

THE CONVENTIONAL IDENTITY OF CHIROPRACTIC AND ITS NEGATIVE SKEW

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ABSTRACT

Objective: To discuss the professional identity of chiropractic as evident in the profession's literature.

Methods: Structured literature review followed by a pragmatic historical narrative of found artefacts.

Results: The literature appears vague regarding chiropractic's identity.

Discussion: The literature does allow a broad determination that the identity of chiropractic is unimodal gathered around the founding premise of DD Palmer with an informed prediction of a left-skewed, negative distribution of concessional chiropractors representing no more than 30% of all. It appears this minority becomes more dogmatic as it concedes elements of conventional identity and adopts extreme evidence-based musculoskeletal medicine to become a sect of about 0.2% of all. About 70% of chiropractors identify with subluxation in an evidence-informed context and I call this representation the conventional chiropractic identity.

Conclusion: The identity of chiropractic may now be described as conventional when its practitioners adhere to the profession's founding precepts, or concessional when it modifies or ignores these. The majority of the profession can be considered conventional. (*J Contemporary Chiropr* 2020;3:111-126)

Key Indexing Terms: Chiropractic; Identity; Subluxation.

INTRODUCTION

The premise of chiropractic is straight forward; subluxed vertebrae compromise the nervous system, modulating tone and the resultant state of Wellbeing. (1, pp 404, 632, 656, 659) Variants of this idea are found throughout the medical literature of the 16th through 19th Centuries (2,3) and the chiropractic literature of the 20th Century. (4)

Palmer's original contribution was the use of the spinous and transverse processes as levers to manually replace subluxed vertebra (5), thus avoiding the painful medical approach of cauterizing with a hot iron, without

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anesthetic, to create a blister over the spinal segment or creating painful irritation with surgical incision. (6-8) His new method to correct a subluxed vertebra became known as the chiropractic adjustment and these behaviors indisputably constitute conventional chiropractic (9) notwithstanding a vocal minority who think otherwise. (10) That which Palmer founded as 'adjusting by hand' (11) is now colloquially known as 'cracking backs.' (12)

One would think the practice of manually adjusting subluxation would form a consistent identity for the profession Palmer founded but this was not to be. In his mid-1990s thesis (13) examining chiropractic in Australia, sociologist O'Neill noted 'the deceptively simple question "what is a chiropractor" still lacks a definitive answer.' (14) The same question had been posed 20 years earlier by Haldeman, who came to be an eminent member of the profession. He asked 'what is a chiropractor, and what does he do?' (15) Not one of a recent series of 13 papers addressing the question 'what is chiropractic' and reporting 'papers describing the chiropractic profession and chiropractic practice' addressed identity. (16, Table 1)

This question would be answerable with a common professional identity that did not distinguish between the discipline as a body of knowledge forming the science of chiropractic, and the profession as the group of people engaged or qualified in expressing that knowledge, based on standards of practice, codes of ethics and of professional conduct. It is the lack of a professional identity gathering these that the evidence shows to allow contemporary counterfactual argument within and about chiropractic.

This paper applies the methods of a pragmatist to examine chiropractic's professional identity by considering a historical context for adjectives descriptive of chiropractors, such as 'straight' or 'mixer', and 'dogmatic' or 'evidence-based.' Australasia allows a case study of identity as it developed outside North America, the founding home of the profession. In Australasia the delineating terms are 'main-stream' and 'second-stream.' (17)

This paper addresses the research question 'what is the professional identity of chiropractic' and will identify the terms 'conventional', 'concessional', and 'negative left skew' as appropriate descriptors in the 21st Century,

formalizing the split identity that emerged during the first decade of the profession.

METHODS

The literature of professions was searched to establish a contemporary interpretation of 'identity' in the context of a health profession. The discipline's literature as indexed by the Chiropractic Library Collaboration (18) was searched for primary data, and secondary data were found by citation harvesting of returned papers from the initial search. The standard assessment processes used by historians to validate found papers and related resources were applied. Primary sources were evaluated by understanding who wrote it, what questions were addressed, and why? (19) The 6 evaluative questions identified by Garraghan (20) to validate historical artifacts were consistently applied to all papers.

The initial search term was 'identity' and I report that the literature does not return a common, shared professional identity for the chiropractic profession; also, that various professional bodies including the World Federation of Chiropractic (WFC) lack commonality in their understanding of the profession they represent.

RESULTS

The Matter of Professional Identity

In general a profession is an occupation based on skill or education (21) where the holder has autonomy. (22) The themes of professional identity are given as 'selflabeling as a professional, integration of skills and attitudes as a professional, and a perception of context in a professional community.' (23) Chiropractic appears as a profession to the public (24-26) and to health-care peers. (27) Given that chiropractors exist under legislation in over 40 countries (28,29) they are considered as health practitioners and the occupational regulators and education accreditors are overt regarding the need to demonstrate professional skills and attitudes. (30) Indeed, 'Universal Competency 1' of the Council on Chiropractic Education Australasia (CCEA) is 'Practicing Professionally'. (30 p. 10)

The Matter of Chiropractic Identity

Different positions within chiropractic are shown to have different ideas of what chiropractic is or should be (31-34) Individual opinions (35,36) range from it being a drug-free (37) wellness profession (38) treating beyond the spine (39) to only a spine-care profession with manual methods, (40,41) or, in a basic form, centering on the analysis and adjustment of vertebral subluxation. (42)

The literature offers few published intellectual constructs of chiropractic identity beyond the unimodal position given in my introduction. Arbitrary positions are promoted by most commentators with presumed authority and I offer

this critique on the basis of my systematic analysis of the chiropractic literature undertaken in March 2019 using the search string 'papers given as first-level related from chiropractic [mesh] AND (subluxation [ti] OR subluxation [ab])' in the form "'chiropractic"[MeSH Terms] AND (subluxation[ti] OR ("joint dislocations"[MeSH Terms] OR ("joint"[All Fields] AND "dislocations"[All Fields]) OR "joint dislocations"[All Fields] OR "subluxation"[All Fields]))'. 101 papers were returned and all were one or more of opinion, cohort studies with ill-defined terms, literature reviews, or other.

As a pragmatic historian and educator I argue that vagueness envelops the professional identity of chiropractic. My use of the term 'vagueness' is after Swinburne's examination (43) and includes inexactness and imprecision, qualities that are appropriate to describe ongoing argument over basic clinical procedures within chiropractic. To demonstrate polar divergence I present 2 examples: a conflict regarding the role of radiography, and actions by a minority to become part of medicine complete with prescribing rights for listed medications.

The Radiography Cleft

With regard to the clinical use of radiography in chiropractic practice there are 2 strongly held opposing views. I accept this as evidence of a heterogeneity of clinical ideas within the profession. (44-52) My critical interpretation of this heterogeneity is the dissent by 1 group from the opinion of another regarding clinical radiography.

The evidence in this case reveals 2 quite different standards (53-56), each claiming to be best practice for the use of diagnostic imaging in clinical chiropractic. Both groups claim to be evidence-based, with 1 aligned with evidence seen through a biomedical lens and the other with evidence seen through a lens of chiropractic clinical practice. In turn, this leaves educational institutions presented with a choice between 2 conflicting versions of evidence, (57) if indeed a choice is needed to teach clinically-based practice standards regarding chiropractic radiography or the medical view where the diagnostic intent of imaging is different. The debate is acrimonious (46) and ad hominem. (58)

The pragmatist's perspective is that the clinical chiropractic view predates the biomedical view by decades and that pre-treatment radiographs provide important clinical information. Some consider they are required for safety (59-61) while others consider otherwise. (62) A critical analysis of the biomedical approach promoted by the WFC suggests flaws in its basic understanding of clinical chiropractic practice by applying the standards of medical care to a patient under chiropractic care. (63) The inability to understand this distinction seems to underpin the WFC's position

in another matter (64) and I make this point here as it appears the contemporary divided professional identity can be resolved to being 1 of 2 interpretations of clinical practice as a chiropractor. These are either a conventional view through a chiropractic lens or a concessional view through a medical lens.

The Medicine Cleft

The complexity of the argument about seeking medical privileges such as issuing prescriptions for pharmaceutical products is such that this paper can only make the briefest notation that it seems to stem from one or two colleges (65,66) embracing the idea that chiropractic is medicine. My brief summation will commence with a journal that arose independently, in Illinois in 1988. The *American Journal of Chiropractic Medicine* closed after three years of attempting to establish a field of 'chiropractic medicine'. In spite of being a peer-reviewed, indexed journal with appropriate processes and an established editor it came to an ignominious end. The editor, Roy Hidlebrandt, a 1949 graduate of Palmer College, had previously worked with Janse of the National College of Chiropractic (NCC) to establish the *Journal of Manipulative and Physiological Therapeutics*. (67) Throughout its 12 issues the *Am J Chiropr Med* argued its need to exist however the profession thought otherwise and did not embrace it.

NCC, which reinvented itself as a health science university, now delivers chiropractic education as 'a doctor of chiropractic medicine.' (65) The institution has taken this program to Florida (68) which has caused consternation in that state among other institutions competing for the chiropractic-student-dollar. (69) Further, NCC as a university is trying to revive the idea of a journal of chiropractic medicine. (70) Its readership is not known and the lead paper in the June 2019 issue was to do with physiotherapy applied to the viscera, (71) a discipline and a clinical approach traditionally not considered chiropractic nor even a variant within Palmer's founding ideas; (72) the September 2019 issue strays into osteopathy. (73) As another example, Kaiser University states 'Our vision is to be the nation's leading school of chiropractic medicine.' (66)

This 'medicine' cleft is between those chiropractors who consider chiropractic to be the conventional form established by Palmer as the identification and correction of subluxed vertebrae and those who concede Palmer's founding principles and seek to create their own variant of the discipline. From this observation I derive my categories 'conventional' and 'concessional.' In Australia these positions were manifest as 'mainstream' (74) where training occurred in a North American chiropractic college, and 'second-stream' (75-79) when it did not, requiring self-proclamation to claim an identity as a chiropractor. (80)

I summarize these 2 positions by suggesting a chiropractor may either be an expert in spine-mediated health and well-being which frames their approach to health care in a conventional chiropractic manner, or they may take a position of being a manual therapist with some training in chiropractic and see the patient through medical eyes as a diseased or injured person to be managed. This is disease care, the province of medicine. (81)

DISCUSSION

Chiropractic Identity as Founded

Palmer's belief system held his approach as pure (72) on the basis he founded and developed it; in this sense it can be only this foundation concept of chiropractic that is able to be considered as conventional chiropractic; all else is a modification, addition, or a concession of some aspect.

Palmer's early graduates were also certified to teach his methods and this quickly gave rise to a number of different colleges. (82-85) In at least 1 case his graduates formed another discipline, naprapathy. (86) Oakley Smith, an 1899 Palmer graduate (87-89) and Solon Langworthy, another early graduate (1901, 90 p. 38) founded the American School of Chiropractic in Cedar Rapids, (91) nearby to Palmer's school. They co-authored the profession's first recognized text. (92) Their teachings were a mixture of chiropractic and osteopathy and it was this that caused Palmer to coin the term 'mixer.' He wrote 'if you want a mixture of Osteopathy, Orthopedial Surgery, Vibratory Chiropractic and Bohemian treatments, go to Cedar Rapids ...' (72 p. 6)

In 1914 (1) Palmer made his view known that structure and function were closely related, writing 'Behind all abnormal functions, is the change in the structure of nerve tissue and an increase or decrease of nerve vibration.' (p. 28) 'Normal structure' and 'normal vibration of nerves' is denoted by 'tone.' (p. 32) Others (93, pp. 8-13) have reinforced the intimacy of function with structure, in particular small changes termed subluxation that occur between contiguous vertebrae. The clinical behaviors around that premise establish chiropractic as a narrated phenomenon and warrant my approach as a pragmatist to seek meaning among these various narratives.

Chiropractic as an Entity Today

Chiropractic is a reality through its commonality as a ubiquitous health-care practice in some 91 countries (94) with the most recent to introduce legislation being Lebanon. (95) Globally there are about 105,000 practitioners, with most practicing under legislation. (28,29) This statutory identity provides the boundaries for the relevant occupational regulator. In the global sense chiropractic is recognized by the World Health

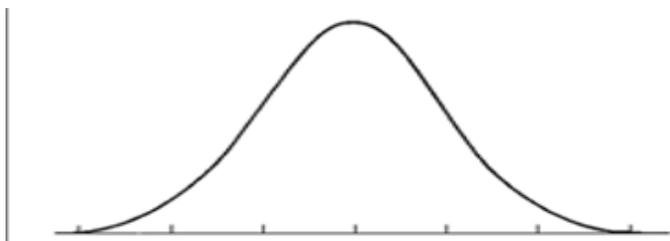


Figure 1. Putative Gaussian distribution of chiropractic identity, after Wardwell, (104) Jamison, (105) Good (106) Kent (107) and Coulter (109)

Organization (WHO) (96) which outlines a range of basic training requirements. A number of conditions treated by conventional chiropractors, notably subluxation, (97,98) are given in the *International Classification of Diseases Tenth Revision, Clinical Modification (ICD-10-CM)*. (99)

Expressions of Chiropractic Identity

The most simplistic interpretation has been addressed, that of 'straight' or 'mixer' together with its origin. This bimodal polarity was used in the 1960s by the American Medical Association (AMA US) as a means to disempower chiropractic. (100) Interestingly, Throckmorton had little concern for straight chiropractors; as legal counsel to the Iowa Medical Society he warned the 'mixers' were more of a menace to medicine. (p. 6 Section F)

Today an extension of this identity is presented by chiropractors from a vocal minority calling for medical prescription rights. (101,102). To counter this, the International Chiropractic Association (ICA), an affiliate of the WFC with the potential to be an alternative global association, has issued a public statement to oppose expanding the chiropractic scope of practice to include the prescribing of 'dangerous drugs.' (103) It is a relatively straightforward conjunction to suggest those chiropractors wishing to practice chiropractic as part of medicine are placing themselves in a concessional position which by definition is weaker than maintaining the conventional chiropractic position of being distinct from medicine.

In contrast to the dichotomous 'straight/mixer' identity, Wardwell, a noted (13) American sociologist, thought of chiropractic that the profession showed a Gaussian distribution of identities. (104) I represent his concept in Figure 1 using imagined data drawn from estimates by Jamison, (105) Good, (106) Kent (107) after Edwards, (108) and Coulter. (109) The literature consistently reports the majority of chiropractors as holding views about subluxation and of the value of evidence and I depict this as 'conventional,' forming the peak of this curve. The empirical rule (110) says about 68% of a normal distribution gathers around this central peak, leaving a left tail and a right tail. Chiropractic shows a small group that statistically fall as the left tail,

progressively rejecting subluxation and insisting only on providing their interpretation of evidence-based care. In Figure 1 I term this tail 'concessional,' representing those chiropractors who concede the foundation premise of chiropractic.

Wardwell's idea had merit at the time he coined it, as the literature of that period shows hard-core tails that were a concern in the 1970s and '80s due to the presence of dogmatic 'straight' positions. (111-113) However it has not been possible to locate current evidence of a right-tail; 1 of the papers returned is a 1996 commentary in a trade magazine by Seaman ('Who are the left-wing and right-wing chiropractors?') (114) that concluded as I do that there is no 'right wing.' He also concluded there is no 'left-wing,' which seems correct in today's terms.

I cannot make any scholarly argument that supports a Gaussian distribution; rather, the evidence is emerging to better understand the unimodal distribution. Richards (115) surveyed Australasian chiropractors to seek their self-categorization from a range of choices of how they viewed their practice style. In very broad terms he found the majority supported a vitalistic view and a minority a mechanistic view. He reported (115) that the mechanistic minority reject vitalism perhaps because of seeing it as a hindrance. (116) To qualify as bimodal these 2 groups would need to be either or about the same size, (117) individually cohesive, and 'have a fair gap between them ... not just random fluctuations.' (118)

The more recent findings of Glucina *et al* (119) reflect Richards' distribution, 'vertebral subluxation is an important practice consideration for up to 70% of chiropractors.' Should this majority be considered as representing the 'conventional' distribution shown in Figure 1 as about 68% (rule of thumb), the tail towards the left would represent the biomechanical, non-vitalistic, concessional grouping, representing at most about 30% of the profession. The resultant left-skewed distribution leaves the majority of the profession, about 70%, grouping towards the right as conventional chiropractors, tailing towards the negative left as chiropractic's founding ideas are progressively jettisoned.

In Figure 2, I attempt to show this distribution as a

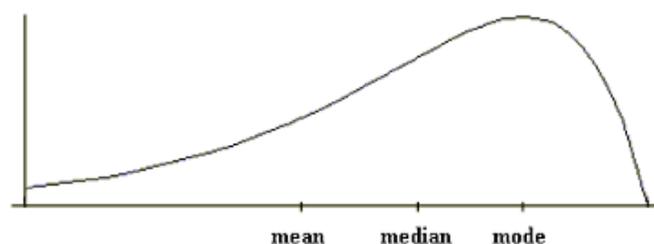


Figure 2. Predictive left-skewed distribution of chiropractic identity presented in this paper

predictive curve should my findings in this report have substance. Of interest is the placement of the mode which a skewed, unimodal distribution allows. The mode is a representative value as the measure of central tendency and as such it is the 'thought position' around which the data is centered. In this representation I show the identity of chiropractic as unimodal and conventional. The tail must be seen as an aberration, perhaps suggesting a fragile nature likely to fracture from the mainstream, conventional chiropractic identity. This probability has been canvassed. (120-122)

The evidence returned for this paper shows there are many opinions as to what the identity of chiropractic could be and these fall either on the side of Palmer's founding concepts (vitalism), or outside them (mechanism). conventional or concessional.

The Rosner Categories

Rosner, a biochemist with an understanding of chiropractic, published an identity structure drawn from his examination of the literature and summarized in Table 1 with my added clarifications. (123) Rosner's proposition characterizes a profession of complexity with 6 traits that seem to form the shape of conventional chiropractors as they exist in this 21st Century.

It is straightforward for a chiropractor to consider each of Rosner's characteristics and determine the extent to which they practice in this manner or not. The literature suggests that concessional chiropractors would rank low against numbers 3 and 4 with ambivalence about numbers 1 and 2. The reduction of this grid to just 2 points, numbers 5 and 6, serves to distinguish a concessional chiropractic identity from the conventional.

The literature shows a small subset of about 10 chiropractors who completely reject subluxation in addition to the Research Committee of the WFC (46,50,51). Members of the WFC Research Committee resigned en masse at the time of writing this paper and the professional destination of those former members is not yet publicly known. In addition to these, the following have published concessional views: Walker, (120) Mirtz, (121) Reggars, (124) Simpson, (125) Young (126), Perle, (127) and Mirtz with Perle. (128) Walker and Perle hold influence as journal editors. (129) Together with 37 self-proclaimed 'expert chiropractors' (130) and some 150 'signatories' to a specific position of chiropractic politics, (131) these some 200 concessional practitioners represent approximately 0.2% of all chiropractors.

There is also a tangential thread of Danish thought unraveling from what the literature shows is the conventional practice of chiropractic in Denmark. (132) The profession has developed in Denmark regardless that 'government's dualistic action relative to the

Table 1. Traits of conventional chiropractors after Rosner (123)

Rosner Criterion	Expression in conventional chiropractic
1. Concepts of manual medicine	The context of an holistic approach to the body as an integral whole, greater than the sum of its parts, within ailments may be managed without drugs or surgery.
2. Areas of interest beyond the spine	An understanding that the spine is central to the functioning of the total individual and is reflected in the state of the individual's health, both actualised and potentiated.
3. Concepts of the chiropractic subluxation	An understanding of the functional anatomy and neurophysiology of the spinal motion units and other joints with acceptance that these may become dysfunctional and potentially correctable by manual intervention primarily as spinal adjustment.
4. Concepts of neurology	An appreciation of neurology in the domains of objective findings (motor, reflex, sensory) subjective reports (sensation, pain, autonomic responses) and abstract dimensions (cognitive, affective, evaluative).
5. Concepts of mainstream or alternative health care	Unfettered public access, typically under jurisdictional legislation.
6. Concepts of primary care, first-contact provider, or specialist.	Allowance of practitioner choice from solo private practice to being a member of a health care team.

Danish chiropractic community' may have 'inhibit(ed) the spontaneous evolution of contemporary Danish chiropractic practice.' (133) Its characteristics include nearly half (47% in 2014) (134) of practitioners being trained locally at the country's only chiropractic training program delivered as 'Clinical Biomechanics' (135) and developed to build the profession's legitimacy. (136) As expected the management of low back pain accounts for around half (49%) of all patient visits. (137) Within the Nordic region both maintenance care (138) in the absence of evidence beyond 'reasonable consensus' (139) and infant care is common (140) including for infantile colic, (141) a practice cautioned against in Australia (142) with the suggestion that such practitioners require 'a minimum 2 years of post-graduate training in pediatrics' and Board endorsement. (143)

This unraveling from the conventional is concessional, dogmatic 'evidence-based musculoskeletal medicine' (EBMM)* which sits outside scholarly debate and offers extraordinary propositions (122,144) which have been countered with argument (145) from philosophical

pragmatists in the Eastern tradition, and from the conventional position. (146) That attitude sits outside the conventional or mainstream model of chiropractic and is contrary to much evidence, clinical experience, and patient initiated reports and observations.

This internal Danish inconsistency reflects from the WFC Research Committee (147) with some members signaling a shift away from the conventional position. There is a media report (148) that the behavior of this thread was an embarrassment to the profession at a global meeting in Berlin in 2019. The ICA has formally complained about this to the WFC on more than 1 occasion. (149,150) The behavior is seen as a reason for financial supporters of the WFC to reconsider their position. (151)

On the other hand the ICA represents conventional chiropractic (152) in contrast to the WFC which has adopted a concessional model by putting aside an identity of chiropractic it developed through extensive consultative processes (153) and instead adopting 'principles' of professional behavior (154) reflecting the ideologies of its contemporary leadership group. None of the 20 principles adopted by the WFC provide a professional identity; starting from their Principle One (1) 'We envision a world where people of all ages, in all countries, can access the benefits of chiropractic' they proceed through a non-evidence-based series of emotive statements with none capable of being a statement of identity for the profession they claim to represent. In stark contrast the World Chiropractic Alliance (WCA) (155) sees an identity of chiropractic as 'the only discipline that focuses on correcting subluxations and reducing the stress that interferes with the body's ability to self-regulate and heal.'

So What is Chiropractic?

In the absence of the literature returning an agreed identity of chiropractic alone a theory of chiropractic, (156) the profession is commonly described in terms of different paradigms. (157-160) This presents a dilemma for educators (161) and in the Australasian context there is divisiveness among Australasian educational institutions in the absence of an agreed paradigm of chiropractic that the accrediting body, the CCEA, (30) fails to address. Even the paradigm proposed by the Association of Chiropractic Colleges (ACC) (162) seems to have failed in uniting all colleges in the countries of its members. (163) Paradigm or not, the literature of chiropractic demonstrates vagueness with the matter of professional identity. (164)

This lack of a common agreement of the professional identity of chiropractic may explain the existence of 3 professional associations (165-167) in Australia and a fourth in New Zealand. (168) When the New Zealand Association was first established in 1921/22 (169,170) it

included the few US-trained chiropractors in Australia at the time but this did not last. The first formal chiropractic association in Australia was founded also by US-trained chiropractors, in 1938. (171)

Identity in Australasia

The introduction of legislation in Australia in particular brought 2 disparate groups together, (17,81) the chiropractor trained in North America, commonly at Palmer College, and considered mainstream by commentators, (80 p. 79 Table 2.3.1,172-177) and the practitioner trained in Australia, usually in naturopathy, then osteopathy and eventually chiropractic. Researchers have consistently classified these as 'second stream' (77-80,178,179) although this term is not welcomed by those (180) who may fit the category. (181,182)

Through the Grandfathering process at the time the statutory register was opened state by state, those states with a second-stream cohort allowed any person with an established practice to nominate themselves as a chiropractor or osteopath or naturopath and commonly all three. Only one state, Western Australia (WA), is noted (80) for holding a strict position on the required level of education to allow registration, limited to graduates from the United States and Australia's first accredited chiropractic program (183) at the Phillip Institute of Technology, Melbourne (PIT). The implication is that WA established chiropractic as a mainstream or conventional profession, an anomaly now the state is served by a local program at Murdoch University which teaches concessional chiropractic as evidenced by it being a signatory to the position statement relegating subluxation to history by the International Chiropractic Education Collaboration (ICEC). (184)

Broadly speaking, as chiropractic was settled in Australia the American-trained chiropractor graduated from a conventional mainstream program and the Australian-trained did not. Mainstream is defined by Peters and Chance as 'the philosophy, sciences and art of chiropractic from its discovery by DD Palmer in 1895 in Davenport Iowa, through its development at the Palmer School of Chiropractic by BJ Palmer, and at other chiropractic colleges, dealing with spinal relationships and neurological in-tegrity and taught in residential courses at standards acceptable to the statutory examination and registration authorities of the day (primarily in the United States and Canada.' (179) By exclusion the definition of second-stream is chiropractic that is not mainstream and includes manipulation called 'chiropractic manipulation'

'by medical practitioners, physiotherapists' and others. (185,186)

This distinction continues today with 2 Australasian institutions (187,188) formally relegating the

subluxation as 'only of historical interest' and just two (189,190) of the remaining four claiming to deliver a curriculum that includes all 6 of Rosner's traits. Second-stream chiropractors now lead 3 of the 4 professional associations, (191-193) with New Zealand being the exception. (194)

How Did This Happen?

The development of chiropractic as mainstream and second-stream in Australasia is addressed in detail by me elsewhere. (17,80) In brief, the profession in Australia developed under the auspices of chiropractors trained at the Palmer school in America, representing the mainstream of chiropractic. A second-stream of self-proclaimed therapists variously as osteopaths, chiropractors, or naturopaths, or all three, formed a small collective of questionably trained practitioners, some of whom who persist today. Australasian education was based on models put forward in 1975 by Winter (171) and the main-stream association. (195) The purpose of Winter's report was to provide the curriculum for a university-level program of chiropractic education for which the entry level was matriculation to address what he saw as the lowest possible standard for registration being set by an inquiry conducted by the state of New South Wales (NSW). (196)

The NSW Inquiry recommended 'broadly, that all practitioners who manipulated, provided they had been in practice for 4 years, should be registered as chiropractors.' (196 p. 7, 3.1.3) It is this abrogation of a reputable standard of education which informs my understanding of concessional chiropractic as being that form of chiropractic which concedes or omits the Palmer foundations and at 1 time in Australia included osteopaths, naturopaths, and untrained persons; the model endorsed by the NSW recommendation. That 'second-stream' of chiropractic could be today's 'concessional' chiropractors as evidenced by the published narratives as shown in this paper.

CONCLUSION

Regardless of my axiological bias toward Palmer's founding idea the evidence shows that chiropractic may be considered as a unimodal profession, one that gathers about Palmer's founding imperatives with some who progressively reject them and tail away to a concessional identity which at its extreme represents EBMM Note: The term 'evidence-based musculoskeletal medicine' or EBMM emerged during the peer-review process and I adopt it as a descriptor of concessional chiropractic.

There is no more appropriate term than 'conventional' to describe evidence-based chiropractic in the mode of the founder's intent. The 6 Rosner traits (Table 1) represent an appropriate characterization of conventional

chiropractic. The literature reveals that there are chiropractors including those who are closely associated with a global body of national associations (WFC) that concedes that Palmer's ideas have no contemporary credence. The most appropriate category for these is 'concessional' on the basis of them conceding that the founder of the profession is irrelevant, as are his original concepts.

My conclusion is that when emotive interpretations and political agendas are stripped from the literature, the evidence shows that the professional identity of chiropractic is skewed with a negative left tail representing no more than 30% of the profession who concede Palmer's founding concepts by abandoning or modifying his ideas to suit their own agendas, whatever they may be, and about 70% grouped as conventional chiropractors in the manner of the founder. Predictive modeling shows the 'identity mode' is firmly gathered within the conventional majority.

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REFERENCES

1. Palmer DD. The chiropractor. Los Angeles: Press of Beacon Light Printing Company. 1914.
2. Bovine G. John Evans Riadore, MD, MRCSE and LSA 1818 FLS, FRCS (Sen) 1852 [A Treatise on] Irritation of the Spinal Nerves. *Chiropr Hist.* 2012;32(1):49-57.
3. Bovine G, Silver JR, Weiner M-F. The role of Edward Harrison's (1766-1838) disciples, Thomas Engall, John and George Epps, Charles Hoyland, John Evans Riadore, John Robinson and John Baptiste de Serney, in the treatment of spinal deformity in the Victorian medical world. *J Med Biography.* 2012;20(1):18-24. DOI 10.1258/jmb.2010.010061.
4. Johnson C. Use of the term subluxation in publications during the formative years of the chiropractic profession. *J Chiropr Humanit.* 2011 Dec;18(1):1-9. DOI 10.1016/j.echu.2011.10.004. Epub 2011 Dec 6. PMID: 22693477; PMCID: PMC3342826.
5. Palmer DD. Chiropractic History. *The Chiropractor.* 1904;1(1):9.
6. Brown T. On Irritation of the Spinal Nerves. *Glasgow Med J.* 1828;1(2):131-60.
7. Barrows HA. Case of spinal irritation. *Boston Med Surg J.* 1834;8:70-1.
8. Gillies H. The theory and practice of counter-irritation

- (Review). *Am J Med Sci.* 1896-04: 453-4. URL <https://doi.org/10.1097/00000441-189604000-00007>.
9. Senzon SA. The chiropractic vertebral subluxation Part 1: Introduction. *J Chiropr Humanit.* 2018;25:10-21. URL <https://www.sciencedirect.com/science/article/pii/S155634991830010X>.
 10. Keating JC, Jr., Charlton KH, Grod JP, Perle SM, Sikorski D, *et al.* Subluxation: dogma or science? *Chiropr Osteopat.* 2005;13:17.
 11. Palmer DD. Chiropractic. *The Chiropractor.* 1906;11(12): inside page Par. 2 'Defined'.
 12. Prxsportscare. When a chiropractor cracks your back, what happens? Web: Health / Therapy / 29 December 2017. URL <https://www.prxsportscare.com/chiropractor-cracks-back-happens/>.
 13. O'Neill A. *Enemies within and without: educating chiropractors, osteopaths and traditional acupuncturists [The-sis].* Bundoora, Vic: La Trobe University Press 1994. URL <https://catalogue.nla.gov.au/Record/372277>.
 14. O'Neill A, Willis E. Chiropractic and the politics of health care. *Aust J Pub Health.* 1994;18(3):327-31.
 15. Haldeman S. The importance of research in the principles and practice of chiropractic. *J Can Chiropr Assoc.* 1976;10(Oct):7.
 16. Hartvigsen J, French SD. So, what is chiropractic? Summary and reflections on a series of papers in Chiropractic and Manual Therapies. *Chiropr Man Ther.* 2020;28(4). URL <https://doi.org/10.1186/s12998-019-0295-2>.
 17. Ebrall PS. *Chiropr Hist. Finding the professional identity of chiropractic in Australasia: A pragmatic narrative of the Formative Period to 1960.* 2020:in press.
 18. Chiropractic Library Collaboration. Index to Chiropractic Literature. chiroindex.org.
 19. Minnesota Historical Society Guidelines for Historical Research and Writing. Retrieved 25 Feb 2018. URL http://www.mnhs.org/legacy/grants/docs_pdfs/Historical_Research_Guidelines.pdf.
 20. Garraghan GJ. *A Guide to Historical Method.* New York: Fordham University Press. 1946.
 21. Caza BB, Creary ST. The construction of professional identity (Electronic version). Retrieved 10 December 2019 from Cornell University, SHA School site 2016. URL <http://scholarship.sha.cornell.edu/articles/878>.
 22. Slay HS, Smith DA. Professional identity construction: Using narrative to understand the negotiation of professional and stigmatized cultural identities. *The Tavistock Institute.* hum.sagepub.com. DOI 10.1177/0018726710384290.
 23. Gibson DM, Dollarhide CT, Moss JM. Professional identity development: A Grounded Theory of transformational tasks of New Counselor. *Counselor Education and Supervision.* 2010;50 (September):21-50.
 24. Cramer GD, Cambron JA, Winterstein J. Patient perceptions of chiropractic treatment for primary care disorders. *J Manipulative Physiol Ther.* 2007;30(1):11-6. URL http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=Citation&list_uids=17224350.
 25. Wilson K, Swincer K, Vemulpad S. Public perception of chiropractic: A survey. *Chiropr J Aust.* 2007;37(4):135-40.
 26. Russell DG, Glucina TT, Sherson MW, Bredin M. A survey of the public perception of chiropractic after exposure to chiropractic public place marketing events in New Zealand. *J Chiropr Humanit.* 2017;24(1):9-14. URL <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5812904/pdf/main.pdf>.
 27. Hawk C, Ndetan H, Kizhakkeveettill A, Cambron N, Scarlett NA, *et al.* Research. Complementary and alternative medicine professions students' perceptions about interdisciplinary collaboration. *Top Integr Health Care.* 2012;3(2). URL <http://www.tihcij.com/Articles/Complementary-and-Alternative-Medicine-Professions-Students-Perceptions-about-Interdisciplinary-Collaboration.aspx?id=0000364>.
 28. Jensen Stochkendahl M, Rezai M, Torres P, Sutton D, Tuchin P. The chiropractic workforce: A global review. *Chiropr Man Ther.* 2019;27(36). URL <https://chiromt.biomedcentral.com/articles/10.1186/s12998-019-0255-x>.
 29. Data sourced from the WFC home page at URL [wfc.org](http://www.wfc.org) and verified by personal email 24 June 2018: Richard Brown, Secretary-General, World Federation of Chiropractic.
 30. Council on Chiropractic Education Australasia. Competency Standards 2017. URL https://www.ccea.com.au/files/1015/0450/1916/CCEA_Accreditation_and_Competency_Standards_2017.pdf.
 31. Peck J. The straight - mixer quandary - Will chiropractic survive? Can it thrive? *Chiropr Dialog.* 2015;2015(1):1-8. Paywall URL http://chiropracticdialogues.sharepoint.com/Pages/2015_1219_straightmixer.aspx.
 32. World Federation of Chiropractic. Identity consultation. Retrieved July 15, 2016. URL https://www.wfc.org/website/index.php?option=com_
 33. WFC document, multi-authored. Final Report of the Identity Consultation Task Force. Retrieved 4 September 2019. URL https://www.chirobase.org/01General/consultation_on_identity.pdf.

34. The Rubicon Group website. Policies. Retrieved 04 September 2019. URL <http://www.therubicongroup.org/policies/>.
35. Arnold LE. Identity of Chiropractic. *J Chiropr*. 1985;22(2):28-9.
36. Brown RA. Spinal Health: The Backbone of Chiropractic's Identity. *J Chiropr Humanit*. 2016;23:22-8.
37. Rademacher WJ, Troyanovich SJ. Maintaining the identity of chiropractic as a drug-free health care profession. *Chiropr Dialog*. 2016;2016(1). URL http://chiropracticdialogues.sharepoint.com/Pages/2016_1458_identityofchiropractic.aspx.
38. Hawk C. Wellness in practice: evidence of chiropractors' views on identity: who do we think we are? *J Am Chi-ropr Assoc*. 2004;41(5):43-50. URL http://www.acatoday.org/content_css.cfm?CID=2255.
39. Donovan J, Cassidy JD, Cancelliere C, Poulsen E, Jensen Stochkendahl M, *et al*. Beyond the spine: A new clinical research priority. *J Can Chiropr Assoc*. 2015;51(1). URL <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4319449/>.
40. Bronfort G, Hegetschweiler K, Labrot TM, Lawrence D, Nelson CF, *et al*. Chiropractic as spine care: A model for the profession. *Chiropr Osteop*. 2005;13(1). URL <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1185558/>.
41. Briggance BB. A proposal regarding the identity of chiropractic: embrace the centrality of the spine. *J Chiropr Humanit*. 2005;12. URL <http://archive.journalchirohumanities.com/Vol%2012/JChiroprHumanit2005-12-8-15.pdf>.
42. Hart J. Analysis and adjustment of vertebral subluxation as a separate and distinct identity for the chiropractic profession: A commentary. *J Chiropr Humanit*. 2016;23(1). URL [http://www.journalchirohumanities.com/article/S1556-3499\(16\)30005-5/fulltext](http://www.journalchirohumanities.com/article/S1556-3499(16)30005-5/fulltext).
43. Swinburne RG. Vagueness, Inexactness, and Imprecision. *Br J Philos Sci*. 1969;19(4):281-99. URL <https://doi.org/10.1093/bjps/19.4.281>.
44. Oakley PA, Cuttler JM, Harrison DE. X-Ray Imaging is essential for contemporary chiropractic and manual therapy spinal rehabilitation: Radiography increases benefits and reduces risks. *A Vertebral Subluxation Res*. 2019;July 29:104-9.
45. Oakley PA, Cuttler JM, Harrison DE. X-Ray Imaging is essential for contemporary chiropractic and manual therapy spinal rehabilitation: Radiography increases benefits and reduces risks. *Dose Response*. 2018;16(2). DOI 10.1177/1559325818781437.
46. Kawchuk G, Goertz C, Axén I, Descarreaux M, French S, *et al*. Letter to the Editor Re: Oakley PA, Cuttler JM, Harrison DE. X-Ray Imaging is essential for contemporary chiropractic and manual therapy spinal rehabilitation: Radiography increases benefits and reduces risks. *Dose Response*. 2018 Jun 19;16(2). *Dose Response*. 2018;16(4). DOI 10.1177/1559325818811521.
47. Anderson B. Critical analysis of 'X-Ray imaging is essential for contemporary chiropractic and manual therapy spinal rehabilitation: Radiography increases benefits and reduces risks by Oakley *et al*.' *Dose Response*. 2018 Oct-Dec; 16(4). DOI 10.1177/1559325818813509.
48. Oakley PA, Cuttler JM, Harrison DE. Response to Letters From Anderson and Kawchuk *et al*: 'X-Ray Imaging is essential for contemporary chiropractic and manual therapy spinal rehabilitation: Radiography increases benefits and reduces risks.' *Dose Response*. 2018;16(4):1559325818809584. DOI 10.1177/1559325818809584.
49. ICA files 'Complaint' Against Two Members of the WFC after Praising Work of Organization (News). *The Chronicle of Chiropractic*. 7 May 2019 11:38 <http://chiropractic.prosepoint.net/164234>.
50. 'Its Absolutely Rubbish' Claims WFC Researcher Jan Hartvigsen on Use of X-rays to Identify Subluxation (News). *The Chronicle of Chiropractic*. 21 April 2019 13:55 <http://chiropractic.prosepoint.net/163926>.
51. Taking X-Rays for Subluxation Management is 'Careless & Unsupported by Evidence' Says World Federation of Chiropractic (News). 12 January 2019 14:38 *The Chronicle of Chiropractic*. <http://chiropractic.prosepoint.net/161664>.
52. ICA Board Shocks Members & Votes to Accept Georgia Chiropractic Association as Affiliate (News). 22 May 2019 19:58 *The Chronicle of Chiropractic*. <http://chiropractic.prosepoint.net/164547>.
53. Kent C. An Evidence-Informed Approach to Spinal Radiography in Vertebral Subluxation Centered Chiropractic Practice. *A. Vertebral Subluxation Res*. 2017;142-6.
54. Oakley PA, Cuttler JM, Harrison DE. X-Ray imaging is essential for contemporary Chiropractic and manual therapy spinal rehabilitation: Radiography increases benefits and reduces risks. *Dose-Response*. 2018;1-7 DOI 10.1177/1559325818781437.
55. Bigos SJ, Bowyer OR, Braen GR, Brown K, Deyo R. Acute low back problems in adults. Clinical practice guidelines no. 14. Rockville Md: Agency for Health Care Policy and Research, Public Health Service, US Dept. of Health and Health Services; 1994 Publication No. 95-0642.

56. Van Tulder M, Becker A, Bekkering T, *et al.* European guidelines for the management of acute nonspecific low back pain in primary care. Cost B13 Working Group on Guidelines for the Management of Acute Low Back Pain in Primary Care; 2004.
57. Ammenodolia C, Taylor JAM, Pennick V, Côté P, Hogg-Johnson S, *et al.* Adherence to radiography guidelines for low back pain: A survey of chiropractic schools worldwide. *J Manipulative Physiol Ther.* 2008;31(6):412-8 <http://www.ncbi.nlm.nih.gov/sites/>
58. Ammendolia C, Brussières A, Peterson C, Taylor JAM. Commentary: Ionizing radiation exposure – more good than harm? The preponderance of evidence does not support abandoning current standards and regulations. *J Can Chiropr Assoc.* 2006;50(2):103-6 <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1839988/>.
59. Beck, RW, Holt, KR, Fox, MA, Hurtgen-Grace, KL. Radiographic anomalies that may alter chiropractic inter-vention strategies found in a New Zealand population. *J Manipulative Physiol Ther.* 2004;27(9):554–9.
60. Carparni J. reporting 'Heath J, Coroner': Chiropractors should carry out X-rays before treating clients to prevent future deaths (News Report). *The Telegraph.* 18 November 2019 <https://www.telegraph.co.uk/news/2019/11/18/chiropractors-should-carry-x-rays-treating-clients-prevent-future/>.
61. Coroner urges first aid training for chiropractors (News Report). *BBC News.* 18 November 2019 <https://www.bbc.com/news/uk-england-york-north-yorkshire-50457351>.
62. Laycock M. Inquest into death of John Lawler hears expert opinion on broken neck (News Report). *The Press.* 14 November 2110 accessed at <https://www.yorkpress.co.uk/news/18034608.inquest-death-john-lawler-hears-expert-opinion-broken-neck/>.
63. Jenkins HJ, Downie AS, Moore CS, French SD. Current evidence for spinal X-ray use in the chiropractic pro-fession: A narrative review (Review). *Chiropr Man Ther.* 2018;26(48): <https://chiromt.biomedcentral.com/articles/10.1186/s12998-018-0217-8>
64. Kawchuk G, Goertz C, Axén I, Descarreaux M, French S, *et al.* The Effect of Spinal Adjustment / Manipulation on Immunity and the Immune System: A Rapid Review of Relevant Literature. *World Federation of Chiropractic.* Retrieved 26 March 2020 https://www.wfc.org/website/images/wfc/Latest_News_and_Features/Spinal_Manipulation_Immunity_Review_2020_03_19.pdf.
65. National University of Health Sciences. Home page / Admissions. Retrieved 23 March 2020 <https://www.nuhs.edu/admissions/chiropractic-medicine/>.
66. Keiser University. Home page / Program mission and vision. Retrieved 19 August 2020 <https://www.keiseruniversity.edu/doctor-chiropractic-dc/>
67. Keating Jr JC. The JMPT: conception, birth & early years. *Dynamic Chiropr* 09 March 1998;16(6). URL <https://www.dynamicchiropractic.com/mpacms/dc/article.php?id=37109>.
68. National University of Health Sciences. Doctor of Chiropractic Medicine Info Night. Retrieved 23 March 2020 <https://info.nuhs.edu/doctor-of-chiropractic-programs-info-night-events>.
69. News item: Florida Would Become a 'Diploma Mill' for chiropractors if CCE Only Language is Removed Says Keiser University Lobbyist. *The Chronicle of Chiropractic.* 26 April 2019 <http://chiropractic.prosepoint.net/164044>.
70. *Journal of Chiropractic Medicine.* Home. Retrieved 23 March 2020 <https://www.sciencedirect.com/journal/journal-of-chiropractic-medicine/vol/18/issue/2>.
71. Santos LV, Córdoba LL, Lopes JBP, Oliveira CS, Grecco LAC, *et al.* Active visceral manipulation associated with conventional physiotherapy in people with chronic low back pain and visceral dysfunction: A preliminary, randomized, controlled, double-blind clinical trial. *J Chiropr Med.* 2019;18(2):79-89 <https://doi.org/10.1016/j.jcm.2018.11.005>.
72. Palmer DD. Chiropractic Mixed - or - Pure and Unadulterated. *The Chiropractor.* 1905;1:8.
73. Maxel X, Girollet F, Stubbe L, Boudot E, Darrailans L, *et al.* Aquatic Osteopathy treatment assessment by infrared thermography on healthy subjects after thermoneutral water immersion. *J Chiropr Med.* 2019;18(3):18807. URL <https://doi.org/10.1016/j.jcm.2019.07.007>
74. Bolton, S.P. (1985). Roots: A mainstream chronicle. *Journal of the Australian Chiropractors' Association.* 15(2):44-5.
75. Peters RE, Chance MA. 1910: A significant year (or the New Zealand influence). *Chiropractic Journal of Australia.* 1995;25(2):42-9.

76. Campbell SA, Black A, Dillon J. The Rise and Legitimation of Chiropractic: A study of professionalisation [Thesis]. University of New England. 1985. URL <https://hdl.handle.net/1959.11/12799>
77. Simpson JK. The influence of political medicine in the development of the chiropractic profession in Australia. [Thesis]. University of Queensland. 2002. URL <https://espace.library.uq.edu.au/view/UQ:105997>
78. O'Neill A. Enemies within and without : educating chiropractors, osteopaths and traditional acupuncturists. [Thesis]. LaTrobe University. 1994. Call number 615.530711 O58e.
79. Peters RE. An early history of chiropractic. The Palmers and Australia. Dissertation. 2014. RMIT University. Asheville: Integral Altitude.
80. Ebrall PS. Finding the professional identity of chiropractic in Australasia that shaped education: A pragmatic narrative of the Inquiry Period from 1960 to 1979. *Chiropr Hist*. 2020;in press.
81. Engelhardt HT. The Disease of Masturbation: Values and the concept of disease. *Bull Histo Med*. 1974;48:234-8. In HT Engelhardt Jr. and SF Spicker (eds). Evaluation and explanation in the biomedical sciences. Dordrecht: Reidel. 1946:125-41. Retrieved 25 August 2020. Stanford Encyclopedia of Philosophy. URL <https://plato.stanford.edu/entries/medicine/>
82. Faulkner TJ. The chiropractor's Protégé. *American School of Chiropractic*. Rock Island IL: Association for the History of Chiropractic. 2017:320-38.
83. Fitton J, Green BN, Ruge R. John Fitz Alan Howard, D.C. founder and first president of The National College of Chiropractic. *Chiropr Hist*. 1994 Jun;14(1):37.
84. Keating Jr JC, Jackson RB, Oliva M, Phillips RB. Origin of the LACC, 1901-1922. *J Manipulative Physiol Ther*. 1994;17(2):93-106 <https://www.ncbi.nlm.nih.gov/pubmed/8169549>.
85. Keating Jr JC, Montgomeri DP. Logan Basic College in the era of Vinton Logan. *Chiropr Hist*. 2006;26(2):55-70.
86. Smith O. *Naprapathic Chartology*. Chicago: Chicago College of Naprapathy. 1917.
87. Zarbuck MV. A profession for 'Bohemian Chiropractic': Oakley Smith and the evolution of naprapathy. *Chiropr Hist*. 1986;6:76-82 <http://www.ncbi.nlm.nih.gov/pubmed/?term=11621192>.
88. Beiderman RP. Oakley Smith's schism of 1908: the rise and decline of naprapathy. *Chiropr Hist*. 1994 Dec;14(2):44-50.
89. Keating Jr JC. Chiropractic at the Turn of the Century. (Newspaper) *Dynamic Chiropractic*. March 12 2001;19(6): <https://www.dynamicchiropractic.com/mpacms/dc/article.php?id=17943>.
90. Keating Jr. JC, Cleveland III CS, Menke M. *Chiropractic History: a primer*. Davenport IA: Association for the History of Chiropractic. 2004.
91. Gibbons RW. Solon Massey Langworthy: Keeper of the flame during the 'lost years' of chiropractic. *Chiropr Hist*. 1981;1(1):15-21 <http://www.historyofchiropractic.org/assets/documents/1-1-Gibbons.pdf>.
92. Smith O, Langworthy S, Paxson M. *Modernized chiropractic*. Cedar Rapids: Lawrence Press. 1906.
93. 93. Biron WA, Wells BF, Houser RH. *Chiropractic principles and technic*. Chicago: National College of Chiropractic. 1939.
94. World Federation of Chiropractic. Home wfc.org
95. DC Staff. Lebanese DCs victorious. [News]. *Dynamic Chiropractic*. Digital exclusive, August 2020. URL https://www.dynamicchiropractic.com/digital/index.php?i=1268&s=123247&l=13&_id=58736&pn=31&r=t&Page=31
96. WHO. *Guidelines of basic training and safety in chiropractic*. Geneva: World Health Organisation. 2005
97. Gwilliam EM. Diagnosing Chiropractic 'Subluxation' in ICD-10-CM. 28 November 2016. Retrieved 18 February 2020 <https://www.icd10monitor.com/diagnosing-chiropractic-subluxation-in-icd-10-cm>
98. 2020 ICD-10-CM Diagnosis Code M99.13 Subluxation complex (vertebral). Retrieved 18 February 2020 <https://www.icd10data.com/ICD10CM/Codes/M00-M99/M99-M99/M99-/M99.13>
99. National Centre for Statistics. Centers for Disease Control and Prevention. ICD-10-CM. Retrieved

- 18 February 2020 <https://icd10cmtool.cdc.gov/?fy=FY2019>
100. The Menace of Chiropractic. An outline of remarks made by Robert B. Throckmorton, Legal Counsel, Iowa Medical Society, at the North Central Medical Conference, Minneapolis, Minnesota. November 11, 1962. Plain-tiff exhibit 172 of 2 December 1975 coded 00131. Copy of document held in the collection of the researcher
 101. Mirtz TA. A treatise for a new philosophy of chiropractic medicine. *Chiropr Man Ther.* 2017;25(7):<https://chiromt.biomedcentral.com/articles/10.1186/s12998-017-0138-y>.
 102. Emary PC, Houweling TAW, Wrangler M, Burnie SJ, Hood KJ, *et al.* A commentary on the implications of medication prescription rights for the chiropractic profession. *Chiropr Man Ther.* 2016;24(33): <https://doi.org/10.1186/s12998-016-0114-y>.
 103. International Chiropractors Association. Public statement: ICA Opposes attempts to expand doctors of chiropractic scope of practice to include the prescribing of dangerous drugs and administration of natural substances under certain circumstances. Retrieved 24 March 2020 <http://www.chiropractic.org/ica-issues-public-statement/>.
 104. Wardwell W. Continuing problems and dilemmas, In *Chiropractic. History and evolution of a new profession.* St Louis: Mosby Year Book. 1992:257.
 105. Jamison JR. Health promotion: Exploring the behaviour of chiropractic patients. *Chiropr J Aust.* 2000;30(3):96-101.
 106. Good C. Chiropractic Identity in the United States: Wisdom, Courage, and Strength. *J Chiropr Humanit.* 2016;29-34 <http://dx.doi.org/10.1016/j.echu.2016.08.001>.
 107. Kent C. A new direction for the CCE? Dynamic Chiropractic (News). November 18 2010;28(24): <https://www.dynamicchiropractic.com/mpacms/dc/article.php?id=55021>.
 108. Edwards J. What Is the CCE Trying to Pull? (News). Dynamic Chiropractic. October 21 2010;28(22): <http://www.dynamicchiropractic.com/mpacms/dc/article.php?id=54917>.
 109. Coulter ID. The chiropractic wars or the enemy within. *Am J Chiropr Med.* 1989;2(2):64-6.
 110. 68-95-99.7 rule. With regard to Gaussian distribution. Wikipedia. 24 March 2020 https://en.wikipedia.org/wiki/68-95-99.7_rule.
 111. Charlton KH. Chiropractic and the gold standard. *Chiropr J Aust.* 1986;6(1):9.
 112. Peters RE. In Memoriam. Reggie R. Gold, DC, PhC, FPAC, Philosopher of Chiropractic 16 December 1925 – 24 March 2012 [eulogy]. *Chiropr J Aust.* 2012;42(2):78-9.
 113. Harris SL, Tuttle CD, Lee K, Wisdo J. Frederick H.E. Barge, D.C., PhC., F.I.C.A., S.C.S., L.S.A.: Chiropractic's articulate crusader. *Chiropr Hist.* 2003;23(2):17-8.
 114. Seaman DR. Who are the left-wing and right-wing chiropractors? *The American Chiropractor.* 1996;May/June:20.
 115. Richards D. Scientific Report. Southern Cross University School of Health and Human Sciences. Research Conference. Gold Coast 2019.
 116. Simpson JK, Young KJ. Vitalism in contemporary chiropractic: a help or a hinderance? *Chiropr Man Therap.* 2020;28(35). <https://doi.org/10.1186/s12998-020-00307-8>
 117. Taylor C. Definition of bimodal in statistics. ThoughtCo. URL <https://www.thoughtco.com/definition-of-bimodal-in-statistics-3126325>
 118. Siegal AF. Histograms. In *Practical Business Statistics* 74. London: Academic Press (Elsevier). 2016. URL <https://www.sciencedirect.com/topics/mathematics/bimodal-distribution>
 119. Glucina TT, Krägeloh CU, Farvid P, Holt K. Moving towards a contemporary chiropractic professional identity. *Com Ther Clin Prac.* 2020;39:101105 DOI <https://doi.org/10.1016/j.ctcp.2020.101105>
 120. Walker BF. The new chiropractic. *Chiropr Man Ther.* 2016;26(26):<http://chiromt.biomedcentral.com/articles/10.1186/s12998-016-0108-9>.
 121. Mirtz TA. A treatise for a new philosophy of chiropractic medicine. *Chiropr Man Ther.* 2017;25(7): <https://chiromt.biomedcentral.com/articles/10.1186/s12998-017-0138-y>.
 122. Leboeuf-Yde C, Innes SI Young KJ, Kawchuk GN, Hartvigsen J. Chiropractic, one big unhappy family: better together or apart? *Chiropr Man Ther.* 2019;27:<https://doi.org/10.1186/s12998-018-0221-z>
 123. Rosner AL. Chiropractic identity: A neurological, professional, and political assessment. *J Chiropr Humanit.* 2016;23(1):<http://www>.

- journalchirohumanities.com/article/S1556-3499(16)30002-X/fulltext.
124. Reggars JW. Chiropractic at the crossroads or are we just going around in circles? *Chiropr Man Ther.* 2011;19:<http://chiromt.com/content/19/1/11/abstract>.
125. Strahinjevic B, Simpson KJ. The schism in chiropractic through the eyes of a 1st year chiropractic student. *Chi-ropr Man Ther.* 2018;26:2 DOI 10.1186/s12998-017-0171-x.
126. Young KJ. Gimme that old time religion: The influence of the healthcare belief system of chiropractic's early leaders on the development of x-ray imaging in the profession. *Chiropr Manual Ther.* 2014;22(36): <http://www.chiromt.com/content/22/1/36>.
127. Perle SM. The dichotomy in the profession. *J Am Chiropr Assoc.* 2000;37(3):49-9.
128. Mirtz TA, Perle S. The prevalence of the term subluxation in North American English-language Doctor of Chi-ropractic programs. *Chiropr Man Ther.* 2011;19(14): <http://chiromt.com/content/19/1/14/abstract>.
129. Editors' statements. Chiropractic and Manual Therapies. Retrieved 22 August 2020 from <https://chiromt.biomedcentral.com>
130. Innes S, Beynon A, Hodgetts C., *et al.* Predictors of instantaneous relief from spinal manipulation for non-specific low back pain: a delphi study. *Chiropr Man Therap.* 2020;28:39. URL <https://doi.org/10.1186/s12998-020-00324-7>
131. Côté P, Bussi eres A, Cassidy JD, Hartvigsen J, Kawchuk GN, *et al*, plus >140 signatories. A united statement of the global chiropractic research community against the pseudoscientific claim that chiropractic care boosts immunity. *Chiropr Man Ther.* 2020;28:21. URL <https://doi.org/10.1186/s12998-020-00312-x>
132. Nielsen OL, Kongstead A, Christensen HW. The chiropractic profession in Denmark 2010–2014: A descriptive report. *Chiropr Man Ther.* 2015 ;23(27):Online access only at <http://chiromt.biomedcentral.com/articles/10.1186/s12998-015-0072-9>
133. Myburgh C. A qualitative exploration of key informant perspectives regarding the nature and impact of contemporary legislation on professional development: A grounded theory study of chiropractic in Denmark. *J Manipulative Physiol Ther.* 2014 Jul-Aug;37(6):383-95. URL <http://www.ncbi.nlm.nih.gov/pubmed/25092554>
134. Nielsen OL, Kongsted A, Christensen H. The chiropractic profession in Denmark 2010–2014: a descriptive report. *Chiropr Man Therap.* 2015;23:27 DOI 10.1186/s12998-015-0072-9
135. Clinical Biomechanics - the chiropractic programme (BA). University of southern Denmark / Programs. URL https://www.sdu.dk/en/uddannelse/bachelor/klinisk_biomekanik
136. Myburgh C, Multon J. The development of contemporary chiropractic education in Denmark: An exploratory study. *J Manipulative Physiol Ther.* 2008;31(8):583-92. URL <http://www.ncbi.nlm.nih.gov/sites/>
137. Hartvigsen J, Sorensen LP, Grunnet-Nilsson N, Stiochkendahl MJ. Chiropractic patients in Denmark 2002: an expanded description and comparison with 1999 survey. *J Manipulative Physiol Ther.* 2006;29(6):419-24. URL <http://www.ncbi.nlm.nih.gov/entrez/query>.
138. Malmqvist S, Leboeuf-Yde C. The Nordic Maintenance Care Program: Case management of chiropractic patients with low back pain - defining the patients suitable for various management strategies. *Chiropr & Osteopat.* 2009;17(1): <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2717107/>
139. Iben A, Lise H, Leboeuf-Yde C. Chiropractic maintenance care - What's new? A systematic review of the literature [systematic review]. *Chiropr & Manual Ther.* 2019 ;27(63). URL <https://chiromt.biomedcentral.com/articles/10.1186/s12998-019-0283-6>
140. Hestb ak L, J rgensen A, Hartvigsen J. A description of children and adolescents in Danish chiropractic practice: Results from a nationwide survey. *J Manipulative Physiol Ther.* 2009. Oct;32(8):607-15. URL <http://www.ncbi.nlm.nih.gov/pubmed/19836596>
141. Wiberg KR, Wiberg JMM. Retrospective study of chiropractic treatment of 276 Danish infants with infantile colic. *J Manipulative Physiol Ther.* 2010 Sep;33(7):536-41. URL <http://www.ncbi.nlm.nih.gov/pubmed/20937431>
142. Evidence-based practice. AHPRA/Chiropractic Board of Australia. Statement by the Chiropractic

- Board on paediatric care. URL <https://www.chiropracticboard.gov.au/Codes-guidelines/Position-statements/Statement-of-Paediatric-care.aspx>
143. Statement on Paediatric Care. Australian College of Chiropractic Paediatrics. URL <https://accp.asn.au>
 144. Murphy DR, Schneider MJ, Seaman DR, *et al.* How can chiropractic become a respected mainstream profession? The example of podiatry. *Chiropr Man Therap* 16, 10 (2008). <https://doi.org/10.1186/1746-1340-16-10>
 145. Ebrall P, Murakami Y. A Critical analysis of the Reality Distortion of chiropractic among scientists with constructive criticism of the current debate. *J Phil Princ Prac Chirop.* 2019;July 11 <https://www.vertebralesubluxationresearch.com/2019/07/10/a-critical-analysis-of-the-reality-distortion-of-chiropractic-among-scientists-with-constructive-criticism-of-the-current-debate/>.
 146. Kent C. Vertebral Subluxation: Semantic pathology, epistemic trespassing, and ethics. *J Phil Princ Prac Chi-ropr.* 2018;July 23:1-7. Paywall URL <https://www.vertebralesubluxationresearch.com/2018/07/22/vertebral-subluxation-semantic-pathology-epistemic-trespassing-and-ethics/>
 147. World Federation of Chiropractic. Home / Research Committee. Retrieved 23 March 2020 https://www.wfc.org/website/index.php?option=com_
 148. News Item. WFC President Laurie Tassal resigns amid scandal at organization's Berlin convention. *The Chronicle of Chiropractic.* 16 May 2019. Retrieved 25 March 2020 <http://chiropractic.prosepoint.net/164441>.
 149. News Item. ICA files 'complaint' against two members of the WFC after praising work of the organisation. *The Chronicle of Chiropractic.* 7 May 2019. Retrieved 25 March 2020 <http://chiropractic.prosepoint.net/164234>.
 150. Welsh S. President's Comments: Maintaining the complaint with WFC. *International Chiropractors Association. Newsletter* March 2020.
 151. News report. U.S. vendors pull WFC sponsorships ... but the reason why will surprise you. *Dynamic Chiropractic.* 2020;(38):79 URL <https://www.dynamicchiropractic.com/digital/index.php?id=a853e338&Page=79>
 152. Welsh S. ICA President Rejects proposition that subluxation-based chiropractic is not evidence-based. News item. *International Chiropractors Association.* Retrieved 25 March 2020 <http://www.chiropractic.org/ica-president-rejects-proposition-that-subluxation-based-chiropractic-is-not-evidenced-based/>
 153. World Federation of Chiropractic. Identity consultation. Retrieved 15 July 2016 URL https://www.wfc.org/website/index.php?option=com_
 154. World Federation of Chiropractic. Home / About WFC / Our Principles. Retrieved 25 March 2020 https://www.wfc.org/website/index.php?option=com_
 155. World Chiropractic Alliance. Home. Retrieved 23 March 2020 <https://worldchiropracticalliance.org>.
 156. Hildebrandt RW. The Science of Chiropractic. *Am J Chiopr Med.* 1990;3(2):93-100.
 157. Coulter ID. The patient, the practitioner, and wellness: Paradigm lost, paradigm gained. *J Manipulative Physiol Ther.* 1990;13(2):107-11 <https://www.ncbi.nlm.nih.gov/pubmed/2307916>.
 158. Coulter ID. The chiropractic paradigm. *J Manipulative Physiol Ther* 1990;13(5):279-87 <https://www.ncbi.nlm.nih.gov/pubmed/2376722>; Letters: Coulter ID, Keating Jr JC. *J Manipulative Physiol Ther.* Nov-Dec 1990;13(9): 556; and Coulter ID, Donahue J. *J Manipulative Physiol Ther* 1990;13(9):554-6.
 159. Senzon SA. The chiropractic vertebral subluxation Part 6: Renaissance of D.D. Palmer's paradigm from 1949 to 1961 *J Chiopr Humanit.* 2018;25:86-98 <https://www.sciencedirect.com/science/article/pii/S1556349918300147>.
 160. Gatterman MI. The patient-centred paradigm: A model for chiropractic health promotion and wellness. *Chiopr J Aust.* 2006;36(3):92-6.
 161. Jamison JR. Chiropractic education: reflecting the paradigm dilemma of chiropractic practice. *J Manipulative Physiol Ther.* 1994;17(3):186-93.
 162. Association of Chiropractic Colleges. Bylaws Chiropractic Paradigm / Scope of Practice. Retrieved 28 October 2019 <http://www.chirocolleges.org/resources/chiropractic-paradigm-scope-practice/>.
 163. McCoy M. The ACC Paradigm - Something We Can All Agree Upon? (Editorial) *J. Vertebral Subluxation*

- Res. 2003 April 3:1-4.
164. Sportelli L. Is chiropractic a profession in search of an identity? *J Chiropr*. 1989;26(9):5+.
165. Australian Chiropractors Association. Home page. Retrieved 21 October 2019 <https://www.chiro.org.au/patients/>.
166. Chiropractic Australia. Home page. Retrieved 21 October 2019 <https://chiropracticaustralia.org.au>.
167. Gonstead Chiropractic Society Australia. Home page. Retrieved 21 October 2019 <https://www.gonstead.com.au>.
168. New Zealand Chiropractors' Association. Home page. Retrieved 21 October 2019 <https://www.chiropractic.org.nz>.
169. New Zealand Chiropractors' Association. About / History. Retrieved 17 January 2020 <https://www.chiropractic.org.nz/about-us/history-of-nzca/>.
170. New Zealand Chiropractors Association. About / History of NZCA. Retrieved 26 November 2019 <https://www.chiropractic.org.nz/about-us/history-of-nzca/>.
171. Winter DO. Submission on chiropractic by the Australian Chiropractors Association to the Federal committee of Enquiry into Chiropractic, Osteopathy and Naturopathy. Faulconbridge: Australian Chiropractors' Association. 1975:10.
172. Chance-Peters MA, Peters RE. Chiropractic in Australia 1985: A thumbnail sketch. *Eur J Chiropr*. 1985;33(3):169-87.
173. Bolton SP. Chiropractic Education in Australia: A short history of its emergence and development. *Chiropr J Aust*. 2010;40:88-90.
174. Bolton SP. Branches: From mainstream roots. *J Aust Chiropr Assoc*. 1986;16(3):99-102.
175. Bolton SP. The influences on Queensland chiropractic history: Mainstream versus medical dominance. *Chiropr J Aust*. 1992;22(1):15-26.
176. Bolton SP. Second-stream colleges in Australia (letter). *Chiropr Hist*. 1998;18(1):8.
177. Chance MA, Peters RE. Identity, role and direction. *Chiropr J Aust*. 1994;24(2):41.
178. Bolton, S.P. (1970). Report on chiropractic. *Journal of the Australian Chiropractors' Association*. Aug-Oct:11-4.
179. Peters, R.E., Chance, M.A. (1995). 1910: A significant year (or the New Zealand influence). *Chiropractic Journal of Australia*. 25(2):42-9.
180. Chiropractic Australia. Home / About / History. Retrieved 25 November 2019 <https://chiropracticaustralia.org.au/about-ca/history>.
181. Devereaux EP. History of chiropractic from a New South Wales perspective (1969-1982) (personal memoir). *Australas Chiropr Osteopat*. 1998;7(2):68-79 <http://www.coca.com.au/journal/article/details.asp?ID=75>.
182. Devereaux EP. Controlling registered practitioners: Another view. *Chiropr J Aust*. 2002;32(4):151-6.
183. Ebrall PS, Molyneux TP. Thirty years of chiropractic education at RMIT University: The establishment period 1975-1978. *Chiropr J Aust* 2005;35:29-38.
184. The International Chiropractic Education Collaboration. Clinical and Professional Chiropractic Education: A Position Statement .13 September 2019 <https://www.cmcc.ca/documents/international-chiropractic-education-collaboration-position-statement.pdf>.
185. Terrett AGJ. Misuse of the literature by medical authors in discussing spinal manipulative therapy injury (Re-view). *J Manipulative Physiol Ther*. 1995 May;18(4):203-10 <https://www.ncbi.nlm.nih.gov/pubmed/7636409>.
186. Wenban AB. Inappropriate use of the title chiropractor and term chiropractic manipulation in the peer-reviewed biomedical literature. *Chiropr Osteopat*. 2006 ;14(1): <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1570468/>
187. Macquarie University Department of Chiropractic. Retrieved 12 September 2019 <https://www.mq.edu.au/about/about-the-university/faculties-and-departments/faculty-of-science-and-engineering/departments-and-centres/department-of-chiropractic>.
188. Murdoch University School of Health Professions/ chiropractic. Retrieved 12 September 2019 <http://www.murdoch.edu.au/School-of-Health-Professions/>.
189. Australian Chiropractic College. Retrieved 12 September 2019 <https://acc.sa.edu.au>.
190. New Zealand College of Chiropractic. Retrieved 12 September 2019 <http://chiropractic.ac.nz>.

191. Gonstead Chiropractic Society Australia. President Toby Fraser. Committee. Retrieved 25 November 2019 <https://www.gonstead.com.au/menu-1/committee/>.
192. Australian Chiropractors' Association. President Anthony Coxon. About. Retrieved 25 November 2019 <https://www.chiro.org.au/about-aca/>.
193. Chiropractic Australia. About / The Board of Directors. President Rob Bonello Retrieved 25 November 2019 <https://chiropracticaustralia.org.au/about-ca/executive-team/>.
194. New Zealand Chiropractors' Association. President Hayden Thomas. Retrieved 25 November 2019 <https://www.chiropractic.org.nz>.
195. Australian Chiropractors' Association (Victorian Branch). (Undated, c. 1976). Rebuttal to the Victorian Report upon Osteopathy, Chiropractic and Naturopathy. Bundoora: P.I.T. Press.
196. Teece JC, Chair. Health Commission of New South Wales. Report of the Committee of Inquiry into the Question of the Registration of Chiropractors. Sydney: Government Printer 1973.