

The Chiropractic Vertebral Subluxation

Part 5: The First Research Era From 1928 to 1949



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ABSTRACT

Objective: The purpose of this paper is to review and discuss the history of chiropractic vertebral subluxation theories between 1928 and 1949.

Discussion: Theories during this period grew in complexity and developed in 4 primary ways: upper cervical models, reflex models, global models, and models based on the work of Speransky. Authors, theorists, and technique developers during this time included B. J. Palmer, R. J. Watkins, Galen Price, John Hurley, Hugh Logan, Major Bertrand DeJarnette, Richard Van Rumpft, Roy Ashton, Joseph Janse, Henri Gillet, James Firth, and J. R. Verner. At least 8 perspectives on chiropractic vertebral subluxation were advanced through research, modeling, and applied clinical methods. By understanding the complexity of this period and analyzing the research, the modern practitioner will be able to appreciate this era. The foundations of modern clinical practice and theoretical applications have roots in this period.

Conclusion: Theories during this period developed in levels of complexity, expanding existing models and clinical practice methods. The theories and research from this period had an effect on the chiropractic profession for the subsequent decades. (J Chiropr Humanit 2018;25C:67-85)

Key Indexing Terms: *Chiropractic; History*

INTRODUCTION

Several new chiropractic vertebral subluxation (CVS) models emerged in the chiropractic profession between 1928 and 1948. Theories during this era were developed through instrumentation,¹⁻⁵ clinical practice,⁶⁻⁸ clinical research,^{1,9-11} model building,^{2,5,12-17} and increasing sophistication of neurophysiological models.¹⁸⁻²¹ According to Martin, the use of science in chiropractic was driven by at least 3 forces, including a revolt against the authority of medicine, the need to upgrade and reform chiropractic educational standards, and the development of new research strategies.²²

Martin suggested that chiropractic research in this period, although paltry in comparison to conventional clinical science, was not very different from the latter.²² He estimated that 51% of the articles published in the first 6 months of the 1935 volume of the *Journal of the American Medical Association* lacked experimental design. Similar statistics were found for the *Journal of Clinical Investigation* during

that time.²² Therefore, chiropractic research from this era should be viewed in this context.

Some of the leading CVS theorists reportedly conducted research during this era. Gillet initiated rudimentary interexaminer reliability studies soon after his graduation from Palmer School of Chiropractic (PSC) in 1928.⁵ Logan created the International Chiropractic Research Foundation in 1934, along with some of his followers, including 2 former PSC faculty, E. A. Thompson and John Craven.²³ Ashton conducted clinical evaluations on his myobasal technique in private practice and at the Standard Chiropractic College in New York City from 1923 to 1940.¹⁰ B. J. Palmer's research clinic opened in 1935.¹ Illi founded the Institute for the Study of the Statistics and Dynamics of the Human Body in Geneva in 1943, based on his research started in the 1930s and his collaboration with Joseph Janse at National Chiropractic College.²⁴ Finally, Weiant became director of research of the National Chiropractic Association Bureau of Research in 1929, research director for the National Chiropractic Association in 1944, and head of the Chiropractic Research Foundation (precursor of the Foundation for Chiropractic Education and Research) in 1945 (Fig 1).²⁵

The purpose of this paper is to explore CVS theories during this period, including the various attempts at research inquiries of these models. A critical analysis is also presented pertaining to research claims, validity, how chiropractors have understood and applied historical data, and evidence-based practices.

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Paper submitted May 18, 2016; accepted May 15, 2018.
1556-3499

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<https://doi.org/10.1016/j.echu.2018.10.004>

Researcher	Starting Year	Research Topic
Gillet	1930s	Motion Palpation
Logan	1934	Logan Basic Technique
Ashton	1923	Myo-Basal Technique
B.J. Palmer	1935	Upper Cervical Technique
Illi	1930s	Pelvic Biomechanics
Weiant	1930s	Photo-electric subluxation instrumentation

Fig 1. Research efforts during 1928-1949.

Chiropractic Vertebral Subluxation Between 1928 and 1949

There were 4 main developments of CVS theory between 1928 and 1949, including upper cervical models,^{1,2,9,17,26} reflex models,^{6,10,12-14,27} integrative models,^{6,11} and models based on work by Speransky (Speranskian models).^{9,16,19,28} Intertwined models were commonplace, such as Firth's integration of most techniques,⁶ B. J. Palmer's integration of Speransky with his upper-cervical approach,^{1,9} and R. J. Watkins' integration of most models with Speransky and the latest neurophysiology.²⁰

B. J. Palmer's Upper Cervical Models. B. J. Palmer's initial upper-cervical theory was based on 7 years of clinical observations with early thermography and is one of the

contributions during this period.²⁶ In 1951, Palmer published a book that reflected the 14 years of data collection conducted after his first text on upper cervical-specific CVS.^{1,9,17} His theories during this time took on new levels of complexity, including his theories of periodicity and frequency of CVS.^{29,30} His models were further developed during this period by his student Galen Price.² Although B. J. Palmer's later emphasis on upper cervical theory is common knowledge, detailed understanding of his theories are rarely described in the literature (Fig 2).

B. J. Palmer introduced his hole-in-one upper cervical model in an article in 1930 and a talk in 1931.^{1,31} Palmer published 3 texts between 1934 and 1938 as *Volumes 18*,

Year	Hypothesis	Theory Development
1923	Heat associated with vertebral subluxation could now be objectively measured	B.J. Palmer started clinical research with thermographic instrumentation
1925	Chronic and acute subluxations present with different thermographic findings	Craven published the first instrumentation findings
1930	Subluxations with interference to the nervous system only occur in the UC spine, which may be empirically observed as repeated patterns of thermal activity.	After seven years of thermographic research, Hole in One / upper cervical technique introduced
1930	Subluxations no longer need to be corrected daily, weekly, or monthly	Commence systematic testing subluxation theory with thermographic and x-ray analysis
1932	Subluxations remain in the same position until adjusted	First two years of clinical research complete
1933	Subluxation intermittently fluctuates in time and dis-ease has a periodicity based on how often subluxation was present	Clinical research using thermography at the same time every day was conducted for weeks
1934	Subluxations have degree, periodicity, and frequency as well as a field of chronic position, which may cause compensations in the spine	Specific subluxations were determined to return to the same field or "abnormal range"
1936	The interference may be related to the human energy system and be affected by environmental energies such as magnetic waves, radio waves, and static electricity	Research in shielded grounded booths using various instrumentation methods
1938	Speransky and Crile came to the same conclusions as chiropractic that quantity and quality energy flow could be modified by blocking afferent or efferent neural structures	Produced a compendium of clinical research based on thermography and x-ray analysis
1951	No two subluxations are alike	Clinical controlled research compilation from 1935 to 1951 is published

Fig 2. Development of B. J. Palmer's chiropractic vertebral subluxation hypotheses. UC, upper cervical.

19, and 20.^{9,17,26} *Volume 18* was published in 1934 and called *Subluxation Specific Adjustment Specific*. It was his first textbook on upper cervical theory and may have included some theories from A. A. Wernsing, a 1926 PSC graduate.^{26,32}

In 1932, Palmer explained why he switched from a theory related to CVS at any level of the spine to specific upper cervical chiropractic.¹ It was multifaceted reasoning that included his then almost 10 years of thermographic pattern observations and about 40 other observations he appended to Stephenson's 33 principles.^{1,33} Starting in 1930, his method for detecting CVS changed to what he referred to as a more accurate and scientific approach. Palmer writes that as of 1935, "We began to definitely set our minds to determine ways and means; to study, research, locate, and to know WHERE, WHEN, HOW NERVE PRESSURE INTERFERENCE TO TRANSMISSION EXISTED."¹ Thus, he did not change his overall theory, which dated to the period from 1907 to 1911,³⁴⁻³⁶ but he did change his analysis, his regional focus, and his methodology. He still defined CVS in terms of misalignment, occlusion, pressure, and interference.

Palmer developed a new regional focus of CVS. He maintained that the only vertebrae that could subluxate were the upper cervical spine and that vertebra below axis could only misalign, not subluxate, and that it was required in this definition that there must be interference to the transmission of mental impulses. A misalignment was less than a CVS and could have all the signs of what was previously deemed a CVS determined through palpation, spinograph, taut fibers, tender nerves, contracted muscles, and even a peak thermographic reading.¹

One reason for this new approach was the finding that successful adjustments of the sacrum and coccyx were actually adjusting the major CVS in the upper cervical spine. Palmer suggested that it was eventually proved this was due to relief of cord tension,¹ which was developed from his original theory of spinal cord tension.³⁷ B. J. Palmer concluded that CVS could only occur in 3 directions simultaneously or be torqued, which he felt put pressure on the spinal cord.²⁶ This was a change from his 1908 theory that CVS occurred in 6 ways: superior, inferior, left, right, anterior, and posterior.³⁸ This was proposed to be determined with thermographic instrumentation based on a method of pattern analysis coupled with x-ray analysis. In 1934, Palmer wrote:

To 'torque' is to cork-screw in a three direction movement simultaneously. The three directions are: up or down, S or I, to left or right, L or R, around, circularly obliquely, a combination. The average mind can readily understand, see, visualize ONE direction. A lesser number grasp and understand TWO directions. FEW appreciate motion when directed THREE directions simultaneously. 'Torqued subluxations' and 'torqued adjustments' involve THREE directions.²⁶

The first 10 years of neurocalometer (NCM) research at PSC from 1923 to 1933 led directly to the development of

upper cervical-specific chiropractic. By 1936, B. J. Palmer included the neurocalograph, which was a sensitive graph reader that attached to the NCM, and the neurotempometer, which set a standardized speed for NCM readings. Patients were checked and rechecked for days and weeks until the heat pattern returned. When it did, and it was consistent, an adjustment was given.¹ This was the development of what has been called *physiological pattern work* in chiropractic.

Building upon D. D. Palmer's original models,^{36,39} B. J. considered the etiology of CVS as an interplay between the interior and the exterior.¹ When external forces overcome internal resistance, a vertebra may lose its position and go from normal to abnormal. He referred to this as centripetal forces overcoming centrifugal forces.¹ By checking and rechecking patients at the same time of day every day for days, weeks, and months, B. J. Palmer and his staff noted variable patterns and frequencies of CVS. They thought that when a CVS returned it was due to an external force or sudden change in the environment, especially temperature.¹

B. J. Palmer hypothesized that seasonal changes in temperature that were abrupt could cause a change in chemical balance in the body, which could affect the muscle's ability to effectively adapt to and resist the heat or cold. For example, sudden cold exposure could contract the muscles of the neck, which were generally exposed to the cold. The contracted muscles did not allow the body to effectively adapt to a new invading force. The reverse could happen if muscles were too relaxed from heat. This could bring back the major CVS pattern. He recommended chiropractors study this seasonal phenomenon in practice.¹

B. J. Palmer proposed that the CVS causes contracted or relaxed muscles, which change to contracted or prolapsed muscles. Muscles normally contract and take up the shock of an invasive force. They absorb the shock with resistance. The thought was that CVS could occur because the external force was overwhelming or because the resistance was lowered from previous CVS. The lowered resistive force could be abnormal or pathological owing to CVS.¹ B. J. Palmer suggested that health could be better understood by analyzing general bodily resistance. He thought if the body could not resist the invasive force, the force had to be "dissipated in either breaking soft tissue or displacing bones in any one of degrees mentioned,"¹ such as misalignment or CVS. He continued:

Some muscle or sets of muscles somewhere distributed about, over, and in human frame; lowering or increasing of action being symptoms and pathologies of dis-ease. This lack of mental impulse supply lowers tone, introduces more or less permanent contracture or permanent relaxation (prolapse) and makes them less able to resist future invasions of even less strong invasionary forces.¹

B. J. Palmer posited that the range of invasive concussive forces resulting in CVS was less than that required for a

dislocation but more than that needed for a misalignment. He also thought that this could result in a primary CVS occluding a foramen, producing pressure on nerves, and interfering with the transmission of mental impulses, which led to the lowered resistance and lowered tone.¹ This was a contribution to D. D. Palmer's contention that chiropractic is based on tone.³⁶

In 1933, B. J. Palmer gave a talk at the PSC lyceum.¹ He proposed that CVS had frequency, degree, and periodicity. In 1934, he added that CVS roved or roamed around within an "abnormal range."¹ The abnormal range became consistent; therefore, the CVSs were reproduced in the same abnormal position in chronic recurrences. These ideas were published in 1934 in *Volume 18* and later edited and republished in 1951, in *Volume 25*.^{1,26} The 1933 talk was published in the April and May issues of *The Chiropractor*. The first article was titled, "Is there an ebb and tide to subluxation frequency?"^{26,29} The second article was titled, "When is a vertebral subluxation?"³⁰ A third article was cited by B. J. in 1951, as the foundation for the other ideas. It was titled, "What is behind the hoboing, roving, or roaming of vertebral subluxations?"¹ He suggested that without the third article, the ideas on CVS frequency would seem "contradictory."¹

Palmer explained that primary CVS may return in the same vertebral positioning in the future and also cause compensatory misalignments in other areas of the spine. He suggested that CVS weakened muscles, even after the CVSs had been corrected they may come back, but the CVS would stay in an abnormal range. He suggested that each CVS created its own field of effects in the body. He wrote, "Each field is distinct unto itself; each creates its own field of consequent and sequential effects noticeable in body."¹ Recurrence of the same vertebral subluxation pattern may indicate such a field.

Until 1930, the theory purported at PSC was that a CVS needed to be adjusted "daily, regularly, constantly, and continuously for months, until the patient was well."²⁶ A change occurred in the spring of that year when B. J. Palmer and his staff tested this methodology using NCM and spinograph (chiropractic x-ray analysis) readings. By fall 1932, they thought that once a CVS existed it was there 24 hours per day, but after it was adjusted, sometimes with just 1 adjustment, it would stay adjusted. By 1933, however, they concluded that CVS may intermittently fluctuate in time.²⁶

Palmer wrote:

Idea that ONCE A VERTEBRAL SUBLUXATION it exists 24 hours a day must now give way to newer observation that all which is necessary to reduce health of an individual is that it be more or less present more or less of time, which gradually decreases distance of time between, which decreases health time periods and increases disease time periods, effects of which

increase in severity or in periods of time and reduce resistance of tone of tissue structure and thus introduce its opposite or dis-ease of tissue function.¹

B. J. Palmer proposed that the CVS regulated the abnormal supply of mental impulses from the brain based on the degree of CVS.²⁶ "Dis-ease" grew when interference to the transmission was continuous, in multiple locations, and when that interference was present more often than innate intelligence could adapt to or correct it. Getting better or worse depended on how often CVS was present or not. He referred to this as periodicity of "dis-ease," which was directly related to its irregular periodicity. He thought that the degree of CVS was variable.¹ By 1951, Palmer concluded that no matter how meticulously he took records or for how long, there was no set law determining CVS periodicity. In other words, no 2 were alike.¹

Two important ideas from D. D. Palmer's final writings were tone and CVS as a regulator.^{39,40} D. D. Palmer hypothesized that CVS was a regulator of tension via the neuroskeleton. In these writings on periodicity and frequency of CVS, B. J. Palmer described it as a regulator of unnatural and abnormal impulses leading to lowered tone.^{1,26} This may be his only mention of "tone." This information refutes a theory by Keating that B. J. Palmer only used D. D. Palmer's earliest theories.⁴¹

Galen Price was a 1936 graduate of PSC and the dean of chiropractic philosophy from 1961 to 1977.⁴² Price went on to become the interim president of PSC in 1978. In 1940, Price republished Stephenson's text with an added section called "Occipito-Atlanto-Axial Region."² Stephenson was on the faculty while Price was a student.⁴³ Price started his chapter with a B. J. Palmer quotation suggesting that the neurophysiology of CVS was well documented in 263 publications from the medical literature, although he did not provide the references. Price then suggested a new innovative rationale for specific CVS of the upper cervical spine. The new rationale was developed by B. J. Palmer and his colleagues and based in part on statistics; clinical practice in the B. J. Palmer Chiropractic Clinic; B. J. Palmer's latest ideas; and the latest instrumentation technologies designed to detect CVS, such as electroencephaloneuromentimpograph (Fig 3), neurotempometer, conturgrafometer, and a new x-ray analysis technique.²

Price built upon Stephenson's ideas about the functional importance of the antagonistic spinal muscles. Stephenson wrote, "The muscles are employed constantly, especially when there is consciousness. The muscles are the means of subluxations occurring. The response to a concussion is referred to as *innate contraction of forces*."⁴⁴ Price proposed the exact muscles involved in each CVS as a new addition to the Palmer Method of analysis.² For example, atony of 1 muscle pointed to the contracture of its antagonistic "fellow-muscle," which locked the CVS in place. He stated that CVS may result in impingement of the spinal nerve, unbalanced

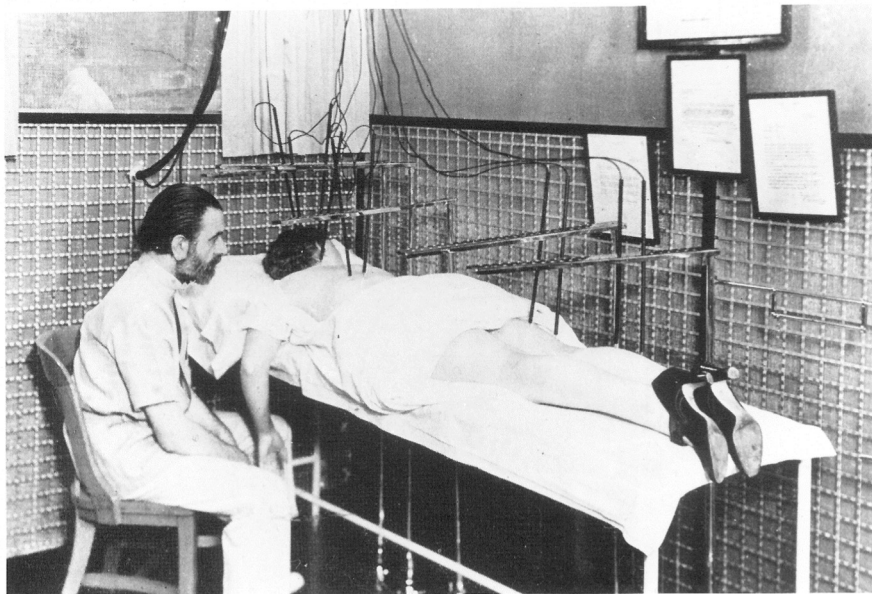


Fig 3. B. J. Palmer with a patient connected to the 8 sensors of the electroencephaloneuromyotomograph in a shielded grounded room lined with copper wiring. (Courtesy of Special Services, Palmer College of Chiropractic.)

tense and tender muscles, pain, misaligned vertebra, tension and tenderness in the region, a thermographic reading (which they thought indicated a hot nerve), or a traceable tenderness, cord pressure below the zone, and incoordination and dis-ease in viscera.²

Price wrote that “dis-ease” was due to “a vertebral subluxation which occludes an opening, impinges nerve channels, and offers interference to transmission of mental impulse supply between brain and body.”² He included the importance of the efferent and afferent nerve fibers in the occipito-atlantoaxial region. Price introduced the following new terminology to describe cord occlusion based upon B. J. Palmer’s models: circumferential constriction, torqued meningeal occlusion, heat expansion meningeal occlusion, and scar tissue occlusion²; each of these terms were included by Palmer in 1952.⁴⁵ Nerve tracing was conducted to determine which zones below the area of cord pressure were affected by the atlas or axis CVS.²

Reflex Models. In 1941, James Firth referred to a class of chiropractic practices as “reflex technics.”⁶ The reflex theories of Hurley,¹² Logan,¹³ DeJarnette,¹⁵ VanRumpt,²⁷ and Ashton shaped many models thereafter.¹⁰ Janse, Houser, and Well’s principles of reflex technics summed up the theories and laid the foundation for further technic and model development.¹⁴ New chiropractic reflex technics and their reflex models emerged during this time. Roots of these theories can be found in several earlier theories.^{39,46-48} These reflex models influenced the profession in significant ways, most of which led to increasingly complex neurological explanations for CVS (Fig 4).^{19,20,49-52}

John Hurley may have graduated from Marchand Chiropractic College in 1916 and PSC in 1918.^{53,54} He was dean of physiology at the California Chiropractic College in 1923. His background was engineering. Early success in his career with very light-force adjusting methods led to a new model.⁵³ Hurley reasoned that the body’s center of gravity

Technic Developer	Subluxation Theory	Analysis
Ashton	Gravitational stress leads to posteriorly rotated innominate, which leads to compensations and subluxations.	Full-spine standing x-ray analysis, palpation, and bilateral scales.
VanRumpt	Combined SOT subluxation model with full spine subluxation approaches as well as any possible nerve interference in the body.	Leg-check challenges to give contact and directional location for thumb-toggle adjustment.
DeJarnette	Innominate subluxation are primary to sacral subluxation, which are related to occipital subluxations, any of which may cause compensations	3 categories are determined using plumb line analysis, palpation, leg checks, pain and other findings
Logan	Anterior and inferior sacrum is primary and rotatory scoliosis as well as full body distortions are secondary.	Standing full-spine x-ray analysis, gluteal crease test, bilateral scales, posture analysis, and palpation.
Hurley	Unlevel sacrum leads to compensatory strains in the rest of the spine in relation to the center of gravity.	Plumb line analysis with standardized footplates to visualize overall spinal distortion with light contact test.

Fig 4. Prominent reflex techniques of the period. SOT, Sacro-Occipital Technique.

was just anterior to the lumbo-sacral junction.¹² He surmised that an unlevelled sacrum led to compensatory strain in the rest of the spine. He developed a device to measure the plumbline in a standing position. His method was a light gluteal contact with vectoring designed to bring the patient's spine closer to the plumbline and alleviate compensatory strain on the tissues. Hurley moved away from language using CVS in his 1932 book, and only used the term *subluxation* 4 times.¹²

Hugh Logan was a 1915 graduate of Loban's Universal Chiropractic College.⁴³ Logan taught for Hurley before 1932 and later developed the work into Logan Basic Method.¹³ In 1933, Logan embraced Sausser's new full-spine x-ray analysis over Hurley's plumbline method of analysis.⁴³ Logan Chiropractic College opened in 1935 in St. Louis, Missouri.²³

In Logan's first explanation of the Basic Technique in 1931, he published a 9-page pamphlet and used the term *subluxation* 22 times.¹³ In his 1950 textbook, Logan used the term 180 times.⁷ Logan's dictum was "as the sacrum goes so goes the spine."⁷ Restoring sacral position was the key to reducing curves, CVS, and disease. The anterior and inferior sacral subluxation was central to his theory.⁷

Logan felt that the body normally self-corrects CVS on its own except when sacral subluxation was present, as the sacrum is the center of gravity. Chronicity and acuteness were dependent upon the tone of the muscles related to the sacral subluxation.⁷

Logan's concept of correction was related to his unique perspective. According to Logan, acute CVS led to radiating tension in the surrounding muscles, "ready to return the sacrum to normal upon application of the slightest force in the proper location and direction, to that direction in which the strained muscles radiate."⁷ This accounted for the "potentiality" of the contact, which was taken at the most strategic point. The light pressure in the direction of the strained muscles led to release of the strain. Logan reasoned that because the CVS was causing the strain, it too should be corrected.

Logan also described the biomechanical and neurological effects of CVS on the organs. He considered that the mechanical disrelationships owing to distortions of the frame and spine, and the lack of transmission of impulses, were due to CVS. He explained that this affects the tone of the organs, muscles, and ligaments.⁷ Logan wrote that a distorted body wasted energy in its attempt to overcome the strain. This abnormal condition and waste of energy was a type of "friction" that would eventually wear the body down. By correcting this condition, the body was able to use its energies for maintenance and its struggles with the environment. As function increased, Logan observed that toxins would dissipate from the system through sweating, yawning, sighing, and increased respiration.⁷

Major Bertrand DeJarnette studied most of the theories of the day. He received a degree in osteopathy in 1922 from the Dearborn College of Osteopathy and a degree in chiropractic in 1924 from the Nebraska Chiropractic College, which was run by the Crabtrees, who were graduates of Carver's school.^{23,55}

In 1930, DeJarnette published his *Vasomotor Control*¹⁸; in 1933, *Sacral-Occipital Technique*¹⁵; and in 1935, *Spinal Distortions*.⁵⁶ DeJarnette combined Logan and Hurley's models with concepts from Frederick Erdman's physiological treatise on controlling vasomotor circulation with manual methods.¹⁸ DeJarnette also modified adjusting methods from Hurley and Logan and combined them with osteopathic maneuvers, diversified type occipital adjustments, and Abrams' spondylotherapy. DeJarnette's sacral-occipital technique included contact points at 5 sacral zones and 7 occipital zones on each side, right and left.¹⁵ Like the other osteopathic and medically oriented chiropractors before him, DeJarnette sought to stimulate or inhibit specific spinal levels.^{48,57}

VanRumpt was a 1923 National School of Chiropractic graduate when Forster and Schultz were secretary and president. VanRumpt was associated with DeJarnette in the 1920s and 1930s. In 1940, he developed the Directional Non-Force Technique, which included the first reactive leg check to determine CVS. Van Rumpt combined DeJarnette's Hurley/Logan approach with some of B. J. Palmer's methods and perspectives.^{23,27}

Roy Ashton graduated from the Standard School of Chiropractic in New York City, where he was dean for many years.¹⁰ Ashton's 1947 book, *Fundamental Chiropractic*, is based on clinical research of his myobasal technique from 1923 to 1940.¹⁰ His theories shared many similarities with concepts from Hurley and Logan. Ashton preferred what he called Carver's nerve occlusion hypothesis over D. D. Palmer's nerve impingement and nerve pressure model.¹⁰ Ashton felt that impingement referred to a diffuse phenomenon, whereas partial nerve occlusion indicated a more direct nerve pressure. He did take the D. D. Palmer position, however, that such pressure leads to irritation.¹⁰

Ashton proposed that when a spinal distortion developed, innate intelligence attempted to compensate by keeping the sacral base level and the center of gravity in line. He referred to this as a protective reaction. He felt that gravity eventually caused the muscle tone to increase and tire, leading to long-term pelvic distortion with a posteriorly rotated innominate. Secondary curves were thought to develop through compensation, which led to subluxations that were not automatically corrected by the body because of habitual hypertension of the spinal muscles. He referred to this as a "habit groove" of the nervous system. Ashton's method of analysis to determine the fundamental distortion included standing full-spine x-ray, inspection, palpation, measurement, and bilateral scales.¹⁰

Ashton felt that the nerve energy that was reflected from nerve occlusion was mostly stored in the periphery and that the proper technique assisted the body in using this energy for maximal correction. His application included a myotonic technique with light concussive vibrations in the form of contacts on the occiput and cervical vertebrae (especially the third), to reduce the hyper-tense muscles. This was followed by sustained contact on the ischial-pubic margin.¹⁰

Janse, Houser, and Wells published a 1947 updated edition of a textbook published in 1938 by Biron, Wells, and Houser,⁵⁸ which had been published in 1923 as the third edition of Forster's *Chiropractic Principles and Technic*.⁴⁷ In their 1947 edition, they included sections on neurology, reflex techniques, pressure technics, and spondylotherapy, as well as a section on extremity adjusting, which replaced an older section on the Meric system.^{14,47} The new chapter on reflex and pressure techniques was adapted from Janse's earlier writings on the topic.⁵⁹ Janse et al acknowledged the methods from Hurley to Logan and from DeJarnette to Ashton, without naming any specific technic. They classified several principles of reflex technics.¹⁴

Janse, Houser, and Wells viewed the periphery of the body as "a switchboard" filled with reflex circuits, which influence different body parts. The viscera could be influenced by specific somatic contacts. The peripheral tissues contained special sense organs that discriminated between "inimical" and "beneficial" stimuli. Citing Sherrington, they suggested that clinicians carefully use reflex contacts to cause relaxation rather than distress. They described a method of contacting the painful area with one hand while touching a "highly sensitive area" with the other, thereby distracting the brain's attention from the sensation. This could inhibit the original pathway and allow for restoration of normal physiology.¹⁴

It was thought that direct nerve blockage could inhibit the transmission of nerve stimulus and that there were many sensitive reflex areas, such as the gluteal, anal, and groin regions, which could initiate relaxation and vasodilation. Any form of contact in these regions that was "properly taken and carefully executed" would lead to release of tension, distress, and malalignment, as well as feelings of warmth, well-being, and even mild stimulation.¹⁴ Pressure technics worked in conjunction with muscle physiology. Light persistent contacts to the muscle belly or light firm stretching of the muscle could lead to the relaxation of contracted muscles. They described several techniques,

such as apex contact, sacrotuberous contact, 3-point gluteal contact, paraspinous contact, and gallbladder and liver reflex contacts (Fig 5).^{14,59}

Integrating Models

Several school leaders, researchers, and technique developers integrated many of the models of the time. The earliest of these leaders were Firth and Gillet. Both integrated the current knowledge about CVS and then developed their own models. Firth's disc model was based on the methods he developed at the PSC, combined with Basic Technique, and other methods.⁶ His students like R. J. Watkins, R. O. Muller, and Clarence Gonstead became leaders in the profession. Gillet and his colleagues studied most of the known approaches to CVS for many years and developed motion palpation, which developed into its own paradigm in chiropractic by the 1980s.^{5,11}

Firth's main contributions to the CVS literature up until he became president of Lincoln Chiropractic College (LCC) in 1940 included his book *Chiropractic Diagnosis*, which went into several editions through 1948. He also was a contributor to the Palmer technique manual, or *Vol. 13*.^{60,61} He was director of the "pit class" or the chiropractic open clinic at PSC and published regular case presentations from 1918 to 1922 with B. J. Palmer.⁶² It is possible Firth left the PSC because of a disagreement with Palmer over the implementation of thermography.⁶³ Firth started LCC with Burich, Vedder, and Hendericks, all former PSC faculty.²³

Firth's 1941 technique manual offers a glimpse into the development of his CVS model after 30 years as a chiropractor, teacher, and diagnostician.⁶ Firth's technique manual is a continuation of B. J. Palmer's earlier models and theories along with newer approaches. However, it did not emphasize Palmer's upper cervical work from the 1930s.⁶ The 1941 technique manual retained B. J.'s earlier approaches to adjusting including interior coccyx adjust-

Janse's Principles of Reflex Technics (quoted directly)
1. The whole of the periphery is a "switchboard" of innumerable reflex circuits which extend to and influence all parts of the body.
2. Special sensory end-organs are present in the peripheral tissues which possess discriminate capacities designating one stimulation as "inimical" and another as "beneficial."
3. Distressing and painful interpretations may be avoided through the application of the principles of counteraction, distraction and suggestion.
4. Inhibition of stimulus transmission is possible by direct nerve blockage.
5. Certain areas of special sensitiveness exist from which innumerable reflexes of muscular relaxation and vasodilation may be initiated.
6. Certain principles of muscle physiology permit the beneficial application of pressure technic.

Fig 5. Janse's original principles of reflex technics.

ments for cord tension. The manual also included Logan Basic and other reflex technics.⁶ The manual may be the first integration of so many theories to that point.

Firth considered that chiropractic was based on a “subluxated” vertebra,⁶ which altered the size and shape of the intervertebral foramina, thus interfering with transmission of nerve force. He described a CVS as “a minute dislocation...a disrelationship existing between two adjacent articulating bones in which their articular surfaces remain in contact.”⁶ He included B. J. Palmer’s definition, which emphasized impingement on nerves and interference with mental impulse transmission. Firth considered the shape of the disc to play a vital role in CVS. According to his theory, a vertebra could only move in the plane of its articulating surfaces. Firth taught that disease was associated with both the concave and convex sides of a curvature. He felt that diseases could be eradicated by adjustments, which normalized the curvature. The role of the adjustment was to expand the disc, stretch the ligaments, and stretch contracted muscles, which resulted in correction and stimulation.⁶

Henri Gillet graduated from the PSC in 1928 (Fig 6). His father and brother were chiropractors. Gillet wanted to pursue a career as an engineer but agreed to follow his father’s wishes and become a Palmer graduate. His brother convinced him to research chiropractic. They decided to pursue every avenue of research from other schools of chiropractic and



Fig 6. Henri Gillet. (Courtesy of Special Services, Palmer College of Chiropractic.)

osteopathic research. After a year in the United States, Gillet completed a postgraduate course at LCC and then went back to Belgium.^{5,11}

Henri and his brother Marcel were eventually joined by Liekens, and the 3 pursued a scientific approach to defining and detecting CVS. Their starting point was to assume that CVS may not exist and that all current methods of CVS detection were worthy of exploration. They applied each new method for at least 6 months, checking and double-checking one another’s work.^{5,11}

Over the course of the first 2 decades of research, they employed methods available to them, such as thermography, palpation, x-ray analysis, and magnification of sweat glands. They adopted the phase 2 NCM developed by B. J. Palmer in the early 1930s. Gillet eventually developed his own thermography device, with a single probe for a unilateral spinal measurement.^{5,11}

Gillet and his colleagues would check, palpate, adjust, and recheck and then compare their notes for years.⁵ After studying with Illi in Switzerland, they bought an x-ray unit and developed meticulous line-drawing methodologies. They explored B. J. Palmer’s hole-in-one method for many months. They studied curves, pain points, tender spots, and heat spots. They also studied trophic reactions, vasomotor changes to pinpricks, and hyper- and hyposensitivity related to CVS. They poured over osteopathic, neurology, physiology, and anatomy texts. Their research continued for 50 years⁵ and explored several ways that CVS might affect nerves apart from the “nerve-pressure-at-intervertebral-foramina theory.”⁵ They theorized that the CVS could affect the cord and the sympathetic nerves and cause various types of irritation.⁵

After they realized that they were neglecting the measurement of muscles, ligaments, movement, and stiffness, Gillet and colleagues developed motion palpation.⁵ The most common finding was that a CVS was fixed in a position. They proposed that the vertebra did not “rest erect” with the rest of the spine. They suggested that many neurological phenomena may be related to such a fixation and found it best to examine the patient before asking for a case history.⁵

The Gillets, along with Liekens, proposed that chronic and degenerated CVS also had degenerated nerve endings. Such chronic cases required a combination of short thrusting recoil adjustments and longer slow kneading motions for 3 to 4 minutes. They also thought that different cases responded differently to either recoil adjustments or “relaxation adjustments.” They described that after they learned to determine the first, oldest, most chronic, or major CVS using the motion palpation methodology, then they started to see results, and other secondary CVSs would self-correct.⁵

Speranskian Theory. Speranskian CVS theories developed in part from the pressures to increase scientific standards,⁶⁴ which led to important collaborations and updated models from leaders in the field, such as Weiant,⁶⁵ Verner,⁶⁶ Muller,⁶⁷

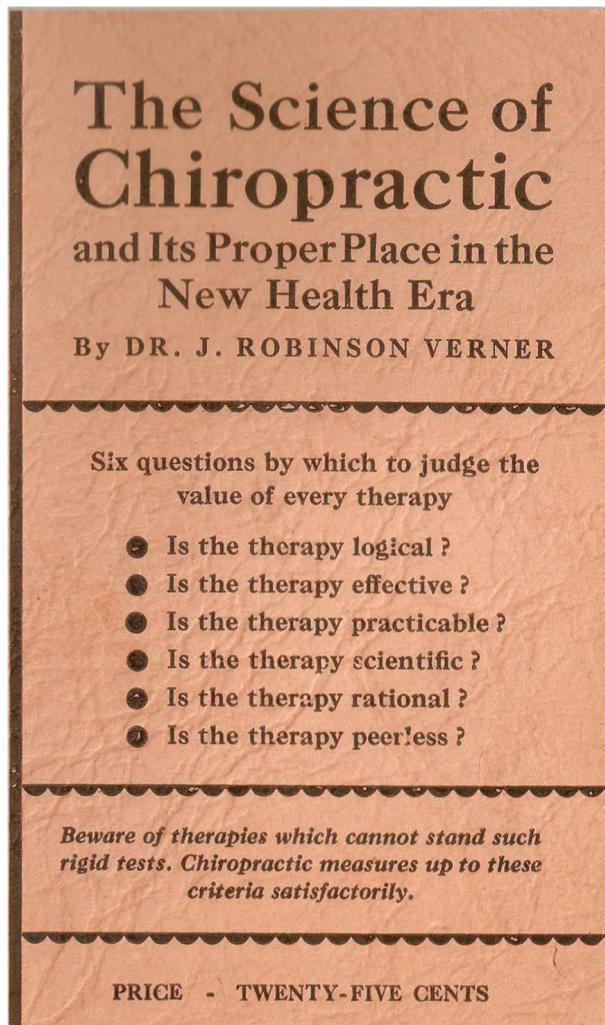


Fig 7. Cover of Verner's 1939 pamphlet.

R. J. Watkins,²⁰ and Heintze.²¹ In 1938, O. Hamilton Wright wrote, "In 1936, another medical scientist of world renown further substantiated the Chiropractic principle in his book, 'A basis for the theory of medicine.' I speak of Dr. A.D. Speransky, of Russia."⁶⁸ Integration of A. D. Speransky's theories became commonplace for many new CVS theories.⁶⁹

Speransky was director of the Institute of Patho-physiology and Experimental Therapy in Moscow and a member of the Academy of Sciences of the USSR.⁷⁰ Speransky was nominated for the Nobel Prize 8 times between 1934 and 1936 for his work on "trophic functions of the nervous system and its role in disease" and "the role of the nervous system in pathology."⁷¹ One of the nominations in 1934 came from Pavlov.⁷⁰ Speransky's research was based on decades of empirical studies of the nervous system with live animal subjects and access to perhaps hundreds of university-employed lab technicians.⁶⁹

Chiropractors from this era determined that Speransky's conclusions were basically the same as the theoretical foundations for chiropractic.^{19,20,28,65,72-74} The first published

writing linking Speransky's theories to chiropractic CVS theory may have been an article in *The Chiropractor*.⁷² Yet, the first chiropractor known not only to actively pursue Speransky's ideas but also travel to Russia and attend a conference he was speaking at was Arthur Heintze.⁷⁵ Heintze influenced Verner and Watkins.²⁰ B. J. Palmer's first reference to Speransky was in 1938,⁹ Verner's first mention was in 1939 (Fig 7),⁶⁶ and Watkins' was in 1946.²⁰ All felt that Speransky's research demonstrated the same explanations of the role of the nervous system in pathophysiology as the chiropractic paradigm.

Speranskian CVS theory is a class of theories that view the CVS as part of a global neurological and noxious phenomenon.²⁸ The chiropractic adjustment is viewed as a disruption to the pathophysiological pattern or process the nervous system is stuck in. According to this approach, the chiropractic adjustment disrupts the pattern of interference, irritation and impingement dissipate, and normal functions may then be expressed more fully as health.

J. R. Verner graduated from Collins' New Jersey College of Chiropractic in 1918. He completed postgraduate studies at PSC in 1920 and Carver Chiropractic College in 1922.⁷⁶ Verner taught at the New York School of Chiropractic from 1934 to 1944 and the Chiropractic Institute of New York until his death in 1961. Rehm called Verner "one of the foremost theorists and teachers" in the chiropractic profession, and Weiant referred to Verner's contribution as "a most valuable intellectual legacy."⁷⁶ His classic 1941 text, *The Science and Logic of Chiropractic*, went into 8 editions through 1956.¹⁹ In 1977, Weiant still considered it the most "important contribution to the literature of chiropractic ever written."⁷⁶

In the book, Verner described the neurological foundations of CVS.¹⁹ His references included Speransky as one of the latest neurological models in the literature. In describing Speransky's importance to the profession, he wrote:

With Speransky, the chiropractor holds that an intact nervous system is a sine qua non to health, and infection is no exception. The basic principle of chiropractic is that structural faults may interfere with normal nerve function. This in turn may permit the development of conditions favorable to the growth of bacteria and the production of their toxins. Chiropractic restores normal innervation in order to re-establish conditions which are unfavorable to pathogenic micro-organisms.¹⁹

Verner thought of CVS as a fixation at the extreme of normal movement and as a somatic or visceral disrelation. When CVS caused microscopic or macroscopic impingements, it was theorized that it could possibly interfere with the nervous system reflexes, affect remote areas of the body, and even cause delayed responses. He felt that CVS irritated synovial or periosteal structures. He proposed they could be perpetuated by an irritated afferent nerve, which may then stimulate its own motor nerve, causing the muscles to remain

contracted.¹⁹ This was a departure from B. J. Palmer's efferent emphasis.⁷⁷ If the afferent impulses caused by the CVS traveled back into the cord, a somatic reflex affected viscera.¹⁹ The CVS and poor posture were viewed as causes of nerve interference,¹⁹ which affected emotional and mental states and had psychological effects. The thought was that the impact of CVS on vasomotor and neurological integrity affected the structural basis of the mind. An intact nervous system was a prerequisite for mental health, according to Verner.^{19,66}

R. J. Watkins was a 1942 LCC graduate.²⁰ Upon returning from the army after WWII in 1946, he returned to LCC and took over the adjusting classes from Firth. Watkins' first writing period started in 1947 and 1948. In late 1947, he was recruited by his old teacher R. O. Muller to run the clinic at the new Canadian Memorial Chiropractic College (CMCC).⁶⁷ In 1948, Watkins published several articles and helped to author the CMCC technique manual with Homewood and other faculty members.^{8,20} In the manual, Watkins was the first to emphasize the key role of the small intersegmental muscles in CVS. Correspondence with Heintze led him to integrate the proprioceptive function of the intrinsic intersegmental muscles into his model.^{8,20}

Watkins' application of theory to practice was based on his study of D. D. Palmer and James Firth, that the subluxated joint was composed of 2 bones. Watkins developed the innovative double contact on 2 adjacent vertebrae to focus energy on the joint between them. He also did this on the sacroiliac joint. This approach was demonstrated in the CMCC technique manual.^{8,78}

Because of the increasing need to adopt more basic science literature, Watkins studied the latest texts from authors such as Speransky, Goldthwaite, Pottenger, Crile, and Kuntz.²⁰ His early writings reflected his studies. He referenced the chiropractic writings of D. D. Palmer, Firth, and Verner, and developed perhaps the most advanced neurological models of CVS the profession had yet seen.²⁰ Watkins started integrating Speransky's theories into models in 1948 with a review of Speransky's book published in the journal of the National Chiropractic Association and also with the publication of his article "A Treatise on Trophic Nerve Impulses." The article provided clinical examples of Speransky's concepts.⁷⁹

In 1949, Watkins published a paper titled "Tissue Memory in Retracting."⁸⁰ That paper also cited Speransky in relation to the retracing effect owing to heavy adjustments. Watkins wrote, "Heavy adjusting with a lot of shock element, whether recoil or some chemical shock will give a maximum of retracing. Speransky showed some of the violence of such retracing by the introduction of either chemical nervous shock or a heavy mechanical shock..."⁸⁰

He referred to specific and nonspecific recoil adjusting as well as Palmer's HIO model. He posited that light adjustments minimized the shock effect and lessened retracing effects. He suggested that reflex adjustments were best for chronic CVS because they minimized nerve shock and heavy adjustments were best for acute cases.⁸⁰

Watkins developed a neurological model to account for the reflex technics. He differentiated this from a simplified "bone out of place"²⁰ model, and explained how a light touch on the sacral tuberosus ligament, for example, could create a change in the whole spine and nervous system. Watkins wrote an article in 1948 titled "Anthropology in Reflex Technics,"¹⁶ and also developed muscular and neurological models to help explain Gillet's findings.

By 1949, Watkins laid out the foundation for proprioceptive postural reflex technics, inspired by his correspondence with Verner. These included his perianal technic and the auricular proprioceptive reflex technic.²⁰ He also developed a new model to understand and use suboccipital reflexes in CVS correction. He felt that all chiropractors should understand the neurophysiology of the reflex approaches apart from the mystery and commercialization in the profession. His model explored sustained contacts, occipital zones, and the change in muscle tone associated with the dissipation of the CVS.²⁰

Watkins published another paper in 1949 on the mechanism of a CVS.²⁰ He realized that chiropractic's growth was based on clinical practice, and he felt that people would understand explanations of how neurogenic symptoms arose from "faulty body mechanics."²⁰ The paper explored the literature supporting impingement at the foramina leading to sciatica, lumbago, abdominal referred pains, referred arm pain, intercostal neuralgias, pressure on sympathetic ganglia, neuritis, radiculitis, and several other duplications of pathophysiologic processes. Watkins wanted practitioners to understand the complexity of the CVS.²⁰

Chiropractic Vertebral Subluxation Perspectives (1928-1948)

Empirical, clinical, and scholarly research between 1928 and 1949 led to a completely new field of theory for the chiropractic profession. Theory of this era was different from 50 years prior. By tracing teacher-student relationships, collaborations, and reference patterns, one can see the development of ideas.

In addition to the 4 main types of theory presented above, this period also included at least 8 distinct perspectives. These perspectives have commonalities, novelty, and the historical attribute of affecting future theory (Fig 8).

Instrumentation Perspective. The instrumentation perspective started in 1910, with the introduction of chiropractic x-ray analysis. This perspective includes an attempt to understand the underlying mechanisms of CVS through the anatomical and physiological systems. With the advent of thermography and photoelectric technology in the 1920s to detect vascular changes,⁸¹ CVS detection instruments were thought to be able to detect the physiological phenomenon associated with CVS at a new level of objectivity.

Global anatomical methods were developed as objective measures to understand changes in posture and vertebral position. Plumbline analysis was pioneered by Hurley and

DeJarnette.^{12,15} Full-spine and standing x-ray analyses, proposed by Sausser at Loban's Universal Chiropractic College and refined by Logan and Illi, were developed to measure the effects of gravity.^{7,43,82}

Physiological measures were developed to study acute changes and long-term patterns. The PSC's new instruments during this time included the model 2 NCM in 1930, the NCM and the neurotempometer in 1936, the Neurocalograph in 1939, and in the 1940s several other innovations including the electroencephaloneuromentimograph.^{63,83} In the early 1930s, DeJarnette developed the vasomotor control hypo-hyper testers and the Junior Chromoclast.⁵⁵ Weiant and Adelman developed the Analyte in 1928 to take photos of capillary changes they thought might be associated with CVS.⁸⁴ Gonstead developed the Nervo-Scope and Analograph in the 1940s.³

Not only did technique developers use their own technologies to further refine and develop their theories, but they also incorporated one another's findings and technologies. For example, after Gillet learned about the Analyte, he started monitoring different types of vasomotor changes.⁵ Gillet used B. J. Palmer's latest NCM and developed his own thermography instrument. Furthermore, Gillet reanalyzed B. J. Palmer's x-ray research from 1938 and worked with Illi in Europe.^{5,9,11} Other instruments of varying diagnostic and commercial relevance were developed during this time by chiropractors.⁸⁵

Upper Cervical Perspective. The upper cervical perspective views the atlas and axis as the most important segments of the spine. This viewpoint was developed by leaders and graduates at the PSC in the early 1930s.³² The development of upper cervical-specific models influenced the profession for decades.^{27,32} B. J. Palmer's 1934 text is cited by his followers and his detractors.⁸⁶⁻⁸⁹ However, the research and detail of his theories are not well described in the

literature. For example, Palmer's periodicity model of CVS was described in 1933 and had its roots in his earlier theories from 1909 about the acute mild CVS, but it is all but lost to history.¹ His new insights about frequency and periodicity were derived from thermographic analysis of physiological patterns associated with CVS over time. His cord tension model, which he introduced in 1911, evolved, and by the 1930s the model centered on the upper cervical area and its spinal cord and meningeal attachments.^{1,2,26} Textbooks, peer-reviewed literature, technique models, CVS theories, and upper-cervical research today reference this as the origin of the upper cervical perspective.^{27,32,90}

Biomechanical Perspective. The biomechanical perspective was developed from several sources, including B. J. Palmer's cord tension model,¹ Carver's full-spine structural approach,⁹¹ Steinbach's spinal balance approach,⁹² and Hurley's sacral base approach.¹² According to Weiant, the structural approach was pioneered by Carver and Spears and it "transformed chiropractic analysis into a problem in mechanics."⁹² Carver's view of the full spine, spinal curves, and the sacrum as a center of gravity was a big influence during this period.⁹¹ Weiant proposed that Spears developed the curvature approach to CVS correction and emphasized inspection over palpation.⁹² Bodily distortion, starting with the sacrum, was the center point for Logan, Hurley, and DeJarnette.^{12,13,15} B. J. Palmer critiqued Logan and Hurley's ideas in the 1930s because he concluded their emphasis on "dis-ease, a contracted muscle, a distorted pelvis," was not targeting the cause, but rather the effects.⁹³

Others focused on biomechanics from different perspectives. For example, Gillet emphasized the fixated vertebra, and R. J. Watkins emphasized the joint between 2 vertebrae and the importance of faulty body mechanics.^{11,20} Watkins developed bilateral contacts on 2 adjacent vertebrae to

Perspective	Statement
Instrumentation Perspective	Physiological changes associated with vertebral subluxation can be detected with various types of instrumentation.
Upper Cervical Perspective	The upper cervical spine is prone to primary subluxation patterns that can cause compensations throughout the spine, spinal cord, and body.
Biomechanical Perspective	Body mechanics, spinal curves and scoliotic patterns may play significant roles in subluxation patterns, often starting from the sacral base or innominate.
Chronic Subluxation Perspective	New models of chronic subluxation included stored energy in the connective tissues and compensatory patterns related to fixation, biomechanics, and neurophysiology.
Reflex Subluxation Perspective	The neurological changes associated with subluxation may be reflex systems linking distant areas of the spine and body and perpetuating subluxation patterns.
Proprioceptive Perspective	Vertebral subluxation is caused by and perpetuates altered joint proprioception and may lead to spillover and cascade as aberrant neurological irritation.
Non-therapeutic Perspective	The evolution of the non-therapeutic model of subluxation was highlighted by the objective measures physiological and structural measures.
Neurodystrophic Perspective	Subluxation can be an initiator, an indicator, or a perpetuator of neurodystrophic breakdown in various body systems.

Fig 8. Eight perspectives on subluxation that emerged during the 1928-1949 period.

concentrate the force of corrective thrust upon 1 articulation.⁸ Gillet felt that fixation, stiffness, incoordination, or abnormal motion was more important than misalignment.⁹⁴

Chronicity Perspective. The chronic CVS perspective was advanced during this period by thought leaders such as B. J. Palmer,¹ Logan,⁷ Ashton,¹⁰ Watkins,²⁰ and Gillet.¹¹ D. D. Palmer was the first to suggest that time was a factor in the chronicity of CVS and directly proportional to the duration needed for adjustments.³⁹ B. J. Palmer elaborated on this theory in a 1913 pamphlet called “Momentum,”⁹⁵ which was developed by Stephenson and Drain.^{33,96} The theorists from this period added to more detailed biomechanical and neurophysiological rationales supported by the preliminary use of instrumentation to characterize chronic CVS.

Reflex Perspective. The reflex CVS perspective originated with D. D. Palmer.³⁹ He was the first to write about reflexive responses to nerve impingement owing to CVS. D. D. Palmer considered this one of chiropractic’s earliest principles. Citing Landois,⁹⁷ he noted that light nerve stretching and tension act as an irritant, which alters function.⁹⁸ The irritability was a reflex response and when the stretch increased, “the irritability and reflex activity” diminished.⁹⁸ D. D. Palmer also wrote that the return to normal tone was a reflex action.⁹⁸

Loban, Carver, Riley, and Forster incorporated reflex systems into their models.^{46-48,91,99} Loban wrote, “Reflex muscular tension tending to increase subluxation and thus augment nerve impingement and its effects.”¹⁰⁰ Forster also wrote of spontaneous adjustments, which included corrections during sleep when possible.⁴⁷ In the updated edition of his book, which was published by Janse et al, they referred to such corrections as “reflex” adjustments.¹⁴ The techniques developed by Hurley,¹² Logan,⁷ DeJamette,¹⁵ Ashton,¹⁰ and Watkins were all methods to enact this reflex perspective.^{16,101}

Proprioceptive Perspective. Price, Verner, and Watkins developed CVS models that shared characteristics with Stephenson’s vertemere cycle.^{2,19,20,44} The vertemere cycle described the neurological impact of the CVS on its own joint, thus keeping it subluxated.⁴⁴ These models later evolved into proprioceptive models.

Heintze was one of the pioneers in the profession to write about the proprioceptive perspective.²¹ Since 1912, Heintze put forward the idea that the proprioceptive sense helped to explain “chiropractic phenomena.”²¹ Heintze corresponded with Watkins after reading his 1948 article “Anthropology in Reflex Technics.”^{16,20} Watkins corresponded with Firth, Weiant, Verner, and Gillet, among others.²⁰ Collaboration was a new component of CVS model development and a key element in spreading the proprioceptive perspective.

Nontherapeutic Perspective. The nontherapeutic perspective originates with D. D. Palmer.³⁹ In an advertisement published by B. J. Palmer in 1902,¹⁰² which was mostly derived from D. D. Palmer’s articles and was republished in *The Science of Chiropractic*, he proposed that chiropractic was nontherapeutic because it did not address “effects” but instead addressed “causes.”^{36,103} D. D. Palmer developed nerve tracing,³⁶ which

led to B. J. Palmer’s Meric system and nerve tracing studies.^{35,104} These were early approaches to locate the “cause” of CVS.

This perspective changed and evolved over the years. The first nonsymptomatic approaches to CVS detection may have been from Howard and Forster. Both were early leaders of the NSC, and both wrote of CVS that presents with little or no symptoms or with some discomfort. The rationale to adjust was not to fix the discomfort but to decrease the interference.^{105,106}

This period introduced a new type of nonsymptomatic assessment. B. J. Palmer and Gillet independently developed nonsymptom analyses.^{1,5,11,26} B. J. Palmer’s Research Clinic included a case history as well as a medical and laboratory workup of every case. Gillet also took case histories. Both concluded that objective measures were enough to locate the CVS.^{1,5,11,26} Palmer included thermography and x-ray analysis. Gillet included motion palpation, supported by other objective findings. This form of nontherapeutic perspective no longer relied on symptoms to locate CVS.

Neurodystrophic Perspective. The neurodystrophic perspective started in the mid-1930s in chiropractic, with Heintze’s visit to Moscow to attend a talk by Speransky.⁷⁵ Speranskian approaches to CVS, such as Verner’s view that the adjustment disassociates the neuropathic syndrome and B. J. Palmer’s view that Speransky explains the disruption to “quantity energy flow” on the afferent and efferent sides of the cycle, offer entirely new perspectives.^{9,19} The integration of Speransky’s concepts introduced a new level of complexity, sophistication, and congruent (yet indirect) empirical bases to CVS theories. In Speransky’s theory, chiropractors found the same basic premise of the chiropractic paradigm: that pathological neurodystrophic processes could be disrupted by altering the central nervous system with some type of input.²⁰

The integration of Speransky’s neurodystrophic hypothesis could be viewed in the context of a wider integration of the physiological literature of the mid-20th century in relation to model building. Several theorists used the new information to increase science standards to integrate other researcher’s findings, such as Pottenger, Crile, Goldthwait, and Kuntz.^{1,19,20} Other models were used as further evidence to bolster the neurodystrophic perspective. Model building was considered by Keating and Mootz as “essential in the long-term evolution of chiropractic research,”¹⁰⁷ and an interesting counterpart to testing the theories. Model building and research continued after this period, guided by the neurodystrophic perspective and inclusive of other Russian neurophysiology literature.¹⁰⁸⁻¹¹⁰

Research and Evidence-based Medicine

This period was the start of research into CVS.

Validity Claims and Research. Martin’s analysis of chiropractors’ use of science during this period is relevant to understanding theory development and the new perspectives

that emerged during this time.²² Martin's approach may help to counter modern criticisms that there was no early research on CVS.^{22,111-113} He stated:

Chiropractors did not rely solely on assertions that technique and science could be equated to support their claims of scientific legitimacy. They also buttressed their claims to scientific status by performing clinical research. The format of chiropractic research publications, replete with tables and graphs, mirrored that of conventional scientific articles. Like orthodox publications, chiropractic studies often employed instruments of both conventional and chiropractic design and increasingly used scientific jargon. Critics doubted the integrity and accuracy of chiropractic statistics, but they could not simply dismiss chiropractic researchers as methodologically naive. During this era, conventional clinical science frequently featured nonexperimental designs. Prior to World War II the methodology adopted by chiropractic researchers differed less from that of orthodox clinical research than physicians would have liked to admit.²²

Martin concluded that chiropractors adopted an alternative approach to science that included conventional science but remained distinct from it.²² This perspective lends itself to different types of validity claims.¹¹⁴

The importance of validity was articulated in the early 1990s and included a focus on clinical trials and evidence-based medicine (EBM) as a pathway to validity claims.^{115,116} The critiques of EBM in alternative medicine,¹¹⁷⁻¹¹⁹ osteopathy,¹²⁰ cardiology,¹²¹ and chiropractic suggest that research should include methods in addition to clinical trials leading to a broader range of validity claims.^{114,122-125} In 1995, Sportelli wrote:

A danger of requiring unrealistic proof by scientific validation is one of practicality. With research limitations on sample size, compliance, demographics, etc., many more procedures which have the potential to be effective will be classed as "unnecessary," versus procedures of no value to be termed "effective." In the rush to reduce costs, and mandate compliance by providers, decision makers have a tendency to forget that "absence of proof is not proof of absence." In their quest to deny validity to many procedures simply because they do not meet the "gold standard" of proof, many valuable procedures are subject to denial and criticism. Even the gold standard becomes obsolete in time, however in the interim between VALID SCIENCE and CLINICAL EMPIRICISM, many people will be denied valuable health care. The question ultimately is, "Who will decide this issue?"¹²⁶

In the decades before EBM and clinical trials, chiropractors sought to bolster their scientific base and

demonstrate that chiropractic hypotheses could be pursued by systematic empirical and clinical observations.

Limitations and Importance of Research (1928-1949). Limitations of the research from this period include that the chiropractic profession had no infrastructure for research or government-sponsored grants like medical schools. Research was an attempt to "prove" chiropractic instead of the dispassionate pursuit of scientific facts. There were economic motivations to increase chiropractic school enrollments, spread technique models, and publicize chiropractic to the general public.¹²⁷ Martin refers to a chart from B. J. Palmer's research clinic from 1949 comparing the pre- and post-pH values of urinalysis from 2,006 patients who received upper cervical adjustments.^{22,128} In this research pamphlet, a list of objectives for the formation of the B. J. Palmer Chiropractic Clinic includes "Medical doctors said there is no vertebral subluxation. We decided to prove there is."¹²⁸ Keating, Green, and Johnson¹²⁷ point out that many chiropractors in the first half of the 20th century had a similar approach and perspective toward science and research.

Even with the limitations of the research designs and the social and cultural forces shaping the profession's agenda, research from this period should not be dismissed for several reasons. The leading reason is that the foundation of modern clinical practice was built from the chiropractic techniques,²⁷ models of CVS,¹²⁹ and systems of CVS analysis.¹³⁰ Several decades of models, research, instruction, and clinical practice were developed from this foundation.²³ Another reason is that leaders from the major chiropractic schools were engaged in these research projects during this time and after.^{1,2,5-21,82,84,92,131,132} Thus, dismissivism does not necessarily apply here.¹³³ Researchers from this period pioneered investigation into the possible effects of CVS correction on biomechanical and neurophysiological relationships with health outcomes (Fig 9).

After a 3-year Delphi process to develop a consensus on CVS terminology throughout the profession in the 1990s,¹³⁴ Chance and Peters officially adopted new definitions. In their editorial in the *Chiropractic Journal of Australia*, they note that many of the hypotheses remain untested but are not untestable.¹³⁵ From the perspective of this first era of research in chiropractic, I add to their statement: although the research from this period had limitations and did not use modern research methods or designs, it does not mean all of the research conducted during this time was worthless.

Claims of No Research. In recent years, several groups have claimed that there is no clinical research evidence on CVS.^{112,113,136-142} Several quotes may help demonstrate the disparity between such claims and the 2 decades of research from this early period. In June 2010, the General Council on Chiropractic of the UK issued a guideline that states, "The chiropractic vertebral subluxation complex is an historical concept but it remains a theoretical model. It is not supported by any clinical research evidence that would allow claims to be made that it is the cause of disease or health concerns."¹⁴³

Kent argues that the General Council on Chiropractic guidelines misrepresent positions and then use a straw man position to attack the opponent.¹⁴⁴ Some of Kent's examples are the claims that CVS theories rely on an antiquated monocausal viewpoint, that all CVS theories rely on the compression model of intervertebral foramina encroachment, and by suggesting the "subluxation-centered chiropractors do not or cannot practice in an evidence based model."¹⁴⁴ Modern CVS theory and practice refute these claims.

Ebrall refers to a similar claim in the context of relegating CVS to history in a policy statement adopted by several European, South African, and Australian schools.¹⁴⁵ He refers to the claim that CVS is viewed as "the cause of disease" but that no current literature makes this claim.¹⁴⁶

In another example, the president of the Norwegian Chiropractors' Association and president of the European Chiropractors' Union wrote, "The subluxation, however, has never been scientifically defined, tested or validated. At present there is no valid or reliable test to determine the presence or absence of a subluxation. And there is no valid test how to find a subluxation."¹⁴⁷

Good suggests that Mirtz et al misused Hill's criteria in relation to CVS research.^{136,148} In a response to Good's critique, Mirtz writes of the "subluxation construct" (SC):

Simply put, if there is little or no data providing evidence of the SC combined with and the claim chiropractors make to treat this putative entity as a causal agent then its validity should be considered unproven. Until data comes forth that can adequately demonstrate the existence of the SC and provide the necessary data that demonstrates that it is a causative agent in disease or ill health then the SC should be regarded as having no such valid utility.¹⁴⁹

Apart from the use of straw man arguments, the main questions these statements bring up have to do with what should account for evidence and validity in chiropractic research, especially because EBM has become more prominent in the last few years in the chiropractic field and is used by some to dismiss CVS research as nonexistent.^{111,112,136-142} This argument has also been used in an attempt to dictate the future of the chiropractic profession's identity.^{125,144}

Evidence-based Medicine and Chiropractic. In 2008, the National Center for Complementary and Alternative Medicine at the National Institutes of Health issued a second round of the R25 grant for education research at institutions of complementary and alternative medicine. The grant included several chiropractic colleges.^{150,151} Some of the goals were to change the culture at these institutions so that students would learn how to navigate evidence, write reviews of research literature, and develop critical thinking skills for clinical application.^{151,152} An emphasis of the grant was to train faculty in evidence-based practice and research literacy. The Process of Integrating

Evidence was developed as part of The Consortium of Evidence-Informed Practice Educators, which was established to coordinate intercollegiate cooperation across most chiropractic colleges.¹⁵³

Some literature critiques EBM in chiropractic,^{114,122-124,144,145} and other literature critiques EBM in general for clinical practice and alternative medicine.^{120,121,154} Hampton, an early proponent of EBM in cardiology,¹⁵⁵ suggests that EBM should be referred to as opinion-based medicine because it is read by some professionals in the form of meta-analysis of many studies, which are filtered through interpretations.¹²¹ Indick suggests that a dialogic approach should counter-balance EBM in patient care because it includes intuitive processes and nonempirical, functionalist, and developmental findings. This would de-emphasize the strict hold that logical positivism could have on a profession like chiropractic, which has its roots in a nonpositivistic and postrational worldview.^{124,154,156}

Ebrall critiques the overemphasis on evidence-based practice in chiropractic, especially chiropractic learning institutions, as an indictment of "chiropractic's social conscience." He wrote:

"If medicine in general expresses reservations regarding an unquestioning uptake of EBP perhaps it is somewhat unwise for academic chiropractors to wantonly embrace what seems to be a flawed paradigm and in so doing alter the premise under which chiropractic's social conscience is expressed in community care."¹⁴⁶

By chiropractic's premise, Ebrall refers to a contemporary concept of CVS and its correction.¹⁴⁶

Villanueva-Russell includes Hampton and Indick in her analysis of the early phase of EBM integration in chiropractic in the 1990s, during the movement to establish clinical practice guidelines.¹²⁴ She observed from one sociological perspective how EBM was used in chiropractic with an emphasis on the rise of professions and boundary control between and within professions. She concluded that EBM was used in chiropractic to control privileged positions associated with orthodox medicine even though the methodologies, epistemologies, and ontologies of chiropractic's original paradigm were "antipodal to the randomized, controlled, double-blind experiments of orthodox medicine."¹²⁴ She framed EBM as a professional mobility project by a segment of the chiropractic profession who were seeking to be more accepted by orthodox medicine. She suggested that EBM was being used as a form of social control to "de-legitimate the validity of chiropractic claims."¹²⁴ She noted concerns during guideline development; some felt that the profession was putting on "our own shackles,"^{124,157} by embracing the EBM paradigm.

The concern was that it was not only pressures within chiropractic and from orthodox medicine that had the greatest impact on EBM guidelines for clinical practice, but outside corporations and managed care entities that would

School Influence	Subluxation Theorist
Palmer School of Chiropractic	B.J. Palmer, Price, Gonstead, Gillet, Drain, Himes, Peterson
Lincoln Chiropractic College	Firth, Watkins, Gonstead, Muller, Gillet
Universal Chiropractic College	Loban, Logan, Illi
Canadian Memorial Chiropractic College	Muller, Watkins, Homewood, Himes, Peterson
Standard Chiropractic College	Ashton
New York Chiropractic College/ Chiropractic Institute of New York	Weiant, Verner, Kimmel
Nebraska Chiropractic College	DeJarnette
National Chiropractic College	Janse, Illi
Texas Chiropractic College	Drain, Weiant, Harper
Ratledge Chiropractic College College/ Los Angeles Chiropractic College	Ratledge, Higley
Western States Chiropractic College & University of Natural Healing Arts	Homewood

Fig 9. School leaders and faculty members engaged with subluxation theory, 1928-1949. CINY, Chiropractic Institute of New York; CMCC, Canadian Memorial Chiropractic College; LCC, Lincoln Chiropractic College; NYCC, New York Chiropractic College; PSC, Palmer School of Chiropractic; SCC, Standard Chiropractic College; UCC, Universal Chiropractic College.

require chiropractors to follow the guidelines, even if they went against clinical decisions based on the doctor–patient encounter.¹²⁴ This perspective was captured in Sportelli’s quote, “In their quest to deny validity to many procedures simply because they do not meet the ‘gold standard’ of proof, many valuable procedures are subject to denial and criticism.” When EBM dominates the discourse, positivistic science becomes the arbiter of legitimacy.¹²⁴

Several authors have pointed out the limitations of EBM as the sole model through which to make claims of validity. Hampton concluded that EBM is important but should not limit physician choice because all patients are unique and rarely reflect those recruited for clinical trials. A clinical trial may tell the effectiveness of treatments but not which patients should receive them.¹²¹ Draper and Richards suggest that the doctor–patient encounter has too many unforeseen variables and that awareness of the limitations of EBM be at the forefront of implementation in chiropractic.¹²³ Rosner suggests alternative research strategies to overcome the limitations of EBM for physical medicine in general, which applies to chiropractic.¹²²

The alternative view of science that Martin described is congruent with Villanueva-Russell’s opinions, that chiropractic research before the 1990s was an alternative to positivistic science.^{22,124} Based in part on these sociological assessments, I previously suggested that this alternative scientific perspective points to a postrational approach to science within the chiropractic paradigm.^{114,156} Such an approach applies the scientific method to a wider range of knowledge domains and does not limit research to only 1 gold standard; instead, it may include gold standards from many methodologies.

Integral approaches to research offer freedom from strict adherence to overly rational evidence-based approaches.¹⁵⁸ Postrational approaches to research might include the perspectives of empiricism, systems, cultural influence, interpersonal relationships, and phenomenological approaches, such as quality life expression and various levels of subjective wellbeing, including the sense of coherence developed from the salutogenic paradigm.^{159,160} Alternative research methods, however, do not absolve chiropractic research of the past from

its weaknesses or limitations, nor do they excuse scientific rigor.

Beyond simply understanding the recent literature on CVS,^{27,129,161-163} which was one of Good's recommendations to Mirtz et al,¹⁴⁸ it would be useful for chiropractors to understand the historical literature, especially the period from 1928 to 1949. This period was the start of profession-wide research on CVS, much of which became the foundation of modern practice. There are many practical applications of chiropractic that arose from this limited research, some of which may still remain as hypotheses to be explored. Learning the history of these theories in this context opens the possibilities for clinical research from many perspectives and a greater depth of understanding of the roots of clinical practice.

Limitations

This article reflects one person's interpretation of historical writings and theories. This paper attempted to provide detail on the evolution of CVS over a 21-year time span and is not without its limitations. The literature of this period is expansive, and some of the sources are fairly rare. It is possible that additional sources might change some of the interpretations offered in the present paper. Future reviews of the literature should include more systematic methods. Without detailed search parameters, inclusion and exclusion criteria, synthesis methods, a standard critical appraisal of the literature reviewed, and evaluation of bias, conclusions do need to be made with caution. A strength of this work is that it includes new insights into the history of the CVS based on primary and secondary sources, many of which have not been included in previous works. However, this research is limited by the writings that are currently available.

CONCLUSION

An examination of the development of CVS theories in chiropractic between 1928 and 1949 points to a robust field of research and modeling. Taking into account the various ways that validity claims might be made while undertaking empirical research, the chiropractic profession today may choose to explore the myriad approaches from this period and determine what research is yet left undone. Considering that 4 types of theory emerged during this period, along with 8 perspectives on CVS, the modern practitioner may choose to become better acquainted with the historical literature. This approach might encourage a greater understanding of the roots of modern practice, inspiration for future research, and a stronger ability to interpret and critique the literature.

ACKNOWLEDGMENTS

The author acknowledges Brian McAulay, DC, PhD, David Russell, DC, Stevan Walton, DC, and the Tom and

Mae Bahan Library at Sherman College of Chiropractic for their assistance.

FUNDING SOURCES AND CONFLICTS OF INTEREST

The author received funding from the Association for Reorganizational Healing Practice and the International Chiropractic Pediatric Association for writing this series of papers. No conflicts of interest were reported for this study.

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Practical Applications

- This series of articles provides an interpretation of the history and development of chiropractic vertebral subluxation theories.
- This series aims to assist modern chiropractors in interpreting the literature and developing new research plans.

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