

# The Subluxation – Historical Perspectives

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**ABSTRACT:** Subluxation is a term that has been used by the chiropractic profession since its early days. The term, meaning less than a luxation, has been used for millennia, similarly so has manipulation been the preferred intervention to overcome this problem. This paper reviews some of the early uses of subluxation and manipulation identifying highlights, to help the reader appreciate that subluxation and manipulation, both spinal and general, are as old as civilisation itself.

**INDEX TERMS:** (MeSH) CHIROPRACTIC; MANIPULATION, CHIROPRACTIC; HISTORY OF MEDICINE; HISTORICAL ARTICLE. (Other): SUBLUXATION.

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## INTRODUCTION

D.D. Palmer stated that he manipulated the spine of Harvey Lillard on 18 September 1895 and restored his hearing after 17 years of deafness, and shortly thereafter gave immediate relief in a case of heart trouble.<sup>1</sup>

With the advice of a patient, the Reverend Samuel Weed, they coined the word *Chiropractic* from the Greek words *chiro* and *praxis*, meaning done by hand on 14 January 1896.<sup>2</sup>

In 1905 D.D., with reference to himself in the third person, stated that

... he does not, nor ever has claimed that vertebrae may be displaced and replaced. He, however, is the **first** to draw the attention of the public to the difference between a complete *luxation* known to the medical world as such, and a **subluxation** as known to the chiropractor as a displacement of the articular processes.

He was the **first** to write lengthy articles, setting forth that 90 to 95 per cent of all diseases were caused by subluxation of vertebrae, and today no other person has placed such statements in the hands of the public unless copied from those written by D.D. Palmer. ...

... He was the **first** person to adjust, replace vertebrae by the unique method known as Chiropractic, using the spinous and transverse processes as handles.<sup>3</sup> (Emphasis added)

But what are the facts?

The first mention of *Subluxation* thus far discovered in the published chiropractic literature appeared in October 1903 in the first issue of *Backbone*, a magazine published by Solon M. Langworthy's American School of Chiropractic and Nature Cure, located in Cedar Rapids, Iowa.

In this issue Dr. Carroll W. Burtch stated: "the fact that the physician who possesses a thorough knowledge of the spinal and sympathetic nervous system can, knowing the nature and location of disease in a patient's body, unhesitatingly place his finger on a spinal subluxation."<sup>4</sup>

A little earlier, on 1 July 1903 D.D. wrote to his son B.J. Palmer, that at a class at Santa Barbara he had given an adjustment in the dorsal region which relieved a *pinched* nerve.<sup>5</sup> The term *Pinched Nerve* became the common acceptance of being the result of a subluxation. By 1909 D.D. Palmer had refined his thinking on what a subluxation does:

If he were to rewrite the above article, he would make two changes and bring it up to date, *viz*: Instead of the nerve being *pinched* in the intervertebral foramen, it is *impinged* just as it emerges from the intervertebral foramen. As we have had occasion to explain, the spinal nerve trunk divides immediately upon leaving the intervertebral foramen into four branches, two of these are somatic, *i.e.*, they go to the framework of the body and its covering and not to the viscera. These are pressed against, impinged by the head of the rib and body of the vertebra being displaced. The ganglia lying close to and upon that joint, is impinged by its displacement.<sup>6</sup>

The term *Pinched Nerve* was also picked up by Langworthy, who, in his pamphlet "Chiropractic Facts" published in 1903, printed probably the first images of what was conceived to be the model for the effects of a subluxation upon a spinal nerve.<sup>7</sup>

B.J. published a pamphlet "Chiropractic Proofs" in late November or early December 1903. In it he restated DD's concept that

"Ninety-five percent of all deranged nerves are made so by subluxation of joints, more especially in the spinal column."<sup>8</sup>

This is the first instance thus far located where Palmer mentions subluxation. It must be stated that many of the early

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published articles have not survived and that D.D. is likely to have published the term *subluxation* previously. It is more than just possible, that Langworthy picked up the term when he studied chiropractic under D.D. Palmer in 1901.

In later years, after D.D. had been advised by W.J. Colville, a well known traveller, author and inspirational speaker, that in 1895 in Paris he had witnessed an “adjustment” of a “subluxation” by a member of the ancient cult of Aesculapius, he stated:

“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 must 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.”<sup>9</sup>

But what was the ancient cult of Aesculapius whose members “adjusted subluxations?”

Aesculapius is the Latin transliteration of the Greek Asklepios. The mythology of pre-history Greece suggests that Asklepios was the son of the god Apollo and the mortal woman Koronis, who gave birth to him above Epidaurus. The infant Asklepios was saved by Apollo from the fire on which Koronis met her death and was taken to Mount Pelion, where he was cared for by the centaur Chiron, who taught Asklepios the secrets of the healing herbs which grew so profusely in that region. Asklepios developed such remarkable powers of healing that he was reputed to be able to restore the dead to life, which led to complaints by Hades, the God of the Underworld, which forced Apollo to strike Asklepios dead with a thunderbolt. Two of Asklepios’ daughters were Hygieia (Health) and Panacea (All Heal).<sup>10</sup>

Following his death Asklepios became a divinity, usually represented holding a staff with a snake curling around it, the fore-runner of the caduceus. Asklepios’ fame spread throughout the ancient world. His followers were a hereditary closed order known as Asklepiades and their sanctuaries Asklepieia. Eventually there were some 300 Asklepieia in *Graecia Magna*, their major ones being in Epidaurus, Pergamum and Kos. In 291 BC the Asklepieian cult spread to Rome where the name of the god was Latinized to Aesculapius.<sup>10</sup>

### MANIPULATION THROUGH THE AGES

For more than two-thousand years, from Hippocrates to Renaissance Europe, physicians as well as folk healers perpetuated the tradition of manually adjusting the spine.<sup>11</sup>

The first existing description of the application of manipulation was probably by Pien Chiao (c. 500-400 BC) who recommended manipulation for fatigue, rheumatism, nervous disorders, insomnia, lumbago and certain forms of paralysis.<sup>12</sup>

Hippocrates II of Kos has been identified as the first Western author to write about luxations and subluxation.

Born *circa* 460 BC in Kos, Greece, he became one of the outstanding figures in the history of medicine. Referred to as “father of medicine” he founded the Hippocratic school of medicine, establishing medicine as a discipline by rejecting superstitions, legends and beliefs that credited supernatural or divine forces with causing illness. It has been suggested that Hippocrates II of Kos was a 16<sup>th</sup> generation descendant of Asklepios.<sup>13</sup>

The first naming of luxation and subluxation apparently took place in part 61 of *Peri Arthron* in the *Corpus Hippocrateum*:

In a word, luxations and subluxations take place in different degrees, being sometimes greater and sometimes less, and those cases in which the bone has slipped or been displaced to a much greater extent, are in general more difficult to rectify than otherwise; and if not reduced, such cases have greater and more striking impairment and lesions of bones, fleshy parts, and attitudes; but when the bone has slipped, or been displaced to a less extent, it is easier to reduce such cases than the other; . . .<sup>14</sup>

Hippocrates advised in “*Corpus Hippocrateum*” (*Peri Arthron*, Chapter 47)

. . . a steam bath, followed by lying on a board to which the patient is bound in the prone position with bands at head, pelvis, knees and ankles. Traction is first given by assistants pulling simultaneously on head and feet; the physician now presses sharply on the kyphosis, while the pull is maintained. The direction of the thrust depends on the condition present; it may be towards head or pelvis. This manner of readjustment, we are assured, is not dangerous. Nor is it dangerous to sit on the back during traction imparting a shaking movement by getting up and down quickly. The foot can also be applied to the prominence, with pressure carefully increased by bringing the body weight to bear. However, the most effective method of all is to put the end of a stout board in a cleft in a wall and place it across the patient’s back with a pad of cloth or leather intervening. While two assistants maintain traction, one or two other men push the free end of the beam downwards. Traction may also be secured by windlass, which makes for ease of control.<sup>15</sup>

Some 100 years later Appolloneus of Citium wrote commentaries on two or three chapters of the *Corpus Hippocatum* including the chapter on Articulations and included 30 hand-painted pictures.<sup>16</sup>

If Western ancient medical history and the history of manipulation of joints started with a great name—Hippocrates—it ended with another equally famous name—Claudius Galenus, or Galen (AD 131-202.). Eighteen of the 97 extant commentaries of his relate to Hippocrates’ work, including that on articulations. Hippocrates’ influence is also shown in two woodcuts in an illustrated edition of Galen’s works.

Galen mentions the case of a man who had fallen off a cart a month earlier and had developed pins and needles with numbness in the third, fourth and fifth fingers of his left hand. He localized the injury to the “spinal nerve below the seventh cervical vertebra” and cured the patient by treating his neck.<sup>17</sup>

The Greek physician and medical writer Oribasius (c. 320-400) was personal physician of the Roman emperor Julian the Apostate. In his collection of writings he included works from Hippocrates, including illustrations of Hippocrates’ bench.<sup>18,19</sup>

The Arabian doctor Abu’ Ali ibn Sina (980-1037) was also known as Avicenna. In his “Codex Avicennae” he shows illustrations indicating that he practised Hippocrates’ methods of treating backs. Avicenna is supposed to have ascribed love to mental disorder and is reported to have died at the age of 57 from an excess of wine, women and overwork.<sup>17</sup>

Abu al-Qasim al-Zahrawi, also known as Abulcasis (936-1013) was an Andalusian physician, considered to be the father of modern surgery and is Islam’s greatest medieval surgeon whose comprehensive medical texts shaped both Islamic and European surgical procedures up until the Renaissance. His greatest contribution to history is the *Kitab al-Tasrif*, a thirty-volume encyclopaedia of medical practice, which also shows traction of the spine.<sup>17,20</sup>

Wei Yi Lin, having assimilated the teachings of Mongolians and Arabians, wrote a book “Effective Medical Remedy” in 1337. The book, which was an orthopaedic recording, described various types of subluxation, dislocation and fractures of extremities. In addition, the book described different methods of fracture reduction and techniques of manipulation.<sup>12</sup>

A manuscript written by Charaf-Ed-Din in 1461 depicts medieval Turkish manipulation during traction.<sup>16</sup>

The greatest surgeon of renaissance times was Ambroise Paré. (1510 – 1590). His works contain a chapter on “vertebral dislocation.” He states:

“The external causes of dislocation are a fall, a severe blow or too much work with the trunk flexed, e.g. in the vineyards.”

His treatment was based on Hippocrates’ approach: “When the vertebrae are dislocated outwards forming a prominence, the patient should be tied down prone to a board with ropes under the armpits, the waist and the thighs. He is then pulled and stretched as much as possible, from above and from below, but not violently. If traction is not applied, cure is not to be expected. The operator then places his hands on the kyphosis and presses the prominent vertebra in.”<sup>21</sup>

Joannes Henricus Hierinimi wrote in a thesis in 1746:

Subluxation of joints is recognised by lessened motion of the joints, by slight change in the position of the articular bones and pain ... most displacements of vertebrae are subluxations rather than luxations.<sup>22</sup>

Edward Harrison, a graduate of Edinburgh University in 1784, wrote in 1820:

A small irregularity in the height and disposition of some particular vertebra is perceptible on examination ... The

effects of this subluxation, not being distinguishable by the symptoms, have never been traced to their origin in the spine. A very slight and partial compression of the cord, or some of its nerves, will disturb the organ to which they run...<sup>23</sup>

J. Evans Riadore, a fellow of the Royal College of Surgeons in England published a treatise on irritation of nerves in 1843:

“Every organ and muscle in the body is dependent, more or less upon nerves...one or two of the vertebrae may be pressing injuriously upon either the anterior or the posterior root of some nerve. ... When one vertebra forms a slight exception in the regularity of the spinal line, either by height or distance from its fellows, a serious train of nervous symptoms may supervene... if any organ is deficiently supplied with nervous energy or blood, is immediately, and sooner or later its structure becomes deranged... If the digestive organs become functionally or organically deranged from such a cause (i.e. spinal irritation) the nerve roots emerging from the sixth to eighth dorsal ganglia recumbency in addition to manipulation is often necessary. ... Various branches that arise from the sixth, seventh and eighth dorsal ganglia ... become irritated by contact, or sympathy with disease, in the notches through which the nerves pass out of the vertebrae.”<sup>24</sup>

Amongst medical men using manipulation during the last part of the 19<sup>th</sup> century was the Swiss physician Otto Naegeli who published his book in 1894 with the title “*Therapie von Neuralgien und Neurosen durch Handgriffe*”—The Treatment of Neuralgias and Neuroses by means of Handgrips—in which he advocated manipulation of the cervical spine.<sup>25,26</sup>

### **CHIROPRACTIC AND THE SUBLUXATION IN THE EARLY PART OF THE 20<sup>TH</sup> CENTURY**

The first search for what would later be called subluxation took place when D.D. Palmer observed a vertebra racked from its normal position and palpated the spinous and transverse processes in a static form. Some time later nerve tracing was introduced.

In January 1909 D.D. Palmer wrote:

We adjust the toes for corns and bunions; there are no nerves between these articulations; therefore nerves cannot be pinched by the displacements of these joints. The first and second pair of spinal nerves do not pass through intervertebral foramina, between two notches, but through long grooves which cannot impinge nerves as they pass outward; yet we have many diseases which are caused by displacements of the atlas, where there is no possibility of a nerve being pinched in the superior or inferior grooves of that vertebra.

... The business of the Chiropractor is to adjust any of the three-hundred articular joints of the skeletal frame, but why do so if there are no nerves between the articular surfaces?

... There may be pressure by impingement. The latter does not imply that nerves are pinched between two articular surfaces—where there are none—an impossibility. If we will use the sense of pressure because of an impingement and tension instead of

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being squeezed, we will have an explanation which will explain one which anatomists cannot gainsay. Remember that the only sensational tissue are nerves; they sense all.

...Bones cannot be displaced except at joints; these cause tension on nerves because of the displaced portion projecting against them. This pressure causes not only a tension, but an irritation depending upon how great the pressure and the surface or edge which is brought to bear. The difference between a rounded surface and a sharp edge will be apparent when we consider the acute excruciating pain of neuralgia and that of rheumatic aches.

...The Chiropractor who asserts that nerves are pressed upon as they pass through intervertebral foramina, is a "back number." How are the first and second pair of cervical nerves impaired? They do not pass through intervertebral foramina formed by two notches. Impinged nerves, which cause corns and bunions, do not pass through foramina surrounded by osseous tissue, nor between the articular surfaces of joints. Nerves are not pinched in the foramina of the sacrum, nor in the sacro-iliac articulations. They are, however, pressed against, impinged by the displacement of these joints; when the projecting articular processes are replaced, then the pressure is removed.<sup>27</sup>

He followed this up in March 1909 with:

A nerve, the channel through which Innate sends its messages, may be impinged, pressed against, bent, stretched, irritated so that the communicative force, or impulse is transmitted too slowly or too rapidly.

...Chiropractic as a Philosophical Science is founded upon the knowledge of functions performed by Innate in health and disease. When this controlling intelligence is able to transmit mental impulses to all parts of the body, free and unobstructed, we have normal actions, which is health.

Innate's desire, directing its vital energy, is transmitted thru the nervous system to specialize the co-ordination of sensation and volition.

Displacement of any part of the skeletal frame, may press against and thereby cause impingement of nerves, which are the channels of communication, decreasing or intensifying their carrying capacity, creating either too much or not enough function, an aberration known as disease; the affection depending upon the shape of the bone, the amount of pressure, age of the patient, nerves impinged and the individual make- up.

Chiropractic as an Art adjusts by hand all displacements, subluxations of the 300 articular joints, more especially those of the vertebral column, for the purpose of removing nerve impingements, which are the cause of deranged functions. The long bones and the vertebral processes are used as handles by which to adjust displacements of the hard tissues of the skeleton; by so doing, normal transmission of nerve-force is restored.

Vital functions are personified physical expressions; normal amount is health. Every vital act is controlled by Innate Intelligence, managed thru the nervous system in proportion as the lines of communication are free and unobstructed.

Knowing that our physical health and the intellectual progress of Innate (the personified portion of Universal Intelligence), depends upon the proper alignment of the skeletal frame; therefore, we feel it our right and bounden duty to replace any displaced bones, so the physical and spiritual may enjoy health, happiness and the full fruition of our earthly lives.<sup>28</sup>

In 1910 B.J. Palmer introduced radiography in search of the subluxation.

B.J. Palmer's concepts in 1911 were:

Taking the words vertebral *subluxation*, it implies, to us, a condition of pressure upon nerves as they emit through the intervertebral foramina.

... The question arises, what do we mean by "pressure upon nerves." We have always utilized this in the sense of a constriction—making smaller the lumen of the nerves. You well know that the *lateral* intervertebral foramina is composed of two halves, an upper and a lower half, and that it is the disarrangement of one part upon the other that made that opening smaller and by making the opening smaller it produced a pressure upon the nerve, and by so doing has interfered with the transmitting capacity of the nerves, thereby interfering with or impeding the transmission of mental impulse currents from brain to tissue cell. Pressure in its last analysis is a constriction; nor do I wish to change that fundamental at this time. It will remain the same.

... *How and What makes Pressures.*

Tightness of nerves produced by and pressure then created upon one or more sides by bone makes the same abnormal functions as, and is equivalent to, entire pressure, and is a constricting force modified. A superior subluxation of atlas, determined by palpation of either or both transverses, would make compression between that notch and the occipital of frequent occurrence. If the right has this condition, the left side usually shows the opposite, altho both sides are easily palpated and might be found with pressure, therefore, tender. The side most prominent would have more pressure as a general rule. Occasionally where the one transverse process is superiorly prominent, the opposite inferior will be the greatest point of pressure upon the second pair of nerves. *There is no set rule for this but it must be made specific in each case by digital palpation and nerve tracing.*<sup>29</sup>

In 1924 B.J. Palmer introduced the Neurocalometer to chiropractic, an instrument designed to locate a subluxation by way of bilateral skin temperature changes.

In 1927 Ralph W Stephenson wrote the catechism for chiropractors when he published the Thirty-Three Principles, partially based on the writings of B.J. and Mabel Palmer and John Craven in the Chiropractic Textbook where subluxation is defined as:



A subluxation is the condition of a vertebra that has lost its proper juxtaposition with the one above or the one below, or both; to an extent less than a luxation; which impinges nerves and interferes with the transmission of mental impulses.

...A subluxation impinging a nerve from brain to organ, also impinges the nerves supplying its own tissues; and that is why it exists as a subluxation.<sup>30</sup>

In a small book “The Art of Chiropractic” also published in 1927 Stephenson defined subluxation in Article 4:<sup>31</sup>

A subluxation is the condition of a vertebra that has lost its proper juxtaposition with the one above or the one below or both; to an extent less than a luxation (dislocation); which impinges nerves and interferes with the transition of mental impulses. All the factors of this definition must be given to make it complete and to make it Chiropractic, for unless it is the cause of disease it is not a subluxation according to Chiropractic. Dislocations and fractures also can impinge nerves and interfere with the transmission of mental impulses but they are not for chiropractors to work with.

By 1934 B.J. Palmer had refined his ideas as:

SUBLUXATION is a condition of three correlated vertebrae more than a MISALIGNMENT, which have in part lost their normal relationship in juxtaposition, where it DOES occlude a foramen; DOES produce pressure upon nerves; DOES offer interference to transmission; DOES create resistance to transmission of mental impulse supply between brain and body, and DOES thereby become THE cause of disease in one or multiple places in the body below or above.

... It is the THREE direction subluxation that DOES torque a misplacement to such a degree that it DOES become a subluxation. It can be safely said that THE ONLY PLACE where we can get a THREE direction torque misalignment which constitutes a subluxation in fact, is at occiput, atlas or axis.

... If SUBLUXATIONS occur, more specifically in the cervical region, then what are those conditions which we find below, which we formerly construed as SUBLUXATIONS?

The hour has arrived when a distinction must be made between a misalignment that IS a subluxation, and a misalignment which is ONLY a misalignment; between a SUBLUXATION which IS occluding the foramen, producing pressure upon nerves, and does interfere with local as well as a multiplicity of transmissions having various exits below itself; and some vertebra which is out of alignment in relationship with ones above and below, but does not and is not occluding a foramen, producing pressures upon nerves, and is not the source of interference with transmission because thereof.<sup>32</sup>

By this time B.J. was developing the concept of “cord pressure” at brain stem level, as distinct from “nerve pressure” at any spinal level in chiropractic theory and practice.

To be able to prove that Atlas or Axis could intrude into the spinal cord canal he went to Dresden, Germany in 1934,

the only place where a body could be quick frozen upon death. With the spinal structures sutured *in situ* the Spalteholz system was employed to dissolve all soft tissue, providing a translucent specimen of the skull and the upper cervical vertebrae. This was the first occurrence where the upper cervical spine could be visualized through the skull—several generations before computed tomography would be able to reproduce the same view.<sup>33</sup>

A few years later—1937—Felix Bauer developed the “Base Posterior View” while interning at B.J. Palmer’s private clinic in Davenport, Iowa.<sup>34</sup>

While B.J. Palmer’s concept of the subluxation is quite specific in what he means, the definition of subluxation as used by the National College of Chiropractic is very simple:

A subluxation is not a dislocation of a vertebra from the adjacent vertebrae above and below it. A subluxation is a condition caused when a vertebra is carried beyond its normal range of motion. It is simply a slight change in the relative position of the vertebra with the contiguous surfaces of the vertebrae above and below it.<sup>35</sup>

## POST WORLD WAR II ERA

The early post-war years were a time of turmoil and change in Germany. With the ceding of the territory east of the Oder and Neisse rivers, including the regions of East Prussia, Silesia and large parts of Brandenburg and Pomerania to Poland, and the Sudeten region to Czechoslovakia, the expulsion of people of German ancestry from those areas, as well as from the Soviet Union, where they had been settled for several hundred years, a major migration took place into Western Germany. To this was added the brain drain from the Eastern Zone of Germany, as the intelligentsia tried to escape the communist domination of the Soviet zone, later to become the German Democratic Republic, until first the “Iron Curtain” tried to stem this tide of migration, and later the “Berlin Wall” made escape virtually impossible.

In Western Germany it meant a major increase in the population, a general shortage of supplies, and an oversupply of physicians. Only after the currency reform of June 1948 did the German economy start to improve.

The oversupply of physicians and experiences of various German surgeons in the operating theatre created a seedbed for new approaches to healing, including spinal manipulation.

Perhaps the best known of the early researchers was Professor Zukschwerdt, who coined the term *Blockierung*, perhaps best translated as *fixation*, as the term *subluxation* has its own meaning in German surgery. Together with Emminger, Biedermann and Zettel he published a book under the title *Wirbelgelenk und Bandscheibe*—Spinal Joint and Disc, which includes a position paper and considered opinion on chiropractic.<sup>36</sup>

Junghanns defines *Blockierung* as “a temporary movement restriction of a motion segment resulting in a functional pathomechanical state.”<sup>37</sup>

Eder and Tilscher<sup>38</sup> categorically state “It has to be made clear that *Blockierung* should never be understood as subluxation. The subluxation theory propounded by

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non-medical chiropractors and the primitive mechanistic representation of disease is indefensible, just as is the closely connected view of the therapeutic replacing or repositioning (of a vertebra). Subluxations and their sequelae are reserved for traumatology and have no place in the area of today's manual medicine.

Mohrle<sup>39</sup> states that there is widespread consensus what *Blockierung* is not, *ie* it is not a subluxation of an articulation as claimed by chiropractors.

Zukschwerdt, while a prisoner of war in France as a military surgeon, came into contact with an American who first told him about chiropractic, but he soon forgot about it. During 1946-47 he treated many patients with suspected disc herniation, among them one who did not respond to conservative treatment, and when surgery was contemplated, decided to try chiropractic as a last resort. A week later he returned to Zukschwerdt, much eased. And when something similar happened to another patient, he realized that chiropractors knew something that physicians did not. Thereafter he gained knowledge of chiropractic manipulation, theory and philosophy through literature collected by a Dr Schweitzer, PhD, who had first learned of chiropractic in the 1920s while on a study visit to the United States, and had kept track of its literature. During 1947 Zukschwerdt had gained sufficient success using chiropractic methods that he gave a major address on it at the Therapy Congress in 1948.<sup>36</sup>

In 1950 Professor Junghanns introduced the term *Bewegungssegment* at the 62<sup>nd</sup> meeting of the German Society of Surgeons in Frankfurt. In our terminology it is known as the *Intervertebral Motion Segment*.<sup>40</sup>

Unfortunately the term *Bewegungssegment* was translated in the American edition of *The Human Spine in Health and Disease* as *motor segment* rather than *motion segment*.<sup>41</sup> As early as 1978, Gatterman<sup>42</sup> called attention to this. It is indeed unfortunate that the term *motor unit* is still used inappropriately by some writers.

The vertebral motion segment includes:

- The intervertebral disk
- The vertebral endplates
- The apophyseal or zygapophyseal joints
- The anterior and posterior longitudinal ligaments
- Ligamentum flava
- The contents of the spinal canal
- The left and right intervertebral foramina
- The contents of the intervertebral foramina
- The spaces between the adjacent spinous and transverse processes
- The ligaments, capsules and musculature must also be considered.<sup>43</sup>

Other early researchers included Freimut Biedermann, MD, who gave a major address to the German Medical Convention in 1952, later translated and published as a monograph by the International Chiropractic Research Committee under the title, *Fundamentals on Chiropractic from the standpoint of a medical doctor*.<sup>44</sup>

In this small book of 55 pages, he discusses the experiences with chiropractic of other highly regarded German physicians and surgeons, and his conclusions on cases successfully managed with chiropractic, covering almost an entire alphabet from Asthma to Varicosities.

By 1952 they had found that a lot of “subluxations” were not caused by accidents, sudden physical shocks and obvious stresses, but primarily by micro-trauma, such as:

- Any sudden or continuous light stimulus (cold, heat, laceration, blow, sting, cold draft)
- Any chemical or thermal stimulus above threshold on the mucous membrane of the upper gastro-intestinal tract (ice water, very hot drink, alcohol)
- Any sudden and sharp increase of light in the eyes
- Any explosive noise
- Any commotion can cause micro-trauma to the cervical spine.

On 2 December 1953 the first medical association dedicated to manual medicine was founded. This association, the *Forschungs und Arbeitsgemeinschaft für Chiropraktik (FAC)*—the Research and Working Group for Chiropractic— included members of all health disciplines, including Werner Peper, DC of Hamburg and Lars Sandberg, DC of Sweden.<sup>11</sup>

German physicians—chirotherapists or manual medicine practitioners—rejected the concept of the “chiropractic subluxation.” This can easily be understood if they used D.D. Palmer's concept that 95% of all disease is caused by subluxation.

However, they developed their own concept of the effects of *Blockierung* as exemplified by Eder and Tilscher<sup>45</sup> in a model of “Segmental-Reflexive Complex” which symbolises the combinations and reactions of various structures and systems with the motion segment involving: joint, joint capsule, tendons, vegetative system, visceral organs, sensory organs, central nervous system, psychological symptoms, peripheral nervous system, hormonal system, lymphatic system, connective tissue muscular system and ligaments. One could be forgiven to think that their model is not that far removed from D.D. Palmer's concept.

Time has moved on since the 1950s and so has research into what is called the “Chiropractic Subluxation.”

Fred Illi, DC, of Switzerland asserted that one of the primary results of the change of human posture from horizontal to a vertical weight-bearing position was freely moveable sacroiliac joints, which are subject to immense stresses.<sup>46</sup> Subluxation of the sacroiliac joints is present when the articular surfaces of the joint are misaligned.<sup>47</sup>

Henry Gillet, DC, of Belgium, who was unable to utilise radiography, is credited with developing “motion palpation.” He analysed the subluxation into its component features and concluded that the term *fixation* is more accurate than subluxation as descriptive of the clinical phenomenon with which chiropractic deals. He did not consider fixation to be completely accurate as a term, because vertebrae are not normally fixed or ankylosed to each other. There is

instead a reduction of mobility caused by varying degrees of dysfunction of the articular soft tissue.<sup>48</sup>

Janse's perception became that a subluxation occurs when abnormal motion is exceeded and osseous movement causes pressure on a nerve. The essential feature of a subluxation is that the vertebra is relatively fixed in its abnormal position and no longer takes part in the normal movement of the spine. If a vertebra possesses normal mobility, it is not considered to be subluxated. The cure of disease by adjustment of subluxated vertebrae is therefore accomplished by the conversion of rigid segments into moveable ones.<sup>47</sup>

Haldeman<sup>49</sup> considers that spinal subluxation causes pain, discomfort, lack of mobility and muscle tension. These factors can cause reflex increase in muscle tension, visceral dysfunction and reticular system activation with insomnia. Correction of the subluxation with the subsequent decrease in afferent input and central reflex activity could, therefore, be at least one of the mechanisms through which the chiropractic adjustment benefits patients with psychological disorders.

Sandoz<sup>50</sup> became aware that the term subluxation, which constitutes a cornerstone in chiropractic terminology, has evolved with the years and has acquired more and more an all-inclusive connotation, being practically synonymous with a derangement in any one of three functions of the spine: static, dynamic and protection of the nervous system. When insufficiently qualified, the term no longer has the same meaning for all and therefore gives rise to misunderstandings, even within the profession itself.

The term "subluxation" does not have to be discarded but should be used again in its original meaning of "partial or incomplete articular disrelationship," the meaning that it had before chiropractic. Therefore the term should no longer be used in a general sense to designate all forms of spinal disturbances. The "chiropractic subluxation," that is a purely dynamic derangement should more properly be termed "vertebral fixation." The luxations, subluxations, fixations, hyperkinesis and any newly discovered phenomenon would altogether constitute "functional or mechanical derangement of the spine."<sup>51</sup>

It can be argued that the chiropractic profession did not seriously investigate the "subluxation" until the last quarter of the 20<sup>th</sup> century. The trigger for the scientific investigation of the "Subluxation" and the "Vertebral Subluxation Syndrome" was probably the workshop held at the National Institutes of Health on February 2-4 1975, resulting in the publication of "The Research Status of Spinal Manipulative Therapy"<sup>52</sup> which highlighted the paucity of chiropractic research.

Rome<sup>53</sup> identified 296 ways that subluxation has been mentioned in the literature, from "Aberrant Motion" to "Zygapophyseal Pathophysiology," but does not include the late Professor Joe Keating's favourite term "Spinal Boo Boo."

It is however beyond the scope of this paper—Historical Perspectives—to go into more recent research into what is now called the "Vertebral Subluxation Complex" which will be covered by other authors.

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