THE UPPER CERVICAL
MONOGRAPH

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Biomechanics of the Upper Cervical Spine

by Ralph R. Gregory, D.C.

Although several thousand distinctly different C1 subluxations occur, only three types form the basis for classification. In them can be found the characteristics of every C1 subluxation. This article discusses each basic type, how it is produced, and the distinguishing characteristics of each type.

Background Information:

A vertebral misalignment always precedes a vertebral subluxation, and it usually takes place within a fixed abnormal range of motion. Vertebrae are in situ when their disc centers of motion align to the vertical axis of the body—that place in the body which represents a well-balanced arrangement of all bodily parts. When vertebrae deviate from the vertical axis, misalignments and subluxations may be produced.

In the cervical spine, an abnormal range of motion occurs whenever the cervical spine and head move as a unit from the vertical axis and remain in either the right or left frontal plane of the body. This abnormal unit motion exists in over 90° of all upper cervical subluxations. The gravital line emanating from the displaced head or load center of gravity no longer falls along the vertical axis, and the displaced vertebrae resultantly rotate into the transverse plane about their displaced centers of motion. The displaced gravitational forces act to maintain a state of disequilibrium.

Disequilibrium is present in a system when forces are acting free or unopposed. If all the forces acting upon a body neutralize each other in strength and in direction, a state of equilibrium is said to exist. The gravitational and muscular forces acting within the abnormal range of motion are the primary causes of vertebral misalignment and subluxation.

The unit movement of the cervical spine and head into the frontal plane is one of angular rotation. The axis of the movement takes place about the center of the body of the first dorsal vertebra, which is called the fixed point. A line drawn vertically on the nasium (A-P) film from the fixed point with a triangular square which is squared with the film will approximate the vertical axis. The vertical axis line, when compared with a line also drawn from the fixed point to a point which equally divides the distance between the center of the odontoid of C2 and its spinous process, erects an angle which, when measured, gives the degree of the angular rotation or excursion of the cervical spine from the vertical axis (Fig. 1).

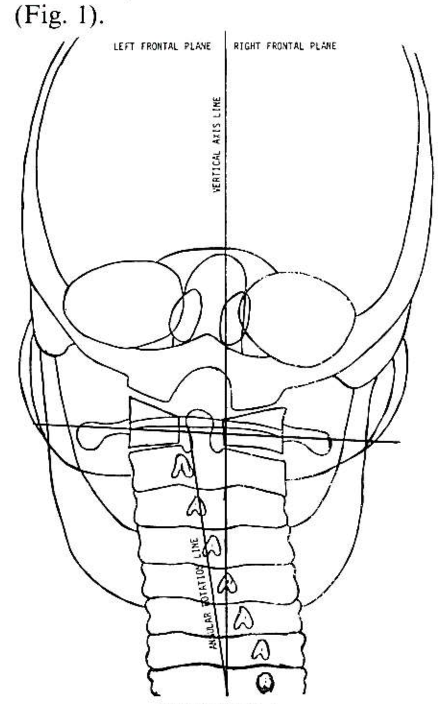

FIGURE 1
ANGULAR ROTATION

(Continued page two)

Initiating Anatometer Research

Robert T. Anderson, Ph.D.
Director of Research,
Pacific States Chiropractic College;
Professor of Anthropology,
Mills College.

It was a day to remember on campus at the still young Pacific States Chiropractic College. The Research Department got an anatometer. Dr. George E. Anderson, chairman of the Board of Regents, had long insisted that we must have one, despite the high cost. Dr. Ralph R. Gregory, who developed the instrument in collaboration with Dr. Daniel C. Seemann, was finally able to promise one from his own largess. By phone he said that it would arrive in a week. It was hard to believe that he could live up to that promise, however, with time so short. California is distant from Michigan. The instrument is heavy, and must be handled with care. Those who know Dr. Gregory will know, however, that he means what he says when he makes a decision. Supported by the board of directors of NUCCRA, he came through for us.

The arrival of the instrument was very impressive. It was the first time I had personally seen a large special delivery crate delivered by the famous Flying Tigers Airline. As an added bonus, the manufacturer, Mr. Pete Benesh, came in person to uncrate, assemble and instruct the reception committee. Dr. Amerigo Biollo, Director of the Clinic, brought together a group of students and faculty members for the occasion. With his quiet, disarming manner, Mr. Benesh had us developing or improving our skills as operators of an anatometer almost immediately.

(Continued page nine)

Biomechanics (from p. 1, col. 2)

Two types of disequilibrium take place into each frontal plane as a result of angular rotation. If C1 lateral movement from the condyles of occiput (laterality), is contralateral to the side of angular rotation, it is called the opposite-the-kink type. If the laterality of C1 is ipsilateral to the side of angular rotation, the term into-the-kink is applied. Distinguishing between the two types is important in establishing adjustic force vectors, when placing the patient for the adjustment, in recognizing characteristics in film analysis, and in minimizing the amount of force required to correct the subluxation.

The superior articulating surfaces of C2 provide the base of support for C1 and the head or load. Angular rotation displaces the base of support, and unbalances the head which adapts by turning toward the vertical axis.

The concept of angular rotation has considerable backing proof. That angular rotation precedes vertebral rotation can be observed in over 90% of the cases. Nasium films taken after a correction of a C1 subluxation in which the angular rotation is remedied show that a correction of the angular rotation to the vertical axis restores to normal the rotated vertebrae subjacent to C2. In the third basic type subluxation in which no angular rotation takes place, vertebral rotation into the transverse plane subjacent to C2 does not occur. Further, it is interesting to note that the angular rotation line from the fixed point at D1 to the center of the neural canal at C2 bisects the normal spinous process of C7 in cases where angular rotation has been solely responsible for vertebral rotation below C2. This fact clearly indicates the close relationship between angular rotation and vertebral rotation in the spinal segments subjacent to C2.

An exception to this relationship is seen when C2 rotates to a greater degree than C1 moves laterally. An excessive C2 rotation distorts the cervical circular pathway, causing various rotative patterns of the lower cervical spine which exceed those produced by angular rotation. In these cases the angular rotation line will not bisect the spinous process of C7 (see Fig. 1).

The disequilibrated state of the cervical spine and head with its rotated vertebral segments do not constitute a state of subluxation. Angular rotation lengthens the cervical canal and therefore tractionizes its contents, but apparently not sufficiently to stress the central nervous system. If neurological stress is present, it is not recordable by a thermographic instrument nor indicated by the presence of a distortion syndrome. Neither the thermographic recording nor the distortion syndrome manifest themselves until C1 moves laterally on the occipital condyles. A subluxated C1, therefore, fulfills the requirements of a stressor.

A stressor has been defined as a condition in the body produced by an injurious factor and manifested by a syndrome (H. Selye). A subluxated C1 distorts the spine and the pelvis because it causes spastic contracture of the extensor (anti-gravity) muscles of the spinal column. Spinal and bodily distortion result. A subluxated C1, therefore is acting as an injurious factor, manifesting itself as a syndrome which is verifiable by measurement and can be correlated to the C1 subluxation. The patient with a subluxated C1 has a subluxated spinal column, an over-innervation of the motor neurons of the spinal cord, neuromuscular imbalance, loss of muscular synergism, distortion of the spinal column from the true axis of the body, and leg disparity. This is the C1 subluxation complex syndrome, and is correctable solely from a precise and pre-determined C1 adjustment.

If disequilibrium and cervical spinal displacement do not cause a state of subluxation until C1 moves laterally on the occipital condyles, what constitutes a normal lateral range of motion for C1? Vertebrae can be shown to displace and not cause detriment or insult to the nervous structure. If a vertebra does displace and thereby causes insult to nervous structure, it is logical to assume that it has abnormally moved, or moved beyond its normal range of motion. Because C1 cannot misalign laterally more than three-quarters of a degree from its alignment to the occipital condyles (about the thickness of a sharp pencil mark), without imbalancing the neurological inhibitory mechanism of the reticular formation at the caudal end of the brain stem, C1 has practically no normal lateral range of motion.

This phenomenon has been observed and tested on over 10,000 cases over a period of many years. The C1 distortion syndrome has always manifested itself whenever C1 has moved laterally beyond three-quarters of one degree on the occipital condyles when the vertebra was moving from its normal position toward the abnormal position.

A C1 vertebra, however, that has existed in a state of misalignment-subluxation for a long period of time and is then adjusted to within a degree or two of normal does not produce neurological insult until a period of time elapses, generally three days to several weeks, depending upon the degree of reduction. When a recurrence of the C1 subluxation is again recorded by the thermograph, the distortion syndrome reappears but to a lesser degree.

Patients, however, who are re-x-rayed after several years will record neurological insult equal to that originally recorded, but analysis of the current films discloses considerably less misalignment of C1. This indicates less tolerance and that changes have apparently taken place in the neurological component during the interim. An expansion toward normal size in the diameter of the nervous structure could account for the lessened tolerance. In any event, less misalignment is required to cause as severe a subluxation.

The type of neurological detriment that is caused by the lateral displacement of C1 on the occipital condyles appears to be a mechanical tractionization of the caudal end of the brain stem. It has been noted in medical literature that pathological and traumatic situations affecting the brain stem can produce impairment or loss of the inhibitory control over the body's extensor musculature. NUCCRA research on the effects of a subluxated C1 on the caudal end of the brain stem confirms the medical hypothesis.

Characteristics of the 3 Basic Types

The first and second C1 subluxation types present characteristics that, if understood, aid in the analysis of the subluxation and are essential to its correction. The two types can be discussed together because the single fundamental difference between the two is the relationship between the side of C1 laterality and the side of angular rotation: thus the terms opposite-the-kink and into-the-kink (Fig. 2 & 3).

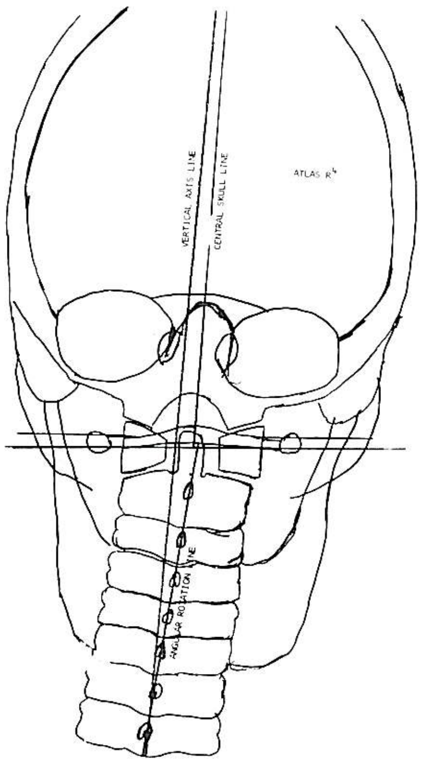

FIGURE 2
FIRST BASIC TYPE

In both types the head or load turns toward the vertical axis, which appears to be an adaptative process. If the head did not turn back to the vertical axis immediately after angular rotation occurred, the state of instability would soon become intolerable, risking imminent collapse of the system. Muscular action and the righting reflexes attempt to balance the load (weight) by turning it toward the vertical axis or normal position.

In the first basic type (opposite-to-the-kink), the head characteristically turns high on the side of C1 laterality, and the plane of C1 is higher on that side. This situation occurs because angular rotation is usually greater in this type, and there is greater dis-

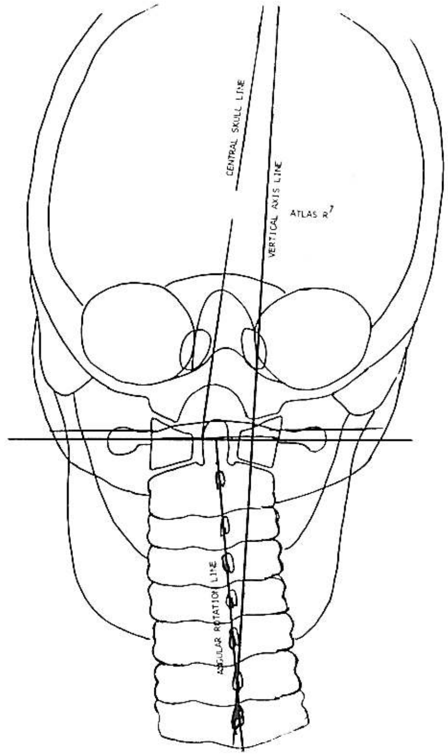

FIGURE 3
SECOND BASIC TYPE

placement of the superior articulating surfaces (base of support) of C2; it is frequently farther from the vertical axis. C1 must also move a greater distance on the condyles of occiput to produce a subluxation. These factors may account for C1 laterality in this type occurring on the side opposite angular rotation.

In the second basic type (into-the-kink), the head or load turns low on the side of C1 laterality, and the plane of C1 generally remains more nearly horizontal. Angular rotation is usually not as pronounced, and the laterality of C1 is caused by the condyles of occiput turning on the superior articulating surfaces of the lateral masses of C1, displacing the foramen magnum of occiput. The axis base of support remains equal to or less than C1 laterality, usually not moving as far from the vertical axis but, nevertheless, providing an inadequate support for the load.

Because angular rotation accounts for the rotation into the transverse plane of the cervical spinal segments subjacent to C2, these vertebrae rotate about displaced centers of disc motion. This characteristic exists in both the first and second basic types, because angular rotation produces vertebral rotation in the cervicals subjacent to C2. If, however, considerable rotation of C2 occurs in the transverse plane, the subjacent vertebrae will rotate more extensively, various configurations appear that are not present when C2 rotates within the limits of C1 laterality. When patterns of vertebral rotation appear in which the spinous processes of the vertebrae subjacent to C2 are turned farther to the right or left, it is indicative of the influence of a severely rotated C2. Whenever the angular rotation line (lower cervical or kink line) does not bisect the spinous process of C7, C2 will be rotated excessively.

The significance of these characteristics becomes apparent when the patient is adjusted. The head must be placed according to the basic type of subluxation, and the degree of torque applied in the adjustment must be proportionate to the amount of C2 rotation. The subjacent cervicals and all other misaligned vertebrae must be restored to the vertical axis. Angular rotation correction is essential because it is necessary to remove the state of disequilibrium in the system. While these rotated segments apparently do not detrimentally affect the neurological structure, they do contribute to imbalance. Unless corrected, the displaced gravitational forces will soon produce another C1 subluxation with its far-reaching distortion consequences.

The third basic type C1 subluxation (no-kink), (Fig. 4) differs from the first and second types in that no angular rotation takes place. The cervical vertebrae subjacent to C2, therefore, are not rotated into the transverse plane, nor does C2 rotate beyond the limits of C1 laterality. In this type the plane of C1 remains approximately horizontal. The C1 subluxation is caused by the head turning on the condyles of occiput and downward on the side of laterality, displacing the foramen magnum of occiput. The locus of the subluxation is usually at the foramen magnum on the side of C1 laterality.

It is, therefore, important that the head is turned upward by the adjustic force. This is significant as the patient must be placed so that the head turns upward and toward the vertical axis. Control of the direction of the adjustic force and its magnitude is especially essential.

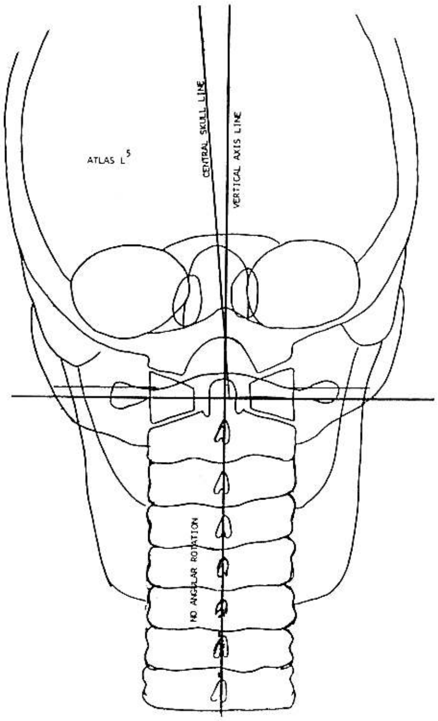

FIGURE 4
THIRD BASIC TYPE

Restoration to the vertical axis, or to normal position, of all the displaced vertebrae and the head is accomplished by turning the atlas-lever about the superior articulating surfaces (base of support) of C2. An adequate correction consists of realigning **all** the deranged vertebrae and the head to their normal position; anything short of that objective is not an adjustment. Equilibrium is thereby restored, and the system is balanced. C1 laterality correction in type 1 is the direct result of establishing a state of equilibrium. In types 2 and 3, realigning the head or load to the vertical axis corrects the laterality of C1. In all types, inhibitory control of the central nervous system to the extensor musculature is re-established, and balance to the spine and pelvis is restored.

Disequilibrium of the cervical spine and head constitute the resistances to the adjustic force. The doctor's understanding of these resistances and how to cope with them by proper patient placement for each type and when computing the adjustic force vectors assures reductions.

Summary

This paper briefly discusses some of the characteristics of the three basic type C1 subluxations. The discussion should benefit the chiropractor by helping him to recognize the characteristics that belong to each type, and should aid him in understanding how C1 subluxations are formed. Above all he should be able to distinguish one type from another, and have a better conception of how to correct each type. Being able to differentiate between basic types will greatly help in analysing the X-ray films.

It is not within the scope of this paper to discuss the adjustment procedure for each type. Such a discussion requires supervised practical work and demonstration. Nor are the mechanical levers of the C1 subluxation discussed. This very important subject will be presented in a future paper.

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THE FIFTEENTH ANNUAL NUCCA CONVENTION

The theme of the 1981 NUCCA convention and educational conference is "Biomechanics of the C1 Subluxation". This theme earmarks the purpose of the convention which will center about the research work conducted by the National Upper Cervical Research Association, Inc. (NUCCRA) since the 1980 NUCCA convention. This research is practical, of the "take home and use" type so needed in today's environment of consumerism, and which helps the chiropractor to obtain faster and more efficient corrections of the subluxation.

If the chiropractor's work is to be efficient, he must always produce mechanical corrections throughout the spinal column. He must learn, therefore, to apply the mechanical laws and principles that bring about corrective changes. In short, his work must benefit the patient in a way that can be demonstrated. By restoring the spinal column to normal and by re-establishing equilibrium, the chiropractor benefits his patient, regardless of the health problem. The attainment of normalization and equilibrium has been shown to result from balancing the neurological mechanisms in the reticular formation of the brain stem by correctly and precisely analysing and adjusting a C1 subluxation.

During its research program, NUCCRA has measured and correlated the distortions and misalignments of the spinal column to the C1 subluxation. Following corrective adjustments, NUCCRA has correlated these objective and measurable symptoms to the degree of C1 subluxation correction. That a positive relationship exists between the two has been demonstrated without exception, and the neurological rationale has been established.

Measurement is the language of science. That a C1 subluxation is the only subluxation that stresses the CNS and is manifested by a syndrome that can be measured and correlated is proven. Any practitioner of Chiropractic, regardless of his technique, must fail in his attempts to restore normalcy to the spinal column until correction of the C1 subluxation is an accomplished fact. Any patient who does not receive a C1 correction fails to receive all the benefits of chiropractic service.

Emphasis, therefore, will be placed on film analysis, especially the advanced research in film analysis. Adjusting technique will be stressed, and the application of kinesiological principles included. Slides highlighting basic and advanced principles will be shown. Examination of X-ray films in terms of characteristics of basic types will be taught so that the practitioner can understand why certain configurations take place and how to correct them.

The educational program will include such speakers as Daniel C. Seemann, Ph.D., of the University of Toledo. Dr. Seemann has acted as research consultant to NUCCRA for nearly a decade and has contributed immensely to upper cervical research.

Another chiropractic researcher, Robert T. Anderson, Ph.D., Professor of Anthropology at Mills College, Oakland, California, and Research Director at Pacific States Chiropractic College, San Lorenzo, California, will also address the convention. Pacific States recently was loaned an anatometer from NUCCRA to help them in their research program.

NUCCA has asked Coker J. Denton, Ed. D., from Northeastern Oklahoma State University to speak to the convention on the topical subject "Principles of Grant Writing". Dr. Denton is knowledgeable in this field, and will answer questions relating to this subject.

A schedule of the 1981 NUCCA convention and educational seminar is listed in this Monograph. Applications must be received at NUCCA headquarters by March 15, 1981. **Space is limited.** Applicants had to be refused because of lack of space last year. Because of the practical work, this program will be limited to 85 registrants.

Additional information can be obtained by writing NUCCA, 217 West Second Street, Monroe, Michigan 48161.

Adjusting Exercises

These exercises aid in developing muscles used in adjusting. They are more effectively developed if the adjuster makes the effort to "feel" the action of the muscles when he is practicing his adjustment on a coordinator; to obtain a feedback.

1. Bring the hands together in front of the body back to back, thumbs down, elbows straight. As you start to inhale, swing the arms forward and upward **slowly**, then backward and downward (inhalation is important for internal support). Note that when the arms are brought downward and backward from over the head, resistance is felt in the musculature of the shoulders. Overcoming this resistance is the reason for the exercise. Keep the musculature loose so that the shoulder blades can glide toward each other, toward the spine, until they touch. This is an essential action in the adjustment when the triceps muscles are pulled, essential to overcoming the inertia of the adjuster's body. Exhale when bringing the arms backward and downward.

2. Let the arms hang at the sides of the body, palms turned outward. Inhaling, swing the arms backward and upward, describing a circle. This exercise helps to develop flexibility, greater freedom of motion in the shoulders.

3. Roll shoulders in a circular motion both forward and backward.

4. Bend from the waist with knees bent. Place the palms of hands on the floor and straighten the knees, stretching the hamstrings without losing hand contact with the floor (If necessary, achieve objective gradually. Do not strain muscles). This exercise conditions the adjuster for the settleback phase.

5. Secure the right wrist with the left hand tightly. Pull with the left arm while resisting or pulling away with the right arm. The elbow of the left arm will straighten if pulled hard from the triceps. This exercise gives the adjuster the true "feel" or feedback of the triceps muscle as felt when he is adjusting properly. Reverse arms and repeat the exercise. The adjuster should feel the humerus head being forced into the glenoid cavity when doing the exercise, and a slight backward movement of the shoulder. **Use force when pulling the triceps muscle.** This is the only expression of force in the adjustment: the force that is going into the adjuster's shoulder lever. **Note that the time sequence is that of the elbows following the shoulder lever action.** Never "snap" the elbows inward in adjusting; move the largest lever (shoulder) first.

6. Fold the arms in front, holding them at a 90° angle to the shoulders. Pull triceps muscles equally. Note the feedback, the backward pull of the triceps, tending to force the heads of the humeri into the glenoid cavities, and forcing the shoulders backward. Repeat the exercise while bent from the waist.

7. Place both hands, palms downward on the seat of a chair. With the forearms at right angles to the backs of the hands, rotate the elbows in a clockwise motion. Reverse the elbow action and rotate in a counter-clockwise motion. This exercise develops the torque action of the adjustment.

These exercises have been used for several years in NUCCA seminars. NUCCA recommends their daily use to the upper cervical practitioner, or to any practitioner attempting to adjust upper cervical. Part of the skill of adjusting is conditioning muscles to perform efficiently, a skill that is considerably more difficult to acquire for upper cervical practitioners.

NUCCA POLICY

For several years NUCCA has sent the Monograph and other materials, including booklets, to non-member doctors and students throughout the world at no charge. Because of the increased cost of printing, handling, and mailing, NUCCA can no longer afford this free service to non-members.

A cost, therefore, of one ($1.00) dollar per past issue of the Monograph will be charged. There are twenty (20) past issues to date. Booklets of a technical nature will be charged for according to the cost of printing and mailing. Members will, of course, receive the Monograph and other mailings as part of their membership privileges.

Orders must be accompanied by a check in the amount of the purchase. NUCCA is a non-profit corporation and cannot send materials on a charge basis. All checks should be made out to NUCCA.

Orders may be sent to the NUCCA editor, 217 West Second Street, Monroe, Michigan 48161. Please print clearly the address to whom the order shall be sent.

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THE DOUBLE PIVOT-POINT SYSTEM

by Ralph R. Gregory, D.C.

A significant contribution to Chiropractic was made in 1943 by the late John Francis Grostic, D.C. Dr. Grostic's discovery of a method for determining the lateral shift of C1 on the occipital condyles is meaningful because of the later discoveries by NUCCRA of the importance of lateral malposition of C1 on the inhibitory mechanism in the recticular formation at the caudal end of the brainstem. In the 40 years following the Grostic discovery, no exception to his method has been found.

The Grostic method measures in degrees the distance that C1 has moved laterally from under the occipital condyles. This is important because the amount of this distance must be known when computing the abnormal movements of the odontoid and spinous process of C2 if an efficient reduction formula upon which to base the corrective adjustment is to be established.

Dr. Grostic's method consisted of two factors: (1) Drawing a line through the attachments of the posterior ring of C1 at those points where the ring crosses the lateral masses at their outer margins, and (2) Establishing a vertical line central to the lateral aspects of the parietal bones of the skull (see Fig. 1).

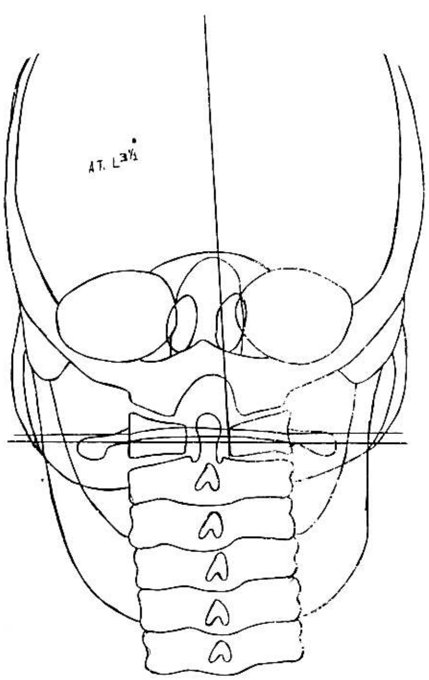

FIGURE 1

At the point where these lines intersect, two angles are formed. If each angle measures 90°, C1 is aligned to the occipital condyles. If one angle is acute, C1 has moved to that side. The degree to which C1 has moved is indicated by the numerical figure that is less than 90°. For example, a reading of 87° on the right side would indicate that C1 has moved from under the condyles of occiput to the right a distance of 3°.

The original Grostic instrument for dividing the skull was called the **Cephalo-Centroscope** (see Fig. 2). The

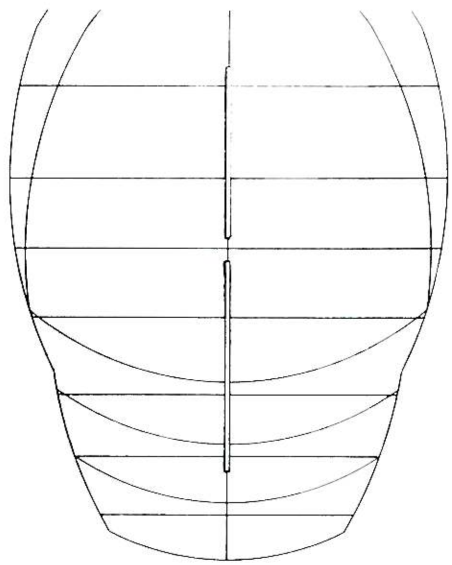

FIGURE 2

application of the Cephalo-Centroscope scope in seminars resulted too frequently in erroneous measurements. The reason for error in the use of the instrument was felt to be the sparsity of reference points. In 1962 the writer developed a new instrument (Figure 3) which provided more reference points by adding a grid arrangement on each side of the instrument, and made the instrument adaptable to a more accurate and provable system of measurement. This instrument is called the **Double Pivot-Point Cephalometer.**

Both instruments are based on the principle that "the perpendicular bisector of a line is equidistant from the ends of the line". The vertical center line and pencil slot pass through the exact center of the horizontal lines. The **Double Pivot-Point Cephalometer,** equipped with grids, accommodates more readily to different size skulls.

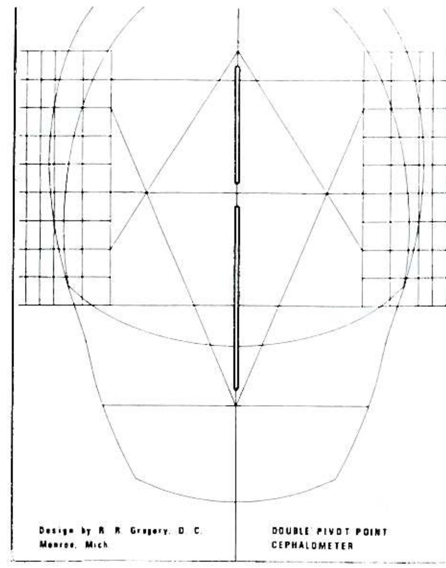

FIGURE 3

How to apply the **Double Pivot-Point Cephalometer** and the process for proving the accuracy of the pivot points is printed below, taken from seminar notes:

A. Procedure:

1. Find a mid-point with the cephalometer between two opposite registry points on the lateral surfaces of the skull below the vertex to the skull.

2. Drop the instrument down about one-half inch and establish an auxiliary mid-point.

3. Keeping these two mid-points aligned to the left side of the instrument's center slot, drop the instrument down about two or three inches. At this point, place another dot on the X-ray film along the left side of the center slot.

Rule: Always keep the center slot of the instrument over the previously established mid-points when marking new mid-points, and always against the left side of the slot.

Reason: To establish the general angle that the instrument will take on any given skull.

4. Locate a point just above the squamosal sutures between two registry points. The pivot-points have been established.

NOTE: Because the cephalometer is never rotated on the skull view, but always pivoted about one of the pivot points, be sure that the difference in meaning between these two terms is understood.

B. Proving the pivot-points:

1. To prove that the pivot-points are accurately centered between the parietal bones, a procedure for proving the accuracy of the location of the points must be executed. One of the pivot-points, either at the top or at the bottom just above the squamosal sutures, must be **assumed** to be centrally located; that is, the point chosen must be considered by the film analyser to be a constant.

Assuming that the lower pivot-point is a constant, check up the X-ray film of the skull with the cephalometer, keeping the instrument aligned to the lower pivot-point and checking every one-eighth of an inch against the lateral aspects of the skull.

2. The cephalometer will need pivoting about the lower pivot-point whenever the perpendicular bisector (cross-line) being used does not conform with the lateral aspects of the skull.

3. When the instrument needs pivoting because of lack of agreement with the lateral aspects (registry points) of the skull, the upper (variable) pivot-points must be changed.

4. Keep in mind that the instrument is always pivoted from the pivot-point that is being used as a constant. Don't change an assumed constant until it is checked throughout the skull; it is the variable that is changed.

5. After the skull is checked every one-eighth upward toward the variable pivot-point; and, if necessary, a new pivot-point has emerged during the checking process, this new pivot-point becomes the constant. The skull is now checked downward from the new constant against the lower pivot-point which is now the variable. This process is repeated until all the pivot-points are in fact constants. That is, until a pivot-point cannot be changed by checking it against the lateral aspects of the skull. Because most skulls have abnormal indentions and extrusions, a few of the points may not agree with the lateral aspects of the skull. By following the procedure, however, the film analyser will know what type of abnormality exists and where it exists, and just how it affects the analysis.

6. A line is drawn through the points which determines the center of the skull.

Note: In using the cephalometer to divide the skull, the analyser should not attempt to read the vertex of the skull nor should he be influenced by recordings below the squamousal sutures. These two areas of the skull are seldom uniform and contain abnormalities. It is within the parietal area between these two points that the determinations must be made.

NUCCA AWARDS PLAQUES

Two plaques in recognition of outstanding leadership and years of devoted service to Chiropractic and to the NUCCA-NUCCRA organizations were awarded this year by the NUCCA Board of Directors.

Receiving a plaque was Dr. Clarence F. Aumann, 105 Woodland Lane, Carmel, Indiana, who graduated from the Palmer College of Chiropractic in June, 1917. Dr. Aumann, now retired, practiced in Indiana for 55 years. He served as ICA representative from Indiana and as a member for several years of the ICA Board of Control. In 1956, Dr. Aumann was elected a distinguished fellow of the ICA, and in 1969 he was made an honorary board member. In 1961 Dr. Aumann was named "Chiropractor of the Year" for the state of Indiana, and in 1971 an honorary member of the Indiana State Chiropractic Association. For 16 years, he served on the Indiana Board of Medical Registration and Examination. Elected a member of the NUCCA Board of Directors, Dr. Aumann became a charter member of NUCCRA when it was formed in 1971. He has served as a director since, and contributed to its support.

Dr. Aumann is shown in the accompanying photo receiving the NUCCA plaque from the NUCCA president, Dr. Ralph R. Gregory.

Recipient of a NUCCA plaque was Dr. James R. Coder, 34 North Lime Street, Lancaster, Pennsylvania. Dr. Coder enrolled in the Palmer College of Chiropractic in 1925, after serving his country as a United States Marine in Cuba, Mexico, and Haiti. Later he served in England and France during World War I. After graduation, Dr. Coder returned to Pennsylvania where he practiced for over 50 years. Arrested three times for practicing without a license, he was never convicted: Pennsylvania had no Chiropractic Board of Examiners at that time.

Dr. Coder has served on committees of several national Chiropractic organizations, and as president of his state organization. In his earlier years in practice, he worked arduously, effectively, and successfully for legislative recognition of Chiropractic in the state of Pennsylvania, prior to the profession's recognition there. As a state organizer of the ABC lay groups, Dr. Coder lectured throughout Pennsylvania, New York, Delaware, and Maryland. He has served NUCCA as a member of its advisory committee, and contributed to its support.

(Unfortunately, Dr. Coder was not available for a photograph of the plaque presentation; his plaque was mailed to him.)

The Fifteenth Annual NUCCA Convention

Dates: May 2, 3, 4, & 5, 1981

Place: Howard Johnson Motor Lodge
1440 North Dixie Highway
Monroe, Michigan 48161
Phone (313) 289-4000

Theme: Biomechanics of the C1 Subluxation

Convention Chairman:
Dr. Harry S. Alexander

Educational Supervision:
Daniel C. Seemann, Ph.D.
University of Toledo

PROGRAM

Saturday, May 2, 1981

8:00 - 8:45
Registration

8:45 - 9:00
Invocation
(Rev. H.B. Fehner, Pastor Emeritus, Trinity Lutheran Church)

9:00 - 9:30
Opening Address
Harry S. Alexander, D.C.

9:30 - 10:45
Basic Steps in Film Analysis
Julia A. Hernandez, D.C.

10:45 - 12:00
Basic Steps in Film Analysis (Cont'd)
Teresa A. Denton, D.C.

Note: A course in solving the biomechanical problems found in X-ray analysis will be substituted for advanced doctors and students.

12:00 - 1:30
Lunch

1:30 - 3:00
NUCCRA Research
Daniel C. Seemann, Ph.D.
University of Toledo
NUCCRA Research Consultant

3:00 - 5:00
Principles of Grant Writing
Coker J. Denton, Ed.D.
Northeastern Oklahoma State University

5:00 - 6:30
Dinner

6:30 - 8:30
Advanced Film Analysis
Ralph R. Gregory, D.C.

Sunday, May 3, 1981

8:30 - 10:30
Practical Work in Film Analysis
Marshall Dickholtz, D.C.

10:30 - 12:00
Kinesiological Principles of Adjusting
Ralph R. Gregory, D.C.

12:00 - 1:30
LUNCH

1:30 - 3:30
Chiropractic Research
Robert T. Anderson, Ph.D.
Professor of Anthropology, Mills College
Director of Research, Pacific States Chiropractic College

3:30 - 5:00
Basic & Advanced Film Analysis

5:00 - 6:30
Dinner

6:30 - 8:30
Adjusting Technique (Slides)
Ralph R. Gregory, D.C.

Monday, May 4, 1981

8:30 - 10:00
Upper Cervical Office Procedure & Insurance Forms
Lloyd C. Pond, D.C.

10:00 - 12:00
Adjusting Technique
Ralph R. Gregory, D.C.

12:00 - 1:30
Lunch

1:30 - 3:00
Practical Work in Advanced Film Analysis
NUCCRA Directive Board Members

3:00 - 5:00
NUCCA Annual Business Meeting (Election)

7:30
NUCCA Banquet & Multimedia Program
Guest Speaker: Robert B. Wells

Tuesday, May 5, 1981

8:30 - 12:00
Adjusting Technique
Film Analysis
Biomechanical Analyses

12:00 - 1:30
Lunch

1:30-4:00
Patient Placement
Leg Check
General Review

DONATIONS TO NUCCRA

THE NATIONAL UPPER CERVICAL CHIROPRACTIC RESEARCH ASSOCIATION, INC. (NUCCRA) expresses its heartfelt thanks to the donators listed below who have generously contributed to NUCCRA, helping to pay for research and the release of educational data. These contributions profit the patient, the doctor, and the profession by financing NUCCRA research.

Dr. Clarence F. Aumann	Indiana
Mrs. Marynelle Shields	Indiana
R. Bressler Associates	Ohio
Dr. R. Jacobs	Ohio
Mr. Ari Eickert	Ohio
Dr. Donald K. Moon	Ohio
Mr. Victor E. Petersen	Ohio
Dr. R. H. Danec	Washington
Dr. Christopher Kemper	California
Dr. Marshall Dickholtz, Sr.	Illinois
Dr. K. Nakano	California
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Dr. Glen Cripe	California
Dr. Walter Krull	California
Mrs. Elmer Goetz	Michigan
Mr. Laurence Wenzel	California
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Mr. John F. Savage	Ohio
Dr. Steven MacDonald	California

Contributions to NUCCRA are deductible under the scientific status granted by the Internal Revenue Service.

INITIATING ANATOMETER RESEARCH
(Continued)

The acquisition of this $11,500 instrument, which is designed for the measurement of angular and rotational deviations in the human spine, allowed us to set up an anatometer research team. We planned to begin work right away. We began, however, even sooner than was expected.

While walking down a hallway shortly after the Flying Tigers delivery, a PSCC student, Kerry Alsop, pulled me aside to offer an opportunity. Kerry is a prize-winning weightlifter. He was organizing an official AAU (American Athletic Union) powerlifting competition to be held in November at the PSCC. Having offered a free spinal examination to all competing lifters, he suggested arcanely that we might get some useful research data if we used the anatometer for that purpose. We had only a few days to plan and organize, but with the encouragement of Dr. Biollo, a key member of the anatometer research team, we decided to accept Kerry's offer.

Student Bob Rogers spent the night bringing in weightlifting equipment from as far away as Santa Cruz in order to be ready for the Saturday morning event. Another student, Dean Harrison, also helped with the setup. Finally, seniors, now involved in clinical training, applied their skills to do the actual measuring. Alex Davis, D.C., offered professional supervision, Joe Ball and Carol Hall spent hours at the anatometer while Randy Henderson and Mike Grady took charge of measuring leg lengths. A fourth-quarter student, Jennifer Bruce Woessner, provided backup staffing.

If nothing else came of this day of work, at least we became familiar with the instrument and with our capacity to work together. We measured approximately fifty athletes as they weighed in at 7:30 in the morning.

The hypothesis we chose to test was interesting both for its general relevance to spinal dynamics, and for its application to sports chiropractic. The men and women who were our subjects were measured first before they had changed their clothes and warmed up. They were still physically relaxed. (We did not, in this preliminary study, attempt to control for psychological tension.) We knew, however, that in the next few hours, each would lift a thousand pounds or more, putting enormous stress upon spinal vertebrae, particularly in the lumbar area. Kerry Alsop agreed from his experience as a lifter and as a student of chiropractic that we could expect post-meet checks to show enormous misalignments.

Hypothesis: After lifting heavy weight, subjects will show increased distortion in all measures of spinal deviation.

Findings: The hypothesis failed. When we held our debriefing session and reviewed our data we discovered that the major category of our athlete subjects was that of zeroed out or improved on all measures. Thus, on leg length, 42% were zero or improved, in contrast with 29% who showed no change and another 29% who were worse. On pelvic tilt, 50% were improved, while 6% were unchanged and 44% worse. Finally, on pelvic rotation, an enormous 75% measured zero or improved in contrast with 11% who showed no change and only 17% who became worse.

What does this mean? First of all, it may not mean anything because our sample is too small to be statistically valid as an indication of what happens generally to weightlifters. We only obtained 18 subjects for post-checks, even though our research team spent the whole day at the meet. Our mistake was to wait until prizes were handed out before we tried to do the second set of measurements. At the next meet we will follow the fortunes of the competitors carefully, and measure them as soon as they drop out of competition. To readers it may seem obvious that this should be done, but it was not obvious to us at the time. Pilot studies are necessary for just this reason: to spot the many unanticipated problems that can interfere.

A second reason why these findings may have no significance (other than to have provided training for our research team) is that the findings may reflect what was happening to us as researchers rather than what was happening to the spines of athletes. We cannot be sure that they were consistent in the way we did our measurements. That problem alone will provide us with a large amount of work. We need to check our reliability in a series of tests. We need also to run tests to evaluate the reliability of the instrument itself. That will require us to check against full-spine radiographs of PSCC clinic patients and against a separate set of measurements done with the Gravity Stress Analyzer of Dr. Larry Allen.

This procedural format will have to be organized before we can move from this pilot study to a larger, fully controlled study when the next AAU powerlifting competition will be held in March. If the hypothesis fails in the March project, then it will have statistical validity, and field doctors will want to examine their clinical procedures as concerns athletes who lift. It may be that a weightlifter's need for chiropractic care is greatest out of the gym during the course of ordinary daily life, and that those few hours in competition are not key vulnerable periods in terms of spinal health and athletic performance. Field doctors specializing in sports chiropractic will want to watch for our findings in this area.

Measuring athletes, while valuable to us at this early stage in our research program, is not our only goal. We plan to explore the usefulness of the anatometer for clinical practice, building upon several years of work by Drs. Gregory and Seemann of NUCCRA. We plan also to use the instrument in studies of non-patient, non-athlete populations. As Dr. Stillwagon pointed out in a recent seminar held at Pacific States, we need to know scientifically how to define normal if we are to identify what is abnormal. In this area we feel that the anatometer has a contribution to make to academic disciplines in the university world as well as to clinicians in private or clinic practice. Thus, we hope to move rapidly into exploring a wide range of problems for which the anatometer seems well suited.

THE ANATOMETER: INDUSTRY AND INSURANCE

NOTE: The National Upper Cervical Chiropractic Research Association (NUCCRA) has printed the following article in pamphlet form for doctors interested in screening applicants for industry and for release to insurance companies.

Doctors interested in instituting a screening program may write NUCCRA for copies of the pamphlet and further information.

THE PROBLEM

Industries burdened with time loss injuries and costly settlements originating from long term disabilities relating to the spine are probably doing a poor job of screening prospective employees during pre-employment interviews. Companies that have adequate screening procedures claim that costly injuries have been reduced dramatically or eliminated altogether.

For industries that do not screen applicants, the problem is not going away. In 1955, 12% of all compensible claims were for low back problems. A researcher reported in the late 1970's that in one industry the incidence of low back pain was second only to upper respiratory conditions for lost time on the job. There is agreement, therefore, among researchers and clinicians that a careful selection process to detect low back pain should be part of the pre-employment evaluation for companies that require manual materials handling.

PREDICTING LOW BACK PAIN

Predicting low back pain is as difficult as treating low back pain. Companies that screen prospective employees usually require a comprehensive medical history and examination, spinal X-rays, and stress tests that attempt to measure the lifting threshold of the applicant. It is reported that there are problems with all three procedures. For an example, medical histories are helpful but also can be distorted by the applicant. X-rays can indicate pathology but cannot predict low back pain. The validity of the various stress tests have been questioned by some investigators, although it is probable that valid testing instruments do exist. An instrument that industry should take a good look at is the Anatometer.

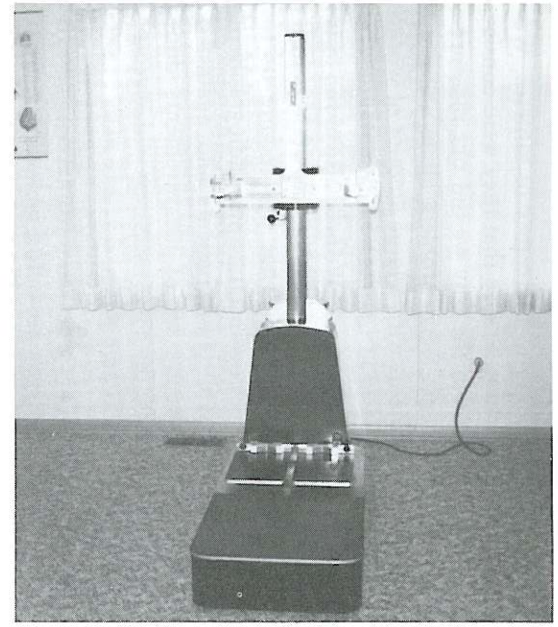

FIGURE 1
FRONT VIEW

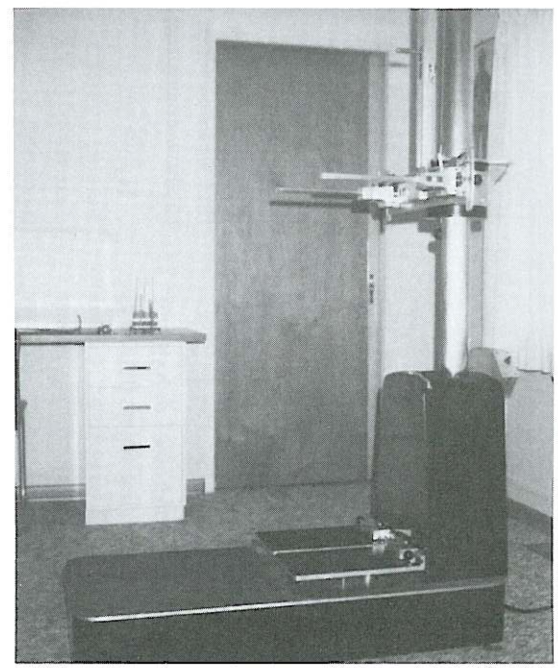

FIGURE 2
SIDE VIEW

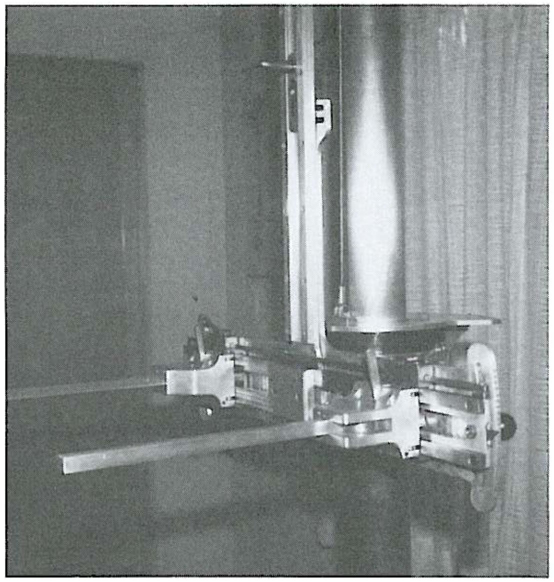

FIGURE 3
CLOSE-UP

ANATOMETER

The Anatometer is a measuring instrument that has been primarily used in the clinical setting to determine the presence of biomechanical distortion in the body. If biomechanical stress is present, the person is a candidate for back problems. This phenomenon has been found to be consistent over many thousands of measurements taken during a carefully monitored research program since 1972.*

(See Fig. 4 & Fig. 5, next page)

The Anatometer is useful to industry as a screening instrument for prospective employees who have or could have low back problems. The Anatometer can quickly determine the degree of pelvic distortion in the frontal and transverse planes (Fig. 5), and also the lateral displacement of the spinal column at the shoulder lever (Fig. 6). Any applicant who did not fall within the prescribed standards or tolerances set by the

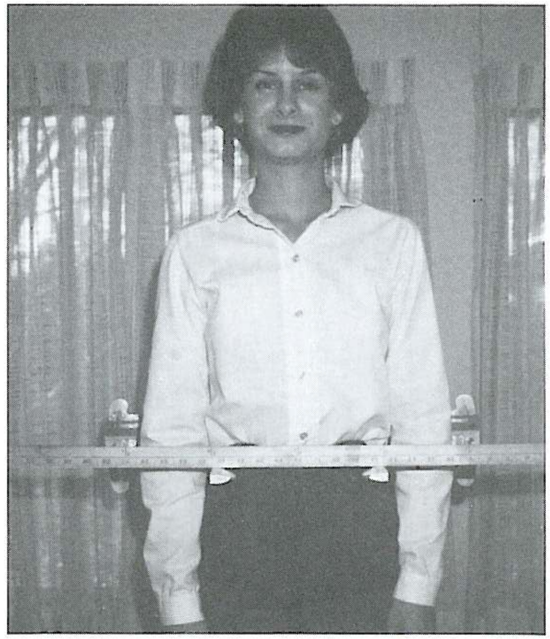

FIGURE 4
NORMAL

FIGURE 5
SPINAL STRESS

Anatometer would then be screened out as a risk. The examination takes approximately five minutes and the applicant can be measured in street clothes. Users of the Anatometer find that it reduces the need to take X-rays, which is an additional saving in time and money. An effective screening program should include a medical history and physical examination with the Anatometer measuring any biomechanical stress in the body.

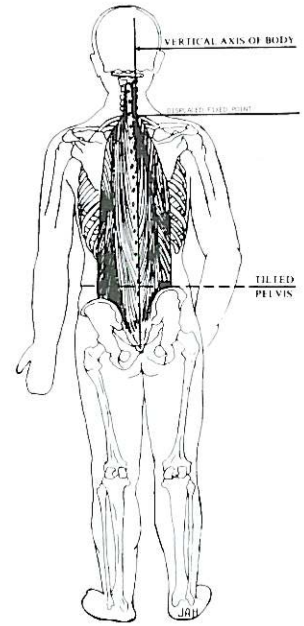

FIGURE 6
SPINAL STRESS

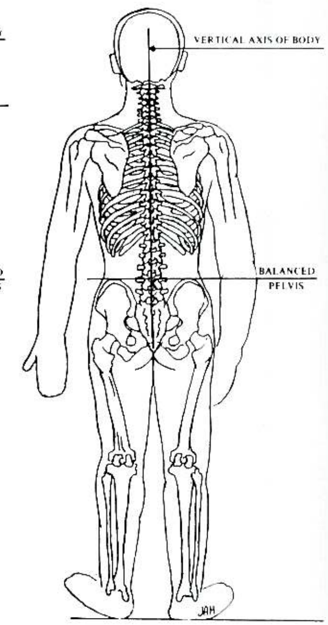

FIGURE 7
NORMAL

For further information, write:
The National Upper Cervical Chiropractic Research Association, Inc.
221 West Second Street
Monroe, Michigan 48161

*C1 Subluxations, Short Leg, and Pelvic Distortions By Daniel C. Seemann, Ph.D.
The Upper Cervical Monograph, November 1978, Vol. 2, No. 5.

NUCCRA in Illinois

District 3 of the Illinois Prairie State Chiropractic Association conducted a continuing educational seminar on November 15th and 16th, 1980 at the O'Hara Inn, Des Plaines, Illinois. It was well attended, attracting several doctors and college students from out of state. Dr. Marshall Dickholtz, Sr. of Chicago was in charge of the program.

The speaker was Dr. Ralph R. Gregory, Monroe, Michigan, who discussed the research work of the NATIONAL UPPER CERVICAL CHIROPRACTIC RESEARCH ASSOCIATION, INC. (NUCCRA). Clinical biomechanics was the principal topic. Dr. Gregory presented the neurological rationale for the widespread detrimental effects of an upper cervical subluxation on the spinal column and body; why a C1 subluxation must be precisely corrected if the spinal column and body is to be freed from distortion; the physical signs of C1 subluxation stress, or the atlas subluxation complex syndrome, and the three basic types of C1 subluxations which contain the characteristics of all C1 subluxations.

Slides of X-ray films taken before and after corrective adjustments of C1 were shown, demonstrating the restoration of subjacent vertebrae to normal position; and when time permitted, case histories were discussed.

MONOGRAPH

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NUCCA Scholarship Awards

The NUCCA Board has approved the continuation of the $250.00 dollar scholarship grant-in-aid for another two years, this sum to be paid to any chiropractic student currently enrolled in a chartered college of Chiropractic who submits to the **Monograph editor** an article pertaining to the upper cervical spine.

Submitted articles may deal with any aspect of the occipital-atlanto-axial area of the cervical spine: mechanics, neurological manifestations, analyses of cervical subluxations, detrimental effects of upper cervical subluxations on the human organism, and the like.

All entries will be judged by the NUCCA Directive Board and by Dr. Daniel C. Seemann of the University of Toledo. Their judgment will be final. Accepted articles become the property of the NATIONAL UPPER CERVICAL CHIROPRACTIC ASSOCIATION, INC. (NUCCA). Winners will be announced at the following NUCCA convention.

NUCCA will attempt to return all submitted manuscripts that are accompanied by a self-addressed, stamped envelope. NUCCA will not be responsible for lost or mislaid material.

Further information is available by writing the Monograph editor, 221 West Second Street, Monroe, Michigan 48161.

FACTS Publishes Chiropractic Health Care Report

WASHINGTON, DC—FACTS (the Foundation for the Advancement of Chiropractic Tenets and Science) is pleased to announce publication of the long awaited federally funded study **Chiropractic Health Care.** This study provides the most extensive data base ever compiled on chiropractic health care. It has been hailed as a model for future health manpower studies.

The two-volume report includes such data as annual income figures for chiropractors, the types and costs of services offered by chiropractors, the percentage increase in costs over the past five years, the number of patient visits to chiropractors, geographical distribution of chiropractors across the U.S.A., costs of chiropractic education, and job market prospects for new chiropractors. It is a very valuable reference tool for chiropractors, institutional libraries, researchers in the health care field, and many other persons and groups concerned with the role of chiropractic in serving health care needs.

Volume I of **Chiropractic Health Care** contains the body of the report, tables, and a summary of major findings. Volume II contains the appendices, copies of questionnaires sent to study participants, and other important information relating to study procedures.

The FACTS report was prepared for the Department of Health and Human Services under the mandate of Public Law 94-484. Among those working on the project were FACTS President Joseph P. Mazzarelli, D.C.; Executive Vice President and Project Director Bruce E. Nordstrom, D.C.; and Assistant Project Director Tom von Kuster.

The FACTS report, **Chiropractic Health Care,** is $50 per volume. To order Volume I and/or II, send your check to FACTS, 1901 L St., NW, Suite 800, Washington, DC 20036.

Change of Address

MONOGRAPHS, booklets, pamplets, and other NUCCA and NUCCRA materials, sent in answer to requests by mail, are too frequently returned because of lack of notification by the subscriber of change of address, or ineligible addresses. Return address corrections add considerably to the NUCCA postage costs as the U.S. Post Office charges twenty-five cents for each correction. Please notify the NUCCA Editor, 217 West Second Street, Monroe, Michigan 48161 of any change of address. PLEASE CLEARLY PRINT OR TYPE YOUR ADDRESS.