THE SUBLUXATION QUESTION

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Journal of Chiropractic Humanities
Volume 7, Number 1

Introduction

The concept of the subluxation is simultaneously chiropractic's central defining clinical principle and the source of contentious debate and disagreement within the profession. As chiropractic has evolved during its 100-year history, one faction of the profession has distanced itself from the original subluxation theory as formulated by D.D. Palmer. Even in the absence of any specific refutation of the theory, many in chiropractic find the simplistic bone-out-of-place (BOOP) Palmerian subluxation formulation as being an implausible explanation for human disease or even for simple back pain. For the most part, clinical studies on the effectiveness of spinal manipulation are conducted and reported without reference to the presence or absence or even the existence of subluxations. In the main, this faction within the profession has concluded that subluxations as Palmer imagined them simply do not exist.

At the same time, a large faction of believers (both individuals and institutions) within the profession stiff cling to undiluted Palmerism; those who characterize themselves and their beliefs about chiropractic as subluxation-based. While some of Palmer's explanations regarding mechanisms may have been modified to accommodate a more sophisticated understanding of physiology and pathology, this faction of the profession remains steadfast in its belief that spinal subluxations represent a critical factor (*the* critical factor?) in human health and disease.

There is also a middle ground. While some institutions no longer make direct appeals to subluxation and eschew the use of the term itself, many of the policies and principles that they advocate are predicated on and inspired by subluxation theory. For example, the admonition to the public, made almost universally by the profession, that they should have a chiropractor evaluate their spinal health even when they are asymptomatic, relies solely on subluxation theory for its validity. The way students are taught in all chiropractic colleges to

locate, evaluate and adjust specific vertebral segments is an expression of subluxation doctrine. And the belief, widely if not universally held, that spinal dysfunction can have effects beyond simply producing back pain owes its existence to subluxation theory.

These divergent views on subluxations represent the principal conceptual dichotomy within chiropractic - those who believe in subluxations and those who don't. This commentary is an attempt to bring some order and reason to the debate and to suggest means of resolving the issue.

How Not to Address the issue

In the past few years, there appears to be a movement intent on bridging the subluxation gulf that divides the profession. There have been several efforts and projects devoted to redefining subluxations in a way which a) is more restrained and qualified than historic Palmerism, and b) hopes to re-introduce subluxations as the unifying principle of chiropractic to that part of the profession which had abandoned subluxations, particularly to the chiropractic scientific and research community. Unfortunately, this movement has not brought clarity and consensus to the subluxation debate, but rather obfuscation and confusion.

A seminal paper in this movement, "***Development of Chiropractic Nomenclature Through Consensus***," was published in 1994. (1) This project and paper were undertaken for the purpose of establishing agreed upon definitions for ten terms commonly used by the chiropractic profession. An elaborate process utilizing nominal panels and Delphi procedures was used to arrive at consensus definitions agreed upon by more than 80% of the project participants.

The terms subluxation, manipulable subluxation, subluxation complex, and subluxation syndrome were among the ten items under consideration. These four terms were fisted under the heading, "The lesion treated by chiropractors." (One assumes that the use of the definite article is intentional.) it is here where the confusion begins. To start the debate by asking the question, "How do we define the lesion treated by chiropractors?" is to short circuit most of the important and interesting questions surrounding subluxations: that is, do they exist

at all? Do chiropractors treat lesions? The authors have begun the consensus process apparently assuming that agreement exists that there is a particular type of lesion that is the focus of the chiropractic profession. Obviously, some chiropractors do believe in the existence of subluxations, but it is equally obvious that many do not. To many chiropractors, the concept that there is a particular lesion that defines our profession is anathema, and these chiropractors would not subscribe to any definition of anything that is characterized by "the lesion treated by chiropractors."

The folly and unfairness of asking the question this way is highlighted by examining the next set of terms defined in this paper. These terms are fisted under the heading "Treatment procedures utilized by chiropractors," and differentiate between, for example, mobilization and manipulation. It is indisputable that there are "Treatment procedures utilized by chiropractors" and it is a reasonable undertaking to name and define those procedures as this consensus process has done. No one, friend or foe, believer or skeptic, doubts that chiropractors use certain procedures, and its desirable that a consistent terminology is used when referring to those procedures. But the existence of adjustments is not in doubt - the existence of subluxations is.

In a subsequent publication, one of the authors of the terminology paper (Gatterman) raises the question of whether some term other than subluxation should be used to refer to "the lesion treated by chiropractors," and provides a fist of over 100 alternate terms that have been proposed. (2) Gatterman states that, "The continuing debate in chiropractic literature with regard to naming the primary lesion treated by chiropractors for the past 100 years has sparked much controversy." (2, p. xi) Well, if there is a continuing debate over this issue, it's a very silly debate and one that misses the point entirely. The issue isn't whether the particular arrangement of letters that forms the word subluxation should be used, or whether some other group of letters is more appropriate. But, framing the subluxation debate as a semantic issue, resolvable by consensus, is precisely the same as asking whether we should refer to the spaceships used by aliens as flying saucers or UFOs. The resolution of this question resolves nothing of importance. The issue is whether

the concept of the subluxation, by whatever name, is valid and represents a clinically important phenomenon.

The subluxation debate is not a semantic dispute that can be resolved with new definitions arrived at by consensus panels. The controversy exists not because of a misunderstanding about terminology, but because of fundamental disagreements about the reality and validity of the term. it is a scientific issue and an important one, and the only reasonable way of addressing the question is through actual research.

The confusion deepens when the actual definitions are considered. First, it's useful to recall that the orthodox definition (the one found in medical dictionaries) of subluxation is "an incomplete or partial dislocation." (3) Palmer's use of the term differs from this only in that he attributed vast and comprehensive disease (or dis-ease, if you prefer) generating capacities to vertebral subluxations. Otherwise his understanding of subluxations as simply a misalignment does not depart from orthodoxy. The consensus panel's definition of subluxation reads: A motion segment, in which alignment, movement integrity, and/or physiologic function are altered although contact between joint surfaces remains intact. A position paper recently issued by the Association of Chiropractic Colleges (ACC) offered a definition of subluxation which appears to be informed by the panel's definition. It reads: A subluxation is a complex of functional and/or structural and/or pathological articular changes that compromise neural integrity and may influence organ system function and general health. (4) My comments will apply to this definition as well.

The panel's definition begins with a conventional reference to alignment and then adds the factor of movement alterations. Thus, a normally aligned but hypomobile segment would be considered a subluxation. Then there is the reference to altered physiologic function. What does this mean? No details are furnished. The devil is in the details, and the details in this case are provided by a book, ***Foundations of Chiropractic: Subluxation***. (2) This text grew from a 1992 Canadian Memorial Chiropractic College conference titled "Subluxation Revisited."

This text begins with a review of the semantic debate and presents the consensus panel's definitions as described above. It continues with a chapter on spinal anatomy, physiology, and neurology, with particular reference to pain mechanisms and pathways. (5) As a compendium of information on these subjects, this text does a credible job. This material is presented with the explanation that the "Pain that accompanies loss of articular function characteristic of subluxation is only comprehended with a thorough knowledge of the anatomic relationships of the spinal joints." (2. p. 4) It's reasonable that an understanding of basic science would be useful in understanding subluxations, but one is left to wonder, how does the anatomy of the spine relate to subluxations? What specific neurologic changes characterize subluxations? These questions are not addressed. Thus, at no point is there a statement or observation that a subluxation is a particular alteration of anatomy, physiology, etc. There is no nexus between this basic science and subluxations except that both concern the spine.

This error is committed throughout the text. In subsequent chapters on clinical and pathological changes in the spine, one is given to understand that all these changes are subluxation-related, somehow, but no specifics are ever provided. There is something misleading about all of this. It's as if the abundance of spine-related facts is intended to add weight and credibility to the idea of subluxations.

The Vertebral Subluxation Complex

The concept of the vertebral subluxation complex (VSC) is currently in fashion in chiropractic. The idea of a subluxation complex was originally proposed by Faye and arose, no doubt, in recognition of what was an obviously over-simplified, bone-out-of-place, pinched-nerve [Vertebral Subluxation Simplex (VSS) understanding of chiropractic. (6) The consensus panel describes subluxation complex as: A theoretical model of motion segment dysfunction (subluxation) which incorporates the complex interaction of pathological changes in nerve, muscle, ligamentous, vascular and connective tissues.

Subsequent to Faye's original formulation, others, particularly Lantz, have developed and expanded the VSC idea. Figure I shows a graphic representation of the VSC developed by Lantz. (7) This VSC

model states the following: Altered spinal mechanics (kinesiopathology) is the essential feature of a vertebral subluxation. These altered mechanics are influenced by neurologic, myologic, vascular, and connective tissue disorders, and each of these tissues and systems are I in turn, influenced by one other. These relationships may result in, or be affected by, inflammatory responses, anatomic, physiologic, and biochemical pathologies. The whole of the network is the vertebral subluxation complex. A slightly altered version of this model was recently distributed profession-wide as a puff-out poster in Dynamic Chiropractic. (8) It's laudable to acknowledge the limitations of the VSS, but does the VSC provide us with a more coherent understanding of the relationship between spinal dysfunction and health? No.

The VSC is described as a theoretical model, and as a theory there are several properties that it should have that it does not:

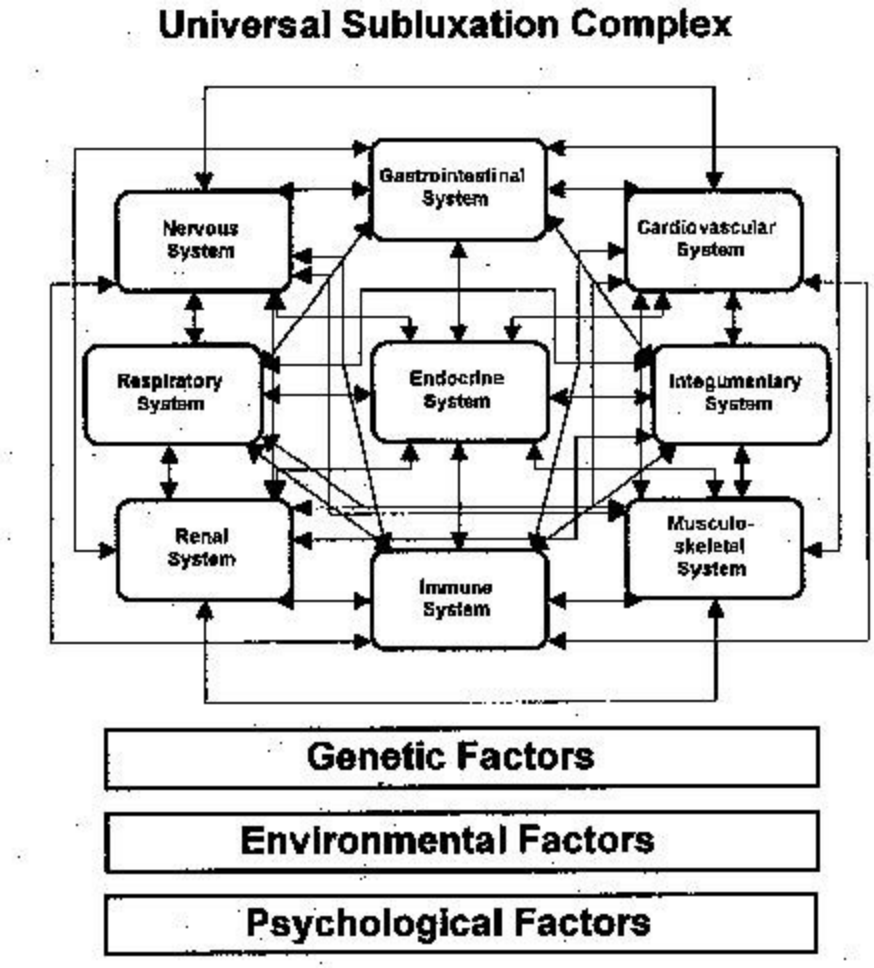
A theory should attempt to explain existing phenomena and observations. What is it that this theory explains? At no time is the VSC theory invoked to explain, say, a particular clinical phenomenon, and it's difficult to see how it could. in fact, Lantz states that " [The VSC] does not identify any single event or process as the sole causative element in the complex process of subluxation development..." (7, p. 166)

- A theory should make predictions. one should be able to state that "If the VSC theory is valid, then we will ultimately discover that X, Y and Z are also true." X, Y and Z could be any clinical/ physiologic phenomenon. But the VSC theory makes no predictions. it does not lead in any particular direction or draw any distinction or specific conclusions. Lantz states that "any particular tissue component may predominate in subluxation degeneration." That is, no one thing, is more important than any other.

- Finally, a theory should be testable or falsifiable. It should be possible to design 4 study or studies that would yield certain results or to make certain observations that would require the theory to be rejected. But what study or observation would be incompatible with VSC theory? It's difficult to imagine any basic science or clinical finding which would cause one to doubt the validity of the vertebral

subluxation complex. A theory that cannot be shown to be false by the emergence of some new evidence is not a theory.

The error that is being committed in the formulation of the VSC theory and in other aspects of this subluxation revival is that of tautology. A tautology is a circular type of argument that validates itself simply by renaming accepted principles or beliefs as a new theory, or principle., In this case, the aggregate fist of tissues, systems, and processes that relate to the spine are renamed as the VSC. A tautology has the virtue of being irrefutable, but the deficiency of being useless. Consider Figure 2.



Employing the same rationale used to develop the VSC theory, I propose what I will call the ***universal subluxation complex*** (USC) theory. This theory subsumes the totality of human health and disease. Each arrow represents a direction of influence and control

and of potential pathogenesis. Each system affects, and is affected by, every other system. At the base of this network of systems are genetic, environmental, and psychological factors, which may affect the above network. Disorders in any one part of this overall model may affect any other part and thereby produce disease, although the precise nature of these interactions is unclear. I will name any disorder in this network a subluxation.

The USC theory is entirely accurate, and I dare say, irrefutable. Alas, it is also pointless. It explains nothing, makes no predictions, draws no distinctions, is untestable and differs from the VSC only in its grandiosity. These models (VSC and USC) might have been brilliant observations at some point in the 19th century, but are now only restatements of the obvious: health and disease are complex, multi-factored phenomena, and certain tissues and systems interact with each other in a variety of complicated ways to affect our health.

Vertebral Subluxation Syndrome

The text reaches a crescendo of absurdity in its final section titled "The Subluxation Syndromes. " (2, p. 303) The text describes a subluxation syndrome as "an aggregate of signs and symptoms that relate to pathophysiology or dysfunction of spinal and pelvic motion segments or to peripheral joints." Although the introduction to this section states that these signs and symptoms are produced by subluxations, its not clear what is the precise relationship between subluxations and subluxation syndromes. Are the syndromes forms of subluxations, or caused by subluxations, or something else? Whatever the intended meaning, the reader is clearly left with the understanding that the syndromes are in some direct and causal way subluxation-related. According to this text the following conditions or findings are considered to be subluxation syndromes:

- Headache
- Homer's syndrome
- Meniere's disease
- Barre-Lieou syndrome
- Thoracic outlet syndrome
- Intervertebral disc syndrome
- Tinnitus
- Vertigo

In addition to these more exotic conditions, virtually all other possible forms and levels of back and neck pain are categorized as subluxation syndromes. In some cases the authors attempt to relate these syndromes to specific spinal motor unit dysfunctions (subluxations) and in other cases they don't. it's not always clear from the text whether the various contributors to this section actually believe they are describing subluxation-related problems. Michael Hubka, D.C., author of the chapter on intervertebral disc syndrome (9), has expressed his firm belief that disc syndromes are in no way related to subluxations. (Hubka M. Personal communications Intentionally, according to Dr. Hubka, the word subluxation does not appear in this chapter.

Whatever the beliefs of the individual contributors, the collective effort to classify this broad range of conditions as subluxation syndromes is preposterous and disingenuous. Preposterous because it would have us believe that this encyclopedic fist of problems are all forms of subluxation-generated disorders. Disingenuous because it appears

to be an attempt to legitimize the concept of subluxation simply by attaching to it a broad spectrum of health problems, each of which obviously exists in its own right, but with no obvious subluxation connection other than having something to do with the spine. I have attempted, unsuccessfully, to identify a spinal problem that would not be described as a subluxation syndrome. The use of the term subluxation becomes, frankly, a bit Orwellian.

By the end of this volume we are left with the following understanding of subluxations: A subluxation is an articular phenomenon that may or may not be of clinical significance, may be palpable or maybe not, may be identifiable on x-ray or may not, may be treatable by spinal manipulation or perhaps not, may produce visceral disease or may not, may be hypomobile or hypermobile or have normal mobility, and may have other biomechanical properties of an unspecified nature; the presence or absence of any of these dichotomous characteristics is not predictable; all tissue types in the vicinity of the spine contribute to ' subluxations although the precise nature of these contributions cannot be stated; a wide range of clinical conditions, both spinal and extra-spinal, are associated with subluxations, although it is not

possible to identify the exact nature, causal or otherwise, of this relationship. In addition, subluxations are described by a variety of theoretical models, few of which appear to be testable.

The efforts, as represented by the works discussed here, to reintroduce subluxations to the academic and scientific community, ultimately fail on several levels. First, it incorrectly concludes that one of, if not the primary issue, is a semantic one. To the extent that there is semantic confusion and disagreement, it is a relatively trivial issue which need not even be addressed until the more substantive questions of the actual nature and reality of subluxations is resolved. By framing the issue as a semantic debate, and then resolving the debate through a consensus process, the illusion is created that something important regarding subluxations has been learned.

Second, these efforts confuse science-relating-to-spines with subluxation science. The compendium of anatomic, physiologic, biomechanical, and clinical data relating to spines is presented as a foundation for subluxations science. The rationale seems to be, "Look at all the of things which can be said about spines, and joints, and nerves. Surely, all this information lends weight and credibility to the concept of the subluxation. " If I may once again resort to a UFO analogy, its as if a UFO apologist attempted to make his or her case by presenting the principles of aerodynamics, propulsion systems, metallurgy, etc., expecting this to be accepted as UFO science. Subluxations will not become legitimized simply by using the term in the same context with some other sound scientific discussions. A proximity to science does not by itself confer legitimacy,

Third, the book commits the error of equivocation in attempting to defend and explain the concept of subluxations. By carefully avoiding making any definitive assertions, and by carefully qualifying all statements regarding the nature of subluxations, the authors have certainly immunized themselves against refutation. Unfortunately, one is left with a concept so amorphous and ambiguous as to be unintelligible, The following is typical: "Examining the kinesiopathologic component of the chiropractic subluxation in isolation, however, may be misleading because any movement modification may very well be the result of both biomechanical and

neurogenic reflexes working in concert. Whether movement restoration with its concomitant therapeutic effects transpires as direct consequence of the forces exerted onto the joints themselves, or through neuromuscular reflexogenic mechanisms is still debatable." (10)

An idea is only interesting and useful if it does make some definitive assertions, if it states that some things are true and others things are not true. To the extent that any clear idea at all emerges from this text, it is that subluxations have no particular or specific qualities that can be relied upon. Indeed, the book is self contradictory in this regard. It begins with the premise that a subluxation is "the primary lesion treated by chiropractors," and then concludes that a subluxation is not one thing, but many things. This reference to "the primary lesion" is made throughout the book, clearly implying some singular entity. However, it is precisely the point of the book that the subluxation is not to be contained within any limiting models. The concept has been so diluted that there is no residue of meaning left. Thus, taking to heart the information contained in this volume, if one said, "Joe has a subluxation," or even, "Joe has a subluxation at L4-5," what has been communicated? Nothing, except that Joe has some sort of imperfection in his spine. Nothing else useful has been communicated about the nature of this imperfection - not its cause, its cure, its identifiable characteristics, its significance.

Fourth, theoretical models (particularly the VSC theory) of subluxations are offered which are non-falsifiable. The VSC is really a description mislabeled as a theory. The vertebral subluxation complex theory could be paraphrased as follows: "Spines are composed of bones, muscles, tendons, ligaments, nerves and blood vessels and these tissue interact in a complex and variety of ways, not all of them desirable. " Finally we understand what the altered physiologic function of the consensus panel definition means. It means everything that happens to spines, and 9 it means everything, then it means nothing.

Those who have embraced the VSC concept and this broadened view of subluxation as presented in this volume have confused complexity with scientific sophistication and legitimacy. But a theory or idea is only interesting or useful if it simplifies our understanding of

the world (or in this case, of health and disease); if it reduces the number of variables and possibilities. Palmer's subluxation theory was so compelling precisely because it simplified our understanding health and disease to such a remarkable extent. Unfortunately, it is obvious to most that his theory is too simple and is incompatible with our current understanding of health and disease. The question remains whether a subluxation theory can be formulated which retains some of the simplicity and explanatory power of Palmer's and can survive experimental tests. If in the end the conclusion is that the spine/health relationship is so complex and unpredictable that no definitive statements or distinctions can be made, then we will have concluded that subluxations do not exist in any meaningful way. How to address this issue is discussed in the next section.

And last, by creating the classification of subluxation syndrome, and including every unwanted clinical event that happens or can happen to a spine (with the usual exceptions of infection, neoplasm, etc.) as a subluxation syndrome, any relationship to reason, common sense and fair play has been abandoned. Creating the classification of subluxation syndrome is an inaccurate, self-aggrandizing and meaningless gesture.

Formulating a Subluxation Theory

Chiropractic research has, to this point in its evolution, focused primarily on measuring the outcomes of chiropractic care and particularly of spinal manipulation. This type of research narrowly answers the questions of whether, and how much, patients benefit from

chiropractic care in comparison to other treatment options or to sham treatments. This emphasis on outcomes research was and is appropriate both from the profession's and the public's point of view. It is absolutely imperative, if one is to survive in today's health care marketplace, to demonstrate effectiveness of care. However, these studies offer no insight into the subluxation question and it is well past the time for the chiropractic profession to honestly examine its basic premises.,

But how do you test the subluxation theory? What is the subluxation theory? The previous discussion argued that current theories are unsuitable for testing. The following characteristics are proposed for any meaningful and relevant subluxation theory:

I . It should bear some resemblance to its historical antecedents. As long as chiropractors continue to use the term subluxation in its non-medical sense, and unless the profession is willing to declare that D.D. Palmer's ideas have no current relevancy, any subluxation theory should retain some connection to Palmer's formulation of subluxations. Otherwise, it's more appropriate and honest to simply abandon the term.

2. It should be testable. By definition, all scientific theories must be testable, which is to say, falsifiable. With regard to subluxation theory, this would mean abandoning the metaphysical component of Innate Intelligence, which must forever remain something one holds as a belief or does not. It cannot be tested. It also means constructing a theory which makes distinctions, discriminations, and predictions which can be subjected to experimental tests, unlike the VSC theory.

3. It should be consistent with current basic scientific precepts and principles. There is no point in predicating a subluxation theory on premises which are known to be false, or at least, not in evidence. A subluxation theory predicated on, for example, nerve compression within the IVF is unlikely to be found valid.

4. It should reflect current practice and educational standards. A relevant subluxation theory should attempt to identify and organize many of the implicit theoretical assumptions made by the chiropractic professional and educational institutions. For example, all chiropractic colleges teach that spinal adjustments should be administered in a manner which varies depending on the specific type or nature of subluxation to be treated.

5. It should be clinically meaningful It's easy to imagine certain physiologic parameters being affected by spinal misalignments, or by corrective adjustments, but which are not clinically significant to the patient. Subluxation theory must posit that some direct and tangible clinical consequences to patients are involved, and not simply an

abstract observation that some sort of connection exists between spinal function and other physiologic processes.

6. It should present a distinct and unique point of view. The chiropractic profession continues to insist that it represents not just one additional therapeutic option which patients should consider, but a divergent perspective on health and disease that rests on principles which are unrecognized by other health professions. A subluxation theory should differentiate chiropractic from medicine, physical therapy, and any other related professions.

With regard to the historical antecedents of subluxation theory, we can identify four principal modifications of the theory from Palmer's original configuration. First, there has been a retreat from the metaphysical principles of vitalism and Innate Intelligence. To be sure, this retreat is not complete. A steadfast minority of chiropractors remain who continue to regard Innate intelligence as the sine qua non of chiropractic, and many others are unwilling to completely renounce the idea. Most chiropractors, however, are probably willing to abandon the centrality of vitalism to subluxation theory. Its possible to imagine subluxations existing without Innate Intelligence and to explain their effects on health in purely physiologic terms. Second, belief in the comprehensive and profound effects of subluxations has diminished.

Very few would be willing to endorse Palmer's assertion that 95% of disease is caused by vertebral subluxations. However, there is a wide range of beliefs on this matter, and it continues to be a divisive issue within the profession. Third, the concept of subluxation has expanded beyond a simple static misalignment to include changes in vertebral motion. Thus, it's proposed that vertebra which are normally aligned may yet be problematic if they exhibit aberrant motion, as in fixation subluxations. This expansion beyond bone-out-of-place can assume absurd proportions as was seen in the discussion of the vertebral subluxation complex. Finally, the presumed mechanism of action of subluxations has shifted from a purely mechanical pinching Of nerves within the IVF to more complex mechanisms, principally that of reflex phenomenon such as somatovisceral reflexes.

Testing the Subluxation Hypotheses

So, with the above discussion in mind, and with the understanding that subluxation theory is not one grand theory, but a series of interlocking principles, herewith are presented four theoretical principles along with testable hypotheses for each of those principles.

Principle #1. There is an important relationship between spinal function and general health. This is often stated in the form of a structure/function metaphor: Function must follow form (structure) and if spinal structure is not optimal aberrant function (disease) will follow. implicit in this aspect of subluxation theory is that spinal function need not be grossly distorted to have adverse health effects. For example, a severe idiopathic scoliosis which distorts the thoracic cage and impairs cardiovascular function, or a prolapsed disc which compresses the neural canal are not evidence of this spine/health relationship. Subluxation theory is predicated on the human body being exquisitely sensitive to much more subtle deformations of the spine. Indeed, the profession consistently promotes the idea that one may be asymptomatic with no obvious spinal lesions and yet harbor subluxations, detectable by a chiropractor, which over time may degrade health.

Testable hypothesis #1: There are clinically important differences in health that can be correlated with specific differences in spinal function. If principle #1 is valid, then studies of populations should be able to detect some correlation between specific health states and specific spinal dysfunctions. The methodological dilemma is choosing which correlations to examine. There are a limitless number of possible health problems (back pain, headaches, asthma, otitis media, etc.) to be correlated with a very large number of spinal function measures (alignment, mobility, strength, etc.). initial studies could simply examine large populations and go on a statistical fishing expedition to identify possible correlations which could be tested in subsequent studies.

It's important to note that if such correlations are discovered, one cannot assume that the spinal dysfunction is causing the health problem. For example, if a correlation were discovered between, say, irritable bowel syndrome and a certain type of spinal problem it might

be that the bowel problem was causing the spinal problem and not the other way around. This would not be an insignificant finding, but it's not one which supports principle #1.

And it is must also be noted that the magnitude of the relationship between spinal function and general health must be significant to support principle #I. Any large population study will almost certainly reveal some statistically significant correlations, but unless these correlations meet some standard of clinical significance they are merely curiosities and of no particular interest or value.

In the context of this discussion, it's not crucial to subluxation theory to know exactly how the spine exerts its influence over health. It's generally assumed that it is the nervous system which mediates this relationship. Reflex connections are considered more plausible than nerve compression as a mechanism, and the ACC position paper refers to neural integrity as a mediating factor. But these are details, albeit important ones, and subluxation theory could be compatible with other or even multiple mechanisms of action.

Principle #2. The spinal dysfunctions which influence health are discrete. That is, the dysfunctions can be said to have a location in a particular motion unit(s). We speak of atlanto-axial subluxations or L5-S1 subluxations. While regional dysfunctions such as hyper or hypolordoses are certainly recognized by chiropractors, these problems are themselves thought to be the result of, or to give rise to, discrete spinal dysfunctions.

Testable hypothesis #2: Spinal dysfunction at levels X, Y, and Z are correlated with increased prevalence of condition W. The type of investigation described under hypothesis #1 should be designed to measure and record, among other things, spinal dysfunctions by specific levels - listings, if you will. The finding that certain health problems are associated with some general and diffuse sort of spinal changes (weakness, or a general lack of mobility, for instance), but with no specific or localized changes, would be an important finding, but not consistent with subluxation theory, nor consistent with the way chiropractic is practiced or taught.

Principle #3. Its possible to reliably differentiate between motion units which are not functioning optimally, and thus degrading health in some way, and those that are functioning normally. Most of the techniques and adjustive systems taught in all chiropractic colleges have as their principle analytic goal the identification of specific dysfunctional motion units knowing that without this ability much of what chiropractors do makes no sense. Subluxations might be real, but unless there is a reliable way of identifying them that fact is of little clinical utility. Thus, principles #1 and #2, even if validated remain only potentially useful unless reliable means are developed to locate, and classify clinically meaningful spinal dysfunction.

Testable hypothesis #3: In a given population of patients, different examiners will be able to reliably identify and categorize spinal dysfunctions which are correlated to clinically meaningful conditions.

There are a variety of procedures and tools which have been proposed to locate subluxations: radiographs, palpation (both static and motion), electromyography, thermography, galvanic skin response, and others. There are two components to this hypothesis: reliability and validity. Reliability is the measure of the ability of different examiners (or of the same examiner on repeated examinations) to reach the same or similar diagnostic conclusions. In the context of this discussion, to find the same subluxations.

Validity is the measure of whether the diagnostic conclusion (subluxation) is actually meaningfully related to health. It's quite easy to imagine a method of spinal analysis that would no doubt be very reliable, but would not represent a valid measure of health. There has probably been more research in this area of subluxation theory than in any other, but to date the results have been disappointing. So far, none of these methods have been shown to meet the both the criteria of reliability and validity. This failure can be interpreted either as evidence of the non-existence of subluxations or of not having developed the means to identify them. (Keating has provided a detailed and technical description of how this particular subluxation principle should be tested.) (11)

Principle #4. Specific adjustive procedures applied to the dysfunctional motion units will restore normal function and promote or restore health. Chiropractic claims supremacy in the field of spinal manipulation because of its asserted ability to deliver specific corrective adjustments as opposed to generalized mobilization procedures. For this claim to be valid a number of predicate assumptions must be true. First, principles 1, 2, & 3 must be valid: subluxations must exit, they must have specific locations, and it must be possible to identify them accurately. In addition, it would have to be possible to administer an adjustment in a manner which causes a vertebra to behave in a predictable and desired way. Chiropractic techniques which prescribe specific contacts, lines of drives, and torque (which is to say, most techniques) are assuming the ability to deliver this type of adjustment.

Testable hypothesis #4: An adjustive procedure directed at a specific location and with a specific intention to correct a particular spinal dysfunction will be more effective than a non-specific manipulative procedure directed to the general area of a complaint, as long as the adjustive procedures in question do not damage articular structures. This hypothesis is tested by conducting randomized clinical trials comparing the two types of interventions described - specific adjustments vs. generic manipulation. The existing literature on the clinical effectiveness of SMT gives us no real insight into this question. It remains plausible and consistent with that literature that a generic manipulation administered in the general vicinity of the patient's complaint achieves the maximal therapeutic benefits of SMT. In other words, it's possible that all techniques which deliver a cavitating adjustment to symptomatic areas are equally effective. No studies have made this type of specific vs. non-specific comparison, so it also remains possible that specific adjustments properly delivered may be more effective.

Principle #4 does raise some interesting questions concerning how chiropractic is practiced. Given the large number of technique systems used by chiropractors, and given the inability of each of those systems to arrive at reliable and valid diagnostic conclusions (i.e. locate subluxations), and given the as yet unproven ability to administer an adjustive procedure with known and specified biomechanical effects, it seems improbable that a patient would

receive a comparable treatment from different chiropractors. That is, if we assume the existence of subluxations as described in principles #1 & #2, and given the analytic shortcomings and diversity of chiropractic techniques, a given patient with a given subluxation (s) would seem unlikely to have that subluxation properly identified and corrected. We might also ask whether a specific adjustive procedure delivered to a non-subluxated segment might produce a subluxation, i.e. harm the patient. The other possibility is that hone of the adjustive fine-tuning makes any difference. All the line drawing, muscle testing, palpating, and nuanced administrations of spinal adjustments may be a waste of time. Neither of these possibilities is very comforting.

In an important way, the testing of principle #4 can give us insight into the whole of subluxation theory. if it is not possible to show any clinically meaningful differences among different adjustive techniques including generic mobilization, it would be difficult to see how principles #1, #2, & #3 could be valid. Conversely, if a certain type of spinal analysis and adjustive technique can be shown to be clinically superior to a generic manipulation procedure, that fact is highly suggestive of something very subluxation-like lurking in our spines.

If subluxation theory is valid as it is currently practiced, taught, and promoted by the chiropractic profession, these four hypotheses should survive the experimental test. it's highly unlikely, though, that an absolute, unequivocal confirmation or refutation of these hypotheses would result from testing. A more realistic expectation is that the data would tend to converge toward or away from confirmation, to a point where reasonable people should be able to reach a consensus on the future relevance of the subluxation theory.

Conclusion

Resolution of the subluxation question is critical to the evolution and development of the chiropractic profession. Whether chiropractors are actually treating lesions, or not, is a question of immense clinical and professional consequence. Resolution will not be found through consensus panels nor through semantic tinkering, but through proposing and testing relevant hypotheses. Left in its current state of unstudied ambiguity, all points of view retain a certain credibility, not a circumstance characteristic of a mature profession. It may be naive

to hope that scientific investigation of the question will cause disparate views to coalesce around the data, all evidence suggesting that the chiropractic profession does not behave in this fashion. Nevertheless, that is what should happen and we ought to give the profession the opportunity to surpass itself.

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