

History or Science: The Controversy Over Chiropractic Spinography

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The historic year 1895 marked the beginnings of both radiography and chiropractic, inventions that would alter the course of world health care. These impressive developments are related in far more than merely dates of origin. Their histories have been intricately interwoven in a tapestry spanning over a century of impressive accomplishment.

But these accomplishments have been accompanied by numerous internal conflicts within the chiropractic world. Techniques and ideologies have vied for supremacy over the course of chiropractic history. One controversy which continues today involves what at first may seem a relatively simple question: when or if to use imaging in a patient's case. This seemingly innocuous problem has generated great debate and strife within the chiropractic community.

The biomechanical based radiographers have embraced the historical chiropractic concept that the primary reason for ordering x-rays is to evaluate spinal alignment. The pathology based radiographers have rejected the traditional chiropractic approach and feel radiography should be performed in accordance with the "red flag" philosophy. Each group seems guided by its acceptance or rejection of historical chiropractic's view on x-ray usage and then proceeds to craft arguments in line with a preconceived belief.

It would appear that some tolerance might be expressed by both sides to allow individuals to practice somewhat to his/her own understanding without suffering the interference of either faction. Perhaps this controversy could be summed up in the words of the often controversial B.J. Palmer which were once emblazoned outside of the driveway arch of the Palmer School of Chiropractic. "Anything that you do that the majority do not do is 'queer.' Queer, isn't it."

To the student stuck in an obligatory study of history, this chore may seem a useless memorization and regurgitation of long ago dates and events. But to the modern historian, the process enlightens

the present and, if thoughtfully considered, may allow us to glimpse the future.

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In order to explore this subject we must define opponents, stage battles and determine outcomes without setting up straw man arguments along the way. As such, we unfortunately set ourselves up as both judge and juror in proclaiming the verdict on a complex subject and fully anticipate the outcries that may spring with equal hostility from both camps. We recognize that our discussion must, of necessity, be shortened, for it would take a book to evaluate the vast quantities of material and far flung arguments involved in this debate. However, we feel that by concentrating on a few key points we can reasonably support our contention that to x-ray or not to x-ray is as much a question of history as one of science—perhaps more so.

Defining the opponents:

For our purposes we will examine the two opposing sides. We recognize that there are many or perhaps most in the profession who fall somewhere in the middle, but feel this method will better illustrate the issue. On one side stand the biomechanical based radiographers (Bios),

who are more comfortable with a traditional chiropractic approach to imaging, which we will define shortly. On the opposite bank stand the pathology based radiographers (Pathos), more aligned with the approach used by the medical profession in determining the need and time of imaging. In using these two terms we do not imply that Bios are superior because they support "classic" chiropractic nor do we imply they are old fashioned. Also, we do not imply that the Pathos are more modern, and therefore in some way superior, nor that they have in any way sold out to the medical industry. That we feel the need to deny any hidden meaning in the titles speaks to the passion that some have regarding this argument.

Biomechanical Based Radiographers

"We introduced the X-ray into spine work back in 1910. We were the first people in the world to do so."¹ These early chiropractors noted that physicians also utilized X-ray, but for diagnosis of pathology, traumatic conditions, location of foreign substances, as well as the treatment of cancer.¹ However the chiropractors did not wish to enter these arenas and stated their position plainly.

The original Chiropractic purpose was not to use the X-Ray for therapeutic purposes, to ascertain normal or abnormal tissues, the character of fractures or whether there was renal calculi or a bullet in the body. We had already settled how a cure occurred; we did not care much about pathological plates; we did not deal with fractures or dislocations; and if there was a bullet or any other foreign substance, that was a case for a physician or surgeon, not for a Chiropractor. We knew our place and proceeded to strengthen our position accordingly.¹

The advent of the X-ray into Chiropractic was to prove that vertebral subluxations did actually exist and could, by use of the X-ray, be made visible to the eye.¹

B.J. Palmer further reinforced that thought when he wrote that chiropractic



Figure 1. E. A. Thompson, D.C., Ph.C. Professor of Spinography in the Palmer School of Chiropractic from *Text on Chiropractic Spinography* 1921.

existed by virtue of two fundamental theories: that vertebrae of the spinal column could be subluxated and could be adjusted by hand and that, in addition, subluxations interfered with nerve flow between the brain and body.² In the booklet *IT IS AS SIMPLE AS THAT* he stated, "In 1910, we introduced THE SPINOGRAPHIC USE OF X-RAY to prove that the segments of the vertebral backbone were out of alignment BEFORE an adjustment and were realigned after an adjustment by hand only."²

This did not mean that chiropractors were not concerned when their patients had problems other than misalignments present on the radiograph. For as Remier, in reference to spinography, states, "When precisionally made it serves several purposes and is the key to skilful and specific adjusting. It determines pathology, fractures and dislocations of the spinal structures, as well as the misalignments;

and in all its ramifications protects the patient as well as the chiropractor."³ "It might be said that the Spinograph is a safety device to palpation, the one and only means by which mistakes and errors in palpation can be eliminated; therefore, its use is essential before an adjustment."⁴ The intent of the traditional view of chiropractic radiology is clear. The primary purpose of X-ray in the traditional view of chiropractic is to aid in the location and correction of the subluxation; however, if things such as pathology or fracture are found, these cases can be referred to the medical profession.

This limited purpose for X-ray usage in historical chiropractic is acknowledged by the chiropractic historian Keating when he summarized B.J. Palmer's attitude toward X-ray. "At various times he claimed that chiropractic spinography was exclusively concerned with subluxation detection, while at others he acknowledged slightly

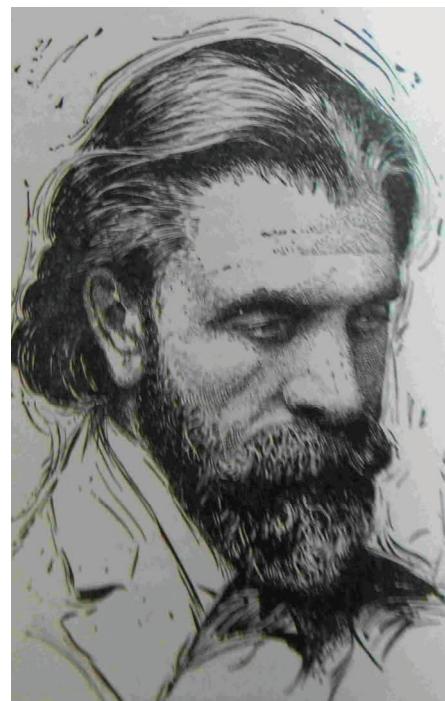


Figure 2. Drawing of B.J. Palmer, D.C., Ph.C. President the Palmer School of Chiropractic from *The Philosophy of Chiropractic* 1920.

broader uses, such as the detection of spinal abnormalities.⁵ So while these early chiropractors do not claim to be the first to use the word subluxation, which dates back to at least 1688 but may have been used by Hippocrates as early as 400 B.C., they lay claim to be the first to use X-ray in their attempt to find and correct them.^{6,7} They also use the word misalignment in a way that designates it as the visual portion of the subluxation, which is the heart of traditional chiropractic and their method of seeing these misalignments is by the use of X-ray.

Pathology Based Radiographers

Phillips' 1992 article, Plain Film Radiology in Chiropractic, is summarized by Lawrence in the 1994 edition of *The Year Book of Chiropractic*.^{8,9} "Indications. - Radiographs are used by chiropractic physicians to rule out pathology in patients seen with low back pain, as well as for biomechanical evaluation. Other reasons given are to protect against medicolegal action and to make money. The literature fails to support the use of X-ray films for any of these reasons."⁹ The suggested appropriate guidelines for the use of X-ray are given as including: age over 50, significant injury, neuromotor deficit, unexplained weight loss, drug and alcohol abuse, suspected ankylosing spondylitis, a history of cancer, steroid therapy, and elevated body temperature and in patients not improved after a recent visit for the same problem and patients seeking compensation for back pain.⁹ Dr. Reed Phillips, former president of the Los Angeles College of Chiropractic, comments on his article when he notes that his objective was to draw attention to this issue and states that radiographs expose patients to harmful radiation and are large cost drivers.⁹ This list of 11 appropriate uses for chiropractic X-ray would be known in the profession as a "red flag" list

and although the items may vary somewhat depending on the source, it is a basic representation of both the medical point of view and what we will call the Pathos view.

Both sides may put forth objections to the two definitions we have chosen, but they do show very opposing views. While these different views were expressed over 70 years apart, they accurately reflect the present positions of the two groups. The latter view is much more closely approximated to what the Bios indicated was the use of radiographs by the medical profession than the view the Bios hold for themselves. The Pathos primary use of X-ray is not for detecting misalignment as it is for the Bios. The Bios embrace the historical usage of spinography; the Pathos embrace what the Bios define as the medical usage of imaging as a means of conforming to a "red flags" guideline. But this conflict is not just an academic exercise. Whichever ideology prevails will have drastic implications for the course of chiropractic education. It will greatly affect the accrediting of chiropractic colleges and universities and the education and practice attitudes of future doctors of chiropractic. It also influences the decisions of chiropractic state boards, the formation and application of laws, as well as the monies paid by both patients and insurance companies. These differences in core values and the obvious potential effect upon the direction of health care put the Bios and Pathos on a collision course—a course that we hope to prove is grounded more in acceptance or rejection of historical tradition than science.

Before we proceed further we wish to state that we are going to remove those who are quite young and those who are quite old, as well as pregnant women from the discussion on whether or not radiography is appropriate prior to chiropractic care. Each of those groups possesses

special characteristics not present in the general population of patients and to cover the more specialized arguments for these groups is beyond the scope of our discussion. For the general population of patients we will confine the discussion to four basic areas of concern: misalignment, costs, contraindications and radiation.

Misalignment

Misalignment has been used as a proxy for or is at the least highly associated with the subluxation. For the purpose of this section we will accept that imaging in some form is either a necessity or at least the most accurate method to quantify intersegmental relationships in the spine. From that premise the Bios can propose that due to the necessity of correcting subluxations and the importance of misalignment in the determination of subluxations, imaging must be commonly employed to assess the existence and magnitude of misalignments. But, if the Pathos could diminish or negate the importance of misalignments, they might damage or void the Bios' usage of imaging based on the need to identify misalignments. While a historian may surmise that such a basic core question in chiropractic has been definitively answered long ago, this is not the case and as such the Pathos will be allowed to strike first.

Pathos often take a two-pronged approach to their opening argument against the need to utilize imaging for locating and quantifying spinal misalignment. They illustrate that many people perform the activities of daily living with little or no current pain or outwardly visible disability while possessing significant spinal misalignments. They also note that many people improve when their spines are manipulated without any accurate method of quantifying misalignment used in the process. They use these points as proof that misalignments are not of great importance.

These points are extremely important in the consideration of applying chiropractic care based largely on correcting misalignments. The Pathos will rightly demand, with so much care at stake, that the Bios identify their logic for using the misalignments as a reason in favor of obtaining spinal imaging. The Bios could respond along several lines.

Medical research shows thoracic hyperkyphosis to be an independent risk factor in the mortality of elderly patients.¹⁰ Additionally increased degenerative changes in both the cervical spine and in patient's knees are associated with misalignment in those areas respectively.^{11,12} If animal studies are included, researchers at Harvard University found that when young rat's tails, which have vertebrae, are misaligned, the vertebrae change shape over time, become fixed in the new position and become resistant to realignment.¹³ Bios might suggest that misalignments are similar to atherosclerosis in that atherosclerosis proceeds without pain to a point where a crisis occurs. Or a strictly mechanical argument could be employed by showing that tires which are out of alignment produce uneven wear in a silent fashion until a significant problem occurs or that watches which are altered mechanically do not keep accurate time. These arguments suggest that whether or not a patient has pain or outward disability, misalignments can have a very real effect on either present or future health and therefore should be a consideration in patient care.

Bios can show that while the Pathos have embraced the medical point of view in relation to X-ray usage relating to "red flags" there are some medical providers to whom alignment is important. Those specialists who deal with scoliosis are quite interested in spinal alignment. Maintenance of cervical lordotic alignment and align-

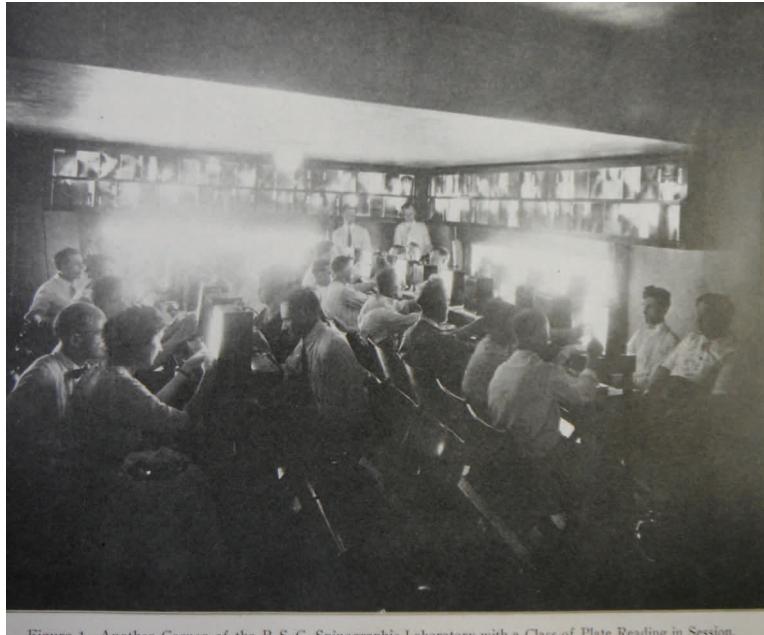


Figure 1—Another Corner of the P. S. C. Spinographic Laboratory with a Class of Plate Reading in Session.

ment at the surgical site are outcome measures indicated by those performing spinal fusion as factors in achieving better outcomes.¹⁴⁻¹⁸ If structural alignment is important to these specialists, then why do the Pathos not embrace this concept for chiropractic usage and outcome assessment?

On a different note, the federal program Medicare will pay for care for both acute and chronic subluxations that are demonstrated by either X-ray or physical examination.¹⁹ Formerly this reimbursement was limited only to subluxations demonstrated on X-ray. It would appear that the attitudes and efforts of the Pathos have had significant influence in this important area and that Medicare has not rejected either side of this argument in its payment policies.

In consideration of these points it would appear that the Pathos cannot easily ignore the argument for misalignment being of importance when evaluating the need for imaging. We note, however, that if the Bios were truly as aggressive in their defense of the misalignment portion of the subluxation, as might be expected for such a core belief,

then surely a very large number of long-term, large-scale studies supporting the importance of correcting misalignments with chiropractic care and tying such correction to significant improvements in patients' long-term health and well-being would litter the PubMed literature. As 118 years have passed since the advent of chiropractic, it raises the question as to why such a core question has not been exhaustively explored. Although, to their credit, the Bios did create a set of guidelines which do support the use of X-ray for misalignment detection (biomechanical reasons) as an appropriate application of radiography and which, as might be expected from this group, includes a portion on the history of radiology in chiropractic.²⁰ Ultimately, the Bios support the historical chiropractic concept that the misalignment/subluxation is important and the X-ray is necessary to see that misalignment, while the Pathos feel that using X-rays for biomechanical assessment is inappropriate.

In the misalignment discussion, both sides raise legitimate points, but neither side can come close to claiming a victory. It

appears that the debate is more related to whether the participants endorse or deny historical chiropractic X-ray usage and therefore use this ideology to choose the points to which they will give the greatest weight as opposed to merely representing one side of a settled scientific question.

Costs

We will stipulate that if a procedure is not likely to change either the treatment or the outcome, it should not be considered. With this stipulation applying equally to groups and individual providers, this is perhaps the easiest part of the Pathos' argument for the Bios to dispel.²¹ In so doing there is little reason to employ a detailed examination of studies related to the expense that chiropractic radiology adds to the cost of care, as several examples and simple logic will suffice.

For example, using research directed at chiropractic care, two studies are supportive of the Bios' position. One study indicates that patients receiving upper cervical adjustments who showed an improvement on pre-adjustment and post-adjustment radiographs of 30% in atlas misalignment had a greater reduction in pain levels than patients who had lesser improvements in misalignment.²² The second study found that following an upper cervical adjustment those patients who had a 50% or greater improvement in atlas alignment required less chiropractic care to treat their condition.²³ These two studies indicate that improving alignment may both improve outcomes and reduce chiropractic costs. Therefore, a method of quantifying misalignment improvement may result in better patient care and could be important in treatment costs and outcomes.

The cost that should be discussed is the cost of plain film X-rays taken in the chiropractic office. All other imaging and X-rays obtained in other places such as hospitals or imaging facilities at the direction of chiro-

practors are not what has traditionally made up the bulk of chiropractic X-rays. To start this discussion we note that the type of radiography performed by chiropractors is obviously not overly expensive to produce as radiographs have been offered to many prospective patients at no cost. It could be argued that most of these offers are for genuinely humanitarian reasons and serve to remove a cost impediment to receiving care and allow more patients to enjoy the benefits of chiropractic. However, it would be disingenuous not to note that some are influenced by the wish to increase practice size. In either event this places the cost to the public in those offices that employ that practice at zero. One might wonder why insurance companies have not seized upon this fact to reimburse plain film radiography of the spine performed in chiropractic offices at zero. We should note that these same arguments are also applicable to all medical providers, hospitals and other medical facilities who offer discounted or free screenings or other reduced cost health services to the public.

For those offices who do assign reasonable charges for spinal radiography, those fees are usually less than the fees charged for similar radiographs in a hospital setting. That these films may serve to lessen the usage of much more expensive services such as hospital X-rays, CTs or MRIs, which are frequently utilized by the medical profession, is a fact that is seldom discussed as a reason to obtain chiropractic radiographs.

While chiropractors of the past have received criticism for the lack of complete chart notes and the lack of the more comprehensive physical examinations that are employed by some medical specialists, they have, under pressure, increased the use of both and brought themselves in line with the medical profession. This "improvement" is often applauded by the Pathos but the

value and validity of many examination procedures are of dubious value. In a 2000 study published in the respected *Journal of Manipulative and Physiological Therapeutics*, French et al., investigated the intra-examiner and interexaminer reliability of the diagnostic tests of "visual postural analysis, pain description by the patient, plain static erect X-ray film of the lumbar spine, leg length discrepancy, neurologic tests, motion palpation, static palpation, and orthopedic tests." They came to the conclusion that these "commonly used chiropractic diagnostic methods in patients with chronic mechanical low-back pain to detect manipulable lesions" were not reproducible.²⁴ If cost was a primary concern for the Pathos, there would surely be a high level of demand that all spinal diagnostic tests or any other procedures of questionable value be banned from use due to monetary reasons, as well as subjecting the patient to unnecessary procedures. Furthermore, while Bios might not agree with the inclusion of radiography in this list, they are also at fault for not making the use of unnecessary procedures a primary issue. But as the subject of cost is such a prime argument of the Pathos, we will devote additional attention to this subject.

Much of the treatment rendered by doctors of chiropractic deals with the treatment of spinal pain.²⁵ It is well known that many cases of acute spine pain are in the short term self limiting.²⁶ While Bios will argue that these cases need chiropractic care to improve alignment and prevent future problems, this would not appear to be a point of argument open to the Pathos. If costs are of such high priority, then it would follow that Pathos would be supporting actions to encourage many patients to wait before receiving care for spinal pain as that pain might very well be alleviated by time alone. In addition, it has been shown that restricting early morning

bending can have long-term benefits to low back patients in both pain and disability reduction without other care.^{27,28} It would appear that Pathos should also support a trial of procedures such as the restricting of morning bending before initiating chiropractic care as means to reduce costs. These things are not done, but the Pathos support a trial period of chiropractic care prior to obtaining spinal X-rays in many cases.²⁹ This emphasis on restricting X-rays while ignoring other potentially cost saving techniques tends to erode support for the Pathos' contention as expressed by Phillips, that costs are an important element of their objection to more frequent spinal X-ray usage. These actions do support the view that the Pathos have singled out chiropractic X-ray to criticize for creating excessive costs while failing to support other cost-saving methods.

To the extent that Pathos focus solely on the fact that chiropractic radiography does demand some cost, and not on the total costs incurred by the patient or the benefit gained by the employment of X-rays, they lose credibility in this argument. Yet, since Bios have not embraced lower costs as part of their argument, they appear to be dismissive of these costs. Neither side can claim an absolute dominance on this point, although we are inclined to point out that chiropractic radiography is an extremely small part of the overall cost of spinal health care. The Bios' view is that the benefits derived from obtaining an X-ray outweigh the costs, while the Pathos feel that the benefit does not outweigh the costs except in "red flag" cases.

Pathos are guided by their rejection of traditional chiropractic usage of radiography and have then proceeded to craft their arguments. However, the Bios have been seemingly unconcerned with this aspect of imaging and have solely focused on its use in a traditional manner.

Contraindications

One almost universally accepted reason to employ imaging is if there is a sufficient expectation of locating hidden fractures or pathology that would likely have an effect on either treatment or outcome. The question is not if this is an appropriate reason for imaging, but when is it needed. We first stipulate that chiropractic adjustments have an enviable safety record.^{30,31} As this would appear to heavily move us in the direction of the Pathos view of indications for imaging as expressed by Phillips, we will require the Bios to offer support for their use of imaging.

The Bios indicate that the Pathos have approached this problem from the standpoint of the medical profession and that while manipulation does have an enviable safety record, it is a far different method of care than the dispensing of medication and must be treated accordingly. Bios can point to a list of relative and absolute contraindications to spinal adjusting that are hidden and likely unknown to the presenting patient. That list would include but is not necessarily limited to hypermobility, bone weakening and destructive disease and aneurysm.³² For that significant portion of the population that has participated in contact sports, articles related to rugby players note that the frequent collisions which occur may lead to chronic vertebral and disc degeneration without a history of acute trauma.^{33,34} Additionally, a paper from members of the Institute of Neurology and the Institute of Orthopaedics at the Catholic University of Rome discusses four patients who suffered serious non cerebrovascularly related injuries as a result of chiropractic cervical manipulations. Those authors argue that "cervical spine films should be considered mandatory in patients being considered for spinal manipulation."³⁵ It should be pointed out that these patients ranged in age from 56 to

67 and as such are over the 50 year age we used for indicating radiographs when we defined the stance of the Pathos, but we note that many Pathos would not always consider radiographs necessary for patients in their 50's. The Bios might also argue that the necessity for X-rays to prevent non-cerebrovascular complications was recommended by German authors and that the French Guidelines for radiology indicate that imaging should be performed prior to spinal manipulations of any area of the spine.^{36,37}

Bios have entered this debate. They feel they can advance their argument with supportive data and for political and financial reasons. When considering the fact that chiropractic care has a good safety record with or without imaging in non red flag cases, neither side can really show complete supremacy for their point. But although Bios have joined in this type of debate, it does not negate the fact that the primary traditional chiropractic use of X-ray is to locate misalignments/subluxations so that they can be corrected via adjustment. Each side has used science to support their *a priori*.

Radiation

This section is perhaps the most difficult to express in the relatively non-technical manner that is most appropriate for a history journal. We do wish to draw your attention to the fact that we have already excluded those who are pregnant from consideration in this article and we reiterate that point here as it is especially applicable to this portion of the discussion. Pathos put forth the argument that radiation is harmful, but this is not to say that either side is totally opposed to the use of technologies that utilize radiation and both sides are concerned about the dose rendered by the practicing chiropractor. This is in keeping with the statement issued

by Radiologyinfo.org, which indicated that while the risk of cancer from a spinal X-ray was very low, it was still a risk.³⁸ To that end both sides support measures such as appropriate shielding and increased speeds for both films and screens and other similar technical measures to reduce, as much as reasonably possible, the exposure received in the chiropractor's office. It is the greater usage of X-ray which results in the larger amount of radiation to which the patient will be exposed that is attacked by the Pathos. But if the reduction of radiation dosage is truly an overriding concern it could be carried to much greater lengths.

Patients could be advised to avoid flying, to live in areas with lower background radiation or towns at lower elevations or to drink water from water sources having the lowest amounts of radiation. While patients are frequently advised to avoid excessive exposure to the sun, the practicing chiropractor might be required to provide a list of the SPF ratings of t-shirts as opposed to other types of apparel. These would be considered as extreme by most professionals, but it does point out the lengths to which radiation avoidance can be carried. On a more realistic level, there are technologies that could be utilized to reduce radiation and still acquire the imaging necessary for the historical application of care.

The EOS system is a technology that greatly reduces radiation exposure, but gives a full spine image that appears suitable for chiropractic analysis.^{39,40} Standing MRIs are available and would reduce radiation to zero. Easier yet would be to take radiographs with exposure factors manipulated to reduce the radiation to the point where only enough of the spinal column would be visible to allow chiropractic analysis of alignment. These would be considered non-diagnostic by the Pathos, but could be acceptable for the sole

purpose of ascertaining spinal alignment. While investigations might also be put forth to utilize methods such as three-dimensional clinical ultrasound, which a recent study has claimed was "an effective, non-invasive and fast assessment method to scoliosis" and which does not use radiation.⁴¹ Yet neither side seems concerned enough regarding radiation exposure to aggressively put forth these thoughts.

If, however, it could be shown that the routine use of chiropractic radiography provided essentially no patient risk and that perhaps some radiation exposure might be beneficial, this would largely put an end to the Pathos' objections. These thoughts have been put forth and are discussed in an article published in the *Journal of the Canadian Chiropractic Association*.⁴² While we note that this view is outside the mainstream, it was almost certainly authored to bolster the Bios' side of the argument.

Neither side is absolutely opposed to utilizing X-rays and, although concerned regarding radiation, both sides recognize that the question is simply, "Is the risk incurred greater than the benefit derived by the performance of the procedure?" Bios tend to take x-rays on most patients because, in their estimation, the subluxation is very important and therefore the use of X-ray to thoroughly evaluate the misalignment/subluxation and allow the greatest opportunity to correct this problem outweighs the small potential risk from this level of radiation exposure. On the other side, the Pathos do not value the use of radiographs to detect biomechanical problems such as misalignments and therefore, to them, any small radiation risk posed by an imaging source outweighs the benefit the image provides to the chiropractic treatment.

This argument again supports the fact that the Bios value the historically relevant

evaluation of misalignments/subluxations through the use of X-rays. The Pathos view X-ray usage as something that should be kept in line with a "red flag" guideline. Both sides' preconceived beliefs are formed by their support or lack thereof of the historically expressed view of chiropractic X-ray usage and they act in accordance with those beliefs.

Discussion

This is a history journal and not the correct place for an exhaustive review of the science related to the present issue and we have chosen not to examine many other articles from the peer reviewed literature to support either side of this debate. If the *coup de grace* were available to the pathological based radiographers in the scientific world, by this time, they surely would have delivered a killing blow. Lawrence and Mootz, former editors of two respected scientific journals, indicated in 1999 that they would publish properly derived scientific data showing that the subluxation did not exist if they were presented with such information.⁴³ However, the Pathos have presented other logical arguments against the biomechanical based radiographer's position and the Bios have not conclusively proven that their point of view is correct.

The Pathos have taken the position that it is up to the Bios to prove the need for radiography to properly care for their patients. This burden of proof is justified in the mind of the Pathos as they have little or no fear of the effects of the misalignment/subluxation and are only concerned with the minimal radiation exposure produced by spinography. The Bios view the misalignment/subluxation as a greater hazard than the exposure from the spinograph and feel that the Pathos should be held accountable for not taking appropriate steps to treat the problem (the subluxation) that is the historical reason for the very existence of

chiropractic.

What shines through is that those who more fully support the traditionally oriented chiropractic view are more in the camp of the radiology usage taught by classic chiropractic techniques such as HIO, Grostic, Pettibon or Gonstead or espoused by B.J. Palmer in which the X-ray is primarily used as a means to evaluate the misalignment portion of the subluxation. Those who support the Pathos position only order imaging as a result of red flags. The evidence indicates that the relative positions of the Bios and Pathos in this argument are more influenced by the embracing or rejection of the historical chiropractic view of the use of x-ray than any preponderance of scientific evidence.

Some have sought compromises on X-ray usage, as indicated in the words of James Winterstein, DC president of the National University of Health Sciences when he asks for a sense of balance by stating, "Yes, I know what the guidelines are and in the majority of instances I apply them. However, there are circumstances in which, for the benefit of my patient, I must be provided the ability to deviate from them and I must not be punished for doing so."⁴⁴ Further in an article discussing the French radiographic guidelines the author feels that it is appropriate to employ radiography if it makes the patient more comfortable to have an X-ray.⁴⁵ It might make more sense, however, if the X-ray were utilized when it makes the attending chiropractor more comfortable with the appropriate path for care. An uneasy truce might be found in some combination of these two views, but neither view addresses the primary reason that traditional chiropractic employs radiography. The traditional view was and remains related to the finding and correcting of subluxations.

The one thing that is abundantly clear is that the Bios feel that the correction of misalignments/subluxations is very



Figure 4: Picture of a corner of the Palmer School of Chiropractic Spinographic Laboratory Number 2 with a class of plate reading in session from *Text on Chiropractic Spinography* 1921.

important and seeing the problem through the use of imaging is a necessary part of the correction process. This is in keeping with traditional chiropractic and they have sought to have the profession progress through the improvement of that model. The Pathos do not have that core belief and they have sought to change chiropractic into something quite different from its original roots. They do not support the traditional view of chiropractic X-ray usage that we have defined and have instead embraced the model put forth by Phillips. This new model is not chiropractic to the Bios, but in their eyes is much more akin to changing chiropractic into a branch of medicine than making an improvement in chiropractic practices. Perhaps this statement could only be made in a history journal as the chiropractic profession seems to be concerned with presenting a unified front as opposed to acknowledging this glaring division within the profession.

Conclusion:

In 1910 DD Palmer described the first chiropractic adjustment:

One question was always uppermost in my mind in my search for the cause of disease. I desired to know why one person

was ailing and his associate, eating at the same table, working in the same shop, at the same bench, was not. **Why?**⁴⁶

This question had worried thousands for centuries and was answered in September, 1895. Harvey Lillard, a janitor, in the Ryan Block, where I had my office, had been so deaf for 17 years that he could not hear the racket of a wagon on the street or the ticking of a watch. I made inquiry as to the cause of his deafness and was informed that when he was exerting himself in a cramped, stooping position, he felt something give way in his back and immediately became deaf. An examination showed a vertebra racked from its normal position. I reasoned that if that vertebra was replaced the man's hearing should be restored. With this object in view, a half-hour's talk persuaded Mr. Lillard to allow me to replace it. I racked it into position by using the spinous process as a lever and soon the man could hear as before. There was nothing "accidental" about this, as it was accomplished with an object in view, and the result expected was obtained.⁴⁶

His words display the basic tenet of historically based chiropractic: The spine misaligns creating problems which are relieved by putting the vertebrae back into their normal alignment. By 1921 Thompson had stated the importance of imaging in this philosophy, "The advent of the X-ray into Chiropractic was to prove that vertebral subluxations did actually exist and

could, by use of the X-ray, be made visible to the eye."¹ This is worlds apart from the reasons given for ordering imaging by the pathology based radiographers, as indicated by Philips, and the issue is far from clear within the scientific arena. Somewhere between the whimsical statement offered in the B.J. Palmer poem "This Inner Power Speaks" that "We chiropractors work with the subtle substance of the soul"—and the harshness of an article in the *New England Journal of Medicine*, which refers to chiropractic care as only marginally better than an educational booklet, lies the middle ground which will be walked by the chiropractic profession.^{47,48} But where that path will lead is only to be written by future historians.

As for now, this disagreement is not based on a preponderance of scientific evidence for either side as each group has legitimate arguments. What has occurred is that the biomechanical based radiographers have embraced the historical concept that the primary reason for ordering X-rays is to evaluate spinal alignment and that such usage outweighs any of the objections offered by the pathology based radiographers. The pathology based radiographers have rejected the traditional chiropractic approach, as well as the arguments of the biomechanical based radiographers and feel radiography is unnecessary except when performed in accordance with the "red flag" philosophy often espoused by the medical profession. Each side is guided by its acceptance or rejection of historical chiropractic's view on X-ray usage and then proceeds to act accordingly.

The question of whether or not spinography will be used for the detection of the misalignment/subluxation is perhaps the controversy most likely to alter forever the fabric of chiropractic care. Eliminating the common usage of spinography for this purpose will essentially eliminate the historical definition of subluxation as

inclusive of misalignment and destroy historical chiropractic's reason for existence. Ironically, historical chiropractic, which has withstood the viscous attacks of organized medicine could be destroyed from within. But the struggle is not over. The question of which side will or should survive has yet to be definitively answered. It is a conflict which is not currently influenced by science as much as it is by history.

All of us who write in the public forum harbor a fear that we will in Kipling's words, "see the truths we've spoken twisted by knaves to make a trap for fools."⁴⁹ We have endeavored not to participate in such behavior and likewise hope that we will not see our words in this article twisted by such knaves. We would like to publicly state our great admiration of all who have the courage to make their views known or as has been said, "I respect the fact they have had the courage to speak. I respect the fact that they have picked up the bullseye and placed it upon their chests."⁵⁰

But ultimately it would appear that some tolerance could be expressed by both sides to allow individuals to practice somewhat to their own understanding without suffering the interference of either group. Perhaps this controversy could be summed up in the words of the often controversial B.J. Palmer which were once emblazoned outside of the driveway arch of the Palmer School of Chiropractic. "Anything that you do that the majority do not do is 'queer.' Queer, isn't it."⁵¹

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Notes

- 1 Thompson, E. A. (1921). *Text on Chiropractic Spinography*. Davenport, IA: Palmer Publishing.
- 2 Palmer, B.J. (1944). *It is as Simple as that*. Davenport, IA: Palmer Publishing.
- 3 Remier P.A. (1957). *Modern X-ray Practice and Chiropractic Spinography*. Davenport, IA: Palmer Publishing.
- 4 Remier P.A. (1938). *Modern X-ray Practice and Chiropractic Spinography*. Davenport, IA: Palmer Publishing.
- 5 Keating J.C. (1997). *B.J. of Davenport: The early years of chiropractic*. Davenport, IA: Association for the History of Chiropractic. (pp69)
- 6 Simpson J.A. (1989). *The Oxford English Dictionary 2nd ed.* Oxford, England: Clarendon Press.
- 7 Hippocrates, Translated by Francis Adams. (circa 460-370 B.C.). *On The Articulations*, Wauwatosa, WI: Charles Rivers Editors.
- 8 Phillips RB. (1992) Plain Film Radiology in Chiropractic. *Journal of Manipulative and Physiological Therapeutics*, 15, 47-50.
- 9 Lawrence. (1994) *The Year Book of Chiropractic*. St. Louis, MO: Mosby.
- 10 Kado, D.M., Lui, L., Esrund, K.E., Fink, H., A., Karlamangla, A., S., Cummings, S., R.,(2009). Hyperkyphosis predicts mortality independent of vertebral osteoporosis in older women. *Ann Intern Med*, 150,681-687.
- 11 Garstang, S., V., Stitik, T., P. (2006) Osteoarthritis: epidemiology, risk factors, and pathophysiology. *Am J Phys Med Rehabil*, 85(Suppl),S2-S11
- 12 Wiegand, R., Kettner, N., W., Brahee, D., Marqina, N. (2003). Cervical spine geometry correlated to cervical degenerative disease in a symptomatic group. *J Manipulative Physiol*, 26, 341-346
- 13 Mente, P.L., Stokes, A., F., Spence, H., Aronsson, D., D. (1997). Progression of vertebral wedging in an asymmetrically loaded rat tail model. *Spine*, 22,1292-1296.
- 14 Katsuura A, Hukuda S, Imanaka T, et al. (1996). Anterior cervical plate used in degenerative disease can maintain cervical lordosis. *J Spinal Disord*, 23:188-92
- 15 Kawakami M, Tamaki T, Yoshida M, et al. (1999). Axial symptoms and cervical alignments after cervical anterior spinal fusion for patients with cervical myelopathy. *J Spinal Disord*, 12:50-6
- 16 Baba H, Uchida K, Maezawa Y, et al. (1996). Lordotic alignment and posterior migration of the spinal cord following en bloc open-door laminoplasty for cervical myelopathy: a magnetic resonance imaging study. *J Neurol*, 243:626-32
- 17 Naderi S, Ozgen S, Pamir MN, et al. (1998). Cervical spondylotic myelopathy: surgical results and factors affecting prognosis. *Neurosurgery*, 43:43-9
- 18 Batzdorf U, Flannigan BD. (1991).Surgical decompressive procedures for cervical spondylotic myelopathy, A study using magnetic resonance imaging. *Spine*, 16:123-7
- 19 Noridian Administrative Services LLC. (2012) *Chiropractic Services Overview*. Noridianmedicare.com

- 20 Harrison D. (Ed.). (2009). *Practicing Chiropractors' Committee on Radiology Protocols (PCCRP) For Biomechanical Assessment of Spinal Subluxation In Chiropractic Clinical Practice Draft IV After Review*. Falls Church, VA: International Chiropractic Association
- 21 Wyatt, L., H. (1992). *Handbook of Clinical Chiropractic*. Gaithersburg, Maryland: Aspen Publishers Inc.
- 22 Rochester, R.P. (2009). Neck pain and disability outcomes following chiropractic upper cervical care: a retrospective case series. *J Can Chiropr Assoc*, 53, 173-185.
- 23 Eriksen, K., Owens, E.F. (1997). Upper cervical post x-ray reduction and its relationship to symptomatic improvement and spinal stability. *Chiropr Res J*, 10-16
- 24 French, S., D., Green, S., Forbes, A. (2000). Reliability of chiropractic methods commonly used to detect manipulable lesions in patients with chronic low-back pain. *J Manip Physiol Ther*, 23, 231-238
- 25 Hurwitz, E., L., Coulter, I. D., Adams, A., H., Genovese, B., J., & Shekelle, P., G. (1998). Use of chiropractic services from 1985 through 1991 in the United States and Canada. *American Journal of Public Health*. 88, 771-776.
- 26 McIntosh, G., Hall, H. (2011). Low back pain (acute). *Clin Evid* (Online). pii:1102
- 27 Snook, S.H., Webster, B.S., Mc Gorry, R.W., Fogleman, M.T., McCann, K.B., (1998) The reduction of chronic nonspecific low back pain through the control of early morning lumbar flexion. A randomized controlled trial. *Spine*, 2601-2607.
- 28 Snook, S.H., Webster, B.S., Mc Goray, R.W.,(2002). The reduction of chronic, nonspecific low back pain through the control of early morning lumbar flexion: 3-year follow-up. *J Occup Rehabil*, 12, 13-19.
- 29 Bussieres, A.E., Taylor, J A.M., Peterson, C. (2008). Diagnostic imaging practice guidelines for musculoskeletal complaints in adults--an evidence-based approach--part 3: spinal disorders. *J Manipulative Physiol Ther*. 31, 33-88.
- 30 Thiel, H.W., Bolton, J.E., Docherty, S., Portlock, J.C. (2007). Safety of chiropractic manipulation of the cervical spine: a prospective national survey. *Spine*, 32,2375-8.
- 31 Dvorak, J., Loustalot, D., Banumgartner, H., Antinnes, J.A. (1993) Frequency of complications of manipulation of the spine. A survey among members of the Swiss Medical Society of Manual Medicine. *Eur Spine J*,2,136-9
- 32 Troyanovich, S.J. (2010). *Structural Rehabilitation of the Spine & Posture: A Practical Approach*. Huntington Beach, CA: MPAmmedia.
- 33 Hogan, V.A., Hogan, N.A., Vos, P.M., Estace S.J., Kenny, P.J., (2010). The cervical spine of professional front-row rugby players: correlation between degenerative changes and symptoms. *Ir J Med Sci*, 179, 259-263.
- 34 O'Brien, C.P. (1996). Rugby neck: cervical degeneration in two front row rugby union players. *Clin J Sport Med*, 1,56-9
- 35 Padua, L., Padua, R., LoMonaco, M., Tonali, P.A. (1996) Radiculomedullary complications of cervical spinal manipulation. *Spinal Cord*,34,488-92.

- 36 Kraft, C.N., Conrad, R., Vahlensieck, M., Perlick, L., Schmitt, O., Deidrich, O. Non-cerebrovascular complications accompanying chiropractic manipulation of the cervical spine. *Z Orthop*, 138 (1), 8-11.
- 37 Koes, B.W., van Tulder, M., Lin, C.C., Macedo, L.G., McAuley, J., Maher, C. (2010) An updated overview of clinical guidelines for the management of non-specific low back pain in primary care. *Eur Spine J*, 19, 2075-2094.
- 38 Radiological Society of North America (2011). Radiation exposure in X-ray and CT examinations. *RadiologyInfo.org*, Patient Safety-X ray, 1-6.
- 39 Illes, T., Tunyogi-Csapo, M., Somoskóy, S. (2011). Breakthrough in three-dimensional scoliosis diagnosis: significance of horizontal plane view and vertebra vectors. *European Spine Journal*, 20, 135-143
- 40 Dubousset, J., Charpak, G., Skalli, W., Deguisse, J., Kalifa, G. (2010). EOS: a new imaging system with low dose radiation in standing position for spine and bone & joint disorders. *Journal of Musculoskeletal Research*, 13, 1-12.
- 41 Li, M, Cheng, J, Ying, M., Ng, B., Zheng, Y.P., Lam, T.P., Wong, W.Y., et al. (2012) Could clinical ultrasound improve the fitting of spinal orthosis for the patients with AIS? *Eur Spine J*, [Epub ahead of print].
- 42 Oakley, P.A., Harrison, D.D., Harrison, D.E., Haas, J.W. (2005). On "phantom risks" associated with diagnostic ionizing radiation: evidence in support of revising radiography standards and regulations in Chiropractic. *J Can Chiropr Assoc*, 49, 264-269.
- 43 Lawrence, D.J., Mootz, R.D. (1999). Editorial autonomy revisited. *J Manipulative Physiol Ther*, 22, 131-133.
- 44 Winterstein, J. (2007). Evidence-based medicine: best practices and practice guidelines. *J Manipulative Physiol Ther*, 30, 615-616
- 45 Maigne, J.Y., Goussard, J.C., Dumont, F., Marty, M., Berlinson, G. (2007). Is systematic radiography needed before spinal manipulation? Recommendation of the SOMMOO. *Annales de Readaption et de medecine physique*, 50, 111-116.
- 46 Palmer, D.D. (1910). *Text-Book of the Science, Art and Philosophy of Chiropractic for Students and Practitioners*. Portland, OR: Portland Printing House Company.
- 47 Palmer, B.J. (1949). *The Bigness of the Fellow Within*. Davenport, IA: Palmer Publishing
- 48 Cherkn, D.C., Deyo, R.A., Battie, M., Street, J., Barlow. (1998). A comparison of physical therapy, chiropractic manipulation, and provision of an educational booklet for the treatment of patients with low back pain. *N Engl J Med*, 339, 1021-1029.
- 49 Kipling R. (2001). *Collected Poems of Rudyard Kipling*, Ware, Hertfordshire, UK: Wordsworth Editions Limited.
- 50 Coleman R.R. (2000), *Coleman's Fables*, Othello, WA: Roger R. Coleman.
- 51 Palmer B.J. (1988), *As a Man Thinketh*, Davenport, IA: Delta Sigma Chi Fraternity