THE UPPER CERVICAL
MONOGRAPH

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Comments from the Editor

The Upper Cervical Monograph is undergoing a refocusing of direction and purpose that will become evident with the next Monograph. Beginning in 2007 the Monograph will serve as an important source of information that will lead to clarification of NUCCA practice, refinement of protocol, integration with the areas of health care practice that overlap and/ or intersect the traditional upper cervical approach, and possible redefinition of fundamental assumptions . There will be invited papers, research summaries, abstracts, reprinted papers, complete and original research papers, discussion of research efforts and directions, book reviews, case studies, and significant results from the field.

All other material deemed appropriate will be shared on the NUCCRA website; this material can include debate, useful practice survey instruments, technical suggestions on biomechanics and adjusting, neurology, symptomatology, etc. A listing of items submitted to the Monograph editor that are placed on the NUCCRA website will be listed in each Monograph.

Those wishing to submit research for publication must have a title and an abstract, a bibliography, and the main body should not exceed 3000 words. All non-invited papers will be reviewed by at least one reviewer and an editor. Both double-spaced paper copies and an electronic version must be sent for submission. All type should be 11 point times roman “with single spacing” (auto) with 1/2 inch left and right margins, header size 18 points. Every table, graph, figure or picture should be placed on a separate page.

This edition of the Monograph is being used to resolve the backlog of articles. Major articles are by Russell Friedman (NUCCA Board Certified and NUCCRA Board member), Marshall Dickholtz Sr. (NUCCA Board Certified and President of the NUCCRA Board), and R.G. Cockwill (President of AUCCO). R.Friedman’s paper proposes a “closed kinetic chain”. M.Dickholtz’s paper is a “rebuttal” to Dr. Friedman’s paper. Dr. Cockwill’s paper is a response to the last Monograph which was devoted to Drs. M.Thomas’ and J. Scholten’s article, “A Shift in the Prevailing Winds”.

Posture and problems of the “upper quarter condition” will be the areas of general focus and The Upper Cervical Monograph will be adept at taking advantage of the “shift in the prevailing winds”.

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Specific Biomechanics: Obtaining Consistent OPM Corrections Using 3-Dimensional Headpiece Placement to Develop A Repeatable Point Of Application For The Calculated Vector.

By Russell Friedman, D.C.

OVERVIEW

The National Upper Cervical Chiropractic Association (NUCCA) and other spinal specific practitioners calculate a height and rotational vector that is applied into the transverse process of the 1st cervical vertebrae to correct postural misalignments. The original procedure was based on principles of physics and algebraic expressions calculated by Gregory, Grostic, and Wernsig. Their research showed that a specific predetermined directional force could be applied to overcome spinal resistance. This calculated force was intended to correct the misaligned spine to anatomical zero where the skull, C1, and lower spine would demonstrate the least amount of stress on the body structure and nervous system. Results were subsequently verified on x-ray and on a postural measuring device called an Anatometer. The original model developed by Gregory, Grostic, and Wernsig contained two variables: 1) the calculated vector and 2) headpiece placement. The procedure worked well for Basic types of misalignments, but Out of Pattern Misalignments did not respond in the same way. This began a practice of making modifications to the calculated vector in an attempt to compensate for the shortfall. The current model applications have evolved into using the original vector calculations as a guideline rather than an absolute. As misalignments have become more non-congruent (misaligned in opposing directions) and non-linear (twisted in opposite directions), deviations from the original vector calculations have increased proportionally. As a result vector calculation has become more art than science and patient outcomes are neither repeatable nor reproducible.

In this paper it is suggested there is no need to modify the original algebraic vector calculations. They are in fact valid for all types of misalignment. Instead, the protocol for Headpiece placement needs to take into account three dimensional planes instead of a single dimension as is currently applied. The predominant factor in headpiece placement is to identify the three-dimensional point of entry for the calculated vector. Empirical data on three planes, obtained from the Anatometer, can be used to direct the calculated vector into a specific point on C2 and the skull to overcome all resistance factors. Understanding the biomechanical role of the skull as a counterbalance to the pelvis instead of it acting as a first or second class lever, enables effective use of the skull to set or re-direct the vector to a specific point of application. This model enables correction for both OPM and BT without calculated vector modification. The protocol provides repeatable and reproducible patient outcomes.

INTRODUCTION

The current protocol, P1, has NUCCA changing the correction vector and setting the skull on the headpiece based on its center of gravity (COG) and on the direction the skull must move towards vertical. P1 works well on the Basic Types [BT] when all factors of the misalignment (i.e. skull, atlas, angular rotation and weight differential) are integrated as a continual kinetic chain, with the Atlas Subluxation Complex (ASC) components approaching zero through one motion down a single reduction pathway. However, results using P1, with vector modification, for Out of Pattern Misalignments (OPM) are less favorable. While modifications to change the correction vector have success in increasing leverage, post correction outcome has been the consistent inability to correct all three planes proportionally as evidenced by the increase in doctors not posting the vertex. This is due to the fact that Skull /Headpiece placement accounts for but one of three dimensions. This results in a patient with a good correction (all components correcting towards zero) but leaning into the right or left frontal plane predecessors. These results point to the fact that the calculated vector is not applied into the correct point of the reduction pathway. The new protocol [P2] would not change the current frontal NUCCA placement method for those patients who are Basic Types. It would however, handle the more complex misalignments found in OPM by a protocol using the Anatometer to determine headpiece placement three dimensionally. The calculated correction vector would work on its own without modification. Headpiece placement and point of application of the calculated vector would be determined from objective Anatometer data and the lateral film.

Part I

ANATOMETER DATA PROVIDES A MULTIDIMENSIONAL PICTURE

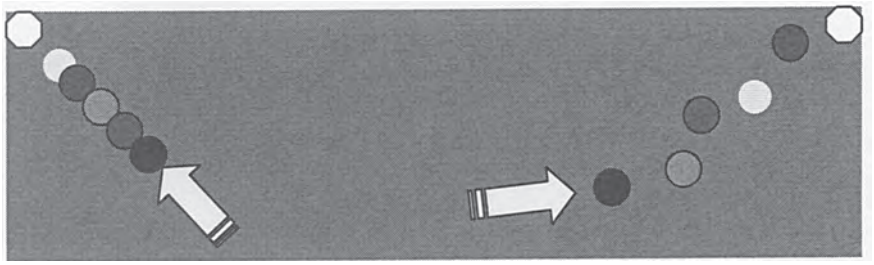
The Anatometer reads postural data from the skull to the pelvis so that the practitioner can know the application point of the calculated vector. The Anatometer is accurate in its measurements to evaluate the three-dimensional data of the body. It not only outputs empirical data about the body imbalance but it also supplies the information necessary regarding where to direct the calculated vector in headpiece placement.

The three evaluation points on the Anatometer are:

1. The frontal plane 2. The transverse linear plane 3. The sagittal plane

Postural deviations from these planes determine the linear and torsion components of the force needed to bring the patient to zero. This then determines the specific application point of the calculated vector. [In order to obtain objective measurement data, I have modified my Anatometer with digital weight scales for weight imbalance, a digital protractor for the vertical axis, and with **two lasers to read right/left pelvic differences** *(difference in distance, Ed.)* **in the sagital plane.**] After checking these evaluation points, the practitioner then pre-sets the skull to overcome the specific resistance. The removal of this resistance allows the body to return to anatomical zero and vertical. This may be through one pathway or, as the Anatometer shows, through two or more reduction pathways.

Imagine this procedure as if we were playing pool (billiards). Five balls are lined up in front of a pocket. Given enough kinetic energy on the white ball, all the balls will fall into one pocket. This is similar to a Basic Type. If we go back to our billiard analogy, what if those same five balls were scattered throughout the table as in an OPM? Although realignment is difficult, it is possible using P2. As in playing pool, a single vector can be calculated to establish a single shot that will sink all the balls or vertebrae into one single pocket! This is exactly what the Anatometer can do; it evaluates all planes of the body from the skull to the pelvis, then it visualizes the structure three dimensionally. The 3-D model developed by the Anatometer enables execution of a single vector to overcome all the resistances in the spine.



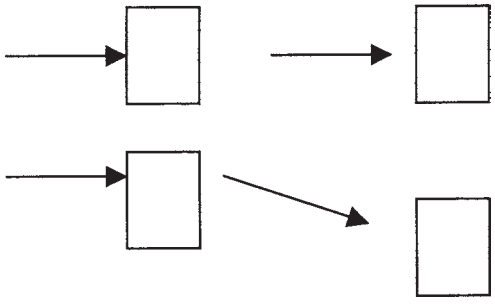
Using the Anatometer information in this manner ensures that the force will be applied into the correct point of the reduction pathway. With these three Anatometer readings, the NUCCA doctor can easily correlate the x-ray views and the calculated vector for the single reduction pathway model in a highly precise and predictable way. P2 creates a more uniform, repeatable, and reproducible correction for ALL misalignments. It offers an explanation as to why the structures move the way they do, when they do, and what their correction vector is in three dimensional components.

Repeatable point of application

Every Doctor has had a patient come in and 1-2-3, are easily corrected. On their next correction, however, it's like pulling teeth. Or a patient holds the correction for a long time, then something goes wrong and they will not even lock in. The usual action is to take pictures because we think the patient did something to somehow get out of pattern. The real problem here is that the headpiece placement is not specific enough to allow the correction vector to BE REPEATABLE through the same point of application as before. Using the Anatometer helps visualize the body as a total unit and not just as an ASC. It allows the NUCCA doctor to look at and measure postural information from the skull to the pelvis showing the path to visualize the misalignment in multidimensional reality.

In short, the Anatometer measurements tell us where to set the head in directing the force down through a possible 360 different increment points of application of the axial or condylar sphere. In P2, the skull acts three dimensionally on a preset surface to direct the calculated correction vector through a specific surface of the axial sphere to overcome resistance that has manifested itself as empirical data on the Anatometer.

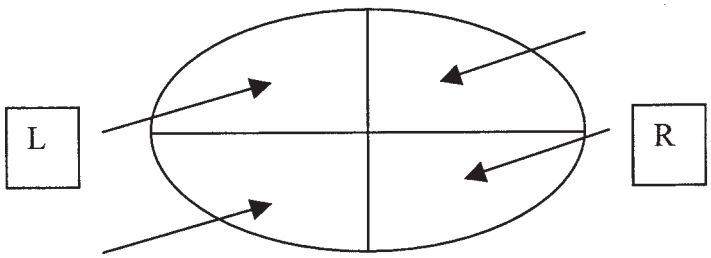
By using the Anatometer, the vector is able to be preset against a specific point to create an exact action down or up a point of application. This concept should be very familiar because we use it all the time in everyday situations. For example, if we were to push a book on a table and we want to move it to a specific place, the first thing is to establish the correct vector and secondly the POINT OF APPLICATION. We would have to contact the object at the CORRECT POINT in order to have the DESIRED action occur. **THE VECTOR ITSELF COULD AND WOULD NOT CREATE THE DESIRED RESULT ALONE. For the correct vector applied at the incorrect point of application will RESULT in the INCORRECT POSITION.**



Same Vector with a different point of application results in a different & INCORRECT final position.

(both translated and rotated, Ed.)

Spinal mechanics obey these same laws. The skull, because of its shape around the condyles, can be used to direct the force from the triceps pull down through the spine to move it from point “a” to point “b”.



Here the same calculated vector is being set into different quadrants of the axial circle. Each vector although the same direction or mirror image will have a significantly different action down through a reduction pathway

Part II

BIOMECHANICAL PRINCIPLES OF THE SKULL

Key terms:

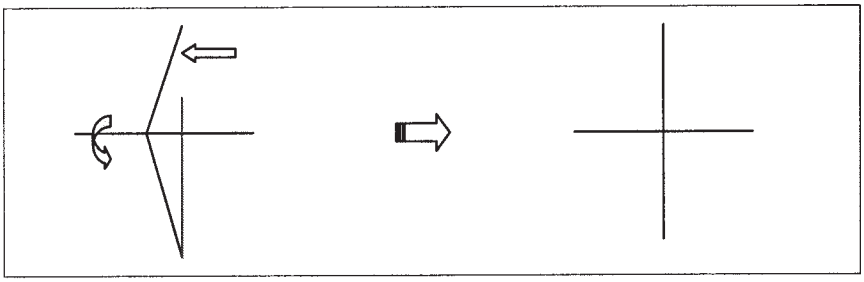
1. closed kinetic chain
2. primary resistance vs. compensating resistance
3. skull weight vs. triceps pull force
4. counterbalance

To correct the OPM and the BT without vector modification, a mechanical model that uses the skull to set or re-direct the direction of the vector to a specific point of application is necessary. This is instead of the skull acting as a first or second class lever. This P2 will explain the reason why the BT does correct and why the OPM does not correct as well.

First, we need to visualize the skull and spine down through the pelvis (A CLOSED KINETIC CHAIN), in terms of a three dimensional structure that misaligns and responds three dimensionally to maintain balance. Secondly, we need to evaluate the restrictive nature of each area (potential resistance) of the spine and its potential to affect other areas based on its mass and articulational ability to compensate. This is similar to the BJ Palmer theory of primaries.

If we look at Basic Types 1 and 2, the factors of the misalignment are always in sequence and demonstrate a single reduction pathway that is easily visible. One pathway will move all the misaligned structures as a unit towards vertical. For instance, in a Basic Type 2 with right laterality:

1. the skull turns into the right frontal plane
2. angular rotation turns into the left frontal plane with a left C2 spinous
3. weight bearing on the Anatometer will be left
4. there will be a left short leg
5. the vertical axis would be in the left frontal plane



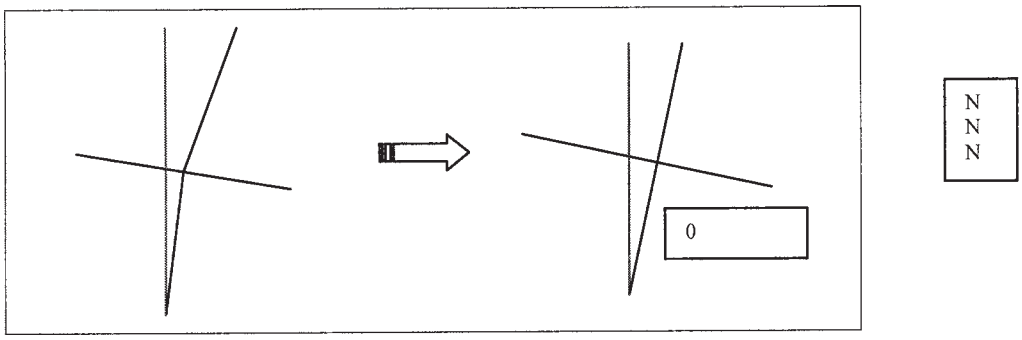
Traditional NUCCA headpiece placement for this misalignment would facilitate the skull tipping downward and would direct the skull towards the vertical axis. Is this the biomechanical mechanism that is at work here? And is this the primary resistant factor and goal (to turn the skull) that solely dictates headpiece placement? Or, is there another explanation for the biomechanics that are in play here? Namely, is the skull mass actually redirecting the vector on the left C2 surface?

It is conceivable that the much larger mass of the skull can redirect a 1-3 lb. (against spinal resistance-not a transducer that indicates maximum available force) adjustive force onto the left C0/C1/C2 articulations and down through the spine. This allows angular rotation to move left to right, the vertical axis and weight bearing to move towards the right frontal plane and the left low hip to approach vertical. This misalignment will have all structures moving in the same clockwise motion. Simply, following the billiards analogy, with just one shot, all the balls fall into the pocket, or we would say here all the vertebrae fall into alignment. But is the skull the primary factor that needs to turn? Or alternatively, is the true reduction pathway actually on the left side with the weight of the skull being used to re-direct the force so the resistance is overcome and so the misalignment below can correct?

In this situation, like all Basic Types, both are true but for OPM both are not. In an OPM they actually contradict each other. For example, if this Basic Type 2 case was out of pattern, we would get the following results:

1. the angular rotation and the fixed point would turn into the right frontal plane
2. the right leg would be short
3. the right side would register heavy on the digital scales on the Anatometer

Most Doctors would have a post with the vertical axis into the right frontal plane and weight bearing on the right leg. The ASC, however, can adjust proportionally to perpendicular angles to each other to verify the correctly calculated vector.

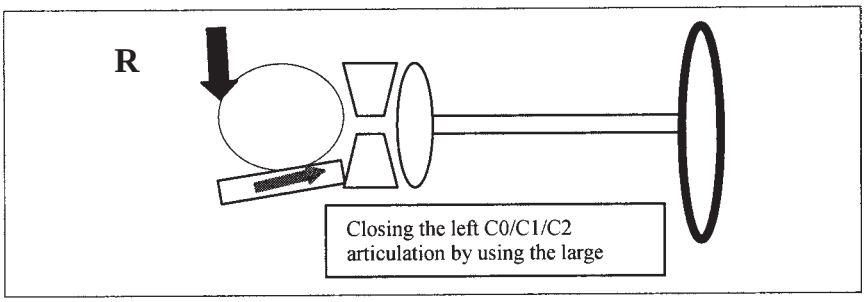


As long as the spine leans off center, the direction or point of application of the calculated vector is incorrect. There is no doubt that the calculated vector can be manipulated on a per case basis to allow more leveraging affect on the structures, but a more optimal scenario would be to create a P2 that is more encompassing and eliminates the need to modify the equation in order to get away from the "do this in this case" but "do not do this in that case" process that makes the outcomes so variable.

It is clear that the difficulty with OPM consists of structures moving in opposing or out- of-sequence patterns analogous to the pool balls scattered across the table... the more scattered, the harder it gets. In an OPM, sections or components of the spine are generally non-coplanar. This makes it difficult not only to find a single reduction vector but also to realize where the primary resistance originates, as well as, where to direct the force to correct the body misalignments.

Ultimately, if the single reduction pathway can be found using the calculated true vector for optimal leverage, and if we use the head piece to direct the force, NUCCA can have a biomechanical model for a larger majority of its cases. It would make sense due to the body's continual kinetic chain that there should be a single reduction pathway. This is the very reason why we calculate a vector. If properly directed, the calculated vector can return all components to vertical and facilitate a more balanced result.

The explanation as to why the previous Basic Type II and its counterpart OPM Type II respond differently is clear. The large and heavier mass of the skull (when preset or loaded against a designated surface of the C1/C2 surfaces) will direct the calculated vector into and down a distinct pathway. **The mass of the skull and its cradle design (like an egg in an egg cup) against C1 can be set to direct or re-direct the calculated vector to a specific point of application. It can be set in any of the three planes at a specific point to close or enhance the contact a surface. This will allow the force to travel down through a specific pre-determined kinetic chain of the spine.**



THE PRE-DOMINANT FACTOR in headpiece placement is to identify the three-dimensional point of entry, set the skull into that point of application, and allow the calculated vector to optimize work (W). Can the skull direct the force?

Yes, the average adult skull weighs significantly more than 1-3lbs. So, it is fair to say that even a heavy adjuster (more than 1-3lbs.) will not overcome that gravitational weight placed on the converging surfaces of C0/C1 from the pre-load of the skull unless the Doctor leans on it. The skull, with its heavier mass when pre-set on the surfaces of the spine and opposing condyle, must then direct or redirect the vector into its calculated entry point optimizing the calculated vector relationship. This will be a function of the three planes of motion on the two spheres of C/A. The 1-3 lb. adjuster cannot

overcome the much heavier gravitational skull weight placed against the spine but will direct the adjustive force to enter as a particle on a specific point down the pre-set closed kinetic chain. Presently, this is thought to be a function of C/A. Although C/A, like any particle in vector form, has a direction but its purpose is a function of leverage not direction. It is a leverage factor at some finite point through the spine that optimizes motion and reduces friction of two finite surfaces. It sets a point of proportional and optimal leverage in terms of a height component.

Primary Resistance

If we examine the C0/C1/C2 articulations, we will see that the skull is no more than a compensating factor of postural balance because the skull has no real locking ability. Primary resistance and locking must occur below C2. *(Bogduk and Mercer discuss the significance of C2-3 in controlling the lower cervicals. When a pillar view is obtained by beaming x-rays upwards and forwards essentially along the phase of the zygapophysial joints C2-3 looks like a "root." "Unlike the* typical *zygapophysial joints whose planes are transverse, the superior articular processes of C3 face not only upwards and backwards but also medically by about 40º. During axial rotation of the neck the direction of coupling with lateral flexion at C2-3 is opposite to that seen at lower segments. Instead of bending towards the same side as rotation, C2 rotates away from that side, on the average," [Clinical Biomechanics 15 (2000) 633-648] Ed.)* NUCCA has always regarded angular rotation as a primary factor of the ASC and its need to be corrected to vertical is IMPERATIVE. The potential for articular locking and increased resistant factors are most likely occurring below the C2 body. C3 through the pelvis have a minimum of five locking joints per vertebra each with a low coefficient of friction (approximately .001u). In series, this can increase the potential for resistance by as much as 400%. It would appear that there is a significantly higher likelihood of locking or resistant factors due to the increased articulations from C3 downward, while the skull through C2 has minimal locking possibilities except for the converging angles of the condyles as they sit on the C1 vertebrae and the gravity's effect on these structures.

At this point, the PRIMARY RESISTANCE is more likely a function of the low hip (weight) and its movement, either anterior or posterior. The intrinsic design of the pelvis allows for rocking in the sagital planes. The lumbars are also of larger mass than the cervical spine and skull, but the same concept applies to them. As the lumbars and pelvis fixate, the large mechanoreceptors in the SI joint will cause a turn through the ankles of the lower extremity causing a counter-balance effect in the C1-C2 mechanoreceptors to respond accordingly. The skull through T12 will react in a linear or twisting counterbalance affect. This will show up as a torsional (Sagittal) or a linear (frontal) misalignment. Most ilia will counter rotate to the low pelvic side to create balance but the twisting may be throughout the whole spine to C2 – C7 where compensation can be accomplished more easily due the articular orientation. The pelvis and lumbars, due to their large mass, can easily affect the rest of the spine towards a balanced system. The facet orientation of the cervical and the multi-directional design of the C0-C2 as previously discussed make it a perfect mechanism for the body to re-establish postural balance. **The skull/C1/C2 due to its decreased locking ability may then act as a counter-balance mechanism. This would indicate that THE SKULL'S placement on the headpiece SHOULD NOT be dictated by the direction of the skull towards vertical but by the plane of movement of the pelvis and angular rotation underneath it.**

With this model in mind, if we found the proper skull placement to optimize the results down a single reduction path-way, our results in OPM misalignments could be standardized and improved. The difficulty lies with when the skull, atlas, angular rotation, leg or pelvic deficiency, and weight bearing are moving into different circular motions (the OPM) created by multiple misalignments.

Now, with the increase in OPM's, the standard approach must be reconfigured. It is apparent that the present headpiece placement has worked intermittently only because the vector was directed down the correct circular pathway and NOT because the skull was loaded towards vertical. This unlocks the angular rotation and pelvis, ultimately causing the skull to compensate for the difference. The result, as I believe Gregory conceptualized, is that the skull will inherently balance when C3 through the pelvis are corrected. Postural counter-balance, in turn, will no longer be an issue.

Part III

PLANES OF MOTION

Key terms:

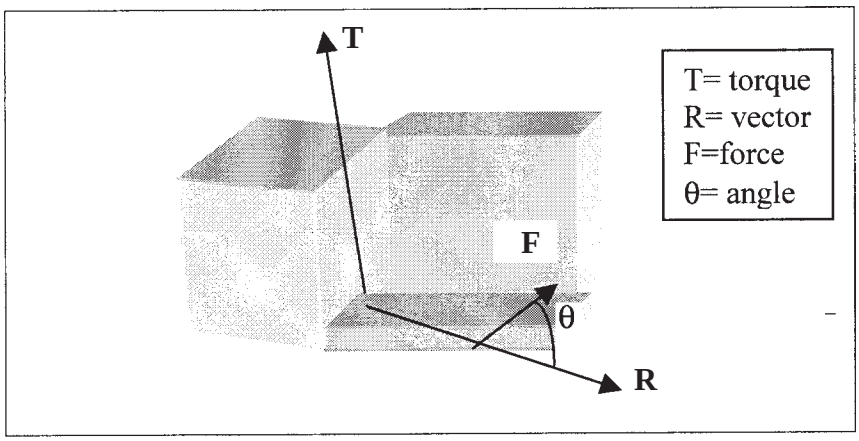
1. Planes of motion: Frontal/Transverse
2. Leverage
3. The Sagittal plane divided: transverse linear plane vs. the Sagittal torsional

***Optimizing Leverage:* The Calculated Vector**

Gregory and Grostic and others developed a system of biomechanical conversion factors that direct a force into the bodies of each vertebra with the appropriate torque and rotational inertia to overcome resistance at different speeds to move structures equal distances. This CALCULATED VECTOR OPTIMIZES LEVERAGE creating the **CORRECT SLOPE** through the reduction pathway.

Everyday experience, such as pushing a revolving door, confirms the fact that to obtain a greater rotational effect with a given force we apply a force at a point farther from the axis of rotation. Rotational acceleration [torque] can be changed either by changing the magnitude of the force applied, or by changing the point of application. The moment of force or torque (T) about an origin is defined as:

T = RxF or as vector quantity T = *FR sin 0*



Where R represents the displacement vector, F represents the force on a single particle, and *0* represents the angle between them.

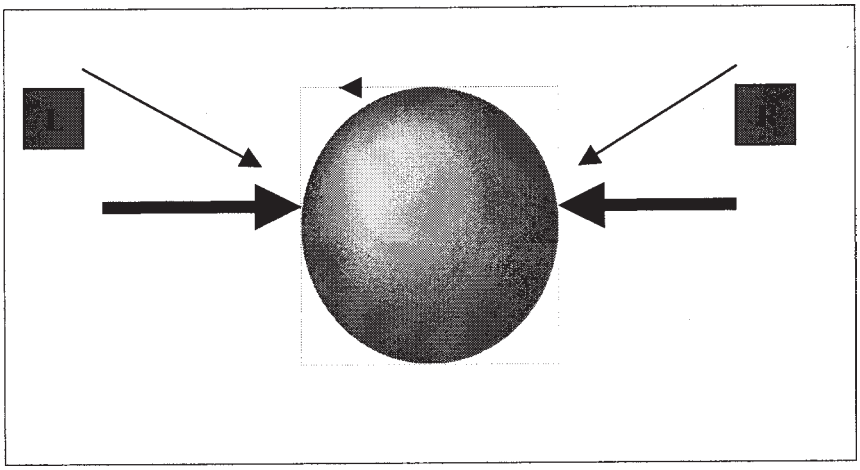
This equation means the torque produced by a force depends not only on the magnitude and the direction of the force but also on the point of application. The lever arm [Rsinq] is the distance from the center to the point of application of the force. A longer lever arm increases the torque or leverage effect, which translates into less force necessary to overcome resistance based on the slope of the C/A surfaces respectively.

If we were to reverse the above force, then the torque or direction of torque will reverse by 180 degrees. Similarly, if we "reverse" R, then the angle will change by 180 degrees thereby changing the direction of T.

By using the skull weight R to create a 180 degree angle, the gravity of the skull and also the incremental buildup of force required in a triceps pull facilitated will determine the direction of the force as well as the torque or moment of force. Furthermore, by keeping the leverage constant (point of application) at its calculated height value, corrections can be more complete and easier to accomplish.

From this model, when the conversion factors are calculated and the height and rotation are unchanged the leverage is OPTIMIZED on the three dimensional surfaces of the ASC and down through the spine and pelvis. The direction of force through a pathway can be guided in any direction based on the headpiece placement. The ability to use the correct optimal mechanical advantage through the kinetic chain results in reduction of the resistant factors more completely and easily.

The figure below depicts a vector and its 180˚ vector from right to left, each having the same leverage effects on the sphere.



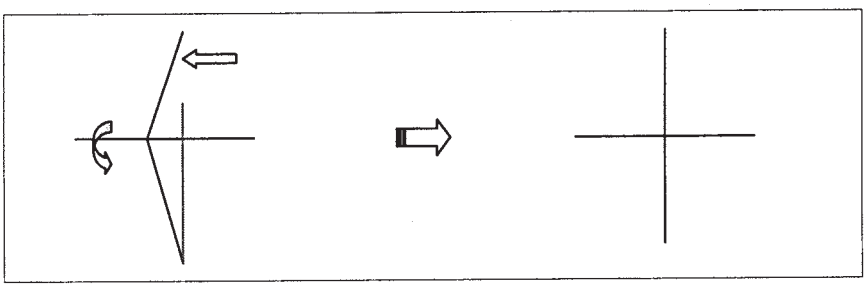
The Frontal Plane

The frontal plane or side shift component of the misalignment can be visualized by the bilateral weight scales on the Anatometer. This usually correlates to the low hip and short leg. Regardless, it is the WEIGHTED SIDE not the leg that is the indicator. The short leg is not the primary determining factor of the misalignment. When this contradiction occurs between the weight scale and the short leg, it is an indicator of one or more misalignments (see discussion on COPM) because the pelvis can turn in the sagital plane and overcome the frontal plane component of the pelvic deficiency.

The primary resistance as previously discussed is the PELVIS and will be indicated by the heavy weight on the BILATERAL WEIGHT SCALES. The Anatometer will analyze what frontal plane the mass of the body is in from this reading. The point of application will tilt the skull to close the C0/C1/C2 articulations to direct the calculated vector to move the weight towards vertical or, in other words, towards THE OPPOSITE DIRECTION OF THE HEAVY WEIGHT SCALES.

RECONSIDER the 1st Basic Type 2 from page 5:

1. The skull turns into the right frontal plane
2. angular rotation turns into the left frontal plane with a left C2 spinous
3. the weight bearing on the Anatometer is left
4. the left leg is short
5. the vertical axis is in the left frontal plane

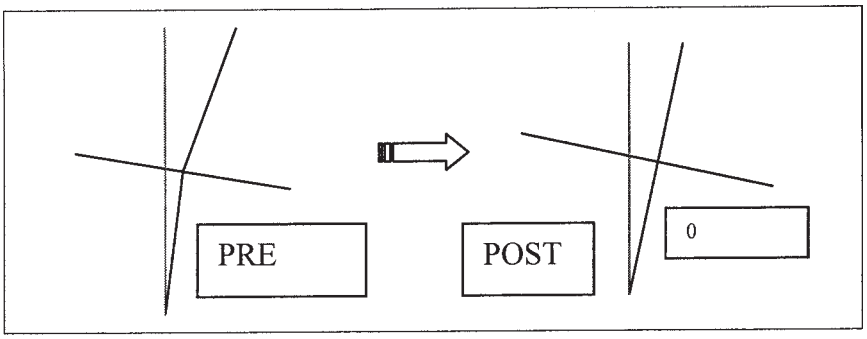


The tipping of the skull cephalically will close the left C0/C1/C2 articulations and it will direct the calculated vector down the left C2 surface and bring the whole spine towards vertical.

THE REASON WHY THE SPINE APPROACHED THE VERTICAL AXIS was not because the skull was allowed to turn towards vertical. If this was true, the following misalignment would correct with BASIC headpiece protocol without ADDING HEIGHT to the calculated vector to **INCREASE LEVERAGE AGAINST THE RIGHT C0/C1/C2 SURFACE.**

Reconsider this 2nd Basic Type 2 from page 6 that WAS out of pattern:

1. the skull turns into the right frontal plane
2. the angular rotation turns into the left frontal plane with a left C2 spinous
3. the weight bearing on the Anatometer is right
4. the right leg is short
5. the vertical axis is in the left frontal plane

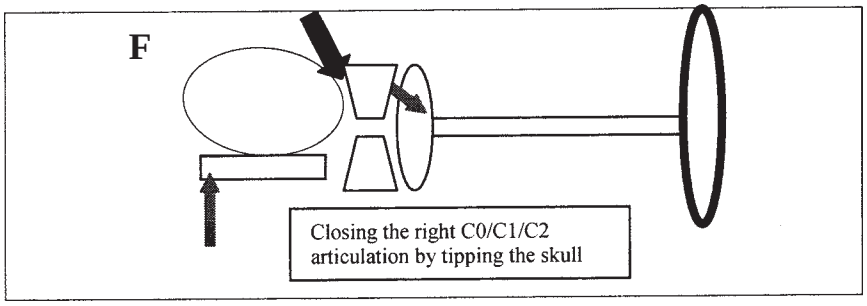


The correct headpiece position will direct the force into the right C0/C1/C2 surface to direct the force right to left.

And if there is:

1. minimal resistance at the CO-C2 articulations except for gravity
2. increased locking of the articulations from C3 to the Pelvis
3. a counterbalance created by the skull to C2 articulations

A right-to-left directional vector to overcome resistance in the right frontal plane is EVALUATED FROM THE ANATOMTER TO CORRECT the misalignment and direct the pelvis and weight bearing right to left. By tilting the skull cephalically (closing the C0/C1/C2 right surface), the vector will be directed into the right frontal plane or on the right C2 surface, being the angle created by the height and rotation with the torque or moment of force leveraging being right to left. The short leg is not a determining factor here because the pelvis can turn in the sagital plane and overcome the frontal plane component of the pelvic deficiency. The placement is as follows:

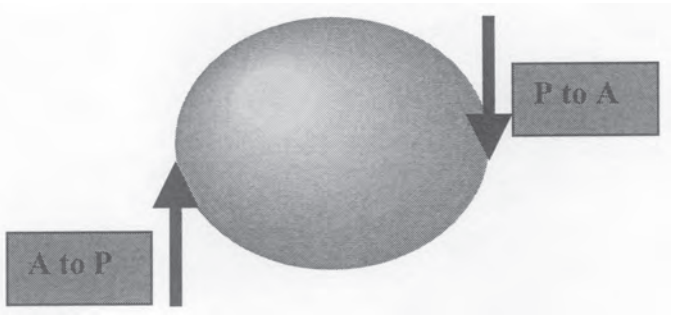


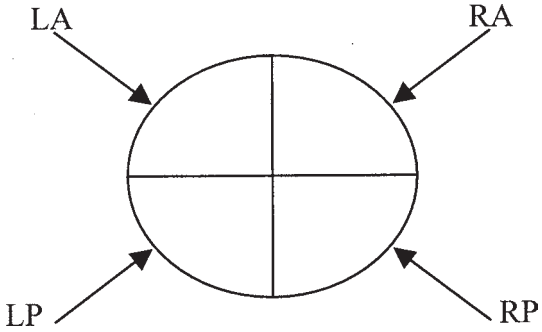
The next component to evaluate is the anterior–posterior (A to P or P to A) plane of motion. Both the transverse and the sagital components can direct the force to have an A to P or P to A action on resistance and, subsequently, on the body structure. For convenience sake, the transverse plane from now on will be referred to as the TRANSVERSE LINEAR because it is corrected through a linear component of the triceps pull and the Sagital plane will be referred to as the SAGITAL TORSIONAL PLANE.

Two Dimensional Considerations: The Transverse Linear plane

The next process in headpiece placement is the transverse linear component. This is the component that will overcome resistance in the spine anterior to posterior (A-P) or posterior to anterior (P-A).

If we refer to the quadrant diagram below, we will notice that the skull can be placed not only on the right or left (skull/C2 surfaces) to direct the frontal component but also more specifically in the anterior or posterior quadrants. This will direct the calculated vector into the appropriate reduction pathway to correct the ROTATED PELVIS and up through the lower angle.





Closing a surface in the transverse linear plane is accomplished by either sliding the headpiece forward or backward or by moving the shoulder forward or backward. It seems that a great starting point is to set the skull in its NEUTRAL LATERAL FILM POSITION, then move the shoulder. **Moving the shoulder forward closes the posterior quadrant while moving the shoulder backwards closes the anterior quadrant.**

Basic Type misalignments usually have a pelvis rotation that matches the C1 rotation which will direct the vector appropriately for the transverse linear plane and makes for an easier correction (all resistance being broken through one pathway).

The Anatometer pelvic lasers define the direction of the quadrant closed on the SIDE OF THE HEAVY SCALES as previously discussed.

A posterior pelvis will dictate a tilting back of the head or moving the “up” shoulder forward to close the posterior surface.

An anterior pelvis will dictate a tilting of the head forward or moving the “up” shoulder backward to close the anterior surface.

So, the only consideration will be the frontal component to direct the vector into the resistant pathway of the heavy scales. The counter rotated pelvic-atlas misalignment defines this concept.

It is from this biomechanics model that a counter-rotated pelvis to atlas rotation can be corrected. For example, a POSTERIOR C1 can be re-directed to overcome the resistance from an ipsilateral ANTERIOR PELVIS. This is of significant biomechanical importance. If the pelvis and lumbars are the locking mechanism and C1 is the body’s counter-reaction, the force must be directed towards the PRIMARY RESISTANCE. This may explain the difficulty at times in overcoming rotations because the vector is not being directed into the primary resistance which leaves the C1 counter balance mechanism intact.

Example

Consider a Basic Type 1 with a right laterality where:

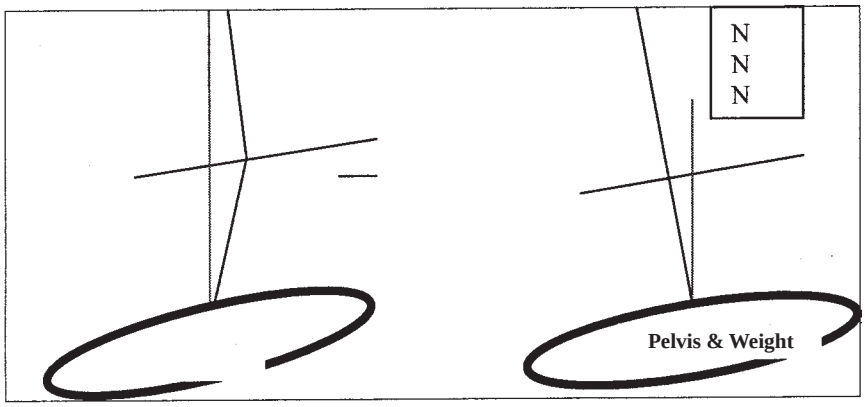
1. the skull is in the left frontal plane
2. the left leg is short
3. the left ilium is low and posterior on the Anatometer
4. the digital scales read heavy on the left
5. the vertical axis is on the left
6. angular rotation is in the right frontal plane
7. C1 is posterior on the right

If we were to examine each section of the misalignment, it is a Basic Type I where the skull & vertical axis need to turn left to right, angular rotation needs to move right to left. Two problems exist:

1. The Anatometer reads heavy left yet the line of drive is right to left.
2. The atlas is posterior on the right and the pelvis is posterior on the left.

Structures are in opposing transverse and frontal planes. If we visualize this one dimensionally (frontal plane), setting the skull on the right or left does not bring all structures to anatomical (3-D) vertical.

Following present NUCCA protocol (P1), the structures would move further into the left frontal plane due to the fact that the protocol for a Type 1 (skull tilting away from laterality) is to turn or stabilize the skull towards the right frontal plane. This will close the right C0/C1/C2 articulations and direct the force right to left. This is why the patient is posted into the left frontal plane. To counter act the skull placement, most NUCCA Doctors would lower the height by varying degrees.



For this example, the DIRECTION of the force needs to be directed into the left posterior C0/C1/C2 surface TO TURN THE WEGHTED PELVIS left to right and posterior to anterior. The reduction pathway will no longer be linear, but be curvilinear. The skull, C1, C2, spine, and pelvis will be misaligned in two opposing planes.

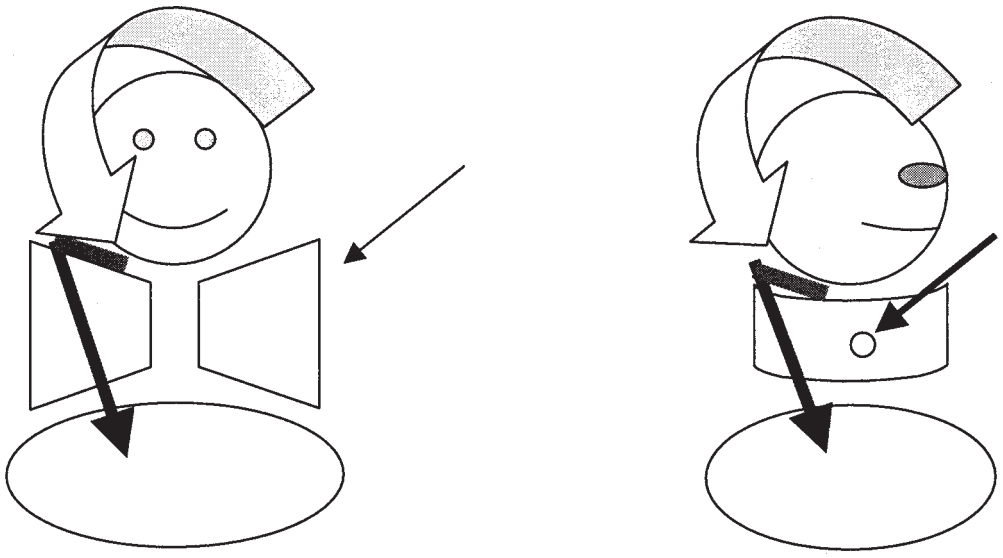
Further and Future thoughts- Multiple misalignments

I have found that there are spines that have broken down and misaligned in multiple misalignments. This misalignment is a misalignment on a misalignment which will be discussed later (see COPM). The concept of being able to direct the vector and using the Anatometer allows a process to correct these multiple misalignment patterns.

P2 Procedure

In the previous example, the pelvis not only needs to move left to right, but it needs to move P to A. By setting the skull on a mastoid support, the vector will be directed into the left C0/C1/C2 articulations (FRONTAL PLANE). And, by sliding the headpiece forward (MOST LIKELY NEUTRAL LATERAL) as well as moving the right shoulder forward, the CO/C1/C2 posterior QUADRANT will close. This will RE-direct the HIGH ANTERIOR VECTOR -LEFT to RIGHT and POSTERIOR to ANTERIOR. Along with the calculated vector for appropriate leverage, the vector is re-routed to COR-RECT this misalignment.

LEFT **RIGHT** **POSTERIOR** **ANTERIOR**



FRONTAL VIEW **SIDE VIEW**

Cross Section C0/C1/C2

This can be broken down into two planes of motion:

Linear or Frontal Component:

The left low hip/ short leg/weight differential will move left-to-right

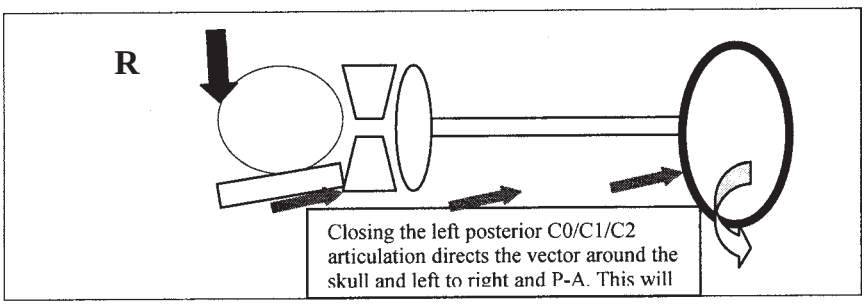
The vertical axis will shift towards the right frontal plane because of the left-to-right linear directional force from the skull tipping into the left C2 sphere. The resistance on the left will be corrected and cause the pelvis to move left-to-right.

The digital scale weight will approach balance or move left-to-right

Transverse Linear:

The skull/ headpiece will be translated forward to close the C0/C1/C2 posterior articulations to direct the force into:

1. The left posterior pelvis and overcome the P-A resistance.
2. The right posterior rotation will be re-routed as a P-to-A vector on the left.



Part IV

<u>Torque:</u> Redefined

Key terms:

1. The sagittal torsional component
2. The 45 degree
3. The saucer shape of C2
4. The four quadrants of C2

The Sagittal Torsional Component:

The SAGITAL TORSIONAL component is complicated because there are three stages of understanding that must occur to be able to recognize when this is an appropriate component to use in the correction. They are:

1. Redefining the DEFINITION of torque in a three dimensional model
2. Noting that the DIFFERENT ACTIONS that torque produces as height and rotation vary above and below the 45 degree vector (i.e. H1A1,H2P2,L1P1)
3. When the APPLICATION of torque in a misalignment vs. the transverse linear component is warranted.

The SAGITTAL TORSIONAL component is a coupled motion. The reason it has a dual effect is because of the saucer shape of the base of support (C2).

What this means is that it has two actions on the resistance of the misalignment: It can

1. It can overcome resistance in the sagital plane (A to P or P to A).
2. And /or overcome resistance in the frontal plane (R to L or L to R).

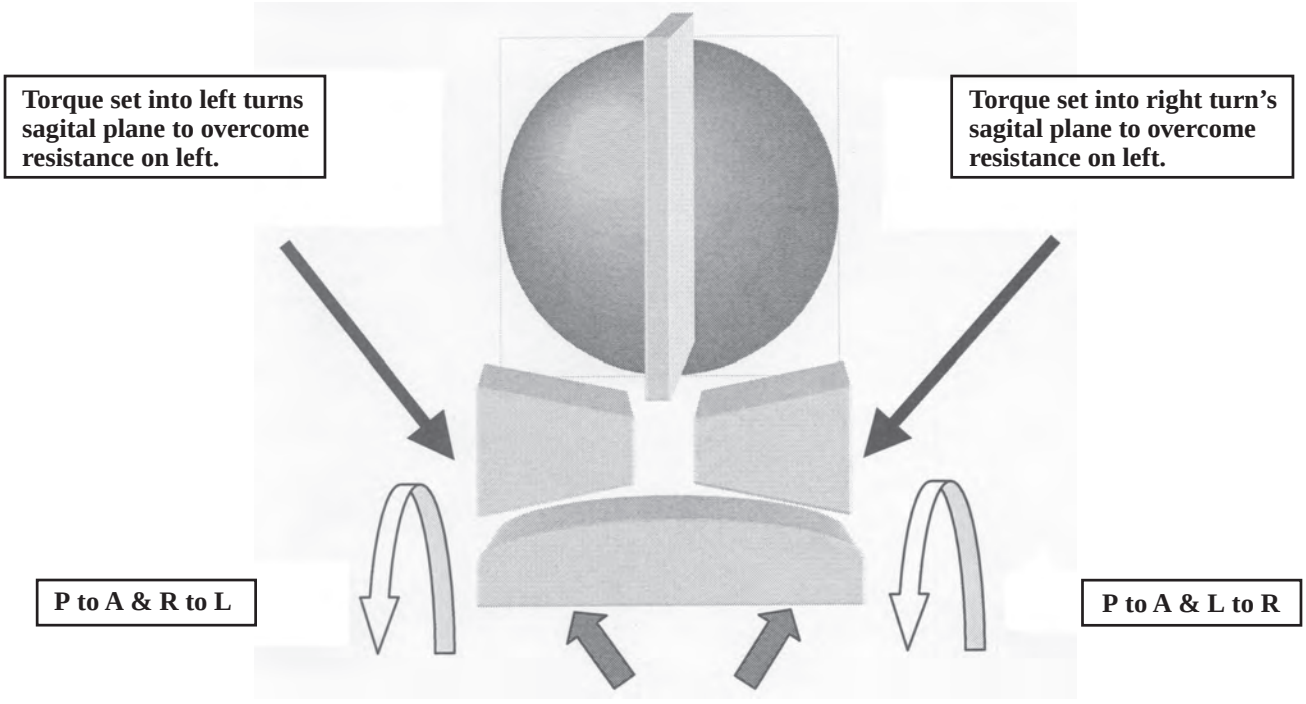
Re-defining Torque

As mentioned above, torque acts on two levels. It is a coupled motion of the frontal and sagittal planes.

Torque is a circular component and can be defined as a particle in a rotating body. It has a particular angular speed about an axis of rotation. The atlas is basically pinned between two upper spheres (condoles) and a lower sphere C2. The skull has its respective right and left spheres each with its own axis of rotation around the atlas. Furthermore, the atlas will turn in a circular coupled motion around its own axis of rotation called--the odontoid. Although they can move in opposite circular pathways, they are dependant on each other due to their being a part of one closed kinetic chain. In a rigid body such as the skull, spine, and pelvis, the direction of forward/backward spin or rotational inertia acting on the spin in counterclockwise or clockwise direction is dependant on the side of the C2 surface on which it is applied. Simply, because the surface of C2 is elliptical or rounded, the placement of the force at will have different points of C2 will affect the structures above and below in very different ways.

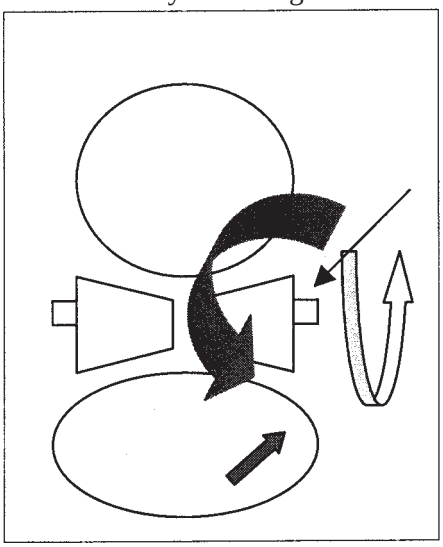
Torque in the correction creates a coupled motion in the sagital and frontal planes.

To visualize this further in terms of spinal mechanics: A sphere (C2 or the occipital condyles) can be divided into four quadrants (right, left, anterior, and posterior) to further explain the direction of a force. Each quadrant has infinitesimal vector projections as a function of direction and an exact 180 degree mirror image of directional complement – right & left and anterior & posterior. This 180 degree vector will allow a directional change of the torque without altering the leverage necessary for a proportional three dimensional correction. This concept of setting the skull against the appropriate C2 and C0 surfaces is the key to correcting the linear (frontal/transverse) as well as correcting the torsional (sagital) component of the misalignment.



For example (below), inferior torque on the right C2 surface will turn the zygopophyseal joints so the resistance of angular rotation and the skull can be overcome to move the structures:

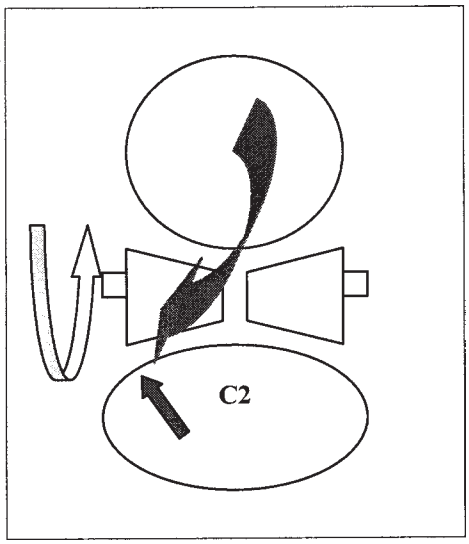
Posterior to anterior
Translationally left-to-right.



Right laterality with the skull placed at the center of gravity and the right C0/C1/C2 articulations closed to allow the force to act on the right.

If the same force (below) on the right, however, was directed in a () of 180 degrees into the left side by turning the skull downward and changing the direction of moment of force: Angular rotation would turn on the left with the same inferior torque that can overcome resistance and allow the angular rotation to move:

Posterior to anterior
Translationally right-to-left



The same right laterality with the skull placed below the center of gravity which closes the left C0/C1/C2 articulations closed to allow the force to act on the left.

The rotational inertia remains the same for each of the above from posterior to anterior but the TRANSLATIONAL component reverses.

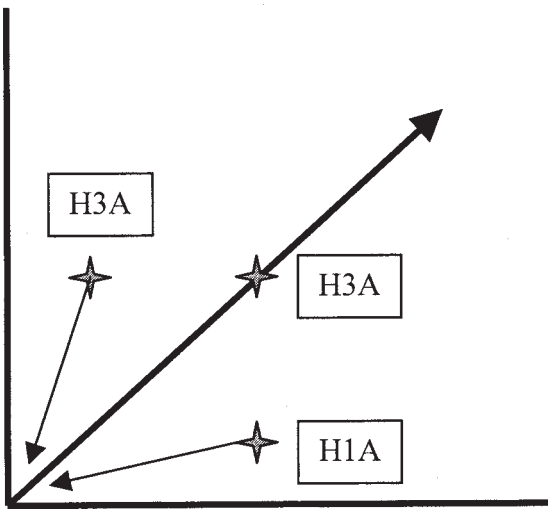
<u>Different Actions of Torque:</u> Understanding the 45 degree concept

As previously discussed, the torque can have two actions on resistance namely in the frontal and/or sagital planes. The relationship of the height to rotation dictates the predominance of either side to side movement or front to back movement. This is extremely important when analyzing the necessary headpiece placement for OPM misalignments. The relationship looks like this:

Height, rotation, and the notch transverse have a relationship that creates a horizontal resultant. The horizontal resultant exists either above the 45 degree, below the 45 degree, or on the 45 degree. For example:

1. **A High3" Anterior3"** creates a HR that is exactly a 45 degree angle. When torque is introduced at this vector or at any vector on the 45 degree it has equal action on the frontal and sagital planes.
2. **A High3" Anterior1"** creates a HR that is above a 45 degree angle. When torque is introduced it has more of a sagital action than a frontal action. As the height to rotation relationship increases above the 45, the more sagital to frontal action occurs.

3. **A High1" Anterior3"** creates a HR that is below a 45 degree angle. When torque is introduced it has more of a frontal action than a sagital action. As the height to rotation relationship increases below the 45, the more frontal to sagital action occurs.



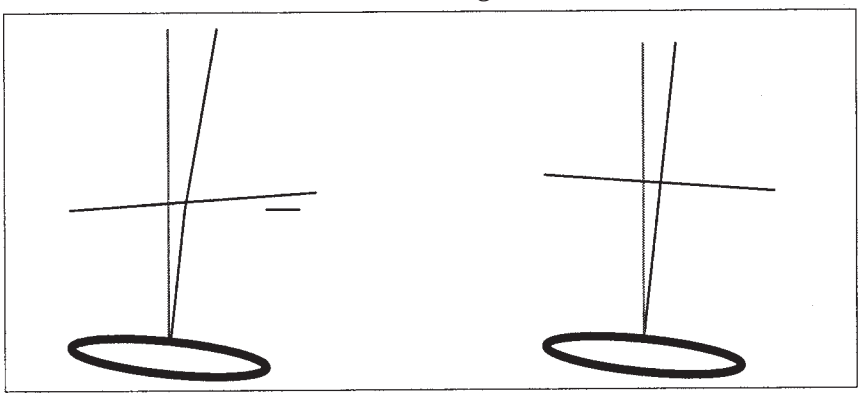
Application of Torque:

The application of torque will be dependant on Anatometer readings. The importance of this concept is probably my most recent significant break-through. This concept completes the process of differentiating whether a misalignment is more linear or more torsional or vice versa. It also allows us to use a torsional component when necessary and a linear one on the same or opposite side in OPM. This CONCEPT will be detailed further on in this article.

The correct torque is viewed on the Anatometer as the sagital component of the weighted pelvis. If the weighted side measures posterior with the lasers then the torque is inferior. If the weighted side measures anterior with the lasers then the torque is superior.

Example #1: An OPM Basic Type IV

1. there will be right laterality and posterior C1 rotation
2. the digital scales are **heavy on the right**
3. the right pelvic anterior displacement- laser read more distance on the right – indicating superior torque
4. there will be right angular rotation
5. the fixed point is right
6. The calculated vector measures High 2" Posterior3"



If this is a musculo-skeletal chief complaint it will not be resolved using P1 due to the increased weight bearing on the right paraspinal structures. It will not matter how much the ASC approaches zero if it is leaning right and anterior. The spine will be unstable and symptomatically not resolve. The current P1 will not post a corrected vertex because the anterior pelvis is uncorrectable without redirecting the posterior rotation vector.

Using the P2:

Linear or Frontal Component: Set the headpiece to close the RIGHT C0/C1/C2 articulations:

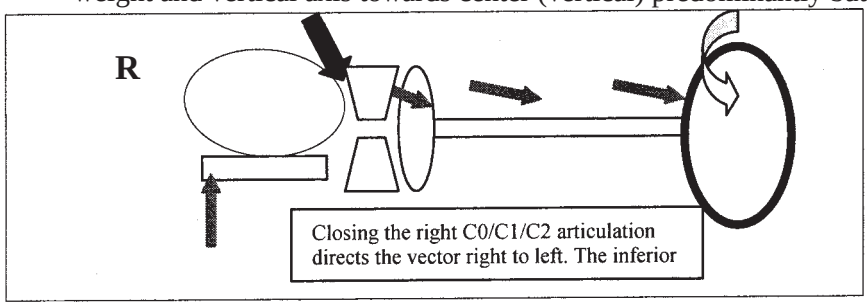
1. the pelvis will move right to left
2. the weight differential will move right to left and APPROACH BALANCE
3. the fixed point will move right to left

Transverse Linear: Set the headpiece to close the RIGHT ANTERIOR C0/C1/C2

1. this will redirect the POSTERIOR ROTATION vector to turn the linear component of the pelvis anterior to posterior

Sagittal or Angular Component: The SUPERIOR torque (determined from the anterior pelvis) on the right anterior C2 surface will:

1. The RELATIONSHIP of height to rotation is below the 45 degree and more of a frontal plane action. This moves the weight and vertical axis towards center (vertical) predominantly but also move the body weight anterior to posterior



Example #2: An OPM Basic Type 1

1. there is right laterality
2. there is right pelvic tilt with posterior displacement of 17mm on digital pelvic lasers
3. the digital scales are 36lbs. heavy on the right
4. there right angular rotation
5. the fixed point is right
6. there is inferior torque- from the Anatometer
7. Calculated vector measures High 41/4" Anterior31/2'"

Using the P2:

Linear or Frontal Component: Set the headpiece to close the RIGHT C0/C1/C2 articulations:

1. the pelvis will move right to left
2. the weight differential will move right to left and APPROACH BALANCE
3. the fixed point will move right to left
4. The frontal plane will be corrected through the linear leverage on the right C2 surface. This will occur from the relationship of the height & rotation that is above the 45 degree and will have a larger frontal plane action.

Transverse Linear: Set the headpiece to close the RIGHT POSTERIOR C0/C1/C2

1. This will redirect the ANTERIOR ROTATION vector to turn the linear component of the pelvis posterior to anterior.

Sagittal or Angular Component: The Inferior torque (determined from the posterior 17mm pelvis) on the right posterior C2 surface will:

1. Have a larger influence on the sagital plane due to the RELATIONSHIP of height to rotation being above the 45 degree. This will turn the pelvis more in the sagital plane than in the frontal plane.

Part V- The transverse plane of skull placement

The third dimension of skull placement

Key Terms

1. transverse plane position of the skull
2. reversing the vector
3. counter-balance mechanism
4. leverage
5. in-line position
6. circular rim of the axial circle

All the dimensions of the correction vector [height, rotation, notch transverse] and headpiece placement [frontal, transverse linear, sagittal/angular] must be accounted for in order to accomplish consistent correction. Up to this point, the discussion has been, how the skull can be used to lever against specific surfaces by either leveraging the skull in the frontal or sagittal planes (tilting the skull up or down and tilting the chin up or down). Specifically, the topic has been based on quadrants and closing those surfaces to direct or re-direct the vector to overcome resistance throughout the misaligned spine.

The transverse plane of skull placement is the final consideration and it is used as a leverage point against rotation and fully facilitates the previously discussed concept of **reversing the vector (transverse linear/sagittal torsion)** to overcome resistance in a C1 pelvic counter-rotation. This phenomenon is visible on x-ray for C1 rotation and on the Anatometer using the digital lasers for pelvic rotation. It is my contention that the lack of vertex rotation changes is based in this counter balance mechanism. When the pelvis is counter-rotated the vector must be re-directed to the correct reduction pathway to overcome the pelvic primary.

This counter upper-cervical balance mechanism as previously discussed in the PRIMARY discussion is only one of many combinations of available mechanism for the body to restore a relatively upright position. This counter balance mechanism is not always applied by the proprioception mechanism by the body to establish a more balanced state. It may achieve a balance state by the frontal plane. The breakdown of the spine and ultimate attempt to return to vertical can be accomplished by the frontal plane leaning back on itself.

This thought is being re-iterated here to only solidify the fact that the breakdown and counter balance mechanism of the body must be evaluated first. The more effectively the treating Doctor understands the primary/ies and the three dimensional pathways of reduction, the closer we will be to correcting spines consistently.

Technique

Rotating or turning the nose superior or inferior (ceiling to floor) in the side posture position will increase the leverage against the rotational component of the spine. THIS CONCEPT WILL ONLY ADDRESS THE TRANVERSE LINEAR AND NOT THE SAGITTAL OR TORSIONAL COMPONENT OF THE PELVIC IMBALANCE.

How much to turn is questionable at this time. The most effective place to begin, however, is to set the transverse plane of the skull (C1 transverse process) in a direct line with the notch- transverse. This does not change the vector. The calculated leverage stays the same (height and rotation), as well as does the relationship of the misalignment in its fixated state. The rotation of the skull or C1 transverse to this **in-line position will facilitate the correct transverse contact point to redirect the vector and maintain the calculated leverage.** The pisiform position in a correction, because of its direct superior CROWNING of the transverse, can contact any area of the transverse to re-direct the vector to an appropriate point of application.

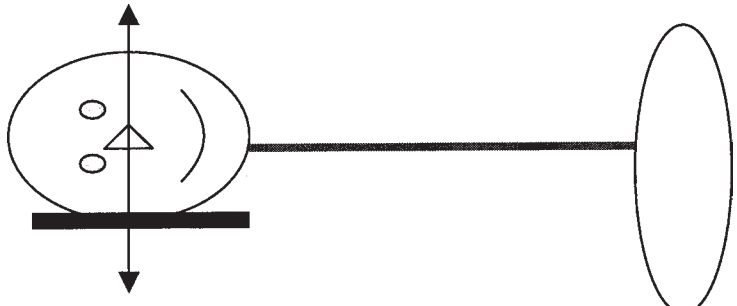
For instance, in the case of either:

1. A pelvis with posterior rotation
2. A C1 counter-balance of anterior rotation

The vector must be re-directed to overcome the resistance of the posterior pelvis. By setting the transverse to its in-line position to the notch-transverse, the posterior aspect of the transverse can be contacted. The calculated vector can be than be redirected down the correct P-to-A pathway to overcome resistant factors of the primary pelvis and/or angular rotation.

1. When the pelvis and C1 are rotating in the same plane:
    a. If anterior- rotate the skull toward the ceiling to increase the anterior leverage.
    b. If posterior- rotate the skull toward the floor to increase posterior leverage.
2. When the pelvis is counter rotated from the C1:
    a. If the pelvis is anterior and C1 is posterior rotate the skull toward the ceiling. This will increase the anterior leverage to redirect the vector anterior to posterior.
    b. If the pelvis is posterior rotate the skull toward the floor. This will increase the posterior leverage to redirect the vector posterior to anterior.

Rotate upward to increase anterior leverage



Rotate downward to increase posterior leverage

The basic concept here is to position the C1 transverse process to optimize its mechanical advantage. …like a crowbar.

This aspect of the head piece placement is significantly helpful when the pelvis is significantly more rotated than C1 (pelvis rotation from the Anatometer – C1 from the vertex). A small (1/4 to 2) anterior C1 will never have the leverage to be on the outer rim of the transverse plane OF A SMALL AXIAL CIRCLE TO OVERCOME RESISTANCE ON A 10-11-12MM ROTATED PELVIS.

Using the skull and the transverse process in the line position will lead to better corrections with less force.

This aspect of the model will facilitate three points of the misalignment:

1. Lever small C1 rotations to overcome larger pelvic rotations.
2. Redirect the vector down the spine to overcome a counter-rotation of C1 and the pelvis.
3. Increase leverage in the transverse plane to overcome rotations and angular rotation (i.e. the more difficult posterior rotations)

Part VI

Surface Leveraging

Key Terms

1. Superior surface
2. Inferior Surface
3. Leveraging

Leverage lets the adjuster use the C1 vertebrae as type 2 lever to increase or magnify the contact loaded by the head. It uses the transverse as a joy stick to overcome resistance throughout A SPECIFIC QUADRANT. This concept fine tunes the correction process because it slows the adjuster down to a place that he or she will not pull randomly and unstabilize the spine and at the same time also allows each adjuster to search each quadrant three dimensionally for resistance.

If the skull is set against the side of laterality:

1. Setting a downward leverage against the transverse process will set up against resistance on the inferior aspect of the vertebral surfaces.
2. Setting an upward leverage against the transverse process will set up against resistance on the superior aspect of the vertebral surfaces.

If the skull is set against the opposite side of laterality:

3. Setting a downward leverage against the transverse process will set up against resistance on the superior aspect of the vertebral surfaces.
4. Setting an upward leverage against the transverse process will set up against resistance on the inferior aspect of the vertebral surfaces.

The list above is one aspect of this concept. It is actually a three dimensional concept that uses the transverse no differently than a “video game“ joy stick. **Leveraging allows the vector that has been directed into a point of a specific quadrant to become THREE DIMENSIONAL and overcome resistance that may be A-to-P, P-to-A, R-to-L, L-to-R, up-to-down, or down-to-up, or just-off-the-vector itself.**

Part VII

Complex Out of Pattern Misalignments: multi reduction pathways

Key Terms

1. COPM
2. MOM

The spine as it misaligns will cause a weight differential on one side or the other causing the pelvis and lower spine to tilt into the right or left frontal plane and also deviate in the sagital plane in an anterior and posterior direction. For example, a low pelvis right means the thoracic, cervical, and skull will attempt to counterbalance the right weight by turning or tilting left and/or posterior. This is a normal counterbalance mechanism where the spine will turn back and the pelvis rotates posterior. However, the thoracic and cervical spine may also lock, either further in the pelvic sagittal plane or as a counter-rotation. This is where the thoracic, cervical, and or skull are on the opposite side of the axis vertical to the pelvis and represent a misalignment on a misalignment (MOM). This multiple directional or non coplanar visualization is caused by multiple misalignments from pelvis up through the lower angle.

This MOM will only be visible after a correction is made and checked on the Anatometer. It will look like this:

1. The patient moved from one side of the vertical axis to the other.
2. The sagittal torsion/transverse linear plane reduces but doesn't correct.
3. The pelvis checks clear on the Anatometer but the shoulder lever remains partially twisted.
4. The correction FEELS jammed and/or the patient is unable to reduce.

In situations 1-to-3, the patient has a MOM where the calculated vector must then be applied to a NEW point of application to facilitate another reduction pathway. Follow the indications from the Anatometer, re-set the skull to protocol, and then remove the next set of resistant factors.

For the transverse linear or Sagittal torsional component:

This means the shoulder will either turn significantly more into the same sagittal plane that the pelvis has already deviated into, or it will turn in an opposing direction. Regardless, the pelvis and the shoulder levers will not be coplanar. This will be visible on the Anatometer because the pelvis and its sagittal deviation will not be congruent with the smaller shoulder lever. This type of a complex out of pattern misalignment (COPM) will be most apparent on the Anatometer after a correction is made. The data will show:

1. The pelvis will approach or may not fully correct to zero.
2. The shoulder lever deviation in the sagittal plane will present in a rotation or counter-rotation sagittal component.

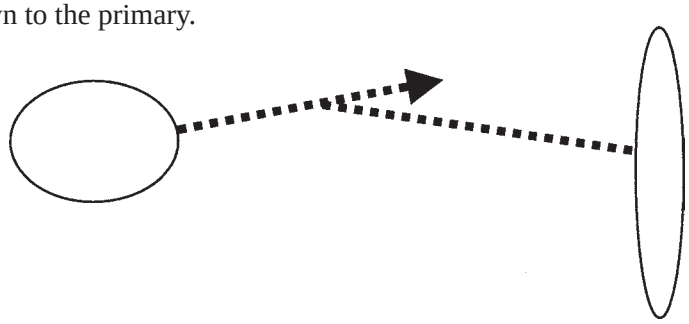
Because the pelvis and other components will approach zero after the first correction, the shoulder distortion will be easier to visualize.

Symptomatically, these patients present with chronic shoulder, neck and cervico-brachial syndromes. Neurologically, especially in the counter-rotation types, brain fog and fatigue will also be present. These misalignments, because of their insidious nature will only present after the Doctor consistently evaluates the shoulder and pelvic levers and their deviation in the sagital plane.

Where the correction FEELS jammed and/or the patient is unable to reduce [situation 4], is the most frustrating. It is the one where you just think either your film is bad or you can't help the patient. It is the one you break a sweat on and nothing is moving. It is the one where we traditionally change vectors, torque. Some Doctors even flip the patient over to adjust the other side!

That WILL NOT be necessary anymore!

Imagine a line of 26 dominos representing the skull down through the pelvis. And we know that the force of a correction runs ADIO. In #4, an upper section of the spine is misaligned out of pattern and does not allow the force to penetrate down to the primary.



In this case… Go to plan B. Address the complete mirror image of the primary. For example if the primary was either:

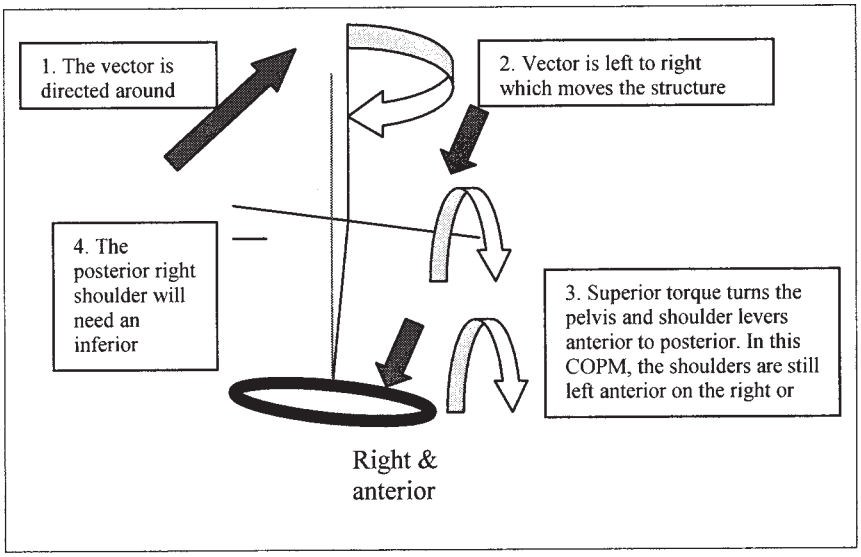
1. a right heavy scale
2. right posterior pelvis

The protocol would be to isolate the RP quadrant. In this case, you would isolate the left anterior quadrant and try to clear it first than go back to the right posterior quadrant.

At present, it is necessary to be less aggressive. Namely, one should adjust and evaluate the outcome. Doing everything at once leads to a prognosis for instability in the spine for the patient and a loss of learning for the Doctor. This revised model creates great improvement in the ability of the Doctor to visualize the predictability of the above protocol. By following this protocol, and sequentially understanding the diverse factors, adjusting the COPM will be easier to perform.

To correct the COPM that has a shoulder deviation that is the same as the pelvic lever but is larger and does not completely correct, an opposite torque or transverse linear component on the opposite C2 surface will be necessary. For example:

1. A left Type One with a posterior rotation- COPM
2. There will be heavy scales on the right- close the right C0/C1/C2 articulations by tipping the headpiece downward to direct the force right to left
3. The pelvis is anterior on the right – use a superior toque to turn the pelvis anterior to posterior
4. Turn the skull/transverse upward to increase the posterior to anterior leverage on the left



After this correction the right SHOULDER is still anterior on the right or posterior on the left. The assumption would be that we corrected all of the above right pathways of resistance so the thought would be a second left pathway is or was on top of the above misalignment.

Everything, if the correction has been completed, is clear on the right. So, a left inferior torque or a posterior action on the left transverse will be necessary to overcome this double sagital dysfunction.

Likewise if there was a counter-rotation in the pelvic and shoulder levers the same torque will be necessary on both sides.

It is important to note that:

1. The doctor must be very light and non aggressive (no leaning or pushing) or the frontal plane will distort.
2. Even with #1 in mind the Doctor may need to revisit the original weight dysfunction side.

Checking and rechecking after each component is addressed will facilitate a greater appreciation of the predictability of this protocol.

CLINICAL DATA

Patient: Preston P.

History:

Chronic lumbago for 10+ years. Patient has seen numerous chiropractors and physicians for symptomatic relief. Patient history of NUCCA care and Vax-D with no results.

X-Ray:
Right Type I
Laterality: R1 ¾
Pl: 2/16
At/Od: 0
C/A: 3/9
Lower angle: L3 ¾
Correction Vector: RH4A3 ½

Anatometer:
Weight Scales: Heavy right 19.6 lbs
Laser reading of rotated pelvis on weighted side: Posterior 8mm
Digital reading of fixed point: Right 2.4 degrees

Leg length:
Right ½ inches

Protocol of head placement

The skull was tilted upward to close the articulations of the Right C0/C1/C2. This will direct the force right to left to correct the right heavy scales. Based on the neutral lateral and the needed P to A reduction pathway, the skull was tilted back to close the posterior articulation. In sum, the RP quadrant was closed. The interesting aspect of this misalignment is to see the counter-rotation of the pelvis and C1. The anterior rotation vector must be re-directed to turn the pelvis. Correcting the patient to the vertical axis only will not resolve the low back pain. The skull (nose) was turned considerably downward (to overcome the large anterior rotation) to facilitate the contact of the posterior aspect of the C1 transverse and redirect the force of the anterior rotation to a P to A force. Until the in-line position was set properly (8 months of re-pre & re-post) (transverse component of the skull placement), the patient never corrected completely, held the correction, or felt considerable long term relief.

Torque:

The height is larger than the rotation that puts the HR vector above the 45. So, Inferior torque based on the posterior pelvis was not used. This is because when the HR is above the 45 degree, it will turn the vertical axis of the patient more into the frontal plane of application. In this case more into the right frontal plane. So, the rotation is considered to be transverse linear rather than sagittal torsional.

Post Results

X-Ray:	***Anatometer:***	***Leg length:***
Laterality: R 1/4	Weight Scales: Heavy Left 1.2 lbs.	Balanced
Pl: 0	Laser reading of rotated pelvis on weighted side: Anterior 1mm	
Lower angle: 0	Digital reading of fixed point: Right 0 degrees	
Rotation A 3/4		

Patient: Susan C.

History:

Right cervical brachial syndrome associated with chronic sciatica following an auto accident in 2003. Patient has seen numerous chiropractors and physicians for symptomatic relief. Patient has had previous NUCCA.

X-Ray:	***Anatometer:***	***Leg length:***
Right Type I	Weight Scales: Heavy Right 12lbs	Right 1 inches
Laterality: R1 3/4	Laser reading of rotated pelvis on weighted side: Anterior 12mm	
C2 spinous L10	Shoulder was posterior on the right- Indicating a COPM with the pelvis	
Pl: 5/16	Digital reading of fixed point: Right 1.6 degrees	
At/Od: 0		
C/A: 3/6		
Lower angle: L4 1/4		
Correction Vector: RH4 1/4P 1/2		

Protocol of head placement

The skull was tilted upward to close the articulations of the Right C0/C1/C2. This will direct the force right to left to correct the right heavy scales. Based on the neutral lateral and the need to direct the force down the right A to P reduction pathway, the skull was tilted forward to close the anterior articulation. In sum, the RA quadrant was closed. There are three points of interest in this misalignment:

1. The small rotation to the large pelvic reading- This will be corrected by a right superior torque based on the RA pelvis.
2. The counter-rotation of C1 and the pelvis- This will be corrected by redirecting the vector on the right A to P.
3. The counter rotation of the pelvis and the shoulders demonstrate a COPM with a MOM- corrected by a two stage adjustment.

The posterior rotation vector must be re-directed to turn the pelvis anterior to posterior on the right. The skull (nose) was turned upward to facilitate the contact of the anterior aspect of the C1 transverse and redirect the force of the posterior rotation to an A to P direction on the right.

Torque:

Superior torque based on the anterior pelvis was used on the right C2 surface. The HR vector is considerably above the 45 and will have a coupled positive affect. It will turn the anterior pelvis (sagittal torsional- the main action) and have a secondary minor affect on the right to left pathway.

Anatometer Readings after 1st correction

Weight Scales: Heavy Left 6.2 lbs.-
Laser reading of rotated pelvis on weighted side(now left): Posterior 5mm
Digital reading of fixed point: Left .4 degrees
The weight scales indicate a left weight that is beyond my 1-2 lb. maximum weight differential and further indicates a MOM. This secondary misalignment is on the left.

Secondary Correction

Based on the post Anatometer readings the next skull placement will be in the LP quadrant (tilted down and back) with the skull still turned upward to redirect and increase the leverage of the small C1 rotation and large pelvic rotation.

Post Results

X-Ray:	***Anatometer:***	***Leg length:***
Laterality: R1/4 spinous L4	Weight Scales: Heavy R 0.2 lbs.	Balanced
Pl: 2/16	Laser reading of rotated pelvis on weighted side: Anterior 2mm	
Lower angle: L3/4	Digital reading of fixed point: Right 0 degrees	
Rotation P0		

Patient: Elissa M.

History:

Chronic bilateral low back pain for 30+ years. Patient has a history of previous NUCCA care with no long holding pattern and minimal symptomatic relief.

X-Ray:	***Anatometer:***	***Leg length:***
Right Type I	Weight Scales: Heavy Left 10 lbs	• Left 1 inches
Laterality: R5¾ spinous R10¾	Laser reading of rotated pelvis on weighted side: Posterior 10mm	
Pl: 2¾	Digital reading of fixed point: Right .2 degrees	
At/Od: 0		
C/A: 3/5		
Lower angle: L5¾		
Correction Vector: RH3¾ P3¾		

Protocol of Head placement

The skull was tilted downward to close the articulations of the left C0/C1/C2. This will direct the force left to right to correct the left heavy scales. Based on the neutral lateral and the need to direct the force down the left P to A reduction pathway, the skull was tilted back to close the posterior articulation. In sum, the LP quadrant was closed. There are three points of interest in this misalignment:

1. The counter-rotation of C1 and the pelvis- This will be corrected by re-directing the vector on the left P to A.
2. The vertical axis and the pelvis are in opposite frontal planes (COPM Type I) indicating a MOM- corrected by a two stage adjustment.
3. This Type I is in the wrong frontal plane-COPM

The right posterior rotation vector must be re-directed to turn the pelvis posterior to anterior on the left. The skull (nose) was turned upward to facilitate the contact of the anterior aspect of the C1 transverse and redirect the force of the posterior rotation on the right to a P to A direction on the left.

Torque:

The torque is on the 45 which would have an equal action in the frontal and sagittal planes. It would help with the rotation in the pelvis but also direction the vector in a right to left pathway and that is contraindicated. So, I did not initially use the torque. I stayed with the transverse linear at first and post checked on the Anatometer.

Anatometer Readings after 1st correction

Weight Scales: Heavy Right 1.2 lbs.-
Laser reading of rotated pelvis on weighted side(now right): Anterior 6mm
Digital reading of fixed point: Right 0 degrees
Right shoulder measured anterior after first correction

Secondary Correction

Based on the weight scales and the rotation of the pelvis, a secondary pathway must be addressed. The point of application will be on the right anterior quadrant based on the post Anatometer readings. The right anterior rotation is the only misalignment pathway still uncorrected. The skull will be tilted upward and anterior to close the RA quadrant and the

skull will be rotated (nose) upward to re-direct the right posterior rotation to an A to P direction (transverse linear). A right superior torque will be used cautiously to facilitate an A to P curvilinear pathway (sagittal torsional)

Post Results

X-Ray:	***Anatometer:***	***Leg length:***
Laterality: R ¾ spinous R1	Weight Scales: Heavy R 0.2 lbs.	Balanced
Pl: 1/16	Laser reading of rotated pelvis on weighted side: Anterior 1mm	
Lower angle: L ¾	Digital reading of fixed point: Right 0 degrees	
Rotation P1		

Patient: Traci B.

History:

Right shoulder pain and right piriformis syndrome intermittent for 12 years. No previous chiropractic care.

X-Ray:	***Anatometer:***	***Leg length:***
Right Type IV	Weight Scales: Heavy left 5.2 lbs.	Left 1 inches
Laterality: R1 ¼ (R2 ¾)	Laser reading of rotated pelvis on weighted side: Posterior 2mm	
C2 spinous R5 ½	Digital reading of fixed point: Left 1.2 degrees	
Pl: -3/16		
At/Od: -1 - NA		
C/A: 3/6		
Lower angle: L ½		
Correction Vector: RH1/2P2		

Protocol of head placement

The skull was tilted downward to close the articulations of the left C0/C1/C2. This will direct the force left to right to correct the left heavy scales. Based on the neutral lateral and the need to direct the force down the left P to A reduction pathway, the skull was tilted back to close the posterior articulation. In sum, the LP quadrant was closed. The interesting aspect of this misalignment is to see the counter-rotation of the pelvis and C1. The posterior rotation on the right must be re-directed to turn the left posterior pelvis. The skull (nose) was turned upward to facilitate the contact of the anterior aspect of the C1 right transverse and redirect the force of the left P to A force.

Torque:

The height is smaller than the rotation that puts the HR vector below the 45. The torque action would be down more of the frontal pathway. Since the left posterior pelvis calls for an inferior toque which will turn the spine out further into the left frontal plane NO torque is applied.

Post Results

X-Ray:	***Anatometer:***	***Leg length:***
Laterality: R ¼ (R ¼)	Weight Scales: Heavy right 0.6lbs.	Balanced
C2 spinous R1	Laser reading of rotated pelvis on weighted side: 0mm	
Pl: 0	Digital reading of fixed point: Left 0 degrees	
Lower angle: 0		
Rotation: P ¼		

Patient: Michael B.

History:

Patient experiences generalized low back and neck stiffness. When running, the patient experiences low back pain and stabbing pain in mid-thoracics. Deep tissue work by a chiropractor without adjustments.

X-Ray:	***Anatometer:***	Leg length:
Left type II	Weight Scales: Heavy left 17.8 lbs.	Right ½ inches
Laterality: L3 (L2)	Laser reading of rotated pelvis on weighted side: Posterior 6mm	
Pl: 2/16	Digital reading of fixed point: Left .2 degrees	
At/Od: -1 - NA		
C/A: 4/8½		
Lower angle: L ¾		
Correction Vector: RH3P ½		

Protocol of head placement

The skull was tilted upward to close the articulations of the left C0/C1/C2. This will direct the force left to right to correct the left heavy scales. Based on the neutral lateral and the need to direct the force down the left P to A reduction pathway, the skull was tilted back to close the posterior articulation. In sum the LP quadrant was closed. The interesting aspect of this misalignment is this Type II is in the wrong frontal plane and using conventional protocol will only move the vertical axis more into the left frontal plane.

The other point to notice is the imbalance between the pelvic and C1 posteriority. The skull must be turned downward to increase the posterior leverage to overcome the 6mm pelvic rotation.

Torque:

The height is larger than the rotation that puts the HR vector above the 45. So, Inferior torque based on the posterior pelvis was not used. Because the HR is above the 45 degree, it would turn the vertical axis of the patient more into the left frontal plane. So, the rotation is more transverse linear than sagittal torsional.

Post Results

X-Ray:	***Anatometer:***	***Leg length: Balanced***
Laterality: 0	Weight Scales: Heavy Left 2.2lbs.	
Pl: 0	Laser reading of rotated pelvis on weighted side: 0mm	
Lower angle: 0	Digital reading of fixed point: Left 0 degrees	
Rotation 0		

Summary and Final Discussion

Considerations of Protocol to establish a Single Vector

1. The skull should be set to direct the force into the C2 surface on the side of the heavy digital scales. This will usually correlate with the low pelvis but may not correlate with the short leg.
2. The force should be directed towards the vertical axis (linear component) towards vertical.
3. The transverse linear component should be evaluated as to which direction the pelvis should move in either a posterior or anterior direction. This will usually correlate to the posture on the LATERAL CERVICAL.
4. The relationship of the height to rotation in regards to the 45 degree should then be evaluated to determine the effect of torque
5. Set the transverse of the in line position and contact the appropriate area of the transverse to direct the vectored force.
6. The patient should be re-evaluated on the Anatometer.
7. 1-2 lbs. of weight differential in the frontal plane, 0-2 mm in pelvic turn, and 0-.4 degrees on the vertical axis are my parameters for a successful and complete correction. If this does not occur on the first post Anatometer reading, stay with the initial placement after the patient walks for a few minutes.
8. If after re-adjusting and checking, be suspect of a MOM. Re-set the placement to the opposite quadrant (i.e. RP > LA) and finish with the initial placement.

While the NUCCA system is more complex than other spinal procedures, it can be stream-lined in its diagnostics and application. The new protocol [P2] demonstrates that the basic principles of the scientific and algebraic foundation given to us by our founders have not changed; the calculated vector works in all situations. In order to achieve consistency in the results of our adjustments, however, we must take a larger view of the biomechanical system involved. Our understanding of the biomechanical principles has evolved so that we can make more effective use of the skull in our corrections. Objective data from the Anatometer facilitates and directs understanding of the complex interactions among three dynamic planes. When we make use of the Anatometer data our adjustments achieve a multidimensional balance heretofore not possible. In order to achieve repeatability and reproducibility, we must stay with empirical data, not, clinical "play by play." The science and algebraic calculations of NUCCA optimize our ability to break resistance and apply leverage to misaligned structures. It is our basis for the concept of the reduction pathway. Deviating from these formulas is unnecessary.

A Rebuttal to Dr. Friedman's Specific Biomechanics

By Marshall Dickholtz, Sr., D.C.

It is very important and proper that I offer the following rebuttal to the lead article by Dr. Friedman in this issue of the Monograph on the Multiple Support Head Piece.

The NUCCA technique was designed for certain biomechanics that work with any misalignment. Dr. Friedman's head piece may not be a proper NUCCA unit that is why he has to try different methods. There has been a history from the beginning of chiropractic, that some, who had difficulty with what has been proven thus far to be the best for the patient, have reverted to attempts to change by subtracting or adding something to the technique. It is very possible that egos were involved. There is always room for change, but it has to be on a scientific basis. That is why NUCCRA exists.

It should be emphasized at this juncture that the Board is always open to new knowledge, a fact of which Dr. Friedman is aware. In fact, as President of NUCCRA, I can state that the NUCCRA board is, and has always been open to assessing any pre and post radiographs, and claims made in light of them. A few years ago a doctor brought x-rays to the NUCCRA board along with his idea of the full support headpiece. The board let him show his evidence but was not at all impressed. There were many errors.

First, I think it is necessary that I give you a few of my credentials. If I am going to give a rebuttal, you should know a little of my history.

Dr. M. Dickholtz Sr.:

- The last of the founding directors of NUCCA,
- Current President of NUCCRA,
- Has been using the Grostic and NUCCA technique for 50 years with the standard, single support headpiece; I was with Dr. Grostic for seven years before he died. Then a year before he died Dr. Gregory started to have his Saturday afternoon classes. After Dr. Grostic died Dr. Gregory and I started NUCCA with a few other chiropractors. The point I want to make here is that Dr. Friedman alludes to knowing their thoughts. I feel that I would be in a better position than he. I know that neither one would except anything without the post x-rays proving any new intervention.

Now, as proof of what the NUCCA technique can do with the tried and proven methods that the NUCCRA Board has thus far approved, I relate the following:

- First, it should be stated that on over 300 consecutive cases, the patients were given an average of only 1.5 adjustments in a four-month time period. With this, on the VAS scale and Rand 36 study, their health improved tremendously!
- Next, on 19 cases with Chronic Fatigue syndrome, ten out of the 19 cases only received one adjustment in 6 months time. Using the Rand 36 study their health improved in all eight categories.
- The High Blood Pressure study.
- Other research projects are at the end of this rebuttal.

High Blood Pressure study:

The abstract printed in the J. of Clinical Hypertension, May 2006, relates that the test subject's blood pressures were lowered 17 points. Eighty five percent of these patients were still holding their first correction after two months. According to our searches, this is the only study in history with a controlled placebo group, which had a fantastic outcome. THIS STUDY SHOWED THAT THIS SPINAL AREA OF CONTROL AFFECTS THE FUNCTION OF THE AUTONOMIC NERVOUS SYSTEM… THUS THE HEALTH OF THE BODY!

The publishing of the complete article is now scheduled for the January 2007. This study reveals tremendous posture changes from the resultant of a proper adjustment, in all Subluxation types, including what is considered 'out of pattern' (OPM). The recent 'Dickholtz Laser Light' Posture constant was also used on all 50 patients in this study.

Here is the x-ray statistics that show the reductions in laterality and rotation of the atlas were on the 25 patients I adjusted in the high blood pressure research program. These were generated on a single point head piece. 85% of the cases only received one adjustment in the two months of observation. There were also 25 patients in the placebo group in this chart. Blood pressure was lowered 17 points on the systolic pressure.

Baseline Descriptive Characteristics

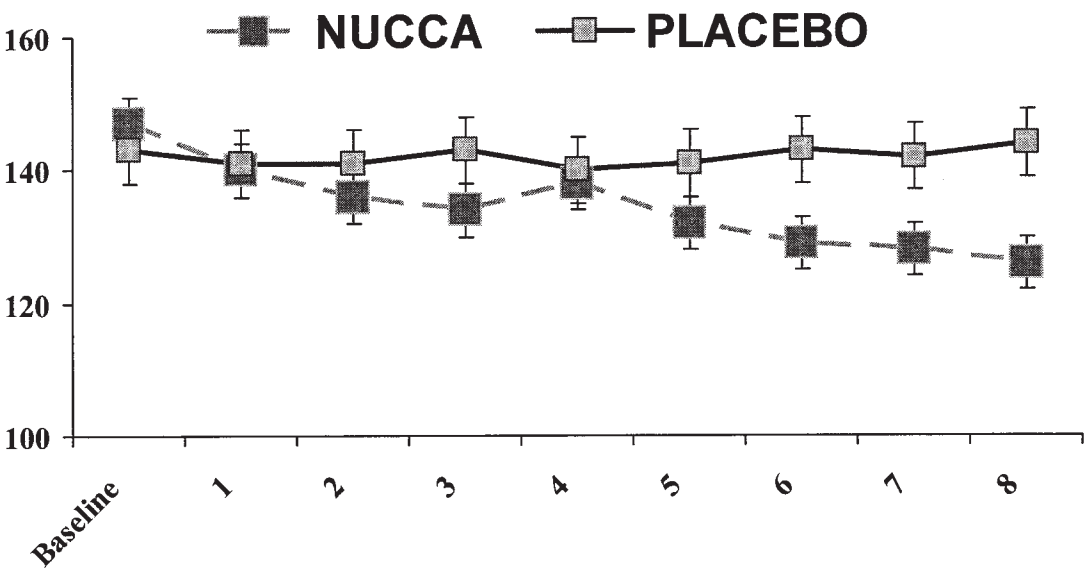
Variable	All	Control	Treatment	p value
	Mean ± SD	Mean ± SD	Mean ± SD	
N	50	25	25	
Age (years)	52.7±9.6	51.8 ± 10.9	53.6±8.3	.51
Systolic BP (mmHg)	148.6± 6.9	149.9± 6.2	147.3±7.4	.19
Diastolic BP (mmHg)	91.7± 6.0	91.9± 5.8	91.6± 6.3	.83
Pulse Rate (beats/min)	73.5±10.8	73.3±11.3	73.6±10.5	.92
Demographic/Ethnicity	%	%	%	
Men	70	80	60	.12
Race (Percent)				.49
Caucasian	96	100	92	
African American	0	0	0	
Multi-Racial	2	0	4	
Hispanic	2	0	4	.49

X-ray Measures of Atlas Position

Displacement	Visit	Control Mean (SD)	Treatment Mean (SD)	P value
Lateral	Pre-adjustment	1.86± 0.84	2.17± 1.41	0.35
	Post-adjustment	1.78± 0.85	0.22± 0.35	<0.001
	P (diff Pre/Post)	0.224	<0.001	
	8 Weeks	1.8± 0.77	0.22± 0.36	<0.001
	P (diff Post/8wks)	0.11	0.788	
Rotational	Pre-adjustment	1.5± 1.28	1.29± 1.05	0.537
	Post-adjustment	1.46 ± 1.27	0.19± 0.36	<0.001
	P (diff Pre/Post)	0.043	<0.001	
	8 Weeks	1.42± 1.04	0.24± 0.44	<0.001
	P (diff Post/8wks)	0.665	0.103	

Results				
	NUCCA (n=25)		**Placebo (n=25)**	
	Baseline	**8 Weeks**	**Baseline**	**8 Weeks**
Systolic BP (mmHg)	**147±6**	**130±10***	**145±6**	**142±11**
Diastolic BP (mmHg)	**92±8**	**82±9***	**91±8**	**89±9**
Lat. Displacement of C7 spine (degrees)	**1**	**0.04#**	**0.6**	**0.5**
*** After adjustment for baseline levels, the treatment effect for Systolic BP was significant at the 0.0001 level and Diastolic BP at the 0.002 level. # After adjustment for baseline values treatment effect for Lateral Displacement of spinal column at C7 was significant at the 0.002 level.**				

Trends in Systolic Blood Pressure in Both Groups over the Eight Week Period



In summary, the previous examples demonstrate the importance of what the NUCCRA board approves and all that is necessary to give a great adjustment. Anything unsound, without careful NUCCRA scientific examination and sound consideration, will complicate or confuse the chiropractors and affect the proper technique, and result in doubtful outcomes, misleading and dangerous to the patient's health.

Poorly analyzed films theoretically indicate good adjustment, but always belie true improvement, resulting in poor patient outcomes. Controlled outcome studies are a sound and enlightening process, and proof that can and should lead NUCCRA and this profession.

First, the whole spine is controlled by the facilitators and inhibitors in the central reticular formation of the brain. If there is a stressor to the brain stem affecting the mechanical, pressure, sensory and proprioceptive centers, the whole spine will be out of balance. Out of pattern cases are no different to adjust. The only question is will the next adjustment need the same vector. I have seen same of these type of cases never change.

The endeavor is to remove this stressor. There is no one hundred percent correlation of which side of the brain stem will be effected when there is an atlas subluxation present.

Drs. Grostic and Gregory had statistics on how many cases in a row they could zero out (upper cervical terms), and I remember the numbers were 20 to 25 cases in a row. At that time they did not have the use of anatometers or standing pelvic measurements.

Now, in response to Dr. Friedman's statement that NUCCA does not have predictability, I can reliably state that I have and by using the NUCCA technique scientific predictability when one takes good x-rays and understands biomechanics!

When there is a subluxation the whole spine is out of balance. The issue is not that the skull has to balance the pelvis.

Some doctors do not use post vertex films, possibly because they are not reducing the rotation of the atlas, or they are using wrong vectors and mechanics because of not considering the new way of measuring vertexes. It does not include any measurement from the pelvis of weight distribution. The anatometer does not measure the transverse plane.

There is only one way to brace the head if the head is braced from a calculated vector, depending upon atlas laterality and head tilt off the vertical axis. This has been my only consideration.

The anatometer does not measure torque in the pelvis as Dr. Friedman states. It really measures translation of the body from the base of support. The anatometer does not measure all planes of the body or the head; it does not measure the shoulder or pelvic tilt or torque; nor does it measure torque in the spine from the shoulders to the pelvis. This is also necessary to determine when a subluxation is removed as completely as possible. X-rays are the best and final proof, but we cannot use x-rays after every adjustment.

The spine is out of balance when there is a subluxation. Its spastic musculature becomes a resistance to the balanced spine.

Dr. Friedman's statement that on a type twos, C1 right side, he would expect a right short leg and a right spinous. Sometimes there is a left short leg, but it is not predictable per se. There is no particular spinal model at present that can predict which side, or what effect; the misalignment of the atlas and other cervicals will have on the body. I have seen twisted spines that are balanced, with equal weight on each foot.

The skull is NOT always used as a fulcrum as he states it is.

One of the illustrations presented is not a Type II, as presented, but is in fact a Type IV, and a different force vector is necessary to accomplish a reduction. Dr. Friedman also states that it takes 1-3lbs. of controlled force to unlock a subluxation. It takes 10 to 23 lbs. to unlock a subluxation. If the doctor cannot control this amount of force, it is no wonder why they do not take post vertex films.

The word as a heavy adjuster misleads chiropractors in their learning curve. The skin should only be dented a sixteenth or eighth of an inch. The head should not move.

The lower cervicals are a factor in balancing the head, but the real locking mechanism is the proper alignment of the atlas around the occipital condyles. This will let the sensors and muscles do what they are supposed to do. Then the facilitators and inhibitors in the brain will take care of the rest of the spinal balance.

The muscle balancing at the brain stem controls all deviations of the spine and pelvis, and brings them back to a better balance immediately in all cases. Again, the point of bracing the skull when adjusting is an item all by itself. The rest of the spine does not have to be taken into account.

The head should be on the vertical axis when an adjustment is finished. On the other hand if there is no laterality and the rest of the cervicals are at 90 degrees to the atlas, but the plane line is not horizontal, there is a righting reflex that will take place within 30 days. Dr. Gregory's practice goal was to balance the facilitators and inhibitors of the brainstem area, and he knew the rest would follow. These centers never travel to the lumbar or sacral area.

In helping to reduce atlas rotation by moving the patient's shoulders forward or backwards, I should point out the atlas is locked also in the transverse plane, and this movement of the shoulders is all absorbed by the free movement in the transverse plane of the rest of the cervicals... with proper measurement and controlled adjustment, atlas rotations are reduced. Keeping the head, neck and shoulders in a neutral position reduces any additional locking effect to an adjustment.

At the present time when only controlled studies are the proof, I offer the following in the 50 patients I had in my latest documented research project where I didn't take into account all that Dr. Freidman is proposing. In fact I feel that his information will harm the chiropractor's ability to give a proper adjustment.

Rotation of the pelvis has never been truly investigated. The anatometer does not show rotation of the pelvis, but my laser lights do.

More Answers to Dr. Friedman's statements:

The anatometer had not yet been invented when Drs. Wernsing and Grostic were living.

Out-of-pattern cases respond as in-pattern cases when the proper vector is used in an adjustment. There is no problem if one knows how to adjust. Patient out-comes are predictable if radiographs are properly taken, analyzed correctly and the understanding of spinal mechanics.

Dr. Friedman is making many incorrect assumptions, to prove a point that is unsound to begin with. HIS PICTURES DO NOT SHOW THE TRUE ACTION OF THE INTERNAL FORCES AS THEY REACT TO AN ATLAS ADJUSTMENT.

Again, patient outcomes are predictable as per my research statistics.

The skull is not a counter balance to the pelvis.

Again, there is no empirical data on the anatometer.

The pelvic and lumbar structures are not the locking mechanism. C1 is not the counter-reaction. Atlas rotations are overcome by what we do know without knowing what side the weight is on, or even moving shoulders forward or backward.

TYPE IV cases are very difficult. Here are the cases from the successful research program.

Case #23 – Held this adjustment at least 2 months in this case. Dr. Friedman suggested that if the weighted side goes anterior then use a superior torque – X-ray analysis calls for inferior torque. After the adjustment using an inferior torque.

The Anatometer frontal plane went from a tilt of 8˚ to 3/4˚; Transverse measurement went from anterior 4˚ to anterior 1˚; Fixed point went from R2˚ to a R1˚; Weight differential went from 26.3% to 12.7%. This was a 75-year-old man that was leaning forward about 45˚.

Two months later his wt. imbalance was down to 4%. This adjustment was still holding after three months.

Case # 14 - I used the same torque on this case that Dr. Friedman suggests. His adjustment is still holding after 2 months.

Case # 29 - No pelvic rotation; severe weight percent differential of 14.7% came down to 2.5%. This case is holding the adjustment at least 2 months.

Case # 33 – Weighted side was anterior on the anatometer. Dr. Friedman stated it should be adjusted with superior torque, but the analysis calls for inferior torque. The patient zeroed-out on the anatometer and the laser light showed a perfectly balanced pelvis. There was a 4˚ tilt of the shoulders. This was acceptable for the time being; it did reduce to one degree within the following two months.

Case # 12 – The weighted side was a posterior. According to Dr. Friedman there should be an inferior torque. The NUCCA Inferior torque was used on this case. The patient zeroed out on the anatometer, and produced a very good reduction on the accurate laser light exam.

Case # 38 - Dr. Freedman calls for superior torque when the case has a weighted side anteriorly rotated. NUCCA radiographic analysis would call for inferior torque. After the adjustment with inferior torque the anatometer and laser lights showed a perfectly balance patient.

Case # 41 – In this case Dr. Friedman calls for a superior torque. Inferior torque was indicated in the NUCCA analysis and used. The anatometer zeroed; the weight difference went from 9.3% to 4.3%. This patient zeroed out on the anatometer and the laser lights showed a perfectly balanced pelvis. There was 6˚ tilt of the shoulders which reduced to 1/2˚. See the chart of the fifty patients

Dr. Friedman states that when there is rotation of the atlas in the transverse plane the pelvis rotates in the same direction. Here are the statistics of the fifty patients as to type and any correlation with his statement.

I analyzed the vertex films as is now taught in the NUCCA classes. My laser light examination of the twist of the pelvis is as good as Dr. Friedman's method. There could be a small factor of translation in our measurement of the twist of the pelvis, but there are many cases and it could balance out the statistics.

I have one additional type of classification that I call type 1 abnormal. It is where the head and cervical spine lean away from the side of atlas laterality.

I have found only a 30% correlation with my statistics.

Types	1 AB	1	2	3	4	Total
#of cases	10	10	13	7	10	50
Correlated Atlas & pelvis	4	2	3	5	1	15
Not correlated, different direction	3	5	5	0	3	16
No rotation of the atlas	1	2	0	1	4	8
No rotation of the pelvis	1	1	5	1	2	10
No rotation of the atlas or pelvis	1	0	0	0	0	1

Of the cases that I adjusted in the high blood pressure research group, 25% were out of pattern as we have classified the different groups. By using what is taught in the NUCCA classes, I reduced all their subluxations.

Again, the anatometer is a good instrument, but does not show the doctor the following:

- It does not show the transverse plane of the pelvis. It shows translation of the body to the feet.
- It does not show shoulder tilt.
- It does not show torque in the spine from the shoulder girdle to the pelvic girdle.

My laser lights examination shows all the above. The United States government just gave me a patent on my laser light invention. This shows that when I examine a spine and say its balanced better than any other chiropractor can say it if they do not have the laser light examination. At the present time, nobody has a set except my son. I used this examination on all fifty patients. In fact a picture of the laser chart, with the laser lights on the patient was taken on all visits as the patients were examined. The placebo group was adjusted after 8 weeks. All 50 patients had good balanced postures after they were adjusted on a NUCCA head piece.

As I stated there were also abnormal types of subluxations. Dr. Friedman is welcome as any other chiropractor to use my laser lights. The point here is, when Dr. Friedman is trying to work with the anatometer to get additional information as to how to adjust his definition of out of pattern cases, he is working with a model that is incomplete.

The other and most conclusive point I want to make is that my outcomes reflect a completely balanced spine. The verified statistics from the high blood pressure outcome based study are the proof.

A few months ago I showed Dr. Friedman NUCCRA'S new way of analyzing vertexes. The new way of analyzing vertex information had been presented to the membership for two years before he asked me about it. He did not know the Foramen Magnum was not in the center of the head more than 50% of the time. This fact alone leads to a large percentage of incorrect vertex vectors, and corresponding lack of reduction.

Dr. Freidman more than once uses the phrase "what most NUCCA doctors do". First, he is making assumptions in an attempt to prove something that will not work, in order to justify his postulate or thinking. NUCCA does not teach lowering a height vector on a Type I. Rather if any changed, the height vector could be increased, depending upon the degree of excursion of the lower cervicals from the vertical axis into the frontal plane. The conclusion of all the statements and statistics that I have presented as scientific proof that the NUCCA head piece is the proper and only one. **The internal forces do not work as Dr. Friedman's drawing indicates.**

Now here is a case that shows the flaws in Dr. Friedman's methodology and his lack of understanding of spinal mechanics.

It's a Marie Strompel's disease. The only vertebra that possibly can be moved is the atlas.

X-ray info

Pre.		Post
Plane Line- 20/16	Head tilted 8 degrees left	N N
At L N S/2		N
Od L'		N
Ax Sp.L l		

- Type 2 Case Left leg contracted 1 ½ inches
- He was 81 years of age and he was in this condition for 50 years.
- On the anatometer the weight percentage differential was 16.6% heavier on the right foot. The right side of the pelvis was low six degrees. The transverse plane on the anatometer was a posterior nine degrees. Fixed point was left three degrees. The near horizontal line projections on the chart are from the laser lights from the left side of each harnesses.
- The dots from the laser lights are from the right side of each harness. The laser lights showed on the pictures, shows the pelvic tilt was the same as the anatometer. The translation of the patients body and the twist of the pelvis shows on the picture as a dot to the right ten degrees. The right shoulder was high seven degrees. The translation and torque of the patients shoulders showed also as a dot that was left five degrees.
- With my laser lights, I also measured the patient in the sagittal plane. His right ear was forward of his right ankle by six and one half inches. His right shoulder was forward two and one half inches from his ankle.

Now I adjusted this case as a low one with no rotation from his left side, on a single contact of his head at the mastoid area, on the standard NUUCA head piece. Post adjustment statistics were even better then I could hope for. Where the right leg was contracted one and one half inches, when in the supine position, the legs were then even. Now on the anatometer the percent weight differential went from the right side of 16.6% to a 4.5%. Again the right hip that was low six degrees then become even. The transverse plane, as read by the anatomoter was a posterior nine degrees, went to zero. The fixed point was a left three degree went to a right one.

The laser exam showed the pelvic girdle leveled from a tilt of six degrees and the torque of the pelvis which before registered a distortion of right ten degrees, came down to a right four degrees. The right shoulders that were high seven degrees, they leveled off to two degrees. The rotation of the shoulders was left five degrees and it came down to three degrees.

Here is one more very important dimension that the chiropractors never used to know. The laser dots on the right side of the patient's shoulders and pelvis indicates if there is a torque in the spine from the shoulder girdle to the pelvic girdle. One more point here is the adjustable shoulder harness, holding the laser lights, is generally narrower then the pelvic harness. In this case, if the dots were within four degrees of each other it would indicate that there wasn't any torque between the two areas. There was a indicated torque of 15 degrees from the shoulder harness to the pelvic harness before his adjustment that came down to 7 degrees. The laser lights in the sagittal plane showed the ear and shoulder were two inches closer to the line of his ankle. All this in one adjustment.

Neurologically, from our understanding, most of the time in type two cases, with no rotation, the left leg would have been contracted. It was the right one with one and one half inches. In other words there really is no one hundred percent predictability in how the spine will be distorted from a subluxation. This also includes the weight distribution as to which side it would fall on. The weighted side was severally on the right side of the pelvis by 22 lbs. and the pelvis was a severe right anterior of ten degrees.

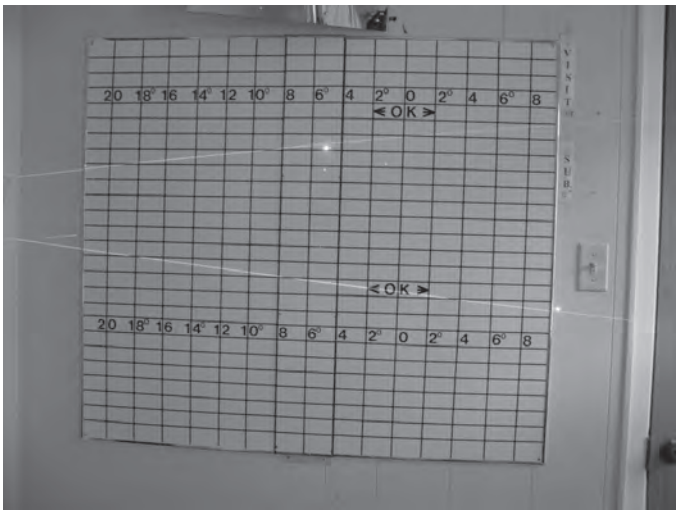
Dr. Friedman states that there should be a superior torque in this case. This was a left listing with a left spinous that required an inferior torque.

Although we do not treat symptoms, this 81 year old man's complaints were of Marie Strompels Disease for 50 years, lack of vitality for 2 years, legs were weak, "can't stand very long." He held this one and only adjustment for at least for seven months. At the end of that time he had no complaints. All symptoms recovered and he also stated that his Alzheimer Disease was better. He then made out a check to NUCCRA for $1000.00

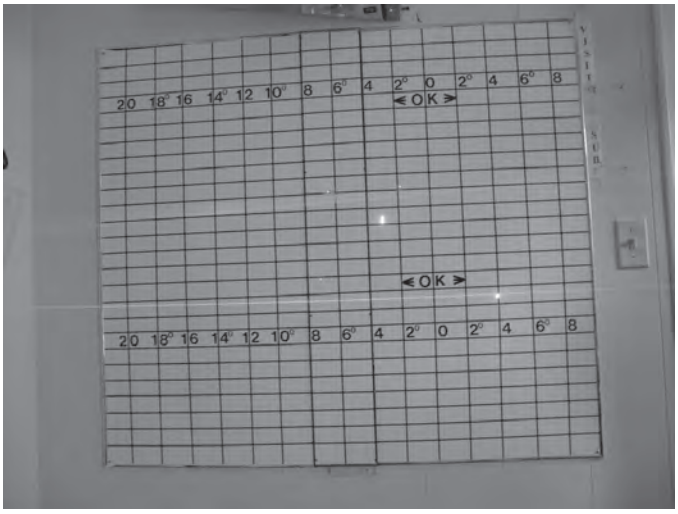
Now I want you to remember that every bone except the atlas was fussed. How would his pelvis become level and the shoulders improve if there wasn't any transfer of any movement throughout the spine. The only process that took place was the facilitators and inhibitors in the brain stem become balanced. Period.

I also want you to notice, in the pictures, that this patient's head was still tilted on the left side. This again disputes Dr. Friedman's idea that the pelvis and head must balance each other.

Laser Light Exam



Before:
Rt. Hip is low 6˚ & turned backward 10˚
Rt. Shoulder is high 7˚& turned forward 5˚



After:
Rt. Hip is level & turned backward 4
Rt. Shoulder is high 2˚ & turned forward 3˚

ADDITIONAL RESEARCH PROJECTS BY DR. M. DICKHOLTZ SR.:

1. Auditory and Somatosensory Evoked Potentials
2. Relative pre and post x-ray documentation of the cervical spinal subluxation complex for 50 years
3. Micro-line grids to reduce x-ray exposure to patients
4. Magnetic stimulation of the motor cortex of the brain
5. Lead filtration to produce sharper x-rays to reduce patient exposure
6. NDI Oswestry Study - 250 subjects
7. SF-36 Study-Comparison of Process and Outcomes Measures, 300 subjects
8. Chronic Fatigue Syndrome Study, - 20 subjects including brain scans, completed, waiting publication.
9. The effects of upper cervical specific chiropractic adjustment on blood pressure, plasma glucose and the autonomic nervous system in non-insulin dependent diabetics, with Life University and Rush Presbyterian-St. Luke's Medical Center Hypertension Center, paper in progress.
10. Outcomes of Patients with Headaches using the Henry Ford Hospital Headache Inventory paper in progress
11. The Abnormal Position of the Foramen Magnum for a Better Determination of Atlas Rotation
12. Control of Blood Pressure through Atlas Adjustment - project completed, Published in a major medical journal in 2006

INVENTIONS:

1. Cervical spine demonstrator
2. Chin centering device for cervical vertex x-ray
3. X-ray viewing boxes with rheostats
4. Vertex square analyzing instrument
5. Lead filtration kit to reduce radiation to patients and to show more detail
6. The first Upper Cervical Chiropractic adjusting table that moves vertically
7. Triceps developer for chiropractors
8. Triceps demonstrator for chiropractors
9. The Dickholtz Laser Light Spinal Analyzer

RESPONSE TO “A SHIFT IN THE PREVAILING WINDS”

By R. G. Cockwill, D.C.

INTRODUCTION

Dear Dr.’s Thomas and Scholten:

I read your paper in the last Monograph and was interested in the varied responses it generated. Some respondents agreed with your assertion that there is a “Shift in the Prevailing Winds” and changes must be made to survive in the 21st century. Some felt that things are fine just the way they are. Some offered historic insights into the trials of upper cervical chiropractors, others gave us their vision of the future. Many agreed, some didn’t. Criticisms were made and solutions were put forward. Some didn’t even understand the point of your paper. It was a dialogue and a debate. I loved it. I believe all of the respondents appreciated the opportunity to let others hear their voice. Through the opening of this forum an important first step has been taken in fulfilling our mandate bequeathed to us by Dr. Gregory to advance the work of upper cervical chiropractic. Since the death of Dr. Gregory the NUCCA Association hasn’t changed, but the healthcare environment has. By opening this dialogue you have allowed us the opportunity to collectively identify the challenges which we face and put forward possible solutions which will allow our work to first of all be recognized, and then respected. I too appreciate the opportunity to lend my voice.

My first upper cervical chiropractic adjustment happened when I was nine years old. Through the years I was able to witness the effectiveness of this type of therapy, both personally and through others of my family. I decided to make this my career. I went to school in what Dr. Gregory called “that medical school up north.” While upper cervical work was not taught and rarely mentioned in this school, it did provide me the opportunity to compare the theoretical basis and the effectiveness of these two somewhat opposing forms of chiropractic therapy. Since childhood, all of my previous chiropractic encounters included measurements of body alignment as well as detailed x-ray analysis of the upper cervical spine. A successful treatment resulted a straight and balanced spine. I also knew when this happened symptomatic improvement would always follow. This made sense to me. On the other hand, in college we were taught extremely subjective diagnostic procedures and were told to treat what appeared to me to be the secondary affects of spinal imbalance. This didn’t make sense. What puzzled me was why no one else could see this. Why wasn’t upper cervical work being taught in college? Why does upper cervical chiropractic occupy such a small niche in chiropractic and healthcare? It took a number of years of being a chiropractor and being in close association with the NUCCA organization to have some idea of the answer to these questions. As the respondents to your paper have made clear, there are a variety of opinions as to why others don’t understand what we do and why we are not universally accepted. I believe that the primary problem that we have is that we do not follow the rules which dictate understanding and acceptance. These are the rules of science. For hundreds of years these rules have been formulated to help us understand the world around us. These are very effective tools for separating wheat from chaff and identifying underlying truths. Unless we abide by these rules we can not expect others to understand or believe in what we do. Without this there will be no acceptance. Without this there will be no growth. I believe that the scientific validation of our work is the most important thing that we must accomplish. All other problems are secondary.

THE RULES OF SCIENCE

As you have pointed out in your paper, the healthcare environment is changing. The words “evidence based” are often used when third party payors or healthcare administrations discuss the disbursements of funds. Any product or therapy that is “scientifically proven” will gain acceptance. The higher the level of proof, the higher the level of acceptance. To prove something one must utilize an accepted and standardized protocol. You must follow the rules of science.

These rules state that any theory or hypothesis must have some level of objective proof before they are accepted. These proofs are obtained by objectively measuring cause and effect relationships. Controls must be used to detect statistically significant changes against normal variation. All investigators and subjects must also be blind in order to eliminate subjective bias. The data cannot be withheld from others. The way that the data has been obtained also cannot be withheld. Others should be able to duplicate the results in another independent study. Data must not be manipulated to fit a preordained conclusion. There is no guru or ultimate authority whose opinion cannot be challenged. In fact it is the duty of a scientist to expect and even welcome a vigorous challenge to any proposed theory. Any theory which withstands close scrutiny will possess obvious merit and is an important brick in the foundation of any knowledge. It is something solid to base scientific work upon.

Many times at NUCCA seminars I have heard that we are “scientific chiropractors”. Drawing lines on x-rays doesn’t make us scientific. Many of our assumptions and procedures that we base our work upon have not been scrutinized enough to possess any degree of scientific certainty. In many cases we are relying on assumptions. This not only happens in our association but throughout the scientific community itself. In an article that I have read, a biologist starts out by stating: “assumptions can be dangerous, especially in science. They usually start as the most plausible or comfortable interpretation of the available facts. But when their truth can not be immediately tested and their flaws are not obvious,

assumptions often graduate to articles of faith, and new observations are forced to fit them. Eventually, if the volume of troublesome information becomes unsustainable the orthodoxy must collapse." I believe that this is what happened in our association. Our assumptions have graduated to articles of faith. For us to move forward, our orthodoxy must collapse. This shift in the prevailing wind will demand that we become more scientifically mature and responsible if we are to survive and grow in the 21st century.

NUCCRA

The organization responsible for matters of science is the National Upper Cervical Chiropractors Research Association. It was formed to be a vehicle for the scientific advancement of upper cervical chiropractic. Its goals are: "to engage in a comprehensive research program designed to establish a scientific basis for the practice of chiropractic; to establish a body of acceptable knowledge that is testable, relevant to fact, and compatible with established and accepted scientific premises, beliefs, and assertions."

Dr. Gregory knew that where he had brought us to was not the final stage in the evolution of chiropractic. He knew he had a good beginning, but it wasn't the end. He also knew that in order to advance we must adhere to scientific principles. I believe that in the 15 years since Dr. Gregory's death the NUCCRA organization has failed miserably in attaining these goals. In order to fulfill these mandated goals the NUCCRA organization must begin some unbiased and unemotional introspection. Barriers to scientific advancement must be removed. Weaknesses and strengths must be identified and plans formulated to address any inconsistencies with accepted knowledge. Our underlying theories and assumptions must be critically analyzed along with the quality of their proof. Studies must be performed to validate our work. This is what the mission statement calls for and this is what must be done. As far as I am aware, not a single study has been published by this association in a peer reviewed journal. We must publish or perish. The past climate of the NUCCA organization openly and sometimes vehemently discouraged questioning of their principles. Dogmatic adherence to antiquated thought has prevailed. The science which supports our prevailing theories has been embraced, while that which doesn't has been ignored, trivialized, or swept under the rug. This has lead to the stagnation of our organization and is a huge impediment to our ability to advance and bring the wonders of upper cervical chiropractic to the world. There are many holes in our theoretical foundation that must be filled before we can expect acceptance and advancement. Unfortunately, filling these holes will be painful. Previous cherished thoughts and beliefs must be challenged. If these beliefs withstand scrutiny they will be accepted, if not, they will be discarded. How we perceive and administer our work may change, but the underlying truth will not. The upper cervical spine will always play an important and integral part in spinal health and our patients will always experience the often wonderful changes we have come to expect.

To build a firm scientific foundation certain steps must be taken. We must realize that there are different levels of scientific proof. The lowest in the hierarchy are anecdotal reports. Unfortunately this is what we rely upon. One patient feels better so they refer another in. Soon we have a busy practice. This helps us pay the mortgage but it does little in convincing others of the validity of our work. Watching late night TV will demonstrate many advertisements which proclaim miraculous cures. Ours is just another voice in the cacaphony. At the high end of the scientific scale are the randomized, blinded, clinically controlled trials. These are the Gold standard but are cumbersome and very expensive. This should be our ultimate goal but many other smaller steps can and must be taken before. This organization has already done some groundwork. NUCCRA has already shown that inter and intra observer reliability in x-ray analysis is good. Unfortunately more work must be done before we can demonstrate that the same patient, x-rayed twice, will show high correlation between readings, or that changes can be seen before or after an adjustment. It seems that these studies must be performed as a prerequisite to proclaiming that 80 percent corrections can be achieved 80 percent of the time. I do believe, and I observe all the time, that there are changes between pre and post x-rays, but quantifying these changes in a blinded matter has not yet been done. The results of this study will likely show that some of us aren't as good as we think we are, and the rest of us not as bad as we're told we are.

Other attempts at objectively verifying our work has also been attempted but experimental design flaws have often impacted validity. One study on pre and post anatometer readings showed excellent results. Every single patient was "zero'd" out after a single adjustment. Unfortunately it was one person taking the pre measurements, adjusting the patient, and then reporting post adjustment measurements. The flaws in this study are self-evident. Subjective and functional questionnaires have recently gained a level of scientific credibility and have already been preformed by this research association. These studies show favorable outcomes but control groups were not used so credibility slips lower on the scientific scale.

A critical look at past research on which we base our mechanical and neural models also possess weaknesses. Research on the center of gravity of the skull was performed on dry specimens, ignoring the weight of two thirds of the brain inhabiting the superior aspect of the calvarium. Our biomechanic model often runs contrary to accepted upper cervical biomechanics, and any engineer will tell you that there are obvious problems with the lever system. These and many more questions will arise with a critical review of our research and fundamental beliefs. Many theories may have to be altered. Some will withstand scrutiny, others will be discarded. By winnowing the facts from conjecture we can also hopefully simplify our unnaturally complex theories of upper cervical biomechanics and adjusting. The Gregory model has taken us this far but further advancement seems unlikely. Our biomechanical theories are reminiscent of early observations of the heavens. It was thought that Earth was the centre of the universe and all planets revolved around it. With closer examination it was disclosed that the sun, moon, and planets did not trace simple circular pathways around the Earth. To reconcile this observation, theories proposed epicycles, circles within circles, extremely complex calculations that finally

seemed to match observation. Finally it was Copernicus that came on the scene and showed that the planets actually revolved around the Sun, and they moved in ellipses instead of circles. What once required an entire blackboard for the mathematical calculations, could now be written on the back of a T-shirt. Complexity was reduced to simplicity. Unfortunately, then as now, challenging the orthodoxy has negative consequences. Fortunately in this age, house arrest or beheading are remote consequences. It seems that at this time we need a Corpernican solution to our mechanical theories. What we have is good but we can always improve. We must always strive for better and more consistent spinal corrections which will only with improved understanding of upper cervical biomechanics. Critical introspection of our theories and practice is essential for advancement of upper cervical work. Equally important is performing studies which validate our work. We must show people what we do and explain to them, in a logical manner, how it works.

WHAT WE DO

All of us that practice upper cervical chiropractic recognize some underlying truths in what we do. We can detect, through measurement, deviation of the spine and pelvis from the vertical. We also know that when a specific upper cervical adjustment has been given, reduction of these distortions can be seen. We also observe that when the spine becomes balanced, symptomatic improvement also follows. Our most basic premise is that a straight spine is a healthy spine. This is a good foundation for our work and one that will evoke little disagreement. The laws of physics are on our side for this one. We just have to show the world that we can actually improve the spines relationship to gravity. The chiropractic profession is hungry for proof of effectiveness. This shouldn't be hard to do. We do it every day in practice. Unfortunately, two of our cherished assumptions have become a barrier to obtaining this proof. We have been taught that less than one millimeter of osseous movement between the skull and atlas as seen on static radiograhps is the difference between a sick and a healthy spine. This millimetric misalignment putatively compromises the brain stem and leads to disease. We have also been taught that masters of this work can reduce most distortions, regardless of size, to within 80 percent of normal. If you do not get an 80 percent correction, you are not a good chiropractor, and your patients will never achieve optimal health. Even though these thoughts have permeated this association for years, not one credible shred of proof has been presented to validate these assumptions. I do believe that 80 percent corrections are possible sometimes. I also believe that there is a difference between a good and bad upper cervical adjustment. I believe that some of our members are extremely gifted and proficient at what they do and the quality of their work is the best that can be expected, but I've seen no proof that we can zero people out all of the time. Osseous anomalies are prevalent in the upper cervical spine and the range of error in patient placement and radiographic distortion inherent in static x-ray analysis precludes stating that we can "zero people out." This is the problem with the certification process. Parts one and two are fine. Showing that your x-ray machine is in alignment and that you can take an x-ray, accurately analyze it, and formulate a logical approach for vector adjusting is good and noble. Part three, however, requires 10 consecutive pre and post x-rays showing 80 percent correction or better. As I have stated before, there is not one shred of proof that this is possible. It is also suspicious that no one has yet volunteered to let anyone else see these miraculous corrections. This is very unscientific and unfair. It would be easy to design a study which would show objective changes in pre and post x-rays and I am confident that we could detect the difference between a pre and post x-ray. I do suspect, however, that the average correction would measure less than the 80 percent that we now profess.

To this date there has been minimal evidence that any chiropractic adjustment or manipulation does anything objective. Some studies have shown changes in cervical spine range of motion after a manipulation and some showed differences in pressure algometry readings. The only proof that chiropractic does anything is subjective pain and function questionnaires which show that we get people feeling better and back to work faster than any other physical modality or time itself. No one has shown that it is possible to determine if a patient has had a chiropractic adjustment or not. This is where we come in. I believe that it should be easy to design and implement a study which would show this. This would be ground breaking science for the chiropractic profession. We could finally demonstrate that we actually do something. This is the first thing that we must do to scientifically validate our work. The previous studies performed by this association which attempted to prove or quantify the difference between pre and post adjustment x-rays were fraught with errors. During the seminars and any other studies previously performed were done by one person taking the x-rays, adjusting the patient himself, re-x-raying the patient, and then reporting the results of their own post x-ray examination. This evidence is anecdotal at best and ranks low on the scale of scientific proofs. It is unfortunate that the accepted belief of 80 percent correction are based upon these kinds of studies. I believe that this ingrained belief has caused much detriment to our scientific exploration of the upper cervical work. Because of our failure to prove this pervading belief our exploration into the objective verification of our work has ceased. I believe this to be a big mistake. Objective measurement is our credo. Much work must be done before we can say that we get 80 percent or any other percent correction on anyone. We must start small and start with the basics. We cannot build a tower without building the foundation first.

To begin I would like to suggest a simple experiment. It is not expensive. It does not require a large team of researchers or banks of computers. It poses no health risk to the patient and is easy to implement. In spite of its simplicity it may have a profound effect on not only on upper cervical chiropractic, but chiropractic as a whole. This experiment will show if we can tell if the patient has had an adjustment. We are not concerned with 80 percent correction or zeroing anybody out. We just want to determine if we see a difference before and after an upper cervical adjustment. Fundamental stuff.

This experiment can be performed in any clinic. A number of patients (10 or preferably 100 or more) from an existing practice will be required along with two experienced clinicians and one independent observer. Clinician #1 will be responsible for measurement, clinician #2 will be responsible for the adjustment. Clinician #1 will first perform

measurements on each patient. These measurements may include leg length discrepancy , thermograph or electromyographic readings, anatometer readings, or various other structural assessment measurements commonly used in practice. Once these measurements have been taken each patient will be brought to a room with clinician #2. The observer will randomly choose if this patient is to receive an adjustment or not. Clinician #2 will perform an adjustment if directed and will be free to measure the patient to determine if an optimal correction has been obtained. Each subject, whether adjusted or not, will return to clinician #1 for a second set of readings. Once performed clinician #1 will record whether or not he believes this patient has or has not been adjusted.

This is a simple experiment yet it possesses objectivity. The primary observer is effectively blinded from anything that happens once the patient leaves the room. This essential feature is missing from most of the previous research performed by this association. It takes scientific maturity to put your beliefs to the test. Sometimes the results of an experiment are less than or even contrary to what is to be expected or hoped for. In spite of this possibility of failure, I feel confident that the results of this experiment would weight in our favor. Every day I measure people and I adjust them. I see changes occur. It should be easy to show to others that these changes are not a construct of my imagination, but are visible to anyone with means of observation.

I believe that this experiment is a good beginning but must be improved upon. Hopefully most of you are aware that there is a small flaw in this experiment. In this experiment that observer is blinded to whether or not the patient has had an adjustment, but the patient is not. To make the conclusion of this study higher on the scale of scientific reliability the patients themselves should be unaware if a treatment has been given or not. This is standard procedure for any drug company who gives placebos to subjects to act as controls. This is even done when studying surgical procedures. In surgical studies, even though only half of the subjects are subjected to surgery, all of the subjects receive an incision so that all are unaware if any surgery has been performed. These “placebo controlled” trials are the ultimate in scientific proof. Unfortunately in the chiropractic profession no one has been able to perform a placebo manipulation. You know when you’ve been manipulated. This is impossible to fake. Fortunately for us our adjustment is easy to fake. Most people don’t feel anything more than gentle pressure from the heel of the hand when a properly delivered upper cervical adjustment is performed. This is in our favour. A placebo adjustment can be performed by placing the skull in the centre of the head piece in a neutral fashion and applying a very light pressure to C4 without activation of the triceps. If this is done to people unfamiliar with our work, they should be unable to determine whether or not an adjustment has taken place. Fortunately for us a very high percentage of our patients do eventually experience changes in how they feel, but most are surprised at the noninvasive character of our adjustment.

This study can also be modified to show if we can tell the difference between an upper cervical adjustment or a sham procedure by taking pre and post x-rays measurements. One expert clinician will be required to take the x-rays on all patients before and after their visit to clinician #2. The clinician performing the x-rays must also be blinded so that bias will not occur by the taking of the post x-rays. I believe that in the last few years at the NUCCA seminars it is being taught that you should straighten the patients skull during the post x-ray if their ears appear level in the standing position. While this may make your post look better, it will not demonstrate objective change, nor will it make your patient feel any better. If you don’t straighten the patient for the pre x-ray, why would you straighten them for the post x-ray? Once the pre x-rays have been taken, a sham or actual adjustment given, and post x-rays taken, any number of observers can be used to conclude whether an adjustment has been given or not. If statistical analysis can demonstrate that we can determine with a high degree of reliability that we can see measurable changes when an adjustment is given, an important milestone will be reached for all chiropractors. Determining the percent correction obtained from various practitioners with different levels of experience, or correlating percentage correction with improvements in health or stability of the adjustment are studies to be done at a later date. We just have to start by showing the world that we can make measurable and objective changes to the spine. Most people agree that a straight spine should be healthier than a crooked spine. No one has yet shown that this is possible to achieve. If we can do this many people will be attracted to our work. We just have to prepare ourselves for our second problem: Explaining how it works.

HOW IT WORKS

On a fundamental level we all agree on what we do. Explaining how it works is another matter entirely. Not only our group but the entire chiropractic profession has struggled since its inception to formulate and scientifically validate various theories of spinal health, disease, and the effects of the chiropractic adjustment. It began with D.D. who postulated nerve compression as the etiology of disease. B.J. later observed that the atlas lies near the brain stem and neural compression in this area could have profound ramifications throughout the body. Since his time diversified and upper cervical chiropractic has diverged. The majority of our profession has abandoned nerve compression or bone out of place theories and have embraced a more dynamic model of spinal function. Their theories postulate that abberant vertebral motion underlies spinal dysfunction. Restoring optimal motion between fixated segments through manipulation is the objective of their therapy. Their theories have evolved over the last 100 years through the incorporation of new data and observations. On the other hand, the upper cervical profession has remained true to the brain stem interference model. B.J. initially proposed that the brain stem could be compressed when the atlas misaligns on the condyles of the skull. This was simple yet logical. It explained the wide and varied symptoms seen in people who possess an upper cervical subluxation. Even though problems in this theory were discovered, namely the fact that there is lots of room in this area and compression of the brain stem is impossible without extreme vertebral excursion, this theory was not abandoned until the advent of a new brain stem interference model, the dentate ligament tractionization theory. To this day this theory is one of the NUCCA association’s central tenants. Unfortunately there are two problems with adopting this neurological theory.

The first is that it is possesses obvious flaws, the second is that, owing to the divergent evolution of chiropractic theories, the rest of the profession and healthcare at large has no idea what we're talking about. No one has heard of brain stem compression outside of chiropractic history classes in college. Dentate ligaments are not mentioned outside of anatomy class. We say 3/4 of a degree of laterality causes neural interference. The world believes that the normal range of motion of the upper cervical spine far exceeds this amount. We say we can detect 3/4 of a degree of misalignment. They believe osseous anomalies exist and no one is perfectly straight. We say lower back problems originate from nerve pressure in the brain stem. They believe that lower back problems are lower back problems. As we can see this theory does not mesh well with what is known or what is accepted. As far as they are concerned, we are living on a different planet.

The second step which must be taken to validate our work and to enable growth is to bridge the gap between our group and others. As discussed before, the accepted language for communication is science. The NUCCRA mission statement calls for us to "test existing theories and to establish a body of acceptable knowledge that is testable and compatible with established and accepted scientific theories." To this date little has been done to achieve these goals. Because of this our scientific foundations are not very stable. We have a lot of work to do to bring out theories in line with accepted scientific thought before we can expect productive rational discourse with others. One must first identify a problem before a solution can be suggested. It is always best that we discover our own problems before others point them out to us. This association's insistence in clinging to old beliefs in spite of contradictory evidence is why we still remain a fringe element, why our numbers haven't grown, and why we still remain "the best kept secret" in healthcare.

One of our biggest problems is the dentate ligament tractionization theory. As most of you are aware the main problem with this theory is the little pesky fact that all evidence overwhelmingly supports the notion that the upper cervical spine moves. In fact everyone else in this world believes that it moves except for this association. It has been established that this area has normal movement far in excess of the 3/4 degree postulated to be the maximum amount of normal movement allowable before brain stem interference can be seen. This is a big problem. This problem must be fixed. You can drive a truck through the holes in this theory. Unfortunately, this association has ignored this problem and has yet to explore or validate any other theories which may describe what we see in a way that is based on scientific evidence. We have been looking at static x-rays for so long that we now fail to see anything else. The joints in the upper cervical spine were designed to move, and there are lots of little muscles which facilitate this. We must reconcile our theories with the dynamic nature of the spine. It has to be done sooner of later, so we might as well do it now.

In a dynamic upper cervical subluxation model we can readily agree that the spine moves, but does not return to its' optimal position when at rest. This is what we detect and treat. When we take our x-rays our patients are in their neutral, natural, upright posture. This is the best that they can do against gravity. Our x-rays and other measurements detect excursions of the spine from the optimal norm. We see spinal misalignments. We see tilted pelvises and shoulders and leg lengths inequality and extensor imbalance. In the past we've attributed these static misalignments and imbalances to brain stem dysfunction. There is a second theory which explains these observations in a much more scientifically acceptable manner. The literature is rife with researchers extolling the influence the upper cervical spine has on spinal balance. One well known researcher states that "the evidence that the neck plays in the crucial role of posture is overwhelming." Another states that "it is almost impossible for others systems of the nervous system to function normally when there is a lack of stability, coordination, and purposeful movement patterns at the cervical level of the body. This area is the key point for controlling the head and the rest of the body in relation to the head." Yet another scientist says "mechanoreceptors are responsible for the tonic neck reflexes and are located in the joints between the occiput, atlas and axis. With mechanical derangement of the upper cervical spine, these mechanoreceptors are capable of producing secondary derangements lower in the spine, pelvis and even the extremities, by creating muscle tone imbalances between right and left sides." None of these researchers are chiropractors. They're saying exactly what we've been saying for years. Neck, head and body orienting reflexes are responsible for our upright position in relation to gravity. It is easy to tie in upper cervical misalignments with compensatory changes in extensor tone and the resulting spinal and postural distortion. By specific upper cervical adjusting we eliminate any compensating mechanisms and allow the spine to become as centered and balanced as possible. This is the ideal state for neutral stance and the best starting point for optimal vertebral motion. This is where we can tie in our theories with those of others. Diversified chiropractors state that aberrant vertebral motion is the cause of vertebral dysfunction. They look for vertebrae which are in effect, locked together, and call it a vertebral fixation. Manipulating fixations is how they treat the spine. These chiropractors state that one of the reasons why these vertebrae become locked together is because of postural distortion. They agree with us that if the spine isn't straight it won't move properly, and various segments will not have proper coupled motion. They use terms like "changes in the instantaneous axis of rotation" or "segmental vertebral facilitation" to describe these findings, but it all boils down to problems with spinal alignment. Unfortunately they also believe that spinal misalignments are natural because no one has shown that they can do anything to change these. This is where the first step in our research agenda comes into play. If we can show that we can improve alignment, it must logically follow that we can therefore change spinal movement. By leveling the leg lengths and pelvis and by balancing the bilateral extensor tone and by returning the centre of gravity of the spine to the centre of the disc, all articular structures throughout the spine will be in a more optimal state. This would better explain how we help so many people with lower back problems, even though we only adjust the upper cervical spine. Instead of adjusting the atlas to unpinch the nerves that go to the lower back, we adjust the upper cervical spine because it has the most profound influence on the tone and balance of all spinal extensors, and hence the positioning of all spinal structures. We can and must admit, however that at this point we don't know for certain how our adjustment works. We can however show that there is a preponderance of evidence in the literature which shows a strong link between the upper cervical spine and the rest of the spine as a whole. This explanation will be more palatable to others who have never

heard of brain stem tractionization. This will also make more sense to new graduates who are more up to date on current theories and research and are taught to be naturally skeptical of unsubstantiated claims. The rules are different in this new era of healthcare.

So far we have shown people that by adjusting the upper cervical spine we can make objective improvements in spinal alignment and balance and have offered a credible explanation of how this occurs. We've only one more thing to do. We have to explain how the tricep pull adjustment works. Let's face it folks, it's a little bit weird. When I had my first upper cervical adjustment I never felt anything. I certainly did a little bit later, but not at the time of the adjustment. We hear this from our patients all of the time. How many of us have been called "that voodoo doctor"? How many of us have had a hard time explaining to colleagues what it is exactly that we do. Most chiropractors haven't a clue. All they have heard is second hand reports from past patients of ours. The tricep pull is a mystery to them. It is a mystery to us as well. Our patients know that it works by the way that they feel. We know that it works by the changes in our measurements. We also strongly suspect that there is a big difference between the tricep pull adjustment delivered by a seasoned veteran of this work as compared to a novice. We must set about measuring the forces generated by the adjustment; the frequency, the amplitude, and vector of force. More biomechanical research is needed to accurately describe how these forces are generated. Our current explanation is very rudimentary and does not fully describe what actually happens or how it works. Much more must be done. By the way, what really makes the popping noise?

CONCLUSION

Upper cervical chiropractic has a deep and rich history that dates back to the days of B.J. Palmer. Many of our compariots cherish the traditions and beliefs that followed. They revel in the mystery of the adjustment and enjoy the simple elegance of brain stem interference to explain the relationship between atlas subluxation and ill health. They are more concerned with mastering the biomechanics and administration of the adjustment instead of worrying about theoretical incongruities. After all, it doesn't matter how sick people get well, as long as they do get well. As you have stated in your article, there is a "change in the prevailing wind." There are storm clouds on the horizon. This is an era of accountability with evidence based therapies being accepted. We need to be accountable. We need evidence. For the last 15 years the NUCCA organization has been trying to preserve the work of Gregory instead of building upon it. Gregory knew NUCCA must change in order to survive. He even created an instrument for this change: the NUCCRA. Unfortunately we have failed in carrying out his mandate. We say that we are scientific yet do not adhere to the rules. Instead of trying to preserve the works of Gregory, Grostic and Palmer, we should try to tear them apart. By chipping away at the years of encrustation we will discover inside a beautiful gem of truth. Scrutinizing our work will never diminish its' importance. It will just lead to better understanding and provide a solid foundation on which to build. Standing aloof and apart and ignoring criticism hasn't got us anywhere. We are vigorously defending a crumbling fort with no reinforcements to be seen. Our numbers haven't grown. Our corrections haven't improved. We have little evidence to validate what we do. It is no wonder that the world at large has not embraced us. You said in your paper that we are the "best kept secret in healthcare." This is unfortunate. How many times have you heard from a patient "why don't all chiropractors do what you do"? This association is poised to bring chiropractic to another level. Unfortunately we have been poised for years. What we do is objective. We can measure changes in patients. No other chiropractor can say that. Unfortunately we have been burdened by the prevailing thought that good chiropractors get 80 percent corrections, and that spinal health is restored by unpinching brain stems. The first is a myth, the second unsubstantiated conjecture. If we can get past this and show people that we can make positive changes to spinal alignment, and that when this happens peoples spinal health improves, and explain how it works in a logical manner, people will be drawn to our work. The best kept secret will be secret no more. Without this evidence we can never expect to grow. Without scrutiny we cannot provide evidence. That is the catch.

The NUCCA Organization does not own the upper cervical adjustment. Others will eventually discover what we know. Others will recognize the important role that the upper cervical spine plays in spinal health and will devise methods of treatment. This will inevitably happen. What we must decide is whether we will be leaders, or simply a footnote in history. We must remove roadblocks to progress and we must learn to play well with others. We must foster a more open environment and encourage original thought and ideas. We must embrace the rules of science instead of just paying lip service. We need to become "spine aligners" instead of "brain stem unpinchers." We must not be afraid to explore. What we do is the next stage in the evolution of chiropractic. In the future, balancing the spine will be the primary intervention for spinal dysfunction. We can leave manipulation to the physiotherapists. We must start asking ourselves the tough questions before others inevitably do. We must allow insight from others and staff our research association with researchers. The NUCCRA mission statement clearly outlines its objectives. We should adhere to these objectives as mandated, or change the mission statement to read: "for the study and perpetuation of the hand adjustment as taught by Gregory." Either way, we will be clear on where this association stands.

I would like to thank Dr.'s Thomas and Scholten for opening this dialogue and allowing the monograph to be used as a vehicle for the exchange of thoughts and ideas. Prior to this time no forum has existed for this purpose. One big impediment has been removed.

Sincerely

R.G. Cockwill, D.C.
(Former member NUCCA)

Intra-examiner Reliability of National Upper Cervical Chiropractic Radiographs- a Necessity for Further Upper Cervical Research

By

Marshall Dickholtz, Sr., D.C. and H. Charles Woodfield, III, D.C. RPh

Abstract: Intra-examiner reliability of the lead author in measuring atlas laterality was tested randomly by drawing 24 files from approximately 1000 patient sets of radiographs and then randomly drawing one nasium radiograph from each of the twenty four files. A double blind protocol was used. Statistics reflect that the lead author succeeded in consistently obtaining similar atlas laterality measurements on a given radiograph.

Introduction: Intra-examiner reliability in marking and analyzing upper cervical radiographs is paramount for research based on the NUCCA procedure. *(Because X-ray measurements have historically been the gold standard in measurement supporting the efficacy of the NUCCA procedure , it is also mandatory for the NUCCA chiropractor to be able to consistently determine a line-of-drive based on a set of pre-adjustment X-ray measurements and to be able to measure consistently the post-adjustment results. Unlike the preponderance of the profession, the X-ray is all important. Unlike the preponderance of the profession which has pain as the major symptom, the major symptom for NUCCA doctors has been posture. Posture has been important because, as Nobel Laureate Roger Sperry has stated: "Better than 90 percent of the energy output of the brain is used in relating to the physical body in its gravitational field. The more mechanically distorted a person is, the less energy available for thinking, metabolism, and healing." Ed.)* This paper reports the results of an intra-examiner reliability study developed through a multi disciplinary team of MD's and DC's utilizing the resources of the involved institution, Rush Presbyterian Hospital, Chicago, Illinois. Establishing the lead author's reliability in reading and marking X-rays as a means to demonstrate the degree of atlas alignment will allow for further credible research using this author and while also suggesting a similar level of reliability for other NUCCA certified doctors.

Upper- cervical chiropractic bases the outcome of its work on specific upper-cervical radiographs, following protocols developed by John Grostic, D.C., and Ralph R. Gregory, D.C., whose pioneering atlas adjustment developments have been codified and formalized in the National Upper Cervical Chiropractic Association (NUCCA) protocols.

The NUCCA upper cervical radiographic series consists of three views: cervical lateral, nasium, and vertex. The cervical lateral view provides measurements for the angle of the S-line view and the plane of the posterior arch of the atlas, thereby allowing for setting of the tilt of the x-ray tube head in order to obtain the proper and most accurate nasium film. The nasium film is precisely marked and measured to obtain the atlas laterality which is measured in degrees. The vertex view illustrates the rotation factor in the transverse plane (anterior or posterior) of the atlas misalignment (subluxation). Because measurements are miniscule and critical, these radiographs must be of absolute clarity and the measurement procedure must be able to be reliably reproduced. Accuracy in determining the Atlas misalignment depends upon patient placement, aligned x-ray equipment, near perfect radiographs, and the precision marking skills of the practitioner.

Several studies on intra-examiner and inter-examiner reliability on marking and reading upper cervical radiographs have appeared in JMPT and to a much lesser extent in the Monograph.[1-2,4-5] Previous NUCCA investigations have presented criticism in the intra-examiner reliability of the investigating chiropractor's ability to mark radiographs.[3] Therefore it is imperative to establish a baseline in which to credibly and reliably enter the realm of future investigations. The purpose of this study was to show the intra-examiner reliability of the investigating chiropractor in order to establish the validity and repeatability of accurate line drawing for further scientific inquiry based on the NUCCA chiropractic procedure and protocol.

Methods

The research question is concerned with the ability of an observer chiropractor, defined in this study as the rater, to obtain consistent (precision) measurements with the same set of X-rays over a period of time, thereby determining the reliability of the rater. A double blind protocol was developed with consultation of a biostatistician to ensure reliability of a single rater assessing/measuring using NUCCA X-ray procedure on 24 radiographic films, two times each yielding 48 measurements, to establish the level of the intra examiner reliability of the rater. The rater has been marking X-rays for approximately 50 years. The study consisted of the following personnel: Research Materials Coordinator, (RC), the blinded reliability rating doctor (RD) who is the first author, Project coordinator (PC), and the Objective Research Assessor/Analyst (OA).

Procedure: Step by step.

1. The RC randomly selected radiographs from the lead author's clinic film library of the last five years consisting of over 1000 patient sets of radiographs.
2. The RC was solely responsible for film selection. To maintain blindness, any RD consultation on research-material selection was not allowed and would have required project abandonment. Although study materials rated only nasium views of 24 sets of pre- and post-adjustment films, the RD was provided each subject's appropriate vertex view as well for reference.
3. The RC cleaned the films of diagnostic marks and packaged each set of films in an individual envelope (pre- or post-adjustment nasium and the vertex) and shipped them via Federal Express to the PC.
4. The PC designed a two-phase, non sequential coding/project film-tracking system which did not differentiate between pre- and post-adjustment films. The PC marked each nasium film with its Phase-1 code (A-Z), attached to it the appropriate vertex film, removed all identification labeling, and saved the film ID for later reattachment. The PC repackaged all films and returned them to the RC via FedEx.
5. The RC received Phase-1 package, holding it sealed, until Rater's Phase-1 measuring session was scheduled.
6. The Rater marked and measured coded Phase-1 nasium films (with access to accompanying vertex films for reference) per NUCCA protocol, and returned films to the RC for FedEx shipment to the PC.
7. The PC received Phase-1 research materials, produced digital reproductions of each marked/coded film for archival purposes, and submitted all original films to the OA.
8. The OA recorded markings of all pertinent angles by coded film and then returned the films to the PC.
9. The PC meticulously cleaned all films (thereby removing Phase-1 coding) with special regard for emulsion maintenance. The PC then replaced the Phase-1 coding with different Phase-2 codes and returned the films to the RC.
10. The RC received Phase-2 package and held it sealed until the Rater's Phase-2 measurement session was scheduled.
11. The Rater marked and measured coded Phase-2 nasium films (with access to accompanying vertex films for reference) per NUCCA protocol, and returned films to the RC for FedEx shipment to the PC.
12. The PC received Phase-2 research materials, produced digital reproductions of each marked/coded film for archival purposes, and submitted all original films to the OA.
13. The OA recorded the markings of all relevant angles by coded film and then returned the films to the RC.
14. The PC meticulously cleaned all films, removed all coding, reattached original film identifications, and returned the films to the RC.
15. The RC received the films and restored them to the X-ray archives.

At this stage of the study the OA compiled the data and analyzed it using the SPSS software package to find the Pearson Correlation Coefficient per suggestion from the bio-statistician consultant who is on the staff at Rush Presbyterian Hospital.

Marking: On the nasium X-ray a solid cephalocaudal line is drawn to bisect the symmetrical portion of the parietal bones. Next a solid horizontal plane line is drawn to parallel the inferior attachments of the atlas' posterior arch at the most lateral junction of the right and left sides of the lateral masses. By comparing the lines to each other the degree of atlas misalignment is determined. *(Due to the darkness of the paper copies that had been submitted of an example of an X-ray from phase one and two, they have been omitted from this paper. Ed.)*

Results: The resulting data (Table 1) and the Pearson Correlation Coefficient value obtained (Table 2) reflect the ability of the rater to reliably mark and measure atlas laterality on radiographs according to the NUCCA protocol. Table one (1) reflects the raw data and includes the date of the X-ray, the Phase-1 Readings of both atlas laterality in degrees and side of laterality (left or right), the corresponding Phase-2 Readings, and the absolute value of the differences.

Discussion: The first author (rater) has taken great care in reducing errors of magnification and distortion and uses special screens to insure high quality X-rays. This is achieved by using high quality lead filters, an optimized X-ray tube port and a 10X12 grid carrier; a focal spot to film distance is 42 inches. A special grid reduces exposure by 40%; it consists of 150 lines per inch, 8:1 ratio, width to depth, carbon interspacing and is carbon fiber covered. The X-ray equipment has been properly aligned and patient head placement is facilitated with head clamps placed toward the tip of the mastoids giving a more secure and centering position.

The chiropractic literature returns little in terms of documenting upper cervical chiropractic X-ray procedure and reliability studies. Most research has been reported in technique -specific, non-refereed journals. The National Upper Cervical Chiropractic Research Association (NUCCRA) has investigated and reported in the Upper Cervical Monograph their own analysis of reliability on rotatory measurements of X-rays.[1] Seemann reported a 0.98 Pearson coefficient using a series of 9 films. This study yielded a Pearson coefficient of 0.90 for 24 films. Coefficients of at least 0.90 signify high reliability; in this case an error of less than one-third of a degree variation per film. *(The Sigler and Howe study, the first one of its kind to be printed in JMPT, was found to be seriously flawed by this Editor. Ed.)*

Table 1 indicates that 8/24 had no difference in Phase-1 and Phase-2 readings while 10/24 had a larger first reading and 6/24 had a smaller first reading, relatively evenly split.

Conclusion: From this study it can be seen that the rater can repeatedly and reliably mark radiographs to be used in any future multidisciplinary research study.

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X-ray date	Phase I Reading (degrees) (L=left ,R=right)	Phase II Reading (degrees) (L= left, R= right)	Difference (Absolute)
01/08/01	2.5 L	2.0 L	0.5
10/25/00	2.75 L	2.0 L	0.75
01/05/00	1.75 L	1.75 L	0
03/27/00	0.25 R	0.75 R	0.50
03/21/01	1.75 R	1.25 R	0.50
03/21/01	1.00 R	0.50 R	0.50
11/01/00	1.00 R	1.50 R	0.50
02/21/01	1.50 R	2.00 R	0.50
11/03/00	1.25 L	1.25 L	0
04/02/01	1.25 L	1.25 L	0
03/23/01	1.00 L	0.75 L	0.25
04/16/01	0	0	0
04/28/00	1.00 R	0.50 R	0.50
04/20/00	1.75 L	1.75 L	0
04/30/00	1.75 L	1.75 L	0
05/15/00	3.00 R	2.50 R	0.50
03/28/01	3.00 L	2.50 L	0.50
06/30/00	2.00 L	1.50 L	0.50
07/14/00	2.50 L	2.50 L	0
06/19/00	2.00 L	1.50 L	0.50
02/23/01	1.25 R	1.50 R	0.25
05/03/00	2.00 L	2.00 L	0
05/01/01	0.50 R	1.00 R	0.50
11/08/00	3.00 L	3.50 L	0.50

Table One: Phase I and Phase II Compiled Raw Data and Results

New Proposal for the NUCCA Technique

by Marshall Dickholtz Sr., D.C.

Let me start with reference to two statements that Dr. R. Gregory stated in his Biomechanics Principles.

1. Into the Kink type case, or the second basic type case it may be necessary to lower the height vector. In such cases the torque should be increased if the spinous process of C2 is on the side of C1 laterality.

2. The smaller the size of C1 laterality, the more that the height vector can be lowered in basic types two and three. Conversely, the larger the degree of C1 laterality, the less the height vector should be lowered.

I propose that all references to a misalignment of the axis body to the inferior articulations of the lateral masses of the atlas be removed when looking at nasal x-ray films.

In its place I want to reference the lower cervical angle to the vertical axis.

On type one, if the cervicals are off the vertical axis of four degrees or more the doctor should add another inch to the computed height vector, but keep in mind that if there is any rotation, the percentage of change to the height vector should be added to the rotation vector.

On type two's, when laterality does not exceed two degrees; subtract one half inch from the height vector for every degree that the lower cervicals are off the vertical axis.

I'm assuming that the nasal x-ray film was taken correctly with the same angle of the head as when the patient was standing. This can be done when the patients ear lobes were used as a reference to a horizontal line chart on a wall.

Lead markers placed on the ear lobes will indicate how accurate the nasal film was taken. A horizontal line that was made of lead should have been imbedded in the grid carrier. This helps in markings comparisons.

One more statement, when looking at the post x-rays, if every measurement did not reduce proportionately, you then decide if the victor should be changed. Did you go to high, too low, did you not stand out far enough or maybe more pelvic tilt for rotation. Atlas laterality is always the main factor even if the lower cervical are not in the vertical axis or at 90 degrees to the atlas plane line.

There is another dimension on a nasal film that I wish to point out. Generally the spinosus in a nasal film are in a fairly straight line. Occasionally there is a curve.

This curve and angle radiates throughout the spine. Additional consideration has to be given for this new understanding.

The point here is the adjusting height vector should be changed up or down another inch depending upon how the furthest point of the spinosus related to the rest of the spinosus "There are no twisted vertebrae on the ventricle axis" ("Dr. R. Gregory").

Keep in mind that when the head is tilted into the subluxation, a round head piece should be used (types 2, 3 & 4).

On types 2, 3, & 4, when the head tilt (in Degrees) is off the vertical axis more than there is laterality, the tip of the mastoid should be used as the fulcrum.

If the head is off the vertical axis 50% of laterality, the head should be braced one half way down from its center of gravity to the tip of the mastoid, and so on.

Observation on a Patient Showing a Close Relationship Between Dental Alignment and the ASC

By, G. Hasick, D.C.

Over the past years I have been working to further understand the relationship between dental occlusion, alignment of the teeth and TMJ influence on the Atlas subluxation complex. It appears there is a very close relationship between dental alignment and atlas subluxation complex influence.

I recently had a patient attend my clinic in April of 2006 with complaints of headaches and pain in her right neck possibly related to a dental appliance fitted in January 2006. This patient had originally consulted me for care in April 1996.

In 1996 she had symptoms in her neck, shoulders, and midback. At that time I found her to exhibit the findings of an atlas subluxation complex syndrome. Care was initiated and her pre x-ray listing showed an atlas left 2 laterality with posterior 3-½ rotation. Her lower angle was a right 4 ½ with a + 4/16 plane line. The subluxation was corrected to left 0 posterior 1 ¼, lower angle of right 1 ¾ and a plane line of + 3/16.

Her initial examination of April of 1996 revealed a total of 23 degrees of postural asymmetry as recorded on the gravity (postural) stress analyzer (GSA). This instrument, for those who are not familiar with it, is similar to the anatometer. The GSA measures lateral displacement, rotation and translation of the pelvis, shoulders and head. The normal value for postural stress should range somewhere between 0 and 5 degrees. Twenty-three degrees is also considered an average amount of postural distortion for a patient presenting with an atlas subluxation complex.

Following correction of the atlas subluxation, her postural measurements returned to within normal limits. This occurred shortly after the initial correction and she maintained that alignment well over a number of years. Her last visit prior to her revisiting the clinic in April 2006 was Oct 20th 2003. At that time she had retained her spinal correction and her last adjusment was in Jan 2000. The patient was asymptomatic and did not experience any significant problems. She demonstrated excellent stability with her misalignment and was seen periodically over the period between 1996-2003.

Upon presentation on April 17, 2006 she experienced headaches and pain on the right side from her neck to the ankle. She felt quite a bit of postural stress and discomfort. She had a gall bladder surgery in October of 2005 and had braces installed in 2004 that she wore for 2 years until January of 2006. At that time she was fitted with an upper and lower dental appliances to further assist in her dental reconstruction and occlusion improvement.

On April 17, 2006 her postural measurements while wearing the dental appliances recorded 34 degrees on the GSA. Again normal should be 0-5 degrees and this is considered a severe amount of postural stress. I had her remove her dental appliances and re-checked her posture. Without the appliances her GSA findings were 16 degrees of postural distortion. A new series of x-rays was taken and the listing was very different from her original x-ray listing.

She presented with an atlas right 1 ¼ degree with anterior 5-degree rotation; the lower angle was left 3 degrees with a plane line of +1 ½ 16 ths. An additional nasium x-ray was taken while wearing her dental appliances. There was no significant difference between the other pre-nasium films taken and the third nasium with the dental appliances in. There was only a ½ degree difference in the laterality and a ¼ degree difference in the lower angle. The plane line remained the same as compared to the nasium with out dental appliances.

From these findings it appears that the dental appliances increased the amount of structural / neurological stress experienced by the patient. However, the appliance did not change her x-ray listing significantly.

A NUCCA adjustment was performed and her post x-ray readings exhibited an atlas of right 0 laterality with an anterior 1-½ rotation. She had a lower angle left ½ and the plane line +0. Her postural re-evaluation on the 18th of April 2006 following the initial correction revealed 1 degree of postural imbalance on the GSA with out her wearing the dental appliances. When she wore the dental appliance and was re-checked again, she measured 16 degrees of postural asymmetry.

The patient was referred back to her dentist for refitting of her dental appliances. She was refitted with a new appliance and rechecked on May 5 th 2006. At that time her postural evaluation was in normal limits and she was maintaining her correction of the atlas subluxation complex. Her symptomatic picture improved significantly and she once again maintained good stability.

It appears there is a close relationship between the stability of the atlas subluxation and dental occlusion, particularly dental appliances that are fitted to assist patient occlusion. We have made it protocol in our practice to evaluate the patients posture and leg check measurements with the appliance in and with the appliance out. If it's found that the appliance creates additional structural stress then a recommendation to revisit the dentist to have the appliance adjusted or refitted is made. The patient is then re-examined to ensure that the dental appliance once readjusted and refitted does not increase the patients' structural asymmetry.

Working closely together with dental community helps to ensure that the patient regains the best structural balance and symmetry that's ideal for them. It appears that additional research needs to be done in this area to further quantify our NUCCA protocol and how it can influence the dental occlusion.

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Co-ordinated mandibular and head-neck movements during rhythmic jaw activities in man.

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Recent observations in man of concomitant mandibular and head movements during single maximal jaw-opening/-closing tasks suggest a close functional relationship between the mandibular and the head-neck motor systems. This study was aimed at further testing of the hypothesis of a functional integration between the human jaw and neck regions. Spatiotemporal characteristics of mandibular and associated head movements were evaluated for 3 different modes of rhythmic jaw activities: self-paced continuous maximal jaw-opening/-closing movements, paced continuous maximal jaw-opening/-closing movements at 50 cycles/minute, and unilateral chewing. Mandibular and head-neck movements were simultaneously recorded in 12 healthy young adults, by means of a wireless opto-electronic system for 3-D movement recordings, with retro-reflective markers attached to the lower (mandible) and upper (head) incisors. The results showed that rhythmic mandibular movements were paralleled by head movements. An initial change in head position (head extension) was seen at the start of the first jaw-movement cycle, and this adjusted head position was retained during the following cycles. In addition to this prevailing head extension, the maximal jaw-opening/-closing cycles were paralleled by head extension-flexion movements, and in general the start of these head movements preceded the start of the mandibular movements. **The results support the idea of a functional relationship between the temporomandibular and the cranio-cervical neuromuscular systems. We therefore suggest a new concept for human jaw function, in which "functional jaw movements" are the result of activation of jaw as well as neck muscles, leading to simultaneous movements in the temporomandibular, atlanto-occipital, and cervical spine joints.**

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Temporal coordination between mandibular and head-neck movements during jaw opening-closing tasks in man.

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Previous finding of concomitant mandibular and head movements during jaw function suggest a functional relation between the human jaw and neck regions. This study examined the temporal coordination between mandibular and head-neck movements during maximal jaw opening-closing tasks, at fast and slow speed. Twenty-four healthy individuals, median age 25 years, participated in the study. They were seated with firm back support but without head-neck support. Mandibular and head movements were simultaneously monitored by a wireless optoelectronic system for three-dimensional movement recording. The timing of head movement in relation to mandibular movement was estimated at defined time-points (start, peak, end and maximum velocity of movement), and during the entire course of the jaw-opening and jaw-closing phases. The results showed that the head in general started to move simultaneously with or before the mandible, reached the peak position simultaneously with, before or after the mandible, and reached the end position after the mandible. A higher degree of temporal coordination was found for fast speed at the start and the peak positions. The head most often attained maximum velocity after the mandible, and mostly lagged behind the mandible during the entire jaw-opening and -closing phases. These findings support the notion of a functional linkage between the human temporomandibular and craniocervical regions. **They suggest that "functional jaw movements" comprise concomitant mandibular and head-neck movements which involve the temporomandibular, the atlanto-occipital and the cervical spine joints, and are caused by jointly activated jaw and neck muscles.** It is proposed that these jaw and neck muscle actions, particularly at fast speed, are elicited and synchronized by preprogrammed neural command(s) common to both the jaw and the neck motor systems. From the present results and previous observations of concurrent jaw and head movement during fetal yawning, **we suggest that these motor programmes are innate.**

Adjusting the Atlas Subluxation Complex

By Robert Brooks, D.C.

In the interface between the adjusting phases and the biomechanics of the subluxated spine is the act of the adjustment. There are key points and without them, the beginner struggles and works much harder than necessary.

The first of these points is the concept of breaking the resistance encountered in the atlas subluxation complex. This resistance is perceived by setting the adjustor's body mass against the contact in the patient.

The experienced adjustor sets up against this resistance automatically and almost unconsciously. The act of pulling the triceps muscles simply activates the adjustor's body mass against the resistance and when the resistance breaks, the vertebrae move away from the contact.

The teaching device for this act has been the NUCCA "coordinator," a bathroom plunger head set atop of a stand eighteen inches from the floor. The top of the plunger is filled with a cork. From the adjusting stance, the adjustor attempts to "drop" the plunger with the triceps pull in the eighth phase of the adjustment. Transducer based coordinators are now available.

The concept of the resistance of the ASC is much easier to perceive by placing a finger on an object (like a glass) on top of a table or flat surface. Slowly and gently increase the effort against the object until it moves. The resistance to moving the object is proportional to the reaction to the weight of the object by the surface on which it is sitting. When that resistance is overcome, the object moves away from the effort. This is not a sliding movement, but a perceptible "break."

When learning to use the coordinator to practice adjusting, this is the sensation that the student is attempting to accomplish. Adjusting patients this becomes the sensation of the resistance breaking.

What is the resistance that breaks? Several *Monograph* articles describe the lever systems (first, second, and third class levers) used to correct the misalignment factors of the Atlas Subluxation complex. The four basic types of misalignments determine the location of the fulcrum and the resistance to overcome in order to restore the cervical vertebrae to a normal position in the vertical axis.

It is possible to have more than one resistance and more than one lever in any one misalignment. Knowing only the location of the predictable fulcrum and resistance will not predict the outcome of the adjustment on the post X-ray.

The resistance may be on either side of the superior articulating surface of the axis vertebra, on the condyle on the side of laterality or on the condyle opposite of the side of laterality. It may also be in the vertebral bodies or facet joints of the vertebra below the axis.

An understanding of the biomechanics of the production of the atlas subluxation complex helps the doctor conceive and perceive the resistance and the pathways of the forces necessary to correct the misalignment factors. The breakdown of the cervical spine as the atlas makes its excursion into either the left or right frontal plane and the movement of the skull as it turns toward or away from the side of laterality can be used to predict the location of the resistance.

Breaking resistance alone however is not enough. The adjustment must be vector specific. Breaking the resistance on the wrong vector will not correct the misalignment factors and in many instances change the misalignment or increase it. This is an outcome that many of us who have learned the NUCCA adjusting procedure know only too well.

The adjustment is repeated in the same "pathway" again and again until all of the resistance is "overcome" and no resistance remains. There is resistance when moving the vertebra in the wrong direction as well as when moving the vertebrae toward a normal position.

The eight adjusting phases taught by NUCCA are all necessary to align the adjustor's pelvic, spinal, shoulder, arm and wrist levers to the specific pathways to reduce the misalignment factors of the atlas subluxation complex. Aligning all of the adjustor's levers and having the ideal stance does not predict the breaking of the resistance either.

To correct all of the misalignment factors of the atlas subluxation complex it is necessary to find the adjustor's center of gravity and to "set" that center against the resistance in the patient. The experienced adjustor sets the center of mass and center of gravity effortlessly and many times unconsciously. Finding this center makes the adjustment much easier for the doctor or student who is learning the procedure.

To find this center it is necessary to use the arc principle. Objects move over their center of mass, relative to gravity, in an arc. As the beginner learns each phase of the adjustment it is necessary to gently rock back and forth to find the "top" of the arc during each of the phases of the adjustment especially the settle back, turn in and conversion.

In the final adjusting stance if the adjustor has lost the ability to be on top of the arc, the lever systems are torqued, the ability of the adjustor is diminished to arm adjusting and encounters the liability of being hurt while performing the adjustment. The forces of the adjustment become curvilinear rather than rectilinear and the adjustments are unpredictable and at best incomplete.

All of the phases and steps of the adjustment are necessary to establish the adjusting posture and to create the force that will effectively move the skull and spine back to its normal position on the vertical axis. The approach, settle-back, turn in, arch, roll in, conversion and pelvic lever phases all have their part to play, but each in turn can be accomplished without losing control of the bodies center of gravity and its relationship to the top of the arc.

The omission of any of these phases will torque the adjustor's body, make the forces ineffective and potentially injure the adjustor.

Finally, the position of the adjustor's feet will determine the degree of ease in reaching the appropriate body posture to correct the ASC. The angulation of the pelvic, spinal, and shoulder levers will be determined by the final resultant. The anterior to posterior (A to P) foot spread will create this angulation, making the position of the feet essential to maintain all of the levers of the adjustor. If the adjustor's body is stressed in the adjusting position, moving the feet will usually allow the adjustor to become more effective.

Usually moving the feet forward, sometimes only a fraction of an inch will integrate the pelvic and spinal levers. The neck lock is designed to initiate this integration, but is easily lost by the novice when initiating the settle back phase. The neck lock initiates a reflex that not only creates a rigid spinal lever but, integrates the spinal and pelvic levers.

Sometimes it is helpful for the beginner to learn to break down these levers and re-establish them in order to find their proper integration. Pelvic and shoulder angulation depend on this integration. It is epidemic in our adjustors that these angles are different because of the lack of integration of these levers. The breakdown of these levers is accomplished by bending over from the settle back position, dropping the head, raising the arms to a horizontal and then to begin raising the head and then the spine until a flat back is achieved. When this action is completed the adjustor will notice a relaxation of the legs and there is a deepening of the settle back. Dropping the arms will create a new awareness of the adjusting posture with the levers integrated and the body mass over the top of the arc.

Once the integration of these levers is achieved, the learning adjustor will be able to move easily through the settle back, turn in, and conversion phases of the adjustment without losing the necessary angulation to address the final resultant of the Atlas Subluxation Complex.

The tricepts pull phase of the adjustment is accomplished much easier from this posture and the adjustor is using the mass of the entire body to break the resistance of the ASC. It is the difference between hitting a baseball with your arms only or hitting it by moving your entire body into it.

One of the models for learning the tricepts pull phase of the adjustment is the visualization of a wire tied to the pisiform bone and connected to the inferior tip of the scapula. This wire can be pulled from either end, first from the pisiform toward the back and then from the scapula forward. If the lever systems are truly integrated, this action places the body mass of the adjustor against the contact and much less effort is required to compress the shoulder girdle and break the resistance encountered in the ASC.

Dr. Gregory stated many times that we are adjusting against our own resistance and this is true. As the shoulder girdle is compressed it creates the effort that overcomes the adjustors resistance to the completion of the force that moves the vertebrae of the cervical spine. Our attention can be focused on overcoming our own resistance or on the resistance being overcome at the contact point.

All of these principles are only the beginning. It takes practice, practice, practice, until the day comes when the adjustor automatically sets up on the vector of the final resultant effortlessly and precisely with the proper angulation, integration of the levers and foot position to accomplish the adjustment that creates the rectilinear forces necessary to complete the adjustment and observe the complete reduction of the misalignment factors of the ASA on the post X-ray. Mastery of the adjustment requires practice, practice, practice! You might as well learn to enjoy the practice.

ACHIEVEMENT OF BLOOD PRESSURE GOAL WITH ATLAS REALIGNMENT

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Anatomical abnormalities of the cervical spine at the level of the Atlas vertebra are associated with relative ischemia of the brainstem circulation and increased blood pressure (BP). Manual correction of this malalignment has been associated with reduced arterial pressure. This pilot study tests the hypothesis that correcting malalignment of the Atlas vertebra reduces and maintains lower BP. Fifty drug naïve (n=26) or washed out (n=24) subjects with stage 1 hypertension were evaluated using a randomized, double-blind, placebo-controlled study design at a single center. Subjects received no antihypertensive medications during the eight-week study duration. After baseline measures, subjects were randomized to receive a National Upper Cervical Chiropractic (NUCCA) procedure or a sham procedure. Statistical analysis was performed comparing data from visits at baseline and week 8. The study was designed with 90% power to detect an 8/5 mm Hg reduction difference in arterial pressure at eight weeks over the placebo group. The study results demonstrate that the cohort consisted of 70% males, (98% Caucasian, 2% Hispanic), mean age 52.7±9.6 years. There were no major differences in baseline demographic characteristics found between the two treatment groups. The primary results of the study are noted in the Table. No adverse effects were recorded. We conclude that restoration of Atlas alignment is associated with marked reductions in BP similar to use of two-drug combination therapy. Larger multicenter studies are needed to validate these findings.

Results

	NUCCA (N=25)		Placebo (N=25)	
	Baseline	8 Weeks	Baseline	8 Weeks
Systolic BP (mm Hg)	147±6	130±10*	145±6	142±11
Diastolic BP (mm Hg)	92±8	82±9*	91±8	89±9
Lat. Displacement of C7 spine (degrees)	1	0.04#	0.6	0.5

*After adjustment for baseline levels, the treatment effect for Systolic BP was significant at the 0.0001 level and Diastolic BP at the 0.002 level.# After adjustment for baseline values treatment effect for Lateral Displacement of spinal column at C-7 was significant at the 0.002 level.

Keywords: Atlas vertebra, Hypertension, Ischemia

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