Atlantoaxial rotation was measured on the AP and true lateral view. Wernsing did not take routine x-rays after the initial adjustment, although he did recommend periodic radiographs to assess the type of correction being made. He felt that one of the benefits of obtaining relative measurement in degrees was to determine the magnitude of the correction.[40]

In March 1934, Wernsing built the mechanical anatomical demonstrator for the purpose of demonstrating how the atlas could laterally misalign around the occipital condyles in degrees of movement. A different type of orthoprotractor was designed in 1935, which was used during radiographic patient placement. In 1937, the atlas slide rule was developed for the purpose of calculating possible errors in analysis as a result of improper x-ray placement. Wernsing built the atlas radiographic demonstrator in 1939, which was used to teach principles of his x-ray analysis.[40]

In 1936, Wernsing designed the Vernier adjusting table. The table's body rest and headpiece were able to tilt laterally to a set amount of degrees. The top portion of the headpiece was able to be turned horizontally or moved from front to back or from side to side. The headrest had small rolls built into the support on both sides to function like mastoid blocks. Wernsing would raise or lower the headpiece to fit the width of the patient's shoulder and cause the atlas to be on the same horizontal plane as the balanced spine. He described how the top part of the headpiece had to be tilted downward many times to prevent supporting the top part of the head (parietal support). This incorrect placement would cause locking of the occipito-atlantal articulation and prevent reduction of the subluxation.[40]

The atlas specific adjustment was conducted by first standing in front of the patient while in the side-lying position on the Vernier table. The atlas transverse process would then be palpated, and the thumb of the opposite hand placed over the contact point. The thumb was placed so that it was parallel to the AP plane of the atlas. The thumb and the first two fingers of the hammer hand would be brought together and placed over the thumb of the nail hand and kept directly in line with the atlas transverse process. The stance was close enough to the patient to allow the doctor's episternal notch to be positioned over the contact point. The thrust was given parallel to the perpendicular plane of the occipital condyle's transverse plane and that of the atlas. Wernsing described the thrust as being light with considerable speed. He stated that the pisiform could be used in cases where the atlas contact could be easily made; however, he felt that the thumb contact was more specific for most cases. Wernsing would actually contact the axis spinous process with rare subluxation types. He did not believe in adjusting cases daily and appeared to appreciate the restoration principle. However, Wernsing felt that chronic subluxations reduced gradually, as evident on post x-rays.[40]

Wernsing traveled to PSC in the fall of 1939 and presented his upper cervical technique to the pre-lyceum meeting. He received a lukewarm reception.[44] However, news of his research spread, and doctors from across the country began visiting his office. These doctors compelled him to teach; as a result, he traveled all over the United States presenting seminars. Between September 1940 and January 1941, he wrote five technical articles on atlas specific in the Los Angeles College of Chiropractic's *Chirogram*.[45] It is in these series of

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articles that Wernsing first presented how to perform an atlas adjustment in the side-posture position. In 1941, Wernsing published the culmination of his work in his book, *The Atlas Specific*.[40] Wernsing made the following statement during one of his presentations in 1939: "I come to you as one without the prestige of leadership, school affiliation or endorsement of any kind. It is my aim that the work live or die, according to its own scientific merit."[40]

B. J. PALMER CHIROPRACTIC RESEARCH CLINIC

B. J. Palmer was able to popularize the upper cervical work because of his position at PSC and influence in the profession. HIO was studied under great scrutiny at the B. J. Palmer Chiropractic Research Clinic. This renowned facility had its beginning in 1935, was state of the art for its time, and was known for accepting "the worst of the worst cases." Many of its patients traveled hundreds of miles after the medical profession had given up hope or only provided limited results. Chiropractors across the country also referred patients to the research clinic to receive specific upper cervical chiropractic care.

Palmer had medical doctors on staff and the latest technology to assess the patients before, during, and after a trial of chiropractic care. Patients typically received daily chiropractic examinations and instrumentation readings with the NCM. The medical physicians conducted weekly physicals that included blood and urine tests, blood pressure checks, vision and audiometric exams, basal metabolic studies, and extensive radiological analyses.[46] B. J. Palmer was driven to use almost any and all technology available during the time to document the effects of upper cervical adjustments on the health of patients. This included the development of the electroencephaloneuromentimpograph (Fig. 1-12), which was a precursor of the electroencephalograph and electrocardiograph. B. J. had hoped that this instrument would be able to prove the existence and location of the subluxation, and the validity of the adjustment by demonstrating the improvement of neuroelectrical transmission. This device proved to be quite promising; however, the technology of the day lacked solid-state high gain, low-noise amplifiers with computerized signal averaging, which limited its effectiveness.

As the 1930s approached, the golden age of chiropractic and PSC were coming to an end. Palmer was faced with many challenges as the Great Depression was taking a terrible toll on the student population. Enrollment at PSC had plunged to just more than 300 in 1929 after reaching a height of more than 3,000 in the early 1920s. David Daniel Palmer (B. J.'s son) returned from graduation at the University of Pennsylvania to find the school in receivership by the Davenport National Bank.[6] This was the professional climate at the time that a young man named John Francis Grostic entered PSC to begin his illustrious career.

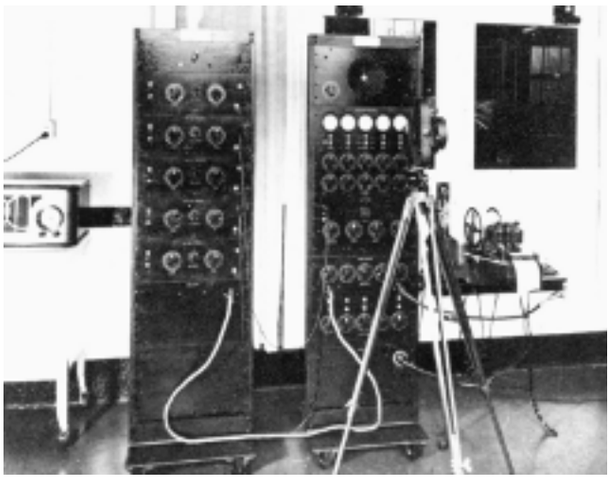

FIGURE 1-12 The electroencephaloneuromentimpograph instrument.

JOHN F. GROSTIC PRECHIROPRACTIC YEARS

John Francis Grostic was born October 9, 1907, to Fred and Magdalina Grostic in Genoa Township, Michigan. He grew up on a farm in Brighton, Michigan. John Francis enjoyed the life of a farmer, but his parents realized the value of an education and sent him to live with his aunt in Ann Arbor to attend St. Thomas High School (Fig. 1-13). He graduated in a class of 13 in June 1927. Upon graduation, Grostic managed Holden's Clothing store in Ypsilanti, Michigan. In 1929, he was diagnosed with what the family remembers to be Hodgkin's disease and was given a poor prognosis with only 2 years to live (Fig. 1-14). He suffered with recurrent fevers over a period of several months and swelling of the lymph nodes around his neck.[47]

Grostic sought the care from a chiropractor that had an office in the same building as the clothing store where he worked. The chiropractor adjusted him several times, giving Grostic some relief and hope that had been previously broken by the medical doctors. The chiropractor suggested that he travel to Davenport, Iowa, to receive continued care from B. J. Palmer. So Grostic purchased a train ticket to make the trek to Davenport. B. J. Palmer adjusted him with a relatively new upper cervical technique known as HIO. This new

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FIGURE 1-13 John Francis Grostic's high school photograph.

approach involved adjusting the first and second vertebrae in the upper cervical region. Miraculously, Grostic experienced what appeared to be a full recovery within a few short weeks.[47] It was understood that chiropractic care was not a treatment of his disease, but it appeared to have a profound effect on his health.

GROSTIC BECOMES A CHIROPRACTOR

This lifesaving experience led John Francis Grostic to move to Davenport and enroll into PSC. There particular emphasis was placed on upper cervical anatomy and relatively new radiologic procedures. Grostic was in school during the latter stages of the development of HIO upper cervical technique. He actually produced a typed set of notes (still preserved) from one of the first courses that was taught by B. J. Palmer on this technique. Grostic became infatuated with the use of x-ray and its validity in the chiropractic profession. His devotion to the upper cervical region, no doubt, stemmed from his own personal lifesaving experience. John F. Grostic, DC, graduated from PSC on March 19, 1933, with a class of 70 fellow chiropractors (Fig. 1-15). He married

FIGURE 1-14 John F. Grostic standing in front of Holden's men's clothing store, which he was managing when he first became severely ill.

Grace Johnson on August 23, 1933, in Davenport, Iowa (Fig. 1-16).

Grostic moved back to Michigan and opened up his first office on the second floor of Whitker Building located in downtown Ann Arbor. The examination and adjusting area consisted of a moderate-size room that was divided into three cubicles. Each cubicle had an adjusting table, a neurocalograph with a constant glide instrument (neurotempometer), and a three-drawer cabinet. The economy was still rebounding from the Great Depression that had begun in 1929, and Grostic had set up his office in the heart of a medical community influenced by the University of Michigan. Grostic's passion for chiropractic and past experience as a successful clothes salesman helped him to establish a successful office despite its location and time in history. Dr. Hollis Westfall worked as an associate doctor in the practice for a number of years. Grostic typically worked on Mondays, Wednesdays, and Fridays; Westfall worked Tuesdays, Thursdays, and Saturdays. The office hours were 9:00 A.M. to 11:30 A.M., 2:00 P.M. to 4:30 P.M., and 7:00 P.M. to 8:00 P.M. This working arrangement allowed Grostic the time to conduct his research, read other doctors' x-rays, and prepare for seminars. In later years, Grostic worked more hours in his office, although he spent Thursdays and Saturdays at home with his family.[48]

All of his success came to a screeching halt in 1935 when he was hit forcefully in the neck by his rather heavy and cumbersome x-ray tube. The accident led to

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FIGURE 1-15 The 1933 PSC graduation class (**A**) with blowup of Dr. John F. Grostic (**B**).

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FIGURE 1-16 Dr. John F. Grostic with his wife, Grace Grostic.

a critical relapse of the Hodgkin's-like symptoms. His condition became so severe that, at one point, he was given only a couple of weeks to live. Grostic developed swelling of his lymph nodes and had a fever between 101° and 105.5° for 23 days. John Francis sought care from numerous local chiropractors, but he was not getting any better. His family ended up putting him on a train to once again seek professional care from B. J. Palmer. He responded significantly by 3 days after B. J.'s upper cervical adjustment. Grostic remained under the care of Palmer as his health was gradually restored; however, he apparently held his initial correction and did not require an additional adjustment for several months.[49] It is thought that Westfall maintained the practice in Ann Arbor during Grostic's long recovery.

Grostic became curious as to why several doctors using the same procedures in their office could not obtain the results that he experienced while under Palmer's care. He never questioned the principle of chiropractic, only its application. This led him to study B. J.'s patient-management protocol. Grostic became perplexed after noticing that there were subtle differences during the setup and delivery of an adjustment, yet these procedures were not clearly taught or understood by HIO practitioners. These minor differences would become John F. Grostic's personal obsession and form the foundation for the research he would carry out. Grostic returned to Ann Arbor with a mission to better himself as a chiropractor by thoroughly investigating the upper cervical region. He delved deeper into the reasons behind the failures of some doctors and success of others who used the same upper cervical analysis and adjustment.

PALMER STANDARDIZED CHIROPRACTORS COUNCIL

While recovering his health once again, Grostic became a member of the Black Tie Organization (BTO). This group comprised HIO chiropractors that used this procedure exclusively in their own practices. They shared their failures and successes as HIO practitioners, as well as worked on ways to improve the clinical results. In 1937, Grostic attended the lyceum and shared his thoughts with fellow BTO members. Together they started an organization committed to improving and standardizing the HIO work.[50] This new organization was called the Palmer Standardized Chiropractors Council (PSCC). It had only 11 founding members, which included John F. Grostic. B. J. Palmer was the honorary president, Dr. Roy G. Labachotte was named the founder, and Dr. Vic G. Coxon was appointed as the first president. Bylaws and an official newsletter were put together in 1938.[48] The select membership of this elite group eventually grew to about 70 chiropractors throughout the United States, Canada, and England.

The PSCC's purpose was to provide a forum to exchange research and new ideas to help standardize chiropractic procedures and methods. The council would meet every prelyceum and share the successes and failures experienced in their offices in an effort to further and foster more successful doctors. As a member, Grostic presented his clinical research and ideas at the PSCC's annual meeting. Grostic and others also presented their clinical research information in the PSCC's monthly *Bulletin.* Between 1937 and 1942, much research was being shared and gathered by the majority of the members. However, some members believed that research was best left to B. J. Palmer, and if not approved by B. J., should not be shared with others. In fact, in 1938, Labachotte admonished Grostic for teaching methods that differed from what B. J. taught.[48] However, many within the council agreed with his initial research, and Grostic pressed on with his work.

Many doctors using HIO struggled with an inability to consistently define and reduce upper cervical subluxations in an objective way. This led to a somewhat "mystical" thinking about setting the atlas in motion and letting "innate" vibrate it into place. This type of thinking was unacceptable to doctors such as Grostic because the upper cervical adjustment is based on physics, not metaphysics. It eventually became apparent that the inconsistent results achieved by HIO doctors were due, in part, to B. J. Palmer's system being a qualitative and not a quantitative analysis. Palmer mastered the HIO technique, but the subtle variations were hard for other chiropractors to duplicate. Palmer struggled with the development of a more precise adjustment listing. For example, in his book *The Subluxation Specific—The Adjustment Specific,* he stated, "Should I list the adjustment: P x R xx I xxx, it would say that it should be adjusted 'P', but the adjustment should be TWICE AS MUCH from the 'R' as from 'P' and three times as much from 'I'."[43]

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FIGURE 1-17 Dr. John F. Grostic studying x-rays.

DEVELOPMENT OF THE GROSTIC PROCEDURE

The Grostic procedure has been presented to other chiropractors since 1939, although it continued to evolve from this point. Grostic's research is based on concepts developed by B. J. Palmer, Aleck Wernsing, and other chiropractors that participated in clinical research in the 1920s and 1930s.

In 1936, John F. Grostic began his in-depth research of the upper cervical region to develop what has become known as the Grostic procedure. The largest contributions came from taking x-rays before adjusting his patients and again immediately afterward. Grostic was thought to be the first chiropractor who routinely took postradiographs after the patient's initial adjustment (Fig. 1-17). He was meticulous with his research; his records recount taking pre– and post–x-rays on more than 80 patients, which caused him to conclude that one of his particular ideas was of no value.[48] Grostic's focus was placed on vectored adjusting, based on the fact that not all HIO doctors using the same listings set up to deliver the adjustment in the same manner. A more precise listing and more specific adjustment were required to help ensure a more standardized procedure. Grostic stated:

> The adjustment should be given with extreme accuracy, governed by the laws of mechanics, mathematics and physics. The spine being mechanically constructed, mechanically subluxated and the adjustment being the application of a mechanical force applied to the spine, it is possible to mechanically measure the effectiveness of the adjustment in the cervical area.[49]

Radiographic Analysis

As it was apparent that his work would be heavily focused on the radiographic assessment, Grostic developed methods to reduce x-ray distortion and radiation. This included the development of various devices (i.e., self-centering head clamps, turntable chair, lead foil filters) and a protocol for aligning x-ray equipment. He used a minimum of 80 kVp and recommended up to 90 (he usually used 88 kVp). Grostic typically used only 5–6 mAs for the lateral, 10–15 mAs for the nasium, and 20–25 mAs for the vertex view. He estimated that the pre– and post–x-rays on a typical patient (total of seven films) only exposed his patients to about 0.382 milliroentgens. Grostic used lead foil compensating filters to reduce exposure to the patient while enhancing the opaqueness of the skull to aid in the analysis of the central skull line. He did not approve of putting paper in cassettes, a method used by some doctors, because this attenuated the x-ray beam after it penetrated the patient (see Chapter 2). Grostic spent a great deal of time in teaching [??9] doctors the importance of proper x-ray equipment alignment. Equipment out of alignment prevented precise x-rays, and he likened this to shooting a rifle without sights. Doctors were also taught to use a precise protocol for developing x-rays to improve film quality.[48]

Geometry of Articulating Surfaces

It is commonly thought that Grostic obtained the occipital condyle circle concept (see Chapters 5, 7, and 16) from Wernsing, but in fact Grostic developed the measurement system and axis body circle component. He initially presented his research on occipital condylar slopes to the PSCC audience in 1938, as well as the novel idea of using a mastoid support with the headpiece. The following year he presented his axis circle analysis. It appears from his records that these concepts were solidified by 1940.[48] Grostic later reported in the PSCC *Bulletin* that the slope of the condyles played a major role in how successfully the atlas misalignment would reduce.[51] [??10]

The diarticulometer template was created to measure the geometry of the articulating surfaces between the occipito-atlantal and atlanto-axial joints. Grostic accomplished this by determining the curvature of the occipital condyles and the superior articulating surfaces of the axis vertebra. These articulating surfaces are slightly more elliptical than circular, but he found that there was an advantage in using a circle because it could be divided into 360 degrees. Grostic realized that using degrees to measure the alignment of the atlas compared with the skull around the occipital condyles provides a method that reduces error in the measurement process caused by divergent x-rays. This type of analysis is also less susceptible to magnification error.

Grostic observed that patients with relatively smaller condylar circle sizes tended to have considerable atlas laterality, whereas cases with larger condylar circles had the propensity for significant atlas rotational

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misalignments. This latter point was particularly noted if the occipital condyles were located toward the anterior aspect of the foramen magnum. He also noted that patients who have large atlas lateralities would usually have a small amount of atlas rotation, and vice versa. Grostic observed that if the weight of the head was on the side atlas laterality, ipsilateral anterior rotation would usually be found. Posterior atlas rotation was usually observed if the head weight was found on the opposite side of atlas laterality. He felt that minute amounts of atlas laterality or rotation were important from a neurological standpoint and that changes in atlas rotation could effect changes in the neurocalograph and leg check.[48] However, atlas laterality usually created more neurological interference than atlas rotation. It should be noted that atlas laterality is a bit of a misnomer because the atlas misaligns around the occipital condyles in a rotatory fashion in the frontal plane, as opposed to shifting laterally from left to right.

Measuring Atlas Laterality

The HIO analysis used wedge analysis to find the side of atlas laterality, although Wernsing discussed how the atlas moves laterally on the occipital condyles. This is why it was vital for Grostic to develop the most reliable method of determining the plane of the atlas and the central skull line. The angular relationship between these two lines would determine atlas laterality. He decided to pick the inferior attachments of the atlas posterior arch as it intersected with the lateral masses. Grostic felt that these were more reliable points compared with the inferior tips of the atlas lateral masses. He noted that the inferior aspects of the lateral masses were not fully developed in infants and that an injury or subluxation early in life could retard the symmetrical growth of these structures.[48] This has also proven to be a good choice because the lateral masses are the location for two of the primary growth centers of the atlas. The inferior aspect was preferred over the superior attachment because of possible bony erosion from the pulsation of the vertebral artery as it lies on top of the posterior arch.

Beginning in 1938, records indicate Grostic's x-ray analysis showing some type of a quantitative listing (e.g., C1 L-H1 over wedge L1 A2 with C2 listed Od R2 P2). However, by 1942, we see from Grostic's records and x-rays the development of what becomes a "Grostic listing." Up to this time, he appears to use a mixture of different types of analyses and AP open-mouth views. By the early 1940s, he established that the nasium view was the best film for measuring components of the subluxation in the frontal plane. Grostic frequently took two nasium x-rays with one taken above the S-line.[48]

Grostic initially conducted considerable research to find the center of the foramen magnum. He tried to establish a central skull/foramen magnum line by bisecting the intercondylar space, although this method was found to be unreliable. This was due to frequent malformations of the condyles and the anterior portion of the foramen magnum. By 1942, his dissatisfaction with this and other methods for measuring atlas laterality led him to develop the prototype of what was to be known as the cephlocentroscope. This template was used to establish a central skull line, which intersected with the atlas plane to determine atlas laterality. Grostic's clinical research found that three-fourths of one degree was the minimum amount of atlas laterality that was measured for a patient to present signs of being subluxated.[48]

The care that Grostic received from B. J. Palmer had helped restore his health when he was deathly sick; however, he apparently continued to have various health issues over the succeeding years while under HIO care. Grostic sought to solve his health problem by having x-rays taken of himself before and after receiving adjustments. He began to notice a significant lateral displacement of the axis odontoid process in relation to the atlas and an obvious deviation of the entire cervical spine to one side.[52] This led him to describe the atlas-odontoid relationship factor and the axis spinous process analysis. These measurements prompted the development of the densmeter instrument. The lower angle measurement was developed at this time, which represented a lateral misalignment between the atlas and axis (see Chapter 5). This concept was revolutionary for its time and is credited to Grostic. It was also found that an accommodation had to be made to the adjustment for the tilt of the atlas plane line. The final height factor involved the measurable differences in the magnitude of the lateral misalignment between C0-C1 and C1-C2 (upper and lower angles). This relationship was found to influence the vector of the adjustment. [??11]

Occipito-Atlantal Rotation

The analysis of rotation between atlas and occiput was established early on with Grostic's work; this was a logical progression from the HIO technique. He chose to use the vertex over the base posterior because he could get the atlas about 2 inches closer to the film with the former view; thus, there was less magnification distortion. There was also a safety issue for some doctors who did not have nonshockproof x-ray equipment. Grostic was quite reluctant to recommend that doctors placing a nonshockproof tube between a patient's legs, where it could potentially touch the patient, as compared with above their head. Incidentally, Grostic described the use of a mirror with a line scribed in the center to be placed on the face of the grid cabinet. This method is still used to aid in the placement of the patient for the vertex view.

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Grostic used vertex stereo views along with the standard vertex x-ray, but he typically used stereo views alone for the preadjustment analysis. According to his personal records, Grostic took a standard vertex view as the postadjustment assessment. Stereo analysis requires two vertex views that are each taken with the tube shifted to the right or left. The theory is that as the tube is shifted to the right, it is like the doctor's left eye is viewing the patient, and vice versa. Each vertex is then marked and placed in each side of a special stereo view box. A special prism causes the images to merge and isolates the doctor's left eye to view the "left-eye" film and the right eye to see the "right-eye" film. This results in a type of three-dimensional image and a unique analysis. Grostic also cautioned doctors about the possibility of a malformed atlas transverse process and/or foramen. This could obviously affect the doctor's analysis of the atlas plane line. He recommended using the atlas lateral masses as a double check to determine if the lines were parallel.[48]

The stereo analysis provided an accurate measurement of atlas rotation, particularly with small misalignments. These views enabled the doctor to see if the x-ray markings and placement were consistent. In 1946, Grostic notes that he measured C2 spinous process misalignments on vertex view(s).[53] It appears that he used these views as a secondary analysis compared with the nasium film because depth can be seen with these radiographs. This transverse plane (vertex) analysis was apparently not stressed to be as important as the frontal plane (nasium) measurement, probably because of the difficulty in accurately locating the axis spinous process on the vertex x-ray. Grostic also commented about the use of oblique stereo views as a good secondary assessment for cervical fractures. However, vertex stereo views predominantly fell out of use after his death.

Grostic classified subluxation patterns as being either opposite-angle or into-the-kink misalignments. He felt that a large lower angle, or kink, produced more adverse conditions than the atlas misalignment in many patients. This is why he did not consider a patient receiving a successful adjustment unless the thrust/torque resulted in a correction of the axis vertebra and lower cervical spine. Grostic speculated that in some cases, the lower cervical kink could have been produced before the occipito-atlantal misalignment. He explained that when the external invasive force exceeded the internal resistive force in the spine, the lower angle could have developed; then, because of the weight of the head, the atlas could have ten misaligned to either the right or left around the occipital condyles.[48]

Supine Leg Check

Grostic has been given credit for the implementation of the supine leg check with upper cervical care as a means of determining the presence of nerve interference. It is thought that he initially derived the idea from an old osteopathic move that involved vigorously pulling the patient's short leg to balance the asymmetry temporarily.[47] Records show that Grostic began to document the supine leg check on his patient listing cards by 1943, although he had used the assessment for an undetermined number of years previously. He developed a meticulous protocol for conducting the supine leg check (see Chapter 9) to enhance the accuracy of [??12] the assessment. This was critical, because he taught that providing an adjustment when the patient was not out of adjustment could create a problem that could take several months to correct. This is probably why he conservatively recommended that the minimum amount of imbalance to be one-fourth inch, as well as a two-point break on the neurocalograph, before an adjustment was necessary. Interestingly, Grostic felt that the neurocalograph was the most accurate postadjustment check to assess nerve interference.[48]

Grostic recorded that he was dissatisfied with the results of tests involving 150 doctors attending three advanced classes. He found that only 20 doctors performed the supine leg check correctly, 81 were off from one-sixteenth to one-eighth of an inch, 24 were off one-quarter of an inch, and 25 were off three-eighths to three-quarters of an inch.[48] In the seminars. they would put heel lifts from one-sixteenth to three-eighths of an inch in the shoes of test subjects. Doctors typically had to check nine people per day (three in the morning, three at lunch, and three in the afternoon), and they would lose 25% for each one-sixteenth of an inch they were incorrect.[47] Grostic even created an instrument that represented the hips, legs, and feet that tested the amount of pressure doctors applied to the shoes during the leg check. Incidentally, Grostic also felt that the supine leg check was a potential practice builder. The author agrees that this can be an effective patient education tool if digital pictures are taken before and after the first adjustment (see Chapter 9). [??13]

Grostic discussed the kinesthetic feedback that could be derived from the supine leg check. He mentioned the relaxation in the leg when the patient is not subluxated, as opposed to contraction in the leg and hip that was due to increased muscle tone when the patient was out of alignment. He also noted either a springiness or a rigid feeling in the hip joint when a slight cephalad pressure was applied to each leg, depending on the subluxated state of the patient.[48] Interestingly, Dr. John D. Grostic (John F. Grostic's son) discussed how the functional short leg actually feels heavier than the opposite leg because of the increased muscle tonicity.[47] John F. Grostic even developed a quantitative postural analysis that measured such things as static head rotation.[48]

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John F. Grostic observed that when the atlas rotation was greater than the atlas laterality, the functional short leg was present on the side of atlas laterality in most all cases. The opposite functional leg length inequality was found if the atlas laterality was greater than the atlas rotation. However, he felt that a significant lower angle deviation could change this finding.[48] John D. Grostic later refined this algorithm and increased the predictive value. He developed a formula that was multifactorial, involving different components of the misalignment listing (i.e., atlas laterality and rotation, axis spinous process), direction, and magnitude. John D. Grostic hypothesized that different misalignment patterns would produce tension on different parts of the spinocerebellar tracts, resulting in various areas of paraspinal muscle contraction. He stated:

> From a biomechanical model of spinal cord deformation resulting from dentate ligament traction, it can be shown that moderate rotation of the atlas with respect to either the skull or axis is not as likely to produce the neurological insult that atlas laterality does. The model predicts, however, that rotation can have a major role in determining which parts of the cord are affected by the mechanical deformation. Clinically, this may mean that changing rotation may greatly alter the symptomatic picture without really reducing much of the subluxation.
>
> This model of mechanical deformation of the cord also provides a basis for understanding the supine leg check. By knowing the magnitude of the misalignments as well as the radii of curvatures for both the condylar and axial articular surfaces, it is possible to calculate the side of maximum deformation of the cord. In one study involving 27 patients, the side of the short leg was found to correspond with the predicted side of maximum cord irritation in 24 of the 27 cases for a correlation factor of 0.88. Several other small studies have yielded correlation coefficients of about 0.90. From these studies, it has been possible to predict which component of the misalignment may be producing the major neurologic insult.[54]

The Adjustment

John F. Grostic modified the HIO adjusting table and the headpiece. His research determined the necessity of supporting the mastoid process, so the headpiece was developed with a solid support for this region of the skull. The mastoid support was made of wood that was 2 inches wide and 1 inch high and was covered with foam. The headpiece did not have an ear slot, and it was built so that its frame fit into a slot that allowed it to be slid in the AP direction. Records from 1938 show Grostic's discussion of tilting the headpiece to provide a better mastoid support, and these concepts were published in the PSCC's bulletins. Dr. Alex Politis (who attended the 1947 Grostic seminar) stated that before Travis Utterback came along, Grostic built the headpieces for doctors.[50]

Grostic determined that one of the hardest elements of the subluxation to reduce was a high atlas plane line. This prompted him to lower the adjusting table to about 13 inches to improve the doctor's ability to obtain an appropriate line of drive.[48] However, this did not prove to be low enough, so a platform was built around the head of the table that essentially raised the doctor about 5 inches above the floor. This allowed the head of the table to be even lower (with respect to the doctor) while allowing the leg check to be conducted in a practical manner. On a side note, Dr. Burton Pierce recounts how determined and tough Grostic was in regard to performing the adjustment. Apparently, Grostic had an accident that resulted in a fractured ulnar process, although he continued adjusting patients by hand. He was afraid that if he stopped using his arms and wrists that his joints would stiffen up.[52]

The Grostic hand adjustment initially used a fair amount of force. It was developed from the open-stance HIO toggle, although some of the force and the recoil was removed. In 1952, the adjustment was modified by adopting a closed stance, lighter contact, and shallower thrust. The adjustment was again lightened in 1957 when it was determined that the light thrust produced better reductions by providing more control.[47] Grostic used torque to correct C2 spinous process and lower angle misalignments. This differed from the HIO concept of torque, which was used to correct the superiority or inferiority of the atlas. He also felt that chronic cases and opposite angle subluxations with inferior C2 spinous process misalignment required more force and possibly a second adjustive thrust. Records before 1944 indicate that Grostic adjusted the axis vertebra directly at times, which is not surprising because his work developed out of the HIO system.[48] It was also common practice to adjust a patient the way they were used to receiving care when an HIO doctor referred them.[47]

Grostic typically provided only one thrust with each adjustment before taking post–x-rays; however, he was known to provide multiple thrusts for certain cases. He would commonly work on an adjusting coordinator device to practice unusual cases before providing the adjustment. Grostic had a very prominent pisiform on each hand, and many times a small red mark would be left on the side of the patients' neck over the contact point.[47] Indeed, interviews of doctors from his era have consistently stated that Grostic's adjustment was quite gentle and little was felt (Fig. 1-18). These doctors have all stated that he was clearly the best upper cervical adjustor at that time and that he was able to significantly reduce their subluxations as evident on the post–x-rays.[47,50,52,55]

Dr. Lewis "Mac" McLellan was a charter member of the PSCC, and he began studying Grostic's research in 1949. In 1953, records show correspondence between

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FIGURE 1-18 Dr. John F. Grostic performing an adjustment. (Courtesy of Richard Grostic, D.C.)

him, Grostic, and Dr. Earl Striplin in reference to instrument adjusting. Apparently, McLellan had sought the care of Dr. Arden Zimmerman and received a significant improvement in his health from the specific adjusting machine (SAM) adjustment (see Chapter 14). McLellan would remain loyal to the Grostic group, but he felt that the future of the Grostic adjustment would be aided with some type of an instrument or machine like the SAM unit. It appears from this discussion that Grostic was cautiously open-minded about the issue. Striplin appeared to be less enthusiastic about the topic.[48] It is unclear if McLellan ever used instrument adjusting in his practice. However, the year following this discussion, Dr. Cecil Laney began his research into developing adjusting instruments that attempted to duplicate the corrections made by hand (see Chapter 14).

[??14]

[??15]

John D. Grostic studied his father's practice and found some interesting data related to the post–x-ray reductions after the first adjustment over different periods. He looked at the data involving several hundred patients from 1946, 1957, and 1964. This revealed that John F. Grostic's reported percentage of correction increased by about an additional 4% in 1957 and then again in 1964, from an original average correction of almost 70% in 1946. During each year, the senior Grostic had about 8% of his cases achieve a 100% correction, although the total average reductions improved over time. This was explained by the fact that in 1957 and 1964 there were only three and one cases, respectively, in which the misalignment(s) was increased, whereas there were several in 1946 that received a poor initial adjustment. This data represented the year in which the most force was used, as well as the period during which the adjustment force was reduced the most. John D. Grostic surmised that the reduction in force merely reduced the chance of a poor outcome when the chiropractor's contact, vector, and/or table placement was incorrect. John F. Grostic was quite strict with his post–x-ray assessment. For example, if the C2 spinous process moved 1 degree to the other side, he would deduct 25% from the overall correction.[47]

Contributions of Travis Utterback

Travis Utterback played a pivotal role in what became known as the Grostic procedure. Utterback lived in Bedford, Indiana, and was a supervisor at the Bedford Arsenal. He suffered from a serious health condition that responded dramatically while under the care of a Grostic practitioner named Dr. Ralph Dayton. Dayton helped pioneer a chiropractic movement called the God-Patient-Chiropractor (GPC). The GPC was heavily influenced by upper cervical doctors, most of which were using or would eventually use the Grostic procedure in their practices. Doctors involved in the GPC did not have set fees and would let patients decide on payment based on their own honesty. Travis Utterback was apparently involved with this group, and he wanted to show his gratitude for obtaining his impressive health benefits. As a result, he was introduced to Grostic in the mid-1940s, and he decided to help him by developing equipment that would revolutionize the Grostic procedure. Utterback resigned his job at the Bedford Arsenal and outfitted a machine shop in Bedford.[50] He designed most aspects of the x-ray equipment, including the head clamps and turntable chair. Utterback would travel around the country to install the x-ray equipment to Grostic's specifications (Fig. 1-19). He also produced the Grostic adjusting table and was generally known to go out of his way to help Grostic doctors.

Contributions of Ralph Gregory

Dr. Earl Striplin and Dr. Ralph Gregory were two of Grostic's closest colleagues, and they played a supportive role in the development and teaching of his work. However, each man was at a different period of his chiropractic career.

Gregory graduated from PSC in 1939, and when he met Grostic in the early 1940s, he had a relatively new practice in Monroe, Michigan. It is unclear how they

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FIGURE 1-19 Travis Utterback with Dr. John F. Grostic.

originally met, although they were local chiropractors that were both involved with political activities in the state. Grostic was vice president of the Michigan chapter of the Palmer College Alumni Association. Gregory struggled somewhat in practice during his early years, and he initially used some full-spine adjusting, so it is unlikely that Grostic originally sought him out for upper cervical care. However, Gregory obviously became a skilled adjustor, as he was one of the few chiropractors that Grostic eventually entrusted to provide him with upper cervical care.[56] His early work with Grostic apparently helped improved his practice success as well as his own personal health challenges. According to Grace Grostic, in the early 1940s, her husband would stay up until 1 and 2 o'clock in the morning on most Thursdays and Saturdays to teach Gregory his research.[57]

It is thought that these men collaborated on some ideas as the Grostic work was being refined. Grostic began his research in 1936. His meticulous records show that the majority of his technique procedure had been established by 1942 and published in PSCC *Bulletins.* Gregory was a valuable sounding board for Grostic, and ideas were likely shared back and forth on a variety of topics. Gregory helped with most seminars and provided short lectures on particular topics, such as patient management. He would typically follow Grostic's analysis and technique lectures to assist the student doctors with the various applications.[48]

As with most relationships, Grostic and Gregory had periods when their friendship was quite contentious. One example is detailed in a series of letters between the two doctors that occurred from August 3 until September 4, 1951. Gregory was offended by the recently printed John F. Grostic Research Roster that listed doctors that had attended the seminars. Gregory was listed with the rest of the doctors as a student of the work and not designated as one who had assisted Grostic. Gregory did not like the fact that patients might see the list, and he requested that his name be removed from the roster. Grostic responded that this was not the purpose of the directory and that it was for the doctor's use. However, this issue may have prompted Grostic to place asterisks next to the names of doctors that assisted in the seminars. The following doctors were indicated as providing some assistance to Grostic during the 1950s: Drs. Clarence Aumann (Indianapolis, Indiana), J. E. and Mable Carpenter (Wooster, Ohio), Ralph Gregory (Monroe, Michigan), [??16] Harold Scheidt (Cincinnati, Ohio), Earl Striplin (Louisville, Kentucky), and Hollis Westfall (Ann Arbor, Michigan).[48]

Successive letters indicated that Gregory thought that Grostic was severing their relationship because of Grostic's decision not to take Gregory to a seminar that was held out of state. Grostic explained that there were not enough doctors signed up to attend the class for him to afford taking Gregory and Westfall, and he didn't want to take one without the other. The records appear to show that their relationship was rather distant from 1950 until 1953, although they apparently reconciled and continued to work together thereafter. It is apparent that Gregory never felt that he received the proper recognition for the role he played in the advancement of the work, and this caused some resentment. These two men were passionate about the upper cervical care they were providing to patients and teaching to doctors. They were doggedly determined and uncompromising in their methods and ideas that were and had been tested. The clash of egos was inevitable, although they seemed to usually work through it as they were pursued the same ultimate goal. Grostic has been consistently described as a humble yet charismatic person; it is possible that because of his busy schedule and hectic pace, he may have neglected Gregory's needs on certain levels.

During the 1960s, it appears friction developed between these two great men once again as Gregory began to be more active teaching workshops to doctors. This created significant stress for Grostic because of the changes Gregory was making with the adjustment and other aspects of the work. One particular letter from Grace Grostic to Dr. Ken Humber details the extent that their relationship had deteriorated.[57] She shares the details of a phone call she received from Gregory. She asks Humber for advice because she wanted this kept from her husband; she did not want him to deal with any further stress. This also may explain why Grostic was not receiving regular Grostic care from Gregory at the end of his life. In the end, these two great men were human, and fault likely falls on both parties. However, their

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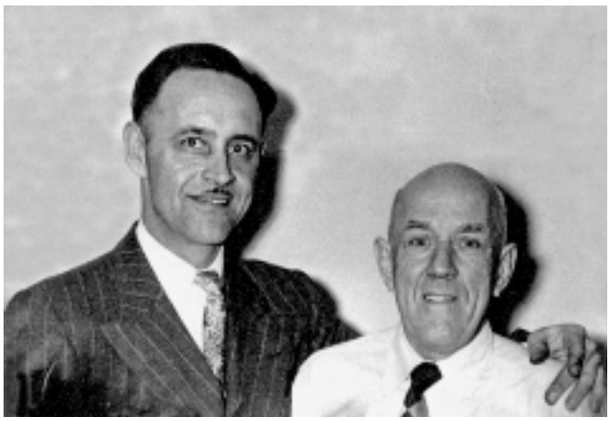

FIGURE 1-20 Dr. John F. Grostic and Dr. Earl Striplin.

FIGURE 1-21 The first Grostic class in 1946.

relationship contributed much to the advancement of the work and is has been carried on to this present day.

Contributions of Earl Striplin

[??17] Dr. Earl Striplin had successful practices in Michigan and Louisville, Kentucky, but he was on the verge of retirement and spent a lot of time at his Sarasota, Florida, home. It was at this point in his career that he decided to travel to Ann Arbor to study Grostic's work intensely (Fig. 1-20). Striplin was in his early 60s, independently wealthy, and determined to master Grostic's research. His passion for the work motivated him to continue a part-time practice in Kentucky. Striplin later retired from practice and moved to Florida in 1952, while spending more time helping Grostic spread his work.

The history of these men goes back to at least 1937; each was a founding member of the PSCC. Striplin no doubt was quite familiar with the early developments of Grostic's research as it was presented in various PSCC bulletins and functions. Striplin became the largest promoter of Grostic's work as he traveled around the country holding 2- to 3-day training sessions for small groups of Grostic doctors. He also assisted with certain aspects of the seminars in Ann Arbor. Striplin made a regular statement in classes to describe the importance of taking care of patients: "How wonderful the opportunity, how great the responsibility." The assessment and correction of the upper cervical subluxation was taken very seriously by these chiropractors. John F. Grostic wrote:

> If you want to reduce or correct subluxations that is of the atlas, and directly benefit the case, you must now face facts, be truthful in your analysis. By increasing your knowledge of this important area, namely the cervical area, you can and will render a greater service, obtain greater satisfaction, and enjoy your work, create a greater desire within you to do better.[48]

GROSTIC SEMINARS

By 1940, Grostic's research began to be privately taught to individual doctors or small groups. By 1944, at least five doctors had received the full analysis of Grostic's work, and they began doing considerable pre– and post–x-ray studies to validate his research. These men were Drs. George Benson, Ralph Gregory, Harold Scheidt, Earl Striplin, and Hollis Westfall. Westfall is an interesting player in the development of the Grostic procedure because he was an associate in Grostic's practice during the early stages of his research. Records show that he helped with some of the early seminars (i.e., taking and developing x-rays, setting up class).[48]

A select few other doctors had received the work before 1946, and those that had received portions of Grostic's research made requests to gain the full procedure. In answer to the many requests from the field, the first official seminar was scheduled to take place October 31 through November 3, 1946. The class was restricted to those who had already received some portions of Grostic's research. The first seminar took place in Ann Arbor, Michigan, with 15 doctors in attendance (Fig. 1-21). Before initiating his official seminar series, Grostic published *The Chiropractor's Field Research Manual* in 1946.[53]

The first Grostic seminars were held at the Allenel Hotel, but they were eventually held in the basement of the Masonic Temple. Grostic encouraged every doctor attending the class to receive an adjustment, primarily from him. Therefore, the doctors would typically arrive on the Saturday or Sunday before the basic class began and receive a pre–x-ray, adjustment, and postfilm. He would typically x-ray and adjust 50 to 60 doctors and some of their spouses. The basic seminar began on Monday and went through Saturday. Each day was quite grueling; classes began at 9:00 A.M. with a prayer and went until noon for a lunch break. Sessions started

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FIGURE 1-22 The 1958 Grostic class.

again at 2:00 P.M. and went until a supper break at 5:00 P.M. The evening session typically lasted until 11:00 P.M. Grostic provided at least 40 hours of seminar instruction, and he was very demanding of the doctors' commitment to learning his work accurately. He used to [??18] quote Schiller to emphasize his teaching points: "Only those who have the patience to do simple things perfectly ever acquire the skill to do difficult things easily."[48]

The advanced classes typically took place from Thursday through Sunday, with doctors receiving professional service on Wednesdays. Grostic initially charged $150 for the basic seminars, but this was raised to $200 in later years. The doctors paid less for the advanced classes. Grostic claimed to make only a small profit from the seminars given the time involved with preparing for the classes and taking 10 days off from his busy practice. Indeed, the seminar fees were a considerable financial investment for doctors of that time, as well as the time away from their own practices. It was known that some patients would actually help pay for their doctor's lost practice income and the expenses of traveling to Ann Arbor to obtain Grostic's training. Some patients had even helped doctors to purchase the necessary equipment, provided a business loan, and supplied patients for the practice, just so that they could receive a Grostic adjustment when needed.[48] Grostic held seminars in Atlanta, Georgia; Louisville, Kentucky; San Angelo, Texas; and Roanoke, Virginia. However, the "show on the road" was stopped in 1953, and future classes were only held in Ann Arbor.[47]

Typically, four classes took place each year. A basic seminar was held each September for new doctors, followed by an advanced class in October for those who had previously attended a basic seminar. Two advanced classes were held in April and May; however, doctors had to qualify to be admitted to these special courses. Since the fall of 1957, doctors were required to send in two complete sets of x-rays at least 60 days before the advanced class. The postfilm had to demonstrate a significant correction, and the analysis had to be accurate (Fig. 1-22). Beginning in 1959, Grostic required doctors to send in film of the nasium and vertex to demonstrate that their equipment was in alignment.[48]

It took Grostic about 300 hours to prepare for each seminar in part because he had to personally analyze and grade each set of x-rays. Grostic would cover the doctors' names on each set of film and review the cases during the seminar to show what mistakes were made. Incidentally, he did not recommend getting out x-rays during regular patient visits, so he stressed the importance of having a listing card that was detailed and accurate.[48] Grostic was a good artist, as evidenced by the professional canvas drawings that he created and used in the teaching of his seminars. The canvas drawings included detailed spinal anatomy, various biomechanical concepts, x-ray analysis, and various aspects related to the adjustment (Fig. 1-23). Grostic originally recorded

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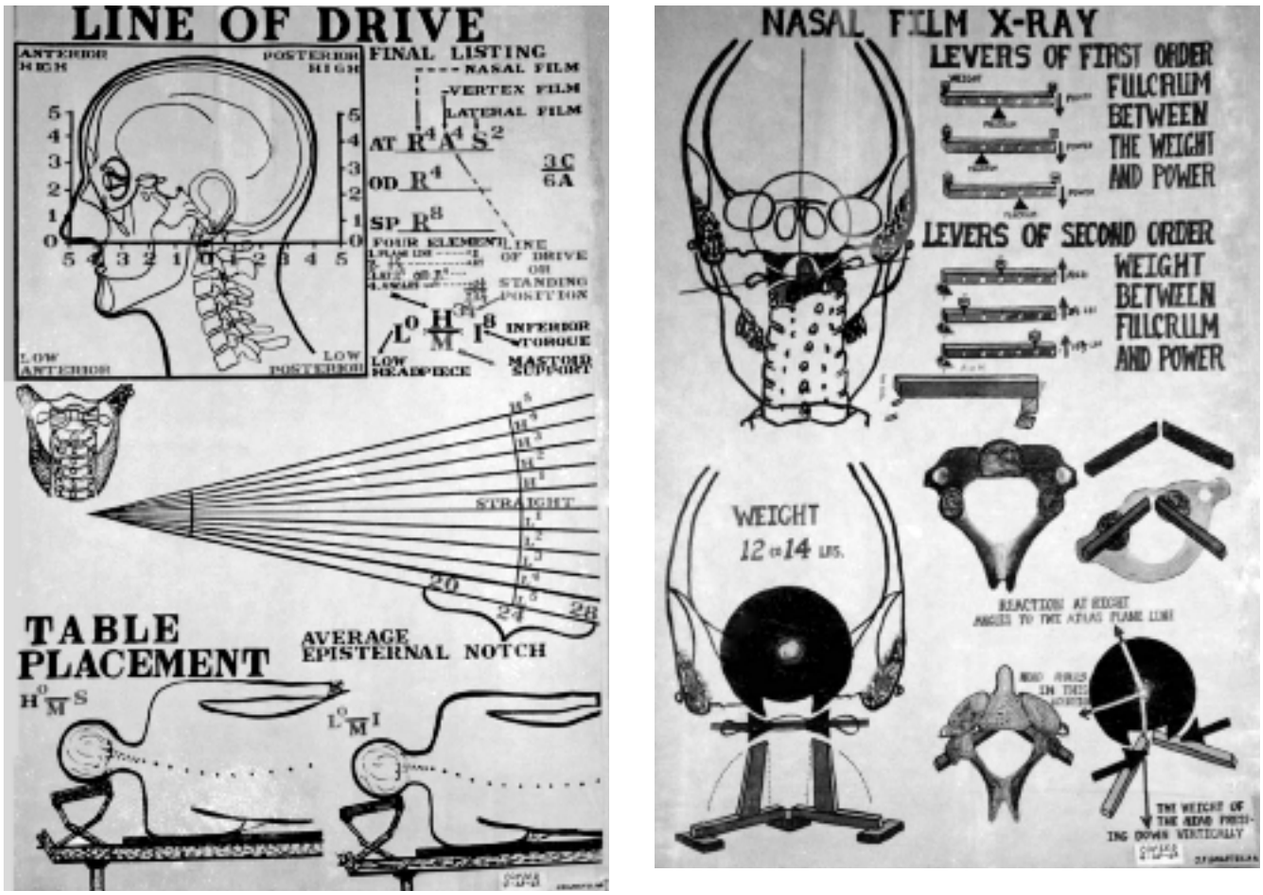

FIGURE 1-23 Canvas drawings (**A** and **B**) made by Dr. John F. Grostic that were used to teach in his seminars.

his seminars on record albums, but in later years, the audio was captured on reel-to-reel tapes. Many of these recordings have survived, and they provide an interesting glimpse into the actual makeup of the classes. They clearly demonstrate that Grostic led the teaching of virtually all of the material related to the technique.[48]

Grostic was quite selective about whom he would allow to attend even his basic seminars. Eventually he would not allow any chiropractors to sign up for his training if they used any form of physical therapy. He had a detailed questionnaire relating to their practice and philosophy of chiropractic. If the doctors did not declare in writing that they were willing to discontinue the use of physical therapy modalities in their practices after learning the Grostic work, then he would refuse their admittance. He did not deny the possibility of physical therapy providing some results for certain patients, but he believed (as many chiropractors of the day) that the use of modalities was foreign to the chiropractic principle. Uniformity between the method(s) by which chiropractors practiced was very important to him. Grostic actually maintained a comprehensive file on virtually every doctor that attended his seminars. This included the various tests that he would administer to his students, as well as various questionnaires that had to be filled out related to their practices and chiropractic philosophy. Grostic tried to limit the attendance of his seminars to 60 doctors.[48]

Grostic allowed only one fourth of a degree of variance between the doctor's measurement of atlas laterality with the use of the cephlocentroscope. His personal records note how he admonished doctors for carelessly drawing central skull lines on pre–x-rays that exaggerated the misalignment, only to correctly analyze the postfilm to demonstrate a false correction. Grostic recommended that the x-ray view box should be wide enough so that pre- and postfilms could be positioned side by side for a proper comparison. Grostic lamented the fact that some doctors considered his approach to the assessment of the adjustment as negative. These doctors believed that intent and thinking positive would result in a successful correction. However, Grostic was

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vehement that an incorrect adjustment will have an adverse consequence in time, and no amount of positive thinking can counteract a doctor's incompetence.[48]

John F. Grostic was a very well read individual. Many doctors thought that he was an engineer before becoming a chiropractor, but this is incorrect. Grostic discussed the current research of his time related to the reticular formation and the work of Magoun and [??19] Moruzzi from Northwestern University. In the 1950s, Grostic discussed his theory of how the upper cervical subluxation caused neurological dysfunction and involved the reticular formation. He also described the function of muscle spindles and how they play a role with neurological function related to the cervical spine and the subluxation. This is quite impressive when one considers how little was known at that time about the function of these muscle receptors compared with what is now understood. He even had an interesting theory about how the subluxation could upset the magnetic field of the spinal cord to produce neurological insult.[48]

GROSTIC'S PRACTICE PHILOSOPHY

Grostic frequently lectured about the patient's needs as opposed to the doctor's needs. He felt that doctors should not brag or accept more new patients than they could appropriately handle by following his strict protocol. It was important that doctors accepted cases they could handle in a professional manner and refer patients when they could not effectively reduce their subluxations. Grostic believed that some patients would be far better off if a chiropractor had never performed an incorrect adjustment because the possibility of increasing the subluxation. The purpose of post–x-rays was for doctors to put aside their egos and face the reality of what they had accomplished and what they did not achieve with the correction. The postfilm provided the doctor with the information that was needed to correct errors and thus help the patient. Grostic admonished doctors from taking advantage of patients by overusing and/or overcharging.[48] HIO and Grostic's work were revolutionary concepts in the application of the adjustment and the management of patient care. According to Grostic:

> Up until a few years ago, it was the general opinion of the profession that once a vertebral subluxation existed, it was always present, and had to be adjusted constantly and continuously until the case got well.[58]

Most subluxation-based chiropractors of Grostic's era (and to this day) believed that the position of the spinal vertebrae was a binary state—either in alignment or out of alignment. However, the quantitative analysis of the Grostic procedure demonstrated that the configuration of the cervical spine and the degree of misalignment reduction varied from patient to patient. This system enabled the doctor to determine the degree of spinal correction and how this correlated with the patient's response to care. Indeed, clinical research demonstrated that the amount of subluxation-induced neurological interference, the patient's ability to hold an adjustment, and the resultant effect on the health of the individual patient was variable as well.

His work was not called the Grostic technique or procedure until many years later. Doctors referred to each other as Grostic doctors, but. John F. Grostic referred to the procedure as *the Work*. Grostic actually discouraged doctors from promoting themselves as Grostic doctors or to hold themselves out to be superior to other chiropractors. He felt that chiropractic should not be pushed onto the public, but that they should be convinced of its merits based on the clinical results. Grostic believed strongly that money was not the measure of success, and this was evident by the fact that he charged less for office visits in his practice than many of his student doctors of the time. He was also known to accept no-monetary payment for his care; in other words, he bartered with some patients who were financially unable to pay.[48] Grostic was concerned about making chiropractic care affordable so that as many people as possible would have access to what he strongly believed to be life-changing care. He was known to carry a portable table with him almost every where he went—from family gatherings to professional meetings—because he felt so strongly that people needed to be subluxation free and clear of nerve interference.[47]

Grostic's chiropractic philosophy embodied three primary principles of life: (i) creation, (ii) transmission, and (iii) expression. He was a proponent of the restoration principle, which involved three basic components: (i) restoring the vertebra(e) to near or normal position, (ii) restoring normal neurological communication, and (iii) permitting restoration of health. Grostic felt that chiropractic was separate and distinct from medicine and the approach of stimulating or inhibiting the patient's physiology. He discussed the concern over medicine actually stealing chiropractic from chiropractors, although he believed that chiropractors should do less criticizing of the medical profession and focus more on their own professional development.[48]

Grostic discouraged doctors from using full-spine adjusting. He did not state that there was no value in some types of lower spine adjustment, but he felt that it took the doctor's strict focus on the cervical spine to master his work. However, he was concerned about the possibility of thrusting into the thoracic spine and causing the upper cervical spine to misalign or even change listings. Grostic admitted that cervical traction could possibly reduce the lower cervical kink, although

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it was obvious that he did not recommend this procedure.[48]

In 1964, Grostic stated that he had only used upper cervical adjustments during the previous 29 years of his practice.[49] It is unclear if he had experimented with adjusting lower spine segments during his first year of practice; however, this is unlikely because to his strict adherence to B. J. Palmer's HIO system of care. Upon becoming a member of the BTO and PSCC, Grostic was restricted from doing anything other than upper cervical adjustments in his practice (including no physical therapy). Membership in the PSCC required doctors to be nominated by other chiropractors who attested that the nominee was an upper cervical purist.[59,60] The PSCC would even investigate doctors to make sure that they were maintaining the organization's strict standards put forth by B. J. Palmer. In 1947, the questionnaires that Grostic sent out to prospective students strictly screened to determine if the applicant used only HIO adjustments in his/her practice. In later years, he would relax this requirement, particularly for new doctors who were learning his work.[48,55]

Grostic believed that the atlas was the major subluxation in virtually all cases, although he stated that the axis could be adjusted in rare cases if atlas laterality and rotation were not present. This could result in temporary results, although a few guidelines should be followed. His notes state that the axis should not be adjusted if the functional short leg is on the opposite side of the C2 spinous process deviation or if the odontoid and axis spinous process are on the same side as the median line.[48]

Dr. Corbin Fox remembered Grostic having two parts to his philosophy: (i) Have a superior service for a reasonable fee, and (ii) Does the glow of the view box outshine the glare of the operating room?[61] Grostic was driven to ensure that the doctors were provided with appropriate instruction to enable them to deliver the best care to their patients. One of his goals was to eventually have four or five top-notch doctors in each state to help new doctors develop at a faster pace. Unfortunately, Grostic never met his goal because he felt that not enough doctors were willing to apply themselves to master his work. He lamented that if he could only have 50 doctors in the field who were fully trained and capable of teaching, then his efforts would not be in vain and his work would survive. Indeed, he believed if he had 500 mediocre doctors to carry on his work, then his research would surely die by the wayside.[62]

Striplin was working extremely hard by traveling across the country to conduct workshops with various doctors. Gregory also worked with doctors, although this was generally done locally in Michigan. Over the years, other doctors were known to teach Grostic workshops. Grostic also commended the superior proficiency of future leaders of orthospinology that included Drs. James K. Humber, Tom Humber, Jim McAlpine, and Roy Sweat (Fig. 1-24).[48,62] These doctors provided some assistance in the Grostic seminars from 1960 until Grostic's death in 1964. However, only John F. Grostic led the teaching of technique-related issues; these other doctors functioned only in a supportive role.

FIGURE 1-24 Dr. John F. Grostic with some of his top students. From his left to right: Drs. Roy Sweat, J. K. Humber, T. O. Humber, C. T. Craven, Irving Mathias. [??47]

As the seminars grew, so did the reputation of Grostic's legendary practice. He averaged about 100 patients per day and usually accepted only four new patients per week, with a waiting list ranging from 1 week to 3 months during the last 12 to 15 years of his practice.[49] Out of an approximate 10,000 patient files over his 30-year career, Grostic had 4,000 to 5,000 active patients.[47] Patients were also known to travel great distances to his office from all over North America and other countries.

INFLUENTIAL CHIROPRACTORS WHO HAVE STUDIED THE GROSTIC WORK

Grostic taught his work to several chiropractors that would go on to be very influential in the profession. Dr. William Harris graduated from PSC in 1938 and was a classmate of Gregory. He practiced in Albany, Georgia, and attended his first Grostic seminar in 1947. Grostic's records indicate that Harris was very influential with referring doctors to attend the classes in Ann Arbor. Upon John F. Grostic's death, Harris established the John F. Grostic Memorial Fund.[48] After making his first contribution, he said, "This fund will act as a living memory of one of our beloved colleagues. I am proud to make this contribution in his memory. It is a token of my

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personal esteem and gain of knowledge this man gave to the profession."[63]

Harris was the president of the international Palmer College Alumni Association. B. J. Palmer designated Harris as a fellow in the International Chiropractors Association during its annual convention in 1956. B. J. authored almost 40 books and dedicated only two of them to chiropractors; Harris was one of them.. Harris was the founder of both the Foundation for the Advancement of Chiropractic Education (FACE) and Practice Consultants (a practice management company). FACE is a nonprofit organization that has contributed more than $5 million to chiropractic research and education.[64] Dr. William Harris will go down in history as the most acclaimed chiropractic philanthropist.

Dr. Lorraine Golden was a 1942 PSC graduate from Louisville, Kentucky, who began attending Grostic seminars in 1948. In 1957, she founded Kentuckiana Children's Center, the primary focus being to provide pediatric chiropractic care to families regardless of their ability to pay. The private, nonprofit center presently has a multidisciplinary staff that operates an outpatient clinic. About 75% of the patients present with autistic spectrum disorders, and the balance of children have allergies, asthma, cerebral palsy, Down syndrome, epilepsy, Tourette syndrome, or other conditions. Kentuckiana has previously developed the profession's first postgraduate, 2-year intern program in pediatrics. Golden served as executive administrator until her retirement in 1998. She has received numerous awards for her contributions to the profession and children. Golden was the first recipient of the Kentucky Chiropractor of the Year award in 1954, and she was commissioned a Kentucky colonel in 1958 for her humanitarian contributions. In 1988, she received the Dr. Mabel Heath Palmer award, which is given to the foremost woman chiropractor of the year.[65]

[??20]

Dr. Weldon Derifield was a 1936 graduate of PSC; he attended the Grostic seminars in 1948 and 1952.[48] He remained a patient of Grostic for many years, as they were fellow Michigan chiropractors. He along with his father, Dr. Romer Derifield, codeveloped what became known as the Derifield-Thompson leg check. This chiropractic procedure was carried out in the prone position. They began presenting this work in the 1940s. It is interesting to speculate about the potential collaboration between Derifield and Grostic in reference to the functional leg check because both doctors began using this assessment at about the same time. However, it is likely that these doctors worked on their recumbent postural analyses independently. Weldon Derifield worked with Dr. Fred Vogel during the latter phase of his career and studied Dr. Roy Sweat's atlas orthogonal technique until his death in 1999.[66] Derifield was Vogel's first chiropractor when he was only 2 years old. Vogel and his mother had been stricken with poliomyelitis, and Derifield made almost daily house calls. The family attributed the chiropractic care as an aid for their bodies to eventually make a full recovery from the disease.[67]

Dr. Richard VanRumpt graduated from National College of Chiropractic in 1923 and did postgraduate work at PSC as well. He attended Grostic classes in 1948. Letters to John F. Grostic indicate that he was a very inquisitive doctor. VanRumpt was a professional boxer in New York at the age of 16. When he and the other boxers would prepare for a fight, the boxing trainer would perform a rudimentary leg check before providing a cervical manipulation. This experience intrigued VanRumpt, and he would later spend years evaluating relative leg length changes with his patients after performing evaluations and adjustments.

VanRumpt became the founder and developer of directional nonforce technique (DNFT). He initially found that the mere pressure of spinal palpation on his patients often resulted in unexpected structural, symptomatic, and physiologic changes. VanRumpt determined that a low force approach could not only be an alternative to the more forceful methods taught in school, but might even surpass the clinical result of traditional adjusting. VanRumpt began teaching his method of analysis and adjusting to other doctors in 1945 and continued until 1986. The adjustment involves a unique thumb impulse. DNFT is one of the only other chiropractic techniques (other than upper cervical specific) that make claims of helping patients with a minimum number of visits and enabling many patients to hold adjustments for several months.[68]

Dr. Burl Pettibon graduated in 1956 from Cleveland Chiropractic College, and he went on to take only one Grostic class in 1959. He eventually developed the Pettibon technique, which showed an obvious similarity between his cervical x-ray analysis and that of the Grostic procedure.[69] The Pettibon technique at one time used a table-mounted instrument, as well as other instruments, to adjust the upper cervical spine. Allegedly, Pettibon obtained the idea of his table-mounted instrument after observing Dr. Cecil Laney's machine (see Chapter 14).[70] Over the years, Pettibon collaborated with others (i.e., Dr. Don Harrison, Dr. Vern Pierce), and his technique eventually drifted away from the orthogonally based upper cervical focus it had in its early roots.

[??21]

Harrison left Pettibon in 1980 and joined up with Dr. Dan Murphy (and Harrison's wife Deanne) to form Chiropractic Biophysics (CBP), or what is currently known as Clinical Biomechanics of Posture®.[70] CBP is a full-spine chiropractic technique and rehabilitation system that uses spinal adjustments and traction as well as specific exercises for the purpose of correcting global

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postural distortions. This technique uses x-ray analysis and an instrument to adjust the upper cervical spine, but the protocol is different from orthogonally based upper cervical care. As of this writing, CBP has published almost 100 papers in the peer-reviewed, indexed literature involving research that is directly or indirectly related to CBP.[71]

Dr. Lyle Sherman (former director of the B. J. Palmer Research Clinic) apparently had a deep respect for Grostic's work. Documents reveal that Sherman referred many patients to Grostic from the B. J. Palmer Research Clinic for his specific type of care.[48] One interesting letter on May 2, 1950, dealt with a doctor who had helped Sherman with a lecture in Austin, Texas. The doctor discovered that Sherman had a series of slides on Grostic's teaching and research. The essence of the letter consisted of the doctor questioning why Sherman had these slides and what he was planning to do with them. He also wanted to know if PSC was planning on teaching the Grostic work and if Sherman was using it in his own practice.[72]

Dr. William G. Blair was a 1949 graduate of PSC and is the originator of the Blair upper cervical technique. Grostic's records indicate that in 1950 Blair requested to take a basic seminar.[73] Dr. Leon Halsted had helped Blair's chronic bronchial asthma so much that he decided to become a chiropractor. Halsted was an upper cervical doctor who attended his first Grostic seminar in San Angelo, Texas, in March 1950, and he likely encouraged Blair to study Grostic's research. However, Blair never attended a Grostic class, and in 1951, he began his research into what would become the Blair technique, which he taught to field doctors from 1961 to 1980.

Blair developed his upper cervical procedure in part because of his concern over asymmetry in this region of the spine. He developed methods for imaging upper cervical misalignments at the margins of their articulations. Blair introduced new concepts of misalignment pathways for the cervical vertebrae, which he thought made it possible to tailor the adjustment precisely to the shape and orientation of the subluxated articulations. However, Grostic also recognized the issue of upper cervical asymmetry, and this is accounted for in his work. Grostic also noted that there usually appears to be developmental adaptations in many of these cases (e.g., short occipital condyle having atlas lateral mass and/or C2 body larger on the ipsilateral side).[48] Blair agreed that these other developmental adaptations could occur.[73] However, he believed that the upper cervical subluxation occurred at the articulation and required a different approach to its analysis and correction. Blair's contention was that articular surfaces tend to match exactly, even in the presence of osseous asymmetry.[74,75]

REFLECTIONS ON THE END OF AN ERA

Grostic noted in his records that his work was not complete and that much work was yet to be done. He mentioned that he had only touched lightly on certain aspects of his research because he realized the importance of focusing on the fundamentals of his work. Late in his career, he hinted that he was working on a system of establishing a line of drive for each individual case that would result in superior corrections and require fewer x-rays to assess each case.[48] Unfortunately, he passed away before he achieved all of his goals. Indeed, he accomplished a tremendous amount during his life, although this took its toll on his health. He kept up a tremendous work schedule between his busy practice, his research, and the preparation involved with his seminars. Grostic had to keep up with almost constant correspondence from field doctors who needed assistance with patient care and other issues. He also suffered from increased anxiety because of a few doctors who were altering aspects of his work and teaching it to doctors in the field. It appears that Grostic suffered from some health issues related to his previous Hodgkin's disease, which is known to be a risk factor for future cardiovascular complications.[76] He was also a heavy smoker, which was a common practice of the day.

One final incident may have set the stage for his untimely demise. During the 1960s, the Food and Drug Administration (FDA) announced plans to seize Microdynameters, which were used by many chiropractors. This device was essentially a sophisticated galvanometer that was marketed to be able to find chemical changes in the body that preceded symptoms of illness by measuring electrical currents generated by the body. FDA Commissioner George P. Larrick condemned the device. The agency stated that it could not correctly diagnose any disease and that it was capable only of measuring the amount of perspiration on the skin of the patient.[77] More than 1,000 Microdynameters were removed from hundreds of chiropractic offices, as well as thousands of other "unproven" devices from various health-care practitioners.[55,78]

It is unknown whether Grostic had a Microdynameter, but he did own a Cameron Heartometer.[79] This rudimentary cardiac instrumentation device recorded on a circular graph a tracing of the pulse beat from the brachial or femoral arteries. Chiropractors of Grostic's era were interested in finding objective ways to monitor their patients' response to care, so they were willing to experiment with the available technology. It has been alleged that a couple of days before his death on Halloween 1964 (18 years to the day of the first official Grostic seminar), his office was visited by the FDA and various

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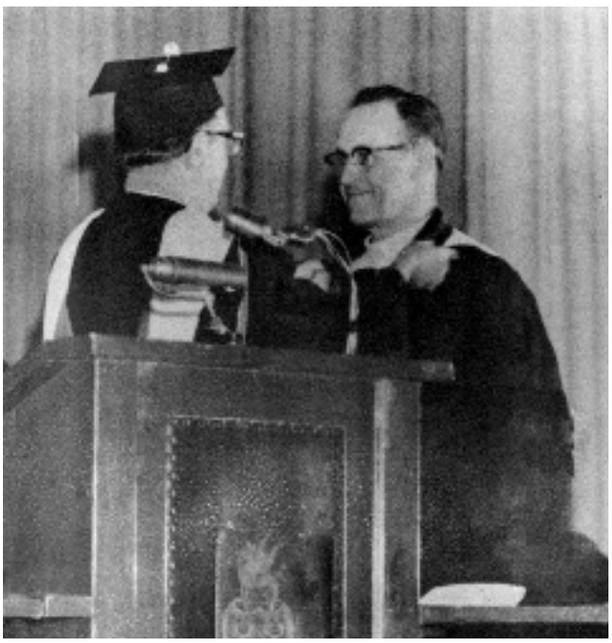

FIGURE 1-25 Dr. John F. Grostic receiving the medal for first-ever Daniel David Palmer Scientific Award from PCC in 1964.

FIGURE 1-26 Portrait painting of Dr. John Francis Grostic. (Commissioned by Dr. Cecil Laney.)

instruments were taken that were thought to be experimental by the medically oriented agency.[47] This created a tremendous amount of stress and anxiety for Grostic and likely contributed to his fatal heart attack. His
[??22] untimely death was a shock to thousands of doctors and patients around the world. However, this book is a testament that his life was not in vain and his work will live on. Dr. John Francis Grostic was a true chiropractic pioneer who blazed the trail for others to follow. Grostic said:

> Research is the delving for facts and principles. Any fact or principle laid down by one researcher which can and has been applied by others can be applied by all providing all elements are understood and utilized with accuracy. With this thought in mind, we may rest assured that the vast mass of suffering humanity may benefit by this work which, God willing, you Chiropractors shall give to them through the more skillful use of your hands.[53]

From 1946 until his death, Grostic presented his procedure to almost 1,500 chiropractors. Before he passed away, Grostic was awarded the first-ever Daniel David Palmer Scientific Award by Palmer College of Chiropractic on March 21, 1964 (Fig. 1-25). This prestigious distinction was created by the president's cabinet for the purpose of recognizing achievement in the field of scientific chiropractic standards and outstanding service to the profession. On the same day that Grostic received this award, he addressed the graduating class during the commencement exercises.[49] Grostic's list of achievements as a chiropractor and human being are far too vast to list in this chapter; however, his legacy lives on with the doctors that have carried on with his work. John F. Grostic's life reveals *why* the Grostic procedure was developed in such an analytical manner and *why* such great attention to detail is necessary to practice this work. Grostic was uncompromising in the application of chiropractic principles and with the methods that he had researched for years (Fig. 1-26). He stated:

> The benefit of all law in human life should be easy to see. In the bewildering complexity of human life man needs intelligent direction in his human activities. Laws give him this direction. The natural law and human positive law enable man to direct his activity to the attainment of the natural good of the individual and of society. Observing and obeying the laws is the light which enables men to step forward on the right road. For without law man is a weary, uncertain traveler, halting at each cross-road, stumbling in darkness over roads not familiar to his feet nor clearly seen by his vision. Without law man is a slave to the whims, fancies or fears that afflict those who travel in darkness over unknown roads. If man will follow the laws laid down in this work, he will be a sure traveler, moving forward in the daylight of reason and over a road that is clearly marked to which he wants to go in relieving suffering humanity.[48]

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FIGURE 1-27 The 1965 Grostic Presentations advanced class held in Atlanta, Georgia.

GROSTIC CHIROPRACTIC PRESENTATIONS, INC.

After Grostic's death, the group eventually split into two divisions: the larger one was established in Atlanta, Georgia, and a smaller one was founded in the Midwest (NUCCA, discussed below). The southern group became Grostic Chiropractic Presentations, Inc. and presented the more traditional technique applications. Drs. T. O. Humber, J. K. Humber, and Roy Sweat of the greater Atlanta area were considered to be three of the top doctors while Grostic was alive, and they each assisted with some aspects of his seminars. In May 1965, the first seminar took place at the downtown Holiday Inn in Atlanta (Fig. 1-27). The Atlanta trio of doctors were joined by Drs. C. T. Craven of Winter Park, Florida; George Wentland of Fresno, California; and Jim McAlpine of Chesaning, Michigan, to teach the first class. Grace Grostic, John D. Grostic, Cheryl Grostic, and Travis Utterback were added as board members at some point, along with the previously mentioned doctors. This organization continued to carry on the Grostic work until it dissolved in 1976. Incidentally, revisions were being made to convert the Grostic procedure to the metric system in the 1970s. This process was supposed to be completed by July 1976; however, this fell out of favor before it was implemented.[80]

SOCIETY OF CHIROPRACTIC ORTHOSPINOLOGY, INC.

In 1977, the Society of Chiropractic Orthospinology, Inc. was organized by some of the former board of directors from Grostic Chiropractic Presentations. Dr. Roy Sweat became the first president of Orthospinology and remained in this position until he resigned to form Atlas Orthogonality in 1981. Dr. David Amundsen took over the presidency but stepped down after about 1 year. Dr. Bobby Smith led the organization for the next few years, and Dr. Jim McAlpine held the presidential post after him. Smith once again was appointed as the president in the late 1980s, and Dr. Steven Humber and Dr. Steve Sheick followed him. Under Humber's leadership, Orthospinology became part of the core curriculum of Life University in Marietta, Georgia. Dr. Roderic Rochester was president from 1996 until 1998 and helped to develop much of the current infrastructure of the organization, which includes its presence on the Internet. Dr. Kirk Eriksen from Dothan, Alabama, was appointed in 1998 and is the current president. He has been greatly aided by his vice president, Dr. Ken Humber, throughout his presidency. Humber is the son of the late Dr. James K. Humber, and both have been known to be two of the top orthospinology instrument adjusting instructors.

After the organization's inception, orthospinology seminars continued to be held at the downtown Holiday Inn in Atlanta for the first 10 years. Classes took place in May and October, and basic classes were held in the offices of various board members. The seminars eventually moved to the Atlanta Airport Sheraton on Virginia Avenue, where they remained until early the 1990s. Presently the classes are held at the Renaissance Concourse Hotel at the Atlanta Airport. An annual orthospinology seminar has been held in Austin, Texas, since 2000, and seminars in Michigan have taken place intermittently over the years.

The orthospinology procedure is now taught as a selective course (which is considered a part of the core curriculum) at Northwestern Health Science University in Bloomington, Minnesota. Plans are under way to implement this work as an elective at Life University and at Parker College of Chiropractic in Dallas, Texas.

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FIGURE 1-28 Dr. Ralph Robins Gregory (1912–1990).

Orthospinology has remained close to the original teachings of John F. Grostic and is based on his model of the subluxation. This organization teaches doctors the hand adjustment, the use of a handheld, solenoid-driven instrument, and a multivector table-mounted instrument. The reader is referred to Chapter 14 for a thor- [??23] ough review of the history related to upper cervical instrument adjusting.

NATIONAL UPPER CERVICAL CHIROPRACTIC ASSOCIATION

In early 1966, Dr. Ralph R. Gregory was contacted by a group of Grostic doctors who requested that he teach seminars because of his affiliation with John F. Grostic. That same year, the first seminar was held at the Howard Johnson Motel in Monroe, Michigan. As a result, the National Upper Cervical Chiropractic Association, Inc. (NUCCA) was formed on April 16, 1966. The first elected president was Dr. Irvin Mathias of Indiana, but Gregory has always been considered to be the leader of this organization (Fig. 1-28).[56] In 1986, U.S. President Ronald Reagan honored NUCCA and Gregory for their great contribution to the chiropractic profession and raising the quality of care for patients.[81]

The National Upper Cervical Chiropractic Research Association, Inc. (NUCCRA) was formed in 1971 for the purpose of conducting and disseminating research related to upper cervical care. NUCCRA began publishing the *Upper Cervical Monograph* in 1973, and it is still in current circulation. This non–peer-reviewed journal has been used as their primary research publication. Unfortunately, little has been published in peer-reviewed, indexed literature related to the efforts of NUCCRA. There are presently some projects that are being produced with plans for publication in scientific research journals.

The NUCCA group uses exclusive manual upper cervical adjusting, which is a modification of the Grostic hand adjustment. Some of the accomplishments of NUCCA and NUCCRA include the following: (i) development of the double-pivot-point x-ray analysis, (ii) development of various analytical instruments used in the radiographic analysis, (iii) development of the triceps pull manual adjustment, (iv) design and development of the Anatometer posture distortion measuring instrument, (v) design and development of the multiple support headpiece, and (vi) classification of four basic types of upper cervical subluxation patterns.[56] Dr. Marshall Dickholtz Sr. is a 1956 graduate of PSC and has been instrumental in various developments of NUCCA, particularly in the area of radiographic procedures. Dickholtz received the Daniel David Palmer Scientific Award from PCC in 1994. NUCCA is currently a part of the core curriculum of Life Chiropractic College West. In addition, NUCCA is taught as an elective at PCC.

ATLAS ORTHOGONALITY

Dr. Roy Sweat founded Atlas Orthogonality (AO) in 1981, with an interest in pursuing research and the further development of instrument adjusting. The AO technique has modified various aspects of the original Grostic procedure and has changed the terminology to a Cartesian coordinate system. The AO adjustment uses a table-mounted percussion instrument that delivers a mechanical impulse through a metal stylus by means of a pressure-controlled actuator. AO is taught as an elective at Life University, Life West, PCC Davenport, PCC West, and Sherman College of Straight Chiropractic. An AO board certification program has been established through Sherman College as well. Sweat received the prestigious Daniel David Palmer Scientific Award in 1995 from PCC. He is renowned for his steadfast dedication and work ethic for the purpose of advancing upper cervical chiropractic care (Fig. 1-29).

ACADEMY OF UPPER CERVICAL CHIROPRACTIC ORGANIZATIONS

Orthospinology, NUCCA, and AO are considered to be orthogonally based upper cervical procedures. They all

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FIGURE 1-29 Dr. Roy W. Sweat, founder of Atlas Orthogonality.

use similar x-ray analyses for the lateral, nasium, and vertex views to assess patients' subluxations. The interpretations of the different types of analyses have some subtle to significant differences, although they have much in common. All three groups are in the same family of orthogonally based techniques and are represented with other upper cervical methods (i.e., Blair, knee chest) by the Academy of Upper Cervical Chiropractic Organizations (AUCCO). The following is the mission statement of the AUCCO:

> To maintain a coalition of chiropractors and chiropractic organizations who recognize, define, and qualify the atlas subluxation complex as an entity. The Academy shall foster and promote knowledge of the atlas subluxation through exchange and dissemination to perpetuate, advance, and preserve the science of the upper cervical adjustment.[82]

The first meeting to organize the AUCCO was arranged by Dr. Hal Crowe at Jekyll Island, Georgia, on June 11, 1994. The academy's founding committee members consisted of Drs. Scott Bender, Julie Brantley, Hal Crowe, Hugh Crowe, Keith Crowe, Keith Denton, John Dunn, Richard Kersey, John Pinto, Roderic Rochester, Steve Sheick, Matthew Sweat, Michael Thomas, and Fred Vogel. The AUCCO helps organize joint conferences that have included Orthospinology, NUCCA and AO. These conferences have been held in Atlanta every few years and involve each group having their own seminars, with joint sessions involving all three groups joining together. Future conferences are being planned with involvement of other upper cervical techniques.

UPPER CERVICAL DIPLOMATE

The AUCCO and Sherman College of Straight Chiropractic have cosponsored a diplomate program in the upper cervical spine. The program is designed to certify doctors of chiropractic with an Upper Cervical Diplomate (UCD). The College of the Upper Cervical Spine has been appointed and includes the following members with their accompanying affiliations: Dr. Kirk Eriksen (Orthospinology), Dr. Robert Kessinger (knee chest), Dr. Susan Brown (Blair), Dr. Edward Owens (formerly of Sherman College), and Jim Palmer (NUCCA). The college has developed the program that includes 300 hours of study, including an academic module and a technique module. The academic module consists of 180 hours of postgraduate training in anatomy, neurology, biomechanics, history, and philosophy. Overviews of various upper cervical techniques and their specific x-ray interpretation procedures are included as well. A research component and thesis rounds out this module. The technique module consists of an additional 120 hours of postgraduate training in an approved upper cervical technique of the doctor's choice.[83] [??24]

CONTRIBUTIONS OF JOHN DAVID GROSTIC

John F. Grostic's son, Dr. John D. Grostic, was very involved in the teaching and research of the Grostic procedure and various aspects of the chiropractic profession until his untimely death on June 27, 1995. John D. Grostic was 21 years old when his father passed away, and he vividly remembered making countless calls to doctors around the country to tell them the horrible news. John D. stated that many doctors passed out or broke down in tears upon hearing it. This was truly a sad period for the Grostic family, as well as for countless doctors on a professional and personal basis. [??25]

John David Grostic was born on April 23, 1943, in Ann Arbor, Michigan. He began studying somewhat under his father as a teenager and was involved with many of the seminars. The young Grostic started developing x-rays at the age of 8, and he once developed 120 sets of x-rays over 2 days. These pre- and postfilms were for the doctors (and some of their spouses) who were

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FIGURE 1-30 Dr. John D. Grostic working on an early personal computer in April 1970.

attending the seminar in Ann Arbor. Grostic was often used in the seminars as a test patient for conducting the supine leg check and other aspects of the class.

John D. Grostic had originally studied to become a Catholic priest, although he eventually decided to follow in his father's footsteps. He graduated from PCC in 1969 and earned a Bachelor of Science degree in chemistry from Eastern Michigan University. He acquired a computer in 1970 and began compiling research from his father's practice that would be published and studied for years to come (Fig. 1-30). John D. Grostic was designated as a fellow of the International Chiropractors Association in 1975 and was honored as a fellow of the Institute for Chiropractic Research (FICR) after working with Dr. Chung-Ha Suh at the University of Colorado in 1981. After private practice in Ann Arbor, he taught at PCC from 1977 to 1983.

Grostic eventually left PCC to open a private practice in Orlando, Florida. He remained in private practice from 1983 until 1986 and served on the Florida State Peer Review Committee during this time. In 1986, he joined the Life College, School of Chiropractic faculty as a professor in clinical sciences, research, and chiropractic sciences. The Life College faculty and students voted him Teacher of the Year in 1987 and 1988. Grostic also became chairman of the National Board of Chiropractic Examiners Question Committee for Neuromusculoskeletal Conditions. On April 30, 1992, he testified before the Military Personnel and Compensation Subcommittee to support the bill H.R. 608. This bill would finally authorize the appointment of doctors of chiropractic as commissioned health-care officers in the U.S. military. John D. Grostic was also involved with the World Health Organization—

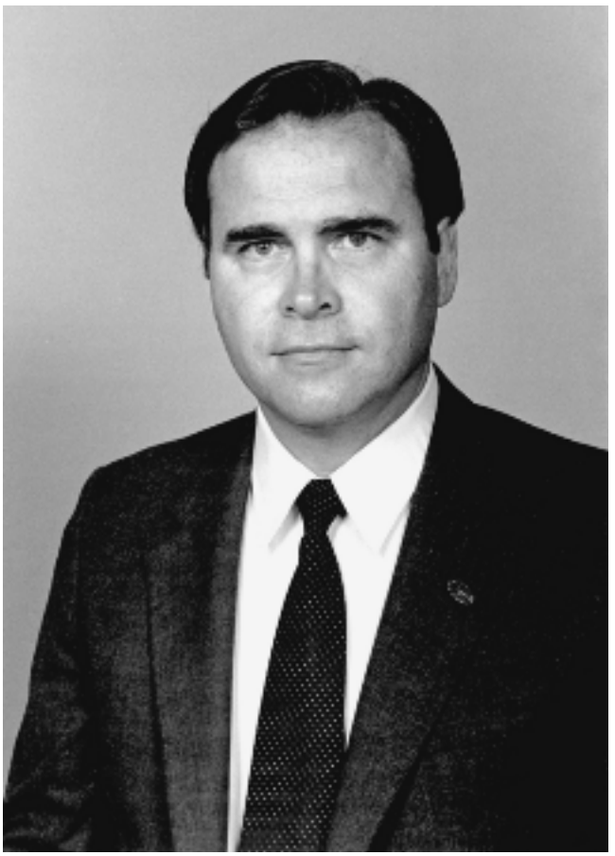

FIGURE 1-31 Dr. John D. Grostic (1943–1995).

sponsored panel to standardize the measurement of low back pain.

Grostic was the director of research at Life University from 1987 until his death in 1995. He served on the advisory board of Orthospinology and had many other professional activities during his career (Fig. 1-31). Grostic published more than 20 research papers and presented at numerous conferences and symposiums. He was the chair for the Upper Cervical Spine Conference and the editor of the *Chiropractic Research Journal* at its inception in 1988. In 1993, he was awarded Researcher of the Year by the World Chiropractic Alliance. The International Chiropractors Association presented him the prestigious Chiropractor of the Year award in 1994, and the Society of Chiropractic Orthospinology provided the same award in 1995. On June 21, 2002, John D. Grostic was posthumously honored the prestigious award of Fellow in the Palmer Academy of Chiropractic by PCC. The following quote from Dr. Sid E. Williams, the founder and former president of Life University, sums up what Dr. John D. Grostic represented as a doctor and human being:

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> For all his brilliance, John was still the most humble person I've ever known. Gentleness and kindness were the qualities that he elevated. His presence at Life College will be indelibly etched in the minds of the students, faculty, staff and patients that he touched. The chiropractic profession has lost a dedicated researcher, respected teacher and a loyal friend.[84]

Dr. John David Grostic's son, Dr. Richard John Grostic, is continuing the family tradition as a doctor of chiropractic. Like his grandfather and father before him, a keen ambition and love for chiropractic is evident. He has maintained and organized volumes of documents and records of his grandfather and father. This legacy offers much insight into the development and evolution of one man's desire to not only preserve his own health, but to share that knowledge with others. This chapter would not have been possible without the presence of such historical documentation, and this book would not exist if it were not for the passion of Dr. John Francis Grostic and his desire to make a difference in the world.

[??26]

SUMMARY

In this chapter, the reader learned about the following issues related to the history of chiropractic and the Grostic/orthospinology procedure:

- Prechiropractic history of spinal manipulation
- Events in the life of D. D. Palmer before his discovery of chiropractic
- D. D. Palmer's discovery of chiropractic and establishment of chiropractic education
- B. J. Palmer's contributions as the developer of chiropractic and leadership of the PSC
- B. J.'s development of the HIO technique and establishment of the Palmer Research Clinic
- Circumstances that led John Francis Grostic to enter chiropractic school
- Grostic's initial research and chiropractic involvement before teaching seminars
- Development and teaching of what eventually became known as the Grostic procedure
- Involvement of various doctors in the advancement of the work and of the chiropractic profession
- Death of John F. Grostic, the development of Grostic Chiropractic Presentations, Inc. and the Society of Chiropractic Orthospinology, Inc.
- Development of NUCCA, AO, and the AUCCO
- Contributions of John D. Grostic

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[??1]AU: Is this a chronological order of death? Seems odd to give their ages out of numerical order.
[??2]AU: Figs. 1-1 and 1-2 cited out of order, so I have reversed accordingly.
[??3]COMP/ED: See x-ref to page number.
[??4]AU: This is confusing. His first student to graduate? To enroll? Which happened in January 1898?
[??5]AU: This doesn't sound like much.
[??6]AU: Does this note include the previous quote? Perhaps it should be moved up to the quote itself.
[??7]AU: Do you think this is the best phrase to use in this context?
[??8]AU: Please check x-ref. A search of Chapter 10 does not come up with this phrase.
[??9]AU/ED: Check x-ref. A search of "paper" yields nothing.
[??10]AU: Check x-refs. Also, edit of sentence as meant?
[??11]Au: Check x-ref.
[??12]AU: Check x-ref.
[??13]AU: Check x-ref.
[??14]AU: Check x-ref.
[??15]AU: Check x-ref.
[??16]AU: Mabel?
[??17]AU: Where in Michigan?
[??18]AU: Please add first name.
[??19]AU: Add first names.
[??20]AU: Changed to Mabel, per previous spellings.
[??21]AU: Check x-refs.
[??22]Au: Although 57 isn't old, I'm not sure it was "untimely."
[??23]AU: Check x-ref.
[??24]AU: Not Dr., correct?
[??25]AU: Again, what makes this death "untimely"?
[??26]AU/ED: This repeats exactly the Learning Objectives? Why does this information need to appear twice? I would delete here.
[??27]AU/ED: For many references within the text, actual page numbers are not given for quotes; the reference simply repeats a work that the quote appears somewhere within.
[??28]AU: Change from Howard correct?
[??29]AU: Please give page numbers for chapter.
[??30]AU: He is author here, not translator, as in reference 1?
[??31]AU: Please give page numbers for chapter.
[??32]AU: Give page numbers for chapter.
[??33]Au: Abradale or Abrams?
[??34]AU: Can't verify. Please spell out name of journal.
[??35]AU: Is 3 the page number? Need page number.
[??36]Au: Can't verify. J Am Chiropr Assoc meant?
[??37]Au: Can't verify. J Am Chiropr Assoc meant?
[??38]AU: Please add publisher.
[??39]AU: Can't verify. Please spell out name of journal.
[??40]AU: Add page number.
[??41]AU: Can't verify. Please spell out name of journal.
[??42]Au: This just goes by year, correct? 1977?
[??43]Au: Is this a paper presented at the conference? Are these published proceedings? Need a more complete reference.
[??44]AU: What issue?
[??45]NOTE: The first two figures have been switched to match text order. Also, many of these are not directly credited. OK? Many have no dates, so I assume they are not known.
[??46]Au: Please name them left to right.
[??47]Au: It would be better to identify him as well, and give all names OUR left to right.
[??48]AU: Wording OK? Can't use a footnote in a table title.
[??49]Au: Abradale or Abrams?