Palmer College Of Chiropractic
The Blair Upper Cervical Chiropractic Technique:
What You Can See on a Radiograph
Todd A. Hubbard, DC, CCSP, MS

Patient “A”
HX: Neck pain, left shoulder pain and left hand numbness for 2½ years following an motor vehicle accident.
  • The neck pain is constant and progressively getting worse
  • Shoulder pain in the posterior scapula (supraspinatus and levator scapulae) area.
  • Left hand numbness
  • She has seen 2 different chiropractors with improvement of the symptoms.
  • C5, C6 and C7 disc bulges are confirmed on MRI
Why X-Ray?

• Reliability of Palpation?
• Is Symmetry of the spine normal or not?
• Does a specific Line Of Drive matter?

Why X-ray

CONCLUSION: The validity of vertebral joint assessment based on the assumption of facet symmetry is challenged, impugning certain chiropractic theories and/or techniques which rely on symmetry as being "normal." To achieve symmetrical function, the anatomical structure must be symmetrical. Since true structural symmetry does not exist, true symmetry of segmental movement may not be possible.


Current Research Supporting the Blair Concept
PRINCIPAL COMPONENTS ANALYSIS OF THE ATLAS VERTEBRA.
Meseke C, Dutny S, Britton E.
J Manipulative Physiol Ther 2008;31:212-216

• Conclusion: Based on statistical analysis of the atlantal variables, vertebral canal width, and the morphology of the superior and inferior articular facets showed significant asymmetry.
• Length TP
  - (L) = 23.06 (SD 2.62mm)
  - (R) = 23.17 (SD 2.41mm)
• Variation in the structure of the atlantoaxial joint may also lead to abnormal biomechanics related to lateral bending.
• These biomechanical abnormalities based on anatomical variation may be mistaken for a subluxation.

VARIABLE MORPHOLOGY OF THE AXIS VERTEBRAE IN 100 SPECIMENS:
IMPLICATIONS FOR CLINICAL PALPATION AND DIAGNOSTIC IMAGING

Objective: To investigate and measure the variable morphologies of axis vertebrae and explore the clinical significance of variations as it may pertain to clinical palpation and diagnostic imaging.
Methods: The common variable morphologies in 100 specimens of intact dry adult axis vertebrae (Chinese) were investigated and measured.
Results: Variable morphologies of C2 that we observed were deviation of odontoid processes (14 cases, 14.0%), deviation of spina processes (7 cases, 7.0%), bifid spinous processes (35 cases, 35.0%). 56 had a process on the left side equal to the right side, 21 were longer on the left, 18 were longer on the right. The distances between apices of transverse processes and inferior articular facets left side of C2 were 17.67 ± 2.47 mm, right side were 17.81 ± 2.10 mm.
Conclusions: Because variable morphology of the axis is common, congenital deviation of the odontoid process, deviation of the spinous process, and asymmetrical bifid spinous processes should be taken into account during clinical palpation and diagnostic imaging.

Atlas–Axis Facet Asymmetry
Implications in Manual Palpation

"Therefore, clinicians must realize that perceived restriction does not necessarily indicate pathologic motion but may simply reflect normal anatomy.

Because spinal joint palpation assumes geometric symmetry from left to right and from one person to another, the implications of these data challenge the validity of palpation as a clinical test of spinal joint function."

Ross et al. Implications of Atlas–Axis Facet Asymmetry
SPINE Volume 24, Number 12, pp 1203–1209
The occlusal distance for the left and right ranged from -7.1 to 19.0 mm and -7.5 to 19.5 mm, respectively.

The mean occlusal distance was identical on the left and right sides (4.6 mm (SD 5.1) and 4.7 mm (SD 5.0), respectively)

When accounting for soft tissue under the mastoid (which does not show up on x-ray) the entire C1TP was occluded by the left mastoid on 19 (15.8%) x-rays and on the right on 18 (15.0%).

Asymmetry of the Upper Cervical Spine

DR. BLAIR’S CONTRIBUTIONS TO THE ADVANCEMENT OF CHIROPRACTIC

Orthogonal vs Articular

- Orthogonally based techniques deriving from the work of John R Grostic… analyzing the radiograph of the cervical spine and skull as a unit, or one segment (above) and compare it to the segment below.
  - “Looking for wedge”
- Articular based techniques analyze the radiograph at the articulation. (Blair)
  - “Looking for the juxtaposition”

Dr. Blair’s Chiropractic Premises

- Dr. Blair first used the “orthogonal and Size Comparison” approaches but found through observation that the spine is not formed symmetrically
- This would cause errors in a system that was based on the idea that vertebrae form symmetrically.
**Premise 1**

- The body formation is asymmetrical when comparing structures on the right side of the body with those on the left.

*Atlas condyles...* there are always differences in the size, shape and angulations of the right and left condyles....
Why Take X-Rays

Examples of Asymmetry

- Anterior Condyle 79%
- Turned Foramen Magnum 77%
- Short Condyle 83%
- Vertical Medial Line off Center 66%
- Tilted Occiput 57%
- Odontoid off Center 57%
- Entire FM and Condyles off Center 62%
- Tilted Foramen Magnum 57%
Dr. Blair’s Chiropractic Premises

Dr. Blair’s premise for analyzing the spine the way he did can be summed up in one question.

“If a misalignment happens at the joint, why not take a picture of the joint to see the misalignment?”

3-D Torqued Subluxation

The movement of the vertebra toward juxtaposition in the adjustment is three-dimensional.

The 3 locking mechanisms (slope, convexity and convergence) will cause the 3-D Torque in of the misalignment.

Volume 18

THE ADJUSTMENT SPECIFIC

“Torqued subluxations” and “torqued alignments” involve THREE directions.

When the Chiropractor studies an A-P and lateral spinograph, and sees a vertebra that is off its natural planes, out of normal levels; is so wrenched, twisted, kinked, that it takes three distorted directions at one and same time - then he sees a “torqued” subluxation.
BJ Palmer

• no ADJUSTMENT is ever given unless THE TORQUED VERTEBRA IS UNTORQUED; until the three-direction locked vertebra is three-directionally unlocked; with its "staying-put value" in exact ratio as the three-directional production is reversed to a three-directional reduction; as the torque is untorqued; as the lock is unlocked.

Locking Mechanisms

Dr. Blair called these 3 locking mechanisms:

• Convergence
• Slope
• Convexity

Normal/Abnormal Motion

• In his studies, it became apparent that the primary direction of misalignment of the atlas vertebra is anteriority or posteriority rather than laterally.
• A Dysfunctional Articulating Segment – still moves, but moves wrong
• A Subluxation
Convergence Angles

Atlas will track along the convergence angle when in segmental dysfunction.

Long Axis of Articulation of the Condyle

- The Base Posterior radiograph shows the anatomy of the occipital condyles and Atlas Lateral Masses, with the Foramen Magnum.
- The Long Axis of the condyle is a straight line down the longest measure of the articulating surface of the condyle.

Right and Left Convergence angles. Bisecting Long axis of the Articulating Condyle.
0 degree convergence angle

45 degree convergence angle

50 degree convergence angle

59 degree convergence angle

0 degree convergence angle

50 degree convergence angle

Posterior on the left condyle

Posterior on the right condyle

Anterior on the right condyle

Anterior on the right condyle
Convergence Angles
Directs atlas motion as it is stopped from pivoting around the condyle.

Is it Laterality?
The primary movement of the atlas in subluxation is anteriority and/or posteriority.
Measuring the Convergence Angles

- The long axis of the Occipito-Atlantal articulation.
- The Base Posterior spino graph is analyzed to give defined A-P directional motion of the Atlas on Occiput.
- The Blair Protraction view is taken with the central ray aligned to the respective convergence angle.

Slope Angles

- Side slip locking mechanism

Lateral Slope Angles

Lateral Slope angles prevent true lateral sliding of the Nuchal on Occipital condyle.
Measuring Slope Angles

Slope = The lateral locking mechanism of the Occipitoatlantal articulation

Convexity Angles

Stops the Atlas from moving straight anterior or straight posterior
Occipital Condyle Convexity

Influence of the Anterior and Posterior rotation around the x-axis

Atlas can not twist without fracture
Atlas can not pivot – a lock is formed
Occipito - Atlantal joint has 0° rotation

Convexity Angles

The convexity angle is measured on the side opposite to the chin

Right Convexity Angle
Left Convexity Angle

Right Protracto View
Left Protracto View

Blair Concept of Atlas Motion
Dr. Blair developed solutions to some basic problems in chiropractic which had not been dealt with by other approaches and which improved the results obtained.

Dr. Blair’s Chiropractic Premises

- The information gained through the new specialized views provided the keys necessary to develop adjustments that address the true misalignment and line of drive.
- These adjustments could be tailored to the individual because the x-rays formed a blueprint of the vertebral motion in that person.

Spinographs taken for the Blair Technique

- Base Posterior
- APOM
- AP Cervical
- Neutral Lateral Cervical
APOM

- The “Blair” APOM is similar to the PUC open mouth.
- Cephalic tube tilt at (about) 10°.
- Central ray goes through a point ¼ inch above the lower molar and the transverse process of atlas.

Neutral Lateral

- 72" FFD
- Patient positioned with shoulders perpendicular to the bucky
- CR at C4
- 10 X 12 Film

AP Cervical

- 40" FFD
- CR at C4
- 8 X 10 film
- Cephalic tube tilt
Base Posterior

- Taken with buckey 90 degrees to tube.
- To obtain Convergence angles.
- Only film taken where patient can be moved out of normal head tilt.

Convergence Angles

- Bisected condyle give convergence angles.
- Used for angles to take Protracto View.
- Used for Line of Drive adjusting angles for C1.

Blair Technique Research


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Taking the Base Posterior

- Buckey and Tube are 90° to each other.
- Tube is at 48 inches FFD.
- Absolutely NO head tilt.
- Taken with the central ray through the center of the mandible and the EAM.

- Patient is placed in the posture constant chair with their hips all the way back against the back of the chair.
- The knees and ankles are moved to the side posts of the chair to allow room for the tube.

- The patient looks straight ahead with their back against the chair.
- Look on the face to compare shadows on the face. Under and over the eyes, cheek bones, under and over the nose.
- You may move the head if you need to.
Taking the Base Posterior

- Place the tube at 48° FFD with the central ray bisecting the middle of the mandible and the EAM.
- Set the buckey perpendicular to the tube.

Good vs. Bad BP

Squash Head

Taking the Protracto View

- The Protracto views are Oblique Nasium spinographs taken at the specific Convergence angle of each condyle.
- The left Protracto View angle is set by the left convergence angle.
- The right Protracto View angle is set by the right convergence angle.
Taking the Protracto View

- The Central Ray (CR) is set at a caudle tube tilt from 48° FFD.
- The CR tube tilt is set to intersect the bottom 1/3 of the maxillary sinus and opposite transverse process of atlas. Or set at the APL and intersects the Atlas TP.

Blair Protracto View

- Taken as an Oblique Nasium.
- Oblique angle = convergence angle of condyle from BP.
- Slope and Convexity angles are taken from Protracto view.
- To find the Atlas start at lower spine, move up to dens, move lateral toward chin to find the joint in question.
ASR (Anterior Superior Right)
- Atlas has moved Anterior Superior and to the right.
- Overlap is seen
- Use the Anterior tubercle of Atlas as the indicator for labeling the misalignment.

PIL (Posterior Inferior Left)
- Anterior Tubercle has moved Posterior, Inferior and left.
- An underlap is seen on the right Protracto View.

Atlas Motion
Atlas Motion
From the Base Posterior
From the Protracto View

The Lateral Edge

The LATERAL Edge
Blair Technique Research

Inter and intra-examiner reliability of the Blair protracto-view x-ray: Examination of a chiropractic technique:

Hubbard T, Vowles B, Forest T. J. Chiropr Med 2010;9(2):63-68

• METHODS: 25 x-ray examiners, ranging from students to chiropractors with 11+ years experience. Examiners looked at 100 Blair protracto-view x-rays (oblique Nasium).

• RESULTS: The overall inter-examiner reliability showed substantial reliability at 0.62. Within group kappa showed: no certification = 0.61, Proficiency = 0.66, Primary level = 0.61 and Advance level certification = 0.74.

• The overall intra-examiner reliability showed outstanding reliability at 0.81. Within group kappa showed: no certification = 0.76, proficiency = 0.84, primary level = 0.82 and advance level certification = 0.92 in examining the ASL – Left Protracto View.

• CONCLUSION: This study shows the Blair protracto-view to be a reliable tool for analyzing the alignment/ misalignment of the occipito-atlantal articulation.
While researching cervical spine asymmetry for the misalignment of atlas to occiput, Dr. Blair discovered a new concept of axis and lower cervical motion.

- The facets have an (I-S From A-P) angle that prevents them from moving in a straight line rotational direction.

- When a lower cervical misaligns or becomes fixated, it will do so in one of two directions:
  - Anterior or Posterior along the facet articulations

- These misalignments are seen using lateral stereo views of the lower cervical spine

- Viewing the lower cervical spine in stereo allows for a clear view of the articulations
Axis and Lower Cervical Listings

- Asymmetry in the lower spine?
- Dr Blair noticed that:
  - Angles of the facets were different from left to right.
  - Some facets were steep, others were shallow.
  - Some facets were tipped more lateral or medial.
- The facets will always be formed in a mirror image of themselves.
- And can easily be viewed if at the correct angle.

Axis and Lower Cervical Listings

- Dr Blair used the spinous process of the lower cervicals as the reference for his listings.
- Similar to the reference point we use for atlas which is the anterior tubercle.
- The listings are:
  - ARS (RLC)
  - ALS (LLC)
  - PRI (LLC, RSC)
  - PLI (RLC, LSC)

Axis and Lower Cervical Motion
Key Points in the alignment of the spine:
- Posterior Vertebral body line
- Posterior Pedicle Rotation
Patient “A”

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Thank you

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