ADJUSTING THE CHILD

USING THE NEUROIMPULSE PROTOCOL

BASIC COURSE

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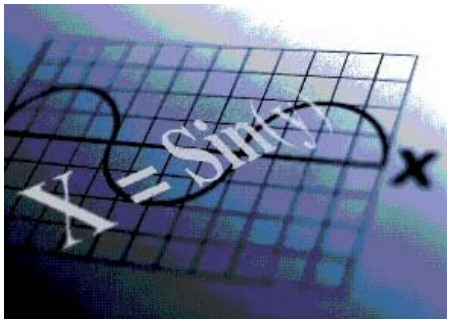
The Nature of the Subluxation Complex



It is axiomatic that consistently accurate clinical decisions are irrevocably intertwined with the understanding that the subluxation is not a random, unpredictable biomechanical event, but rather, a neuropathological state which exhibits multifaceted, measurable manifestations in the neuromusculoskeletal system which occur in patterns as predictable as a mathematical formula.

The role of the chiropractor, then, is not simply the mobilization of a stuck joint' as some have wrongly imagined, but correction of patterns of functional neuropathology. In this, the chiropractor must make a carefully weighted decision in each and every patient consultation, keeping accurate and exhaustive records in order to facilitate recognition of recurring patterns of subluxation.

That functional neuropathology accompanies disease and biological imbalance, and freedom from such neuropathology is necessary for the individual to enjoy the benefits of homeostasis, has always been, and always will be, the fundamental philosophic premise upon which the science and art of chiropractic is predicated (Palmer 1910). The relentless search for the specific in each individual which, when corrected, will result in the elimination of neuropathology, and the restoration of homeostasis (Strang 1984) remains the original franchise of the chiropractor.

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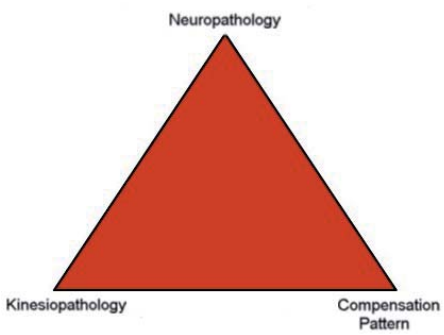
The Neuropathological Basis of the Subluxation



The subluxation complex is based on precise, predictable patterns of neuropathology, kinesiopathology and compensation pattern (Lantz 1995). Each of these elements of the subluxation complex must be present every time and in every case before a precise chiropractic adjustment of the subluxation complex can occur.

The inherent importance of the above rule is that it provides for specific subluxation diagnosis. Working in this way and in particular in allowing the neuropathology to guide examination and diagnosis provides for the treatment of one subluxation complex and not of many compensations which display one but not all of the properties required for subluxation diagnosis. Additionally, the precise and predictable patterns allow for the testing and proving of subluxation correction before any care is implemented.

The neuropathology of the subluxation complex, involves the synthesis of four neuro-physiological mechanisms which provide an explanation of the neurological effect that the subluxation has on neurological function.

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Mechanism 1: The Effect of Dural Tension

The major mechanical attachments of the dura are at the cranium, upper cervical spine and lumbar-sacral junction and involve attachments to the occiput, ligamentum flavum, rectus capitis posterior minor, directly to C2 and C3 and via Hoffman's and Trolard's ligaments to L5 and sacrum (Snell 1992, Barbaix et al. 2000, Wadhwani et al. 2004).

Cerebro-spinal fluid flow is dependent upon, among others, the appropriate function of the contractible meninges (Greitz 1993). If the biomechanical lie of the dura is changed due to aberrant kinesiology, then the contractible function of the meninges becomes impaired and thus contributes to a change in csf flow, changing the csf pressure and affecting the function of a number of central nervous system structures. The effect that increased intracranial pressure has on neurological function is easily recognised by noting the effects induced by trauma on the central nervous system. The reticular formation as an example of a key central nervous system structure and processing point (Snell 1992) allows us to recognise how a subluxation can change CNS function. Kinesiopathology results in a change in the lie of the dura, and is associated with a change in csf pressure. This results in aberrant reticular formation function causing the processing of inappropriate neurological signals which reach the cerebral cortex and must be processed into a meaningful efferent output. The cerebral cortex is also challenged by a change in csf pressure and in so doing fails to adequately synthesize the sensory information resulting in the process known as dysafferentation (Seaman 1998, Knutson 1999). Additionally the cranial nerves will be directly affected by dural torsion as they pierce the dura on exiting the brain stem. It is also important to remember that the reticular formation plays a part in autonomic controlling mechanisms and thus dysfunction may also result in appropriate autonomic activity.

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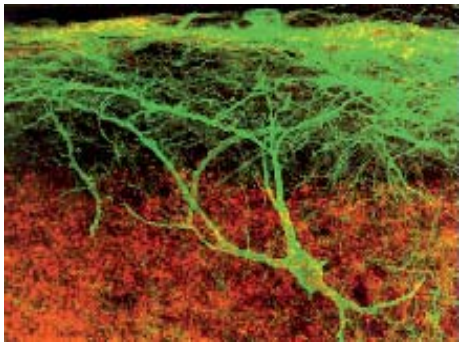
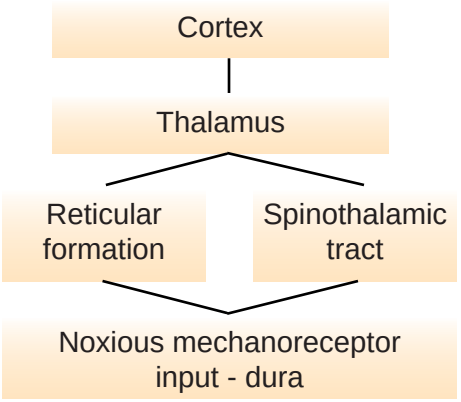
Mechanism 2: Noxious Mechanoreceptor Input From the Dura



The major innervation of the dura is through slow reacting type C fibres and fast reacting type A fibres, principally at the cervico-cranial junction (Snell 1992). Additionally the ventral dura is richly innervated by the sinuvertebral nerve plexus and from a number of perivascular nerve plexi (Groen et al. 1988, Fricke et al. 2001).



As with any ascending sensory information, the ascending tract for the transmission of nociceptive information is mainly via the spinothalamic tract. This tract communicates directly with the thalamus but also sends some fibres via the reticular formation. The spinoreticular tract is also thought to be involved in nociception (Mense 2004).

If dural tension is created by aberrant kinesiology the contractibility of the meninges is effected (Greitz 1993) and nociceptor stimulation will occur. This creates a noxious input from the dural system into the central nervous system creating a type of sensory overload. The sensory information must be adequately processed by the reticular formation and thalamus so that the cortex receives appropriate sensory information. Failure to adequately process sensory information into appropriate efferent information is known as **dysafferentation.**

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Mechanism 3: Noxious Mechanoreceptor Input From the Facet Joints

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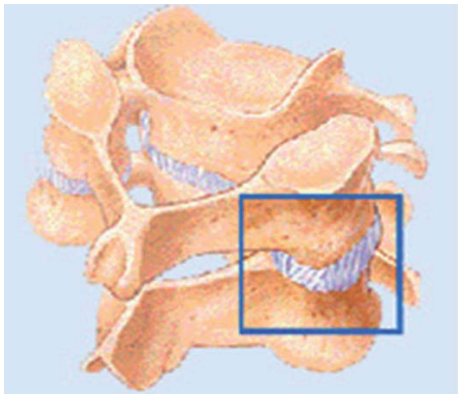
The facet joints are innervated by a variety of types of nerve endings. Principally types I,II, III and IV have been recognised (Mclain 1994, Mclain and Pickar 1998, Snell,1992). The type IV nerve ending is a free nerve ending and is particularly relevant to nociception.



The mechanoreceptor pathways which feed in to the central nervous system are the spinothalamic and spinocerebellar tracts and the posterior columns.
This contribution of sensory information is transmitted via a number of central nervous system structures including the cerebellum, reticular formation and thalamus.
Aberrant kinesiopathology, changes the orientation of the facet joint and its capsule and may expose the synovium to mechanical stress (Inami et al. 2000). Aberrant facet position and the physiological irritation of the anatomical structures can result in the sensory overload discussed in mechanism 2.

Mechanism 4: Aberrant Sympathetic Activity

Control of the blood supply to the cranium is achieved through the actions of the sympathetic nervous system. It is particularly influenced by the cephalic and cervical portions of the sympathetic nervous system (Coutsoukis 2007). The internal carotid nerve appears to be directly derived from the superior cervical ganglion and innervates the internal carotid artery as it travels superiorly to form the Circle of Willis. The Circle of Willis in turn is created by both the internal carotid arteries and the vertebral arteries (arising from the subclavian arteries). The vertebral arteries are innervated by the inferior cardiac nerve, arising from the inferior cervical ganglion (Coutsoukis 2007).

It is of importance to note that the sympathetic initiation of the flight or fight response tends to use the above named innervation to re-direct blood flow away from the central nervous system to supply the demands of the skeletal muscle. This minimal decrease in blood supply to the cerebrum may alter the internal environment of the CNS providing more challenges to neurological homeostasis and further effect the working of key CNS structures such as the reticular formation and cerebrum as previously mentioned.

Additionally, the direct connections of the sympathetic nervous system via the grey rami communicantes into the spinal nerves may provide for a source of sensory overload or afferent imbalance in the presence of the fight or flight response. The sympathetic fibres can also be stimulated through prolonged stress (Kadojic et al. 1999) or excessive facet irritation (Suseki et al. 1996). The presence of excessive sensory input or overload is of particular relevance at the sensitive upper cervical complex and sacral areas which must also process afferent innervation from the richly innervated dura at these levels and provides another possible mechanism of dysafferentation.

The fight or flight response from the sympathetic nervous system occurs as a reaction to stress in many different forms. The subluxation complex can certainly represent a form of chronic stress and it is in the presence of this prolonged stress that the process of dysafferentation will be exacerbated.

~Notes~

The Common Elements

Each of the discussed neurological mechanisms contribute to the neuropathology of the subluxation. Each mechanism results in the process known as DYSAFFERENTATION and it is this which is crucial to the understanding of the neurological effect of the subluxation complex.

Additionally, all sensory pathways decussate. This means that adverse sensory events initiated on the left side of the body are interpreted by the right brain and vice versa.

Finally, the effect on the autonomic nervous system is noted by the interconnections of the reticular formation and the superior cervical ganglion.

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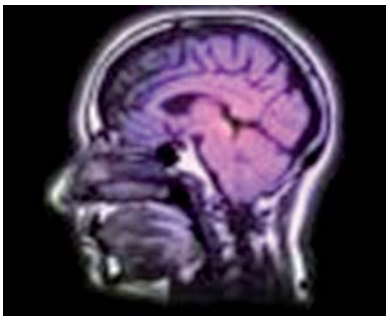
The Adjustment



The chiropractic adjustment is a precise and specific intrusion into the nervous system.

Delivering any adjustive thrust, and in particular, repeated adjustive thrusts to a compensated region of the spine or extremities must be assiduously avoided at all times if inappropriate neurological input is to be avoided. Repeated adjustive thrusts will put the patient at risk of developing an iatrogenic hypermobility syndrome at that level (Cox 1997).

The chiropractic adjustment can be seen as providing a sort of resetting mechanism to the nervous system. It overrides the gating mechanism and activates specific neurological pathways (Carrick 1997).

~Notes~

The Subluxation-Compensation Relationship

One of the most poorly misunderstood clinical relationships is that of the compensatory response to the subluxation. A compensation is a biomechanical aberration which is invariably devoid of the full complement of physical examination findings that would define it as a subluxation (Herbst 1968) and will be manifest as a predictable pattern of movement loss, hypermobility or both (Davies 2000) with little capacity to cause neuropathology (Plaugher 1993).

Compensation is a kinesiopathologic response to the subluxation and may involve a single motion segment or a whole area of the spine (Gatterman 1995). Compensation is frequently found as far from the subluxation as the occiput is from the sacrum. Compensatory kinesiopathologic response to the subluxation may be demonstrated on postural assessment and motion palpation examination with the elements related to alteration of primary curve contour and disc shape most reliably seen on X-ray

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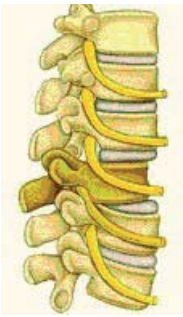
~Notes~

When is a Subluxation really a Subluxation?

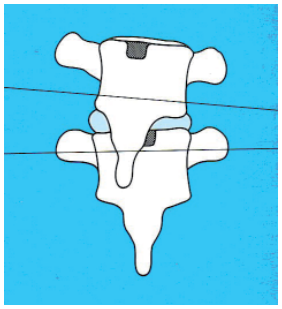


The essence of sound decision-making in chiropractic is the result of a process of clinical logic and deductive reasoning which has taken into account all the available physical evidence. The conclusion that a chiropractic adjustment is an appropriate clinical intervention should only be arrived at when adequate evidence of all five fundamental aspects of the subluxation can be demonstrated.

It is illogical to decide to ‘adjust’ a given spinal motion segment when only hypomobility, for example, can be demonstrated. Such hypomobility, existing in the absence of other findings, almost certainly represents a compensation (Davies 1997.)

~Notes~

Use of Listings in Chiropractic Practice



A listing provides the chiropractor with a simple and convenient way to describe, in detail, the directional vectors involved in the kinesiopathologic states of fixation and hypomobility that may be involved as a manifestation of the subluxation.

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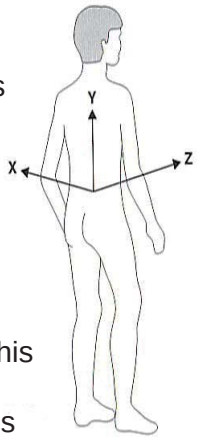
Listings applied to each spinal motion segment provide the chiropractor with a mechanism for kinesiopathologic vector resolution in order to facilitate precise, directionally accurate adjusting.

Listings are also very useful for quick and accurate clinical record-keeping. In essence, they represent a description of the kinesiopathology of the vertebral subluxation complex at a given point in time. Frequently, as care in rendered to a chiropractic patient over time, a record of the listings on each consultation forms a pattern for that patient which may be interpreted by the chiropractor and made use of in future clinical decision making. The listings used in this manual are principally those formulated and taught by Dr Clarence Gonstead (Herbst 1968). There are, however, significant variations in the total system proposed in order to accommodate those biomechanical derangements not allowed for in the original or current Gonstead system. There are also some minor omissions from the traditional Gonstead system, which reflect new knowledge produced by biomechanical research of recent years.

Terminology

Listings use a single letter to identify each of the vectors represented by translation, rotation and curvilinear movement in each of the three axes now universally referred to as the X, Y and the Z axes of rotation (Bergmann et al 1993, Gatterman 1990). The common origin is a point between the cornua of the sacrum. The Y-axis is described as the line occurring vertically through this origin, the X-axis at 90 degrees to this line in the coronal plane and the Z-axis at 90 degrees in the sagittal plane as shown in the figure opposite.



The letters used in the formulation of a listing describing kinesiopathology at the typical vertebral motion segments and what they signify are shown in Table 1. It should be noted that certain variations to this usage occur at the atypical spinal motion segments such as occiput / atlas, L5 / sacrum, etc. Where this is the case, the precise usage will be identified.

Table 1
Letters used in the compilation of listings to define vectors of kineseopathology

Designated letter	Description of movement	
P	Posterior	Describes extension movement about the X-axis
A	Anterior	Describes flexion movement about the X-axis
R	Right	Describes rotation about the Y-axis
L	Left	Also describes rotation about the Y-axis
S	Superior	Describes lateral flexion movement about the Z-axis
I	Inferior	Also describes lateral flexion movement about the Z-axis
Ex	External	Applies to iliac rotation on the sacrum about the Y-axis
In	Internal	Also applies to iliac rotation on the sacrum about the Y-axis

~Notes~

IMPORTANT CLINICAL NOTE!

The cardinal rule of NIP chiropractic adjusting for typical vertebral motion segments is that all the adjustive thrusts should be made against the convexity of any scoliotic curve with the primary goal of reducing the intervertebral disc distortion designated by the letter ‘S’ in the listing.

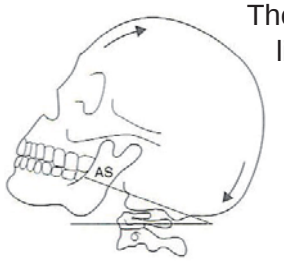


Fig 1

The anatomical reference point for flexion / extension components of occipital listings has by convention been twofold according to the direction of movement. When the occiput moves into extension, the anterior rim of the foramen magnum moves anteriorly and superiorly. This movement about the X-axis and is therefore designated by the listing AS. (Fig 1)

Conversely, when the occiput moves into flexion, the posterior rim of the foramen magnum moves posteriorly and superiorly about the X-axis and is thus designated by the listing PS. The convex shape of the long axis of the occipital condyle is the reason that both listings contain the letter S, indicating that the nominated reference point has moved superiorly. (Fig 2)

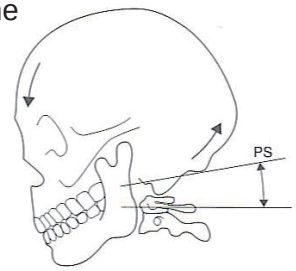


Fig 2

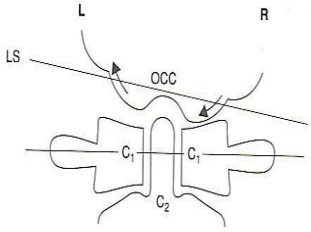


Fig 3

The anatomical reference point for lateral movement of the occiput is the condyle on the side of lateral movement which will always moves superiorly owing to the convex shape of its transverse axis. This lateral and superior rotation about the Z-axis is designated by the listings RS or LS according to which side has moved laterally. In Fig 3, the left condyle has moved laterally and superiorly in accordance with the joint shape.

~Notes~

Table 2
Full complement of occipital listings

AS occipital listings	PS occipital listings
AS (straight or bilateral)	PS (straight or bilateral)
AS-LS, AS-RS	PS-LS, PS-RS

The Atlanto-Axial Atriculation

Movement of the atlas on the axis is very complex and requires a four-letter listing to adequately describe all the possible vectors. The first letter is always ‘A’ which denotes the small anterior translation that the atlas undergoes along the Z-axis concurrent with either flexion or extension.

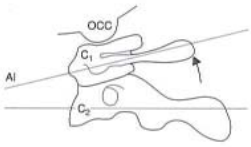


Fig 4

The anatomical reference point used to describe flexion and extension of the atlas on the axis about the X-axis is the anterior tubercle of atlas. In flexion, the anterior tubercle moves inferiorly and is denoted by the listing ‘AI’. (Fig 4)

while in extension the anterior tubercle moves superiorly and is denoted by the listing ‘AS’. (Fig 5)

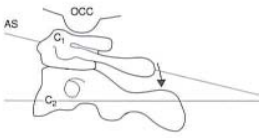


Fig 5

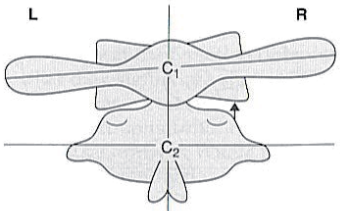


Fig 6

While there is no translation of atlas on axis along the X-axis, the atlas may become ‘wedged’ on one side owing to capsular swelling between the atlas inferior articular surface and the corresponding superior articular surface of axis (Herbst 1968, Plaugher 1993). When viewed from the anterior, the atlas appears to have rotated about the Z-axis with the side of superiority being denoted as the side of atlas laterality. This is designated by the third letter of the atlas listing being either ‘L’ or ‘R’ depending upon which side has been affected. The anatomical reference point is the tip of the transverse process on the side that has moved superiorly. In Fig 6, the listing is R.

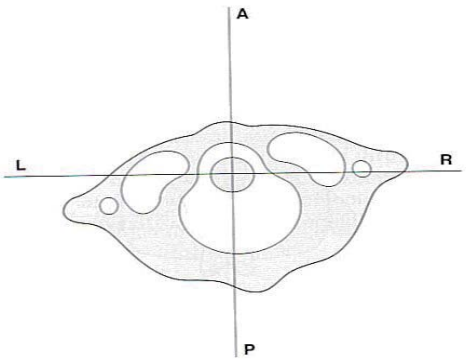


Fig 7

Anterior rotation of the atlas on the right side

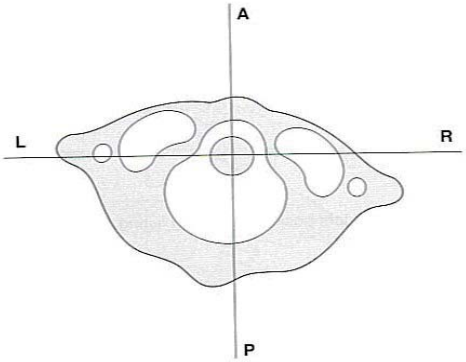


Fig 8

Posterior rotation of the atlas on the right side

The atlas also moves very significantly in rotation on the axis, the instantaneous axis of rotation being at the odontoid process. This movement accounts for 50% of all cervical rotation and is a simple movement about the Y-axis. The anatomical reference point is the transverse process on the side of ‘laterality’ which may move either anteriorly or posteriorly (Figs 7 & 8). Anterior rotation is denoted by the letter ‘A’ while posterior rotation is denoted by the letter ‘P’. These letters denote the fourth component of the atlas listing. The full complement of atlas listings is shown in Table 3.

~Notes~

Table 3
Full complement of atlas listings

AS atlas listings	AI atlas listings
ASL, ASR	AIL, AIR
ASLA, ASRA	AILA, AIRA
ASLP, ASRP	AILP, AIRP

Axis/C3 and the Lower Cervical Motion Segments

The anatomical reference points for listing the cervical spinal motion segments is the spinous process for extension about the X-axis and rotation about the Y-axis.

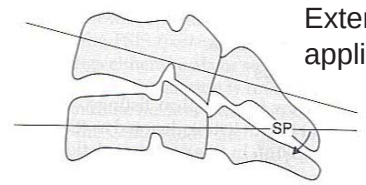


Fig 9

Extension is denoted by the letter ‘P’ and is always the first letter used in the listings applicable to these segments. Posteriority, or extension about the X-axis, is the result of distortion of the annular fibers with anterior wedging of the intervertebral disc. (Fig 9)

Spinous process movement to the right is denoted by the letter ‘R’ (Fig 10) and to the left by the letter ‘L’. These letters appear second in the listing.

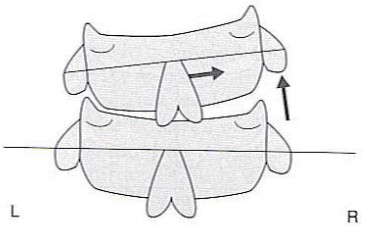


Fig 10

The transverse process on the side to which the spinous process has rotated is used to list lateral flexion, by definition resulting in a wedging open of the intervertebral disc about the Z-axis (Fig 11). The letters ‘S’ or ‘I’ are used to reflect the distortion in the annular fibers of the lateral aspect of the disc (e.g. in the listing C2 PRS, the S means that the C2/3 disc is wedged open on the right side).

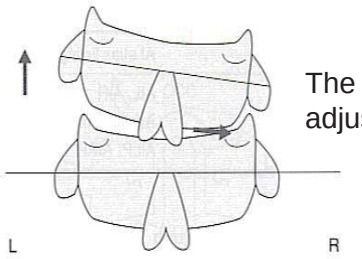


Fig 11

The listings in the cervical spine which have a ‘-La’ component indicate that the adjustive thrust should be applied to the lamina opposite the side of spinous rotation, which is in keeping with the convention of always applying the adjustive thrust against the convexity of the lateral spinal curve.

Atypical Axis Listings

The axis also has two atypical listings. The first is the entire segment lateral listing denoted as ‘ESL’ or ‘ESR’. In this case, translation of the entire axis segment relative to C3 has occurred along the X-axis in addition to lateral flexion about the Z-axis, the superiority being on the side to which the segment has translated. There is also some degree of extension about the X-axis, although it is not denoted within the letters of the listing.

The second atypical listing is the PI axis that involves only extension about the X-axis

The full complement of lower cervical listings is shown in Table 4.

~Notes~

Table 4
Full complement of lower cervical listings

Typical listings	Atypical listings
PLS, PRS	ESL, ESR
PLI-La, PRI-La	PI (straight posterior)

The Thoracic and Lumbar Spinal Motion Segments

The anatomical reference points used in the thoracic and lumbar spinal motion segments are identical to those used in the cervical spine and the listings are derived in exactly the same manner. It should be noted that the Gonstead system has not historically described the flexion subluxation in the thoracic spine owing to the anatomical inability of the segments to translate anteriorly along the Z-axis. For the same reason, of course, thoracic segments are unable to translate posteriorly, which makes the use of 'P' in the thoracic listings something of a misnomer.

In order to resolve this anomaly, the use of the letters 'P' and 'A' in thoracic listings will be construed to mean extension or flexion respectively about the X-axis without necessarily implying translation along the Z-axis.

The listings in the thoracic spine which have a '-T' component indicate that the adjustive thrust should be applied to the contralateral transverse process; while in the lumbar spine '-M' indicates that the thrust should be applied to the contralateral mamillary process in keeping with the convention of always applying the adjustive thrust against the convexity of the lateral spinal curve.

Atypical Listings at L5

The lumbosacral spinal motion segment, owing to several factors related to pelvic structure and function, presents a number of atypical configurations which have to be taken into account in order to respect the cardinal rule of adjusting – application of the thrust into the convexity of the lateral spinal curve. The atypical listings arise because of the relationship between the sacrum and its effects on the lumbar curve at the lumbosacral junction. It is possible at this level to have the closed wedge side of the disc on the convex side of the lumbar scoliosis, in which case the contact for adjusting has to be taken on that side. When adjusting these atypical listings, the convexity of the lumbar scoliosis always takes precedence over the side of the open wedge.

~Notes~

Table 5
Full complement of thoracic and lumbar listings

Thoracic listings	Typical lumbar listings	Atypical lumbar listings (L5)
P (straight posterior)	P (straight posterior)	PLI, PRI
A (straight anterior)	PLS, PRS	PLS-M, PRS-M
PLS, PRS	PLI-M, PRI-M	
PLI-T, PRI-T		

At the sacroiliac joint, listings of both the innominate and sacrum apply. The anatomical reference point for innominate listings is the PSIS (posterior superior iliac spine) and for sacrum listings either the ala or second sacral tubercle. The ala is used when the sacrum is rotated and the tubercle is used for midline flexion / extension subluxations.

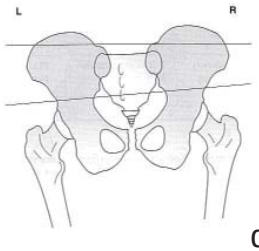


Fig 12

Historically, the Gonstead system has only listed posterior rotations of the sacrum about the Y-axis and lateral flexion about the Z-axis. The posterior rotation of the sacrum is designated as 'P-R' (Fig 12) or 'P-'L' depending upon which sacral ala has rotated posteriorly. Should there be an inferior component, evidenced by rotation of the sacrum about the Z-axis, then the listing is designated as 'PI-R' or 'PI-L'

Recent investigations using CT scanning techniques and reported in the literature by Gatterman (1995), however, have clearly quantified anterior rotations of the sacrum about the Y-axis. In addition, many chiropractic investigators have identified consistent physical signs that imply the existence of the anterior-inferior sacral or 'AI' configuration (Coggins 1975, Kirk et al 1985, Logan & Murray 1950). In order to correct this anomaly, the AI sacral listing has been added.

As well as the rotational configurations of the sacrum, it is common to find extension of the sacral base in its relationship to the inferior end plate of L5, distorting the intervertebral disc posteriorly (Fig 13) and being listed as a base posterior sacrum or 'BP'

Fig 13

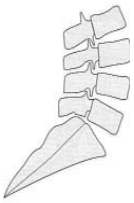


Fig 14

Additionally, the sacrum occasionally moves into flexion about the X-axis grossly distorting the intervertebral disc at its anterior margin (Fig 14). This is referred to as a base anterior sacrum, the listing being designated as 'BA'

Neither the base anterior or posterior listings have any rotational factors. There is also the possibility of the sacral segments being posterior in the midline or in rotation either singularly or in combination (Ie S2 post or S2 P-R and S3 P-L)

The full component of sacral listings in shown in Table 6.

The innominate is listed as having moved into extension (listed as 'PI') or flexion (listed as 'AS') about the X-axis as well as internal rotation (listed as 'In') or external rotation (listed as 'Ex') about the Y-axis. Given the published data by Gatterman (1995) and Bergmann et al (1993) identifying the translational movement of the ilium on the sacrum in the oblique sagittal plane as an integral part of sacroiliac motion, it is reasonable to conclude that in all probability innominate listings will be compound (i.e. involving vector components of both flexion/extension and rotation) rather than simple.

~Notes~

Table 6
Full complement of sacral listings

Posterior sacrum	Anterior sacrum
BP (base posterior)	BA (base anterior)
P-L, P-R	LAIS, RAIS
PI-L, PI-R	
S2 P (2nd sacral segment posterior)	

The Atypical Innominate Listings

These are all related to bilateral listings. They are nominated here as atypical owing to the relative infrequency with which they occur when compared to the unilateral compound listings described above.
The full complement of typical and atypical listings are shown in Table 7.

The Pubic Symphysis

The pubic symphysis has only minor capacity for movement as a shearing action about both the X and Y axes. Considerably more movement is seen in the child than in the adult. In the case of trauma where the symphysis is separated, the listing ‘Rlat-Llat’ is used, implying that both the right and left pubic rami have moved laterally. When one of the pubic rami has moved superiorly, the listing ‘RS’ or ‘LS’ is applied as the case may be. Conversely, when one of the pubic rami has moved inferiorly, the listing ‘RI’ or ‘LI’ is used.
The full complement of pubic symphysis listings are shown in Table 8.

The Sacrococcygeal Articulation

While there is motion at the sacrococcygeal junction normally, a subluxation complex is most often only evident after trauma, which may be sudden or prolonged. The coccyx moves in flexion/ extension about the X-axis, rotation about the Y-axis and if ligament damage is present, rotation about the Z-axis which is seen as lateral deviation of the sacral apex. The coccygeal apex is used as the anatomical reference point and the listings used to describe coccygeal movement are ‘A’ for anteriority or flexion about the X-axis, with the addition of ‘L’ or ‘R’ to denote rotation of the base against the sacral apex. Lateral deviation of the coccygeal apex is identified by the open wedge it produces at the sacrococcygeal articulation .
The full complement of coccygeal listing are shown in Table 9

~Notes~

Table 7
Full complement of innominate listings

Typical listings	Atypical listings
PI, AS	In-Ex pelvis
In, Ex	Double PI, double AS
PIIn, PIEx, ASIn, ASEx	Double PIIn, PIEx Double ASIn, ASEx Double Ex, In

Table 8
Full complement of pubic symphysis listings

Llat – Riat (separation of the pubic synchondrosis)
LS, RS
LI, RI

Table 9
Full complement of coccygeal listings

Apex	
Anterior	Posterior
A-L, A-R	LP, RP
Base	
Anterior	Posterior
A-L, A-R	P-L, P-R
AI-L, AI-R	PI-L, PI-R

Introduction

For the purposes of this discussion, the upper cervical complex is deemed to include the occiput/atlas, atlas/axis and axis/C3 motion segments. The common denominator of movement loss in the upper cervical complex from which all the listings are finally derived is lateral flexion, not at any particular level, but generally. In order to achieve an accurate, reproducible clinical assessment, the patient must be placed in a position that is absolutely neutral to the X, Y and Z axes as shown opposite. To assist the very young child to maintain a neutral X Y Z position, it is needful for the mother to put one hand over the low back and one hand over the chest and to push the child upright. Correct patient placement is shown in Figs 15-18.

Fig 15

Fig 16

Fig 17

Fig 18

~Notes~

Lateral Flexion of the Upper Cervical Complex

Technique

Fig 19

~Notes~

The first step in the examination of the upper cervical complex is lateral flexion of the entire upper cervical spine. This is best appreciated by taking a contact with the thumb and index finger of the preferred palpating hand while the other hand is placed on the top of the head, with the pisiform placed firmly over the upper thoracic spine as discussed above to keep the childs cervical spine in as neutral a position to the universal axes as possible. The range of motion involves only the upper cervical complex and not the lower cervical spine. Correct technique is shown in Figs 19 & 20.

Fig 20

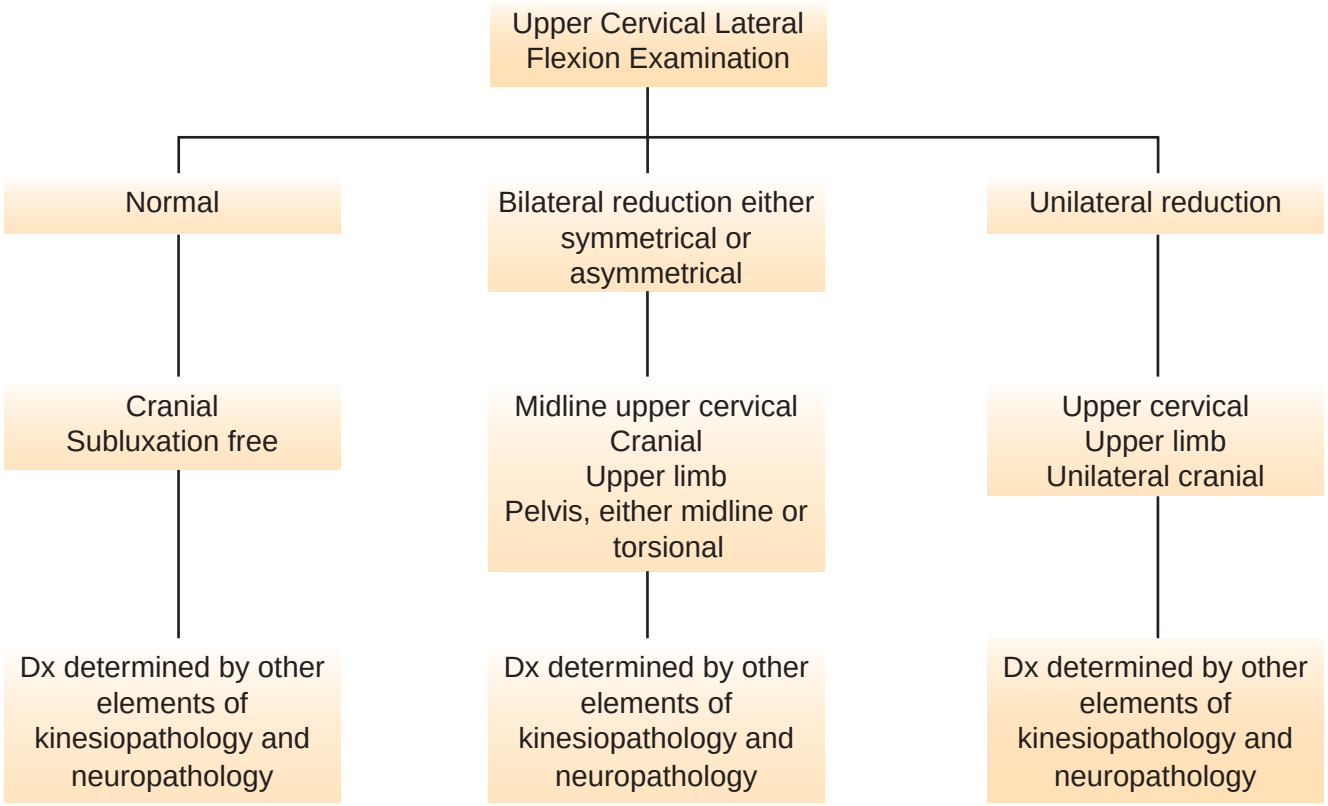
Clinical Interpretation

Analysis of the movement to each side will result in one of the following conclusions;

- Unilaterally diminished movement to either the right or left
- Bilaterally diminished movement of equal magnitude
- Bilaterally diminished movement of asymmetrical magnitude. (Ie R>L or L>R)

In terms of clinical interpretation, unilaterally diminished movement implies ipsilateral upper cervical subluxation. This will be confirmed by demonstration of a predictable pattern of neurological deficit seen as Shimizu and pectoral hyper-reflexia.

Bilaterally diminished lateral flexion of either equal or asymmetrical magnitude may also imply a midline upper cervical subluxation. In this case, the neurology will show the Shimizu and pectoral reflexes to be bilaterally hyper-reflexive. Loss of lateral flexion at the upper cervical complex specifically identifies the Z-axis elements of the subluxation (lateral occiput, lateral atlas or open wedge at C2/C3, the S or -La components of the listing using the Gonstead system).



Once the lateral flexion component has been established, the remainder of the steps are utilized to identify both the motion segment level and the exact directional elements of the subluxation complex. Occiput/atlas is examined first, followed by axis/C3 and finally atlas/axis.

~Notes~

Assessment of Long Axis Motion at the Occipital Condyle

Technique

Fig 21

Fig 22

~Notes~

The occipital condyles lie in a roughly horizontal plane converging at approximately 45° to the anterior. This anatomical lie necessitates an examination protocol that requires isolating motion of the occiput on the atlas across the Z-axis at the said 45 degrees. The occiput is examined first in extension (Figs 21 & 22) and then in flexion (Figs 23 & 24).

Fig 23

Fig 24

Clinical Interpretation

The movement will be determined to be normal, excessive or restricted. Excessive motion is a compensatory reaction to either an axis/C3 subluxation or a sacral subluxation, either midline or torsional. Conversely, axis/C3 motion in flexion will be excessive in the presence of an occipital subluxation. When there is subluxation of the upper cervical complex, normal occipital motion is generally seen in association with the atlas/axis subluxation. Unilaterally restricted movement, when seen on the side of restricted lateral flexion is indicative of ipsilateral occiput/atlas subluxation. Specifically, restricted flexion identifies the anterior occiput listing and restricted extension identifies the posterior occiput listing.

~Notes~

Lateral Flexion	Extension	Flexion	Listing
Right restriction	Right restriction	Normal	PS-RS
Left restriction	Left restriction	Normal	PS-LS
Right restriction	Normal	Left restriction	AS-RS
Left restriction	Normal	Right restriction	AS-LS
Bilateral restriction	Bilateral restriction	Normal	Double PS
Bilateral restriction	Normal	Bilateral restriction	Double AS

Table 10. Possible combinations of motion loss at occiput/atlas and their clinical interpretations.

Assessment of Motion at the Axis/C3 Motion Segment

The next step is to examine the axis/C3 motion segment in flexion (Fig 25). When subluxated, the combination of both condyles being hypermobile along their long axis in both flexion and extension along with restricted flexion between C2 and C3 is diagnostic, provided the expected neuropathology has been identified.

Once this relationship has been demonstrated, and only then, should the motion segment be examined in rotation. The reference point for rotational loss is the spinous process and it may of course be to the left or to the right. It is deemed to be left when no motion can be detected between C2 and C3 spinouses on left head rotation and of course the same principle holds true with loss of motion on right head rotation (Fig 26)

Fig 25

Fig 26

Lateral Flexion	Flexion	Rotation	Listing
Right restriction	Restricted	R-L restricted	PRS
Left restriction	Restricted	L-R restricted	PLS
Right restriction	Restricted	L-R restricted	PLI-La
Left restriction	Restricted	R-L restricted	PRI-La
Bilateral restriction	Restricted	L-R/R-L restricted	PI

Table 11. Possible combinations of motion loss at Axis/C3 and their clinical interpretations

~Notes~

IMPORTANT CLINICAL NOTE!

The occiput/atlas and C2/C3 motion segments act in harmony in maintaining motion balance in the upper cervical spine. Therefore, when a loss of motion occurs in flexion or extension at one level, the other level will compensate by becoming hypermobile

Assessment of Motion at the Atlanto-Axial Motion Segment

Technique

The last step is very simple. Given that there is a lateral flexion restriction to one side and normal movement at both the occipital condyles and the C2/C3 motion segment, the only possible level at which the subluxation can be found is atlas/axis. The well documented fact that 50% of cervical rotation occurs at this motion segment makes its identification as the subluxated level very simple. Normal full range of motion is shown in Figs 27 & 28. Note the doctors position observing the extent of rotation by using the patients nose as a guide. Also note the difference in technique for generating the gross rotational movement in the very young patient as opposed to the school age patient. As to when to change technique from the very young to the older child will depend upon patient compliance and to a large extent, apon the patients size. Generally one changes to the older child technique at around age 4 to 5 years.

Clinical Interpretation

A loss of gross rotation as shown at left (below), appreciated as the premature tightening of the SCM muscle at rotational end range, implies that the atlas is rotated anteriorly on that side. A right anterior atlas therefore would be manifest as a combination of restricted lateral flexion and gross rotation on the right.

Lateral Flexion	Occiput/Atlas	Axis/C3	Gross Rotation	Listing
Right restriction	Normal	Normal	Restricted to right	ASRA AIRA
Left restriction	Normal	Normal	Restricted to left	ASLA AILA
Right restriction	Normal	Normal	Restricted to left	ASRP AIRP
Left restriction	Normal	Normal	Restricted to right	ASLP AILP

Table 12. Possible combinations of motion loss at atlas/axis and their clinical interpretations.

IMPORTANT CLINICAL NOTE!

The AS/AI component needs to be identified by neurological assessment the technique for which is described later.

~Notes~

Role of the Shoulder Girdle in the Upper Cervical Subluxation

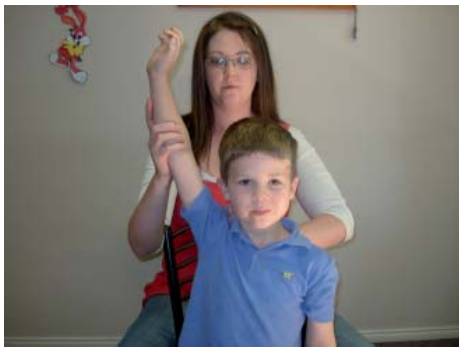


Fig 29

Fig 30

~Notes~

The hand is held palm away from the body in the X-axis and the arm is raised into full abduction at the glenohumeral joint. Normally, the arm will abduct 180º as shown in Fig 29 in a smooth, unbroken arc of movement. Care must be taken to keep the arm in the XY plane at all times throughout the procedure as shown opposite and below.
It is common for movement to be lost at 90º -135º (Fig 30) when there is subluxation of the upper cervical complex, the shoulder itself, certain cranial complexes or the pelvis and its appendages. Lost abduction at particular levels is also seen in thoracic subluxation and is level specific

Neuropathology

Fig 31

Fig 32

Fig 33

Fig 34

Fig 35

Fig 36

When an upper cervical subluxation is present, the following neurological deficits will be in evidence;

•Positive Shimizu reflex (scapula rises or the humerus abducts) One needs to carefully hold the childs arm, particularly in the very young to appreciate the reflex by palpation as much as visually. (Figs 31 & 32)
•Hyperactive pectoral reflex (Figs 33 & 34)
•Normal scapulohumeral reflex (Figs 35 & 36)

~Notes~

Point Specific Pain Findings
(Myopathology and Connective Tissue Pathology)

For each of the upper cervical listings there will be a reliably reproducible pattern of bony and soft tissue, point specific pain findings. It is advisablt to use these on in children who's cognative level allows them to be able to offer the examiner qualitative information in relation to the specific nature of these pain findings. It is inaporopriate to endeavor to use them in a baby, toddler or young child. The pattern of painful points as they relate to the specific listings in the upper cervical complex are identified in table 13.

~Notes~

Level	Description of location of pain points
Occiput	Pain over the nuchal lines on the side of subluxation. More reliable in the posterior listing than the anterior listing
Atlas	Pain over the styloid process of the side of laterality and over the posterior arch on the side of posterior rotation
Axis PRS and PRI-La	Pain over the right side of the axis spinous and the left lamina
Axis PLS and PLI-La	Pain over the left side of the axis spinous and the right lamina
Axis PI	Pain over the point of bifurcation of the axis spinous process in the segmental midline

Table 13 Relationship of point specific pain findings and upper cervical listings.

Postural Examination

Each of the upper cervical listings causes the head to tilt away from the involved side, making the ear high on that side. The posteriorly rotated atlas subluxation (Ie ASLP, ASRP, AILP and AIRP), however, is an exception to the rule as it makes the head tilt towards the side of subluxation.

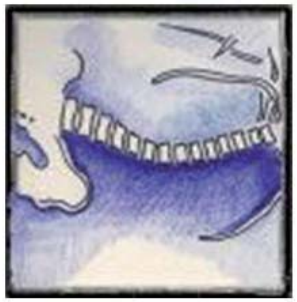
In addition, there will be a physiological short leg, measured in the supine position, ipsilateral to the side of occiput laterality and axis superiority (open wedge at the axis/C3 disc) and contralaterally to the side of atlas rotation in atlas/axis subluxation.

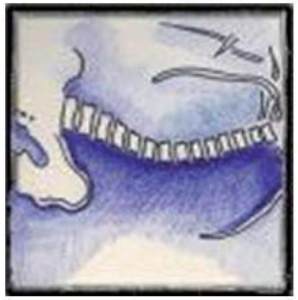
~Notes~

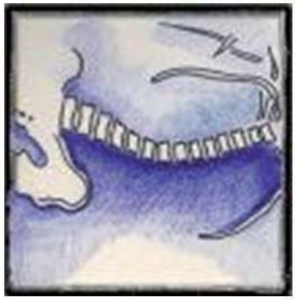
IMPORTANT CLINICAL NOTE!

The subluxation is a neurological entity and as such behaves predictably. To qualify as a subluxation, kinesiopathology, neuropathology and the expected compensation pattern must be demonstrated

Examination of the Lumbopelvic Region

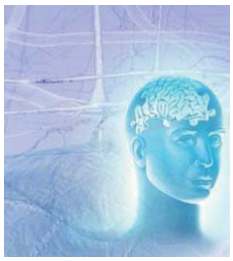






The Role of the Upper Cervical Complex and Shoulder Girdle in the Assessment of the Lumbopelvic Subluxation

As a global starting point for this discussion, it is reasonable to assert that diminished total range of motion at the upper cervical complex in rotation about the Z and Y axes is universally seen in all dural tension subluxation complexes. Coupled with a diminished range of motion at the glenohumeral joints and a standard, orthodox neurological assessment of the Shimizu and pectoral reflexes, this phenomenon offers the chiropractor a great deal of clinical information about the specifics of the lumbosacral subluxation complex.



When the primary subluxation is in the lower lumbar spine or within the pelvic structures, there will be a predictable compensatory pattern of kinesiopathology and neuropathology at the upper cervical complex and the shoulder girdle. The patterns of movement loss which lead the chiropractor to the lumbopelvic area are as follows;

At the upper cervical complex

Fig 37
Bilaterally diminished lateral flexion

Fig 38

Fig 39
Bilaterally diminished gross rotation

At the glenohumeral joint

Fig 40

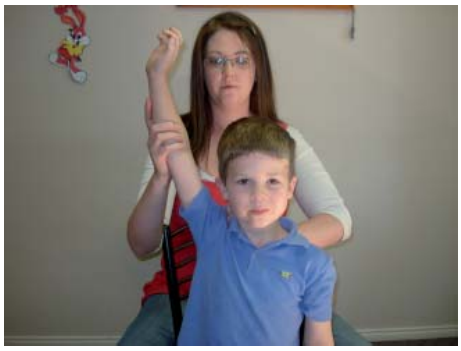


Fig 41
Bilaterally diminished abduction in the XY plane

IMPORTANT CLINICAL NOTE!

It is the rule rather than the exception that movement loss at both the upper cervical complex and the glenohumeral joint, while bilateral, will be asymmetrical in terms of magnitude

~Notes~

The typical kinesiopathology is only half the equation in determining that a primary pelvic subluxation exists. There will also be a definite predictable pattern of neurological loss which will accord with the nature of the pelvic subluxation as follows;

Upper cervical and glenohumeral kinesiopathology suggestive of a pelvic subluxation

Shimizu reflex present bilaterally Pectoral reflex normal Scapulohumeral reflex normal	Shimizu reflex absent bilaterally Pectoral reflex normal Scapulohumeral reflex normal
Midline pelvic subluxation	Torsional pelvic subluxation
• BA sacrum	RAI/LAI sacrum
• BP sacrum	P-R/P-L sacrum
• Posterior sacral segment	P-R/P-L sacral segment
• Counter-rotated sacral segments	P-R/P-L coccyx
• Posterior coccyx base	Unilateral pubis
• Pubis	Unilateral diaphragm
• Xiphoid	A-R/A-L xiphoid
• Bilateral diaphragm	PIEx, PIIn, ASEx, ASIn ilium
• Double PI or AS ilia	L5 PRS, PLS, PRI-M, PLI-M
• PI L5	L5 PRS-M, PLS-M

~Notes~

IMPORTANT CLINICAL NOTE!

It is pointless to examine the pelvis until after a thorough upper cervical assessment has been performed and the kinesiological and neurological compensation elements have been identified.

Examination of the Pelvis

For the purposes of this discussion, the pelvis may be considered to be made up of the lumbosacral junction, the sacroiliac joints and the pubic symphysis. The common denominator of movement loss in the pelvis from which all the listings are derived is flexion/extension at the L5/S1 junction. It is important to understand from the outset that in standard kinesiopathological patterns the loss of movement at the sacroiliac joints is opposite in direction to that at the L5/S1 junction.

~Notes~

L5 and Anterior Sacral Subluxation

Technique

Fig 42

Fig 43

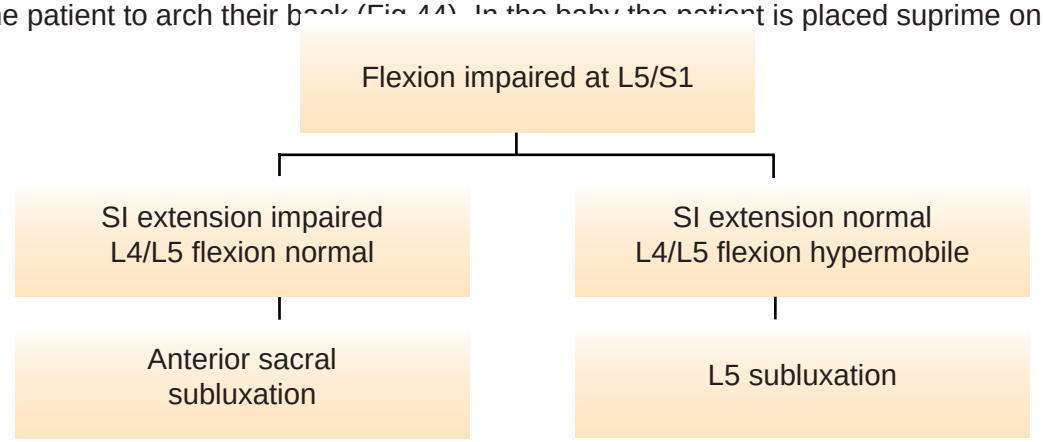
Fig 44

Fig 45

Fig 46

The first step in the examination of the pelvis is L5/S1 flexion. This is best appreciated by palpating the space between the L5 spinous and the sacrum. In the older child the patient position is seated and the motion is initiated by having the patient slump (Fig 42). This slumping motion produces rotation about the x axis at the L5/S1 junction. In the baby the patient is examined prone across the mothers lap and flexion is induced by literally wrapping the baby around the mothers leg (Fig 43). An adaptation of this techinique for the toddler is to have the child across the Doctors knee with mum holding the childs hands and to induce the flexion motion the child pelvis is literally wrapped around the Doctors leg as shown opposite.
Once it has been determined that flexion is impaired, the sacroiliac joints should be examined in extension. Extension in the older child is induced by palpating across the joint with the thumb and while holding the shoulder ask the patient to arch their back (Fig 44). In the baby the patient is placed suprime on the mothers lap and the motion is induced by extending the sacroiliac joint by palpating across the joint with one hand and raising the patients leg with the other (Fig 45). An adaptation of this techinique for the toddler is to place the child across the Doctors lap and to induce the motion in s similar way (Fig 46).

child pelvis is literally wrapped around the Doctors leg as shown opposite.
Once it has been determined that flexion is impaired, the sacroiliac joints should be examined in extension. Extension in the older child is induced by palpating across the joint with the thumb and while holding the shoulder ask the patient to arch their back (Fig 44). In the baby the patient is placed suprime on the mothers



IMPORTANT CLINICAL NOTE!

Regardless of whether the subluxation is at L5 or sacrum, the Shimizu reflex will determine if it is midline (bilateral), or torsional and therefore unilateral. Neurological loss in the lower limb will be consistent with the Shimizu indications and the kinesiopathology in the pelvis. A Shimizu reflex present bilaterally will be associated with bilateral neurological deficit in the lower limb while an absent Shimizu reflex is associated with a unilateral neurological loss in the lower limb

The Complete L5 Listing

Once it has been determined that L5 is the primary subluxation, the remainder of the 3-dimensional vectors need to be determined. This is only required in the event there is no Shimizu reflex present as this is the key neurological indicator for torsional subluxation.

The first element to be determined is rotation about the Y-axis. This is accomplished as shown opposite in the older child placed in the seated position. The spinous process should rotate from right to left on right body rotation and left to right on left body rotation. Failure to rotate implies that the spinous is fixated towards that side.

In the infant and toddler rotation is determined in the prone position by tortioning the pelvis as the lumbar spine is held steady and palpation is applied to the L5/S1 junction as shown opposite. In this case the spinus should move from left to right when the pelvis is tortioned towards the left and conversely right to left when the pelvis is tortioned towards the right. Failure to rotate as expected implies that the spinus is fixated to that side.

The second element to be determined is rotation about the Z-axis. This is accomplished in the older and school age child by depressing the shoulder as the L5/S1 interspinous space is palpated as shown opposite. When the L5/S1 disc is widened on the right side, motion about the Z-axis to the patients right as shown opposite will be impaired. Conversely, when the open wedge is found on the left side, motion about the Z-axis to the patients left side will be impaired.

In the infant and toddler the examination about the Z-axis is performed with the child prone on the mothers lap. The pelvis is tortioned laterally as the lumbar spine is heald steady and palpation is applied to the L5/S1 junction. A loss of movement will be seen on the side of the open wedge as is the case with the seated child.

~Notes~

Technique

Fig 47

Fig 49

~Notes~

The second step in the examination of the pelvis is L5/S1 extension. This is best appreciated in the older and school age child by palpating the space between the L5 spinous and the sacrum as the patient arches their back, keeping their shoulders vertically above their pelvis as much as possible as shown opposite. This back arching motion produces rotation in extension about the X-axis.

In the baby and toddler the examination is performed in the prone position with the patient placed on the mothers lap. In this case the pelvis is used to initiate extension at the L5/S1 junction as shown opposite while the L5/S1 interspinous space is being palpated. In thetoddler and pre schoolage child it's usually advantageous to place the child on the Doctors lap prone with the Doctors legs slightly apart to allow the lumbar spine to flex and externd into the gap created by the space between the Doctors knees as shown opposite. Extension motion at the L5/S1 junction can be readily initiated in this position and it offers the added attraction of giving the Doctor a very high level of control over the childs movements, a factor particularly helpful in non-compliant patients.

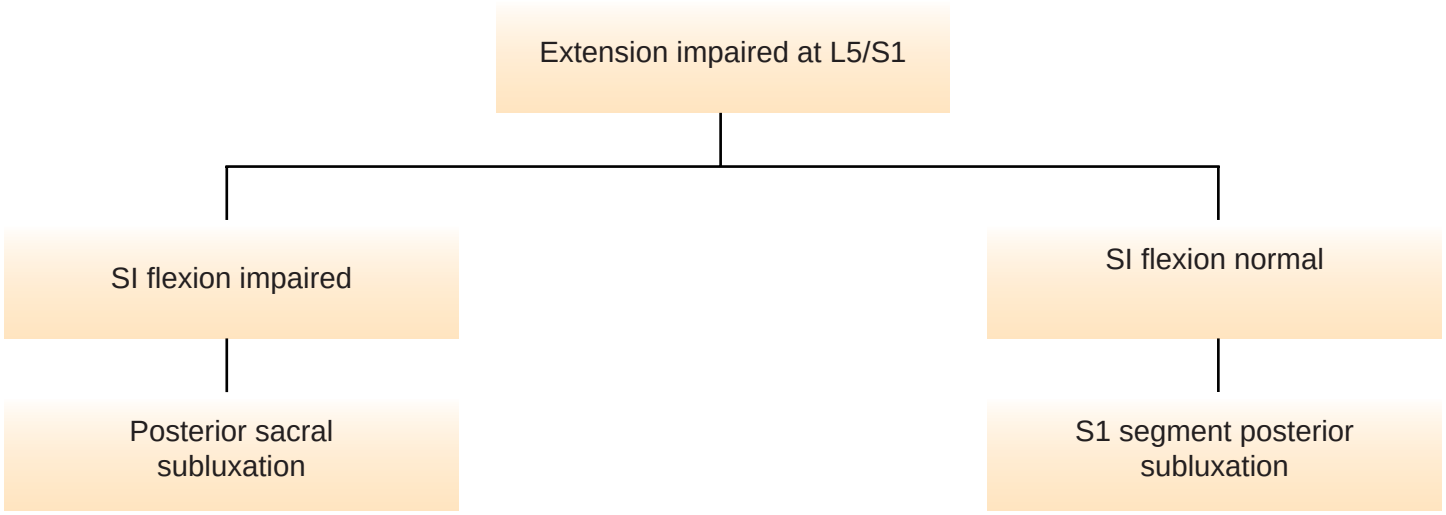
Once it has been determined that extension is impaired the sacroiliac joint should be examined in flexion as shown opposite for the infant, toddler/pre school age child and older/school age child.

Fig 48

Fig 50

Clinical Interpretation

Loss of motion in extension implies a widening of the posterior aspect of the L5/S1 disc, a result of either a posterior S1 segment subluxation or a base posterior sacral subluxation. Both entities produce the same effect on the L5/S1 disc. Differentiation between the two will depend on the findings at the sacroiliac joints as follows;



~Notes~

IMPORTANT CLINICAL NOTE!

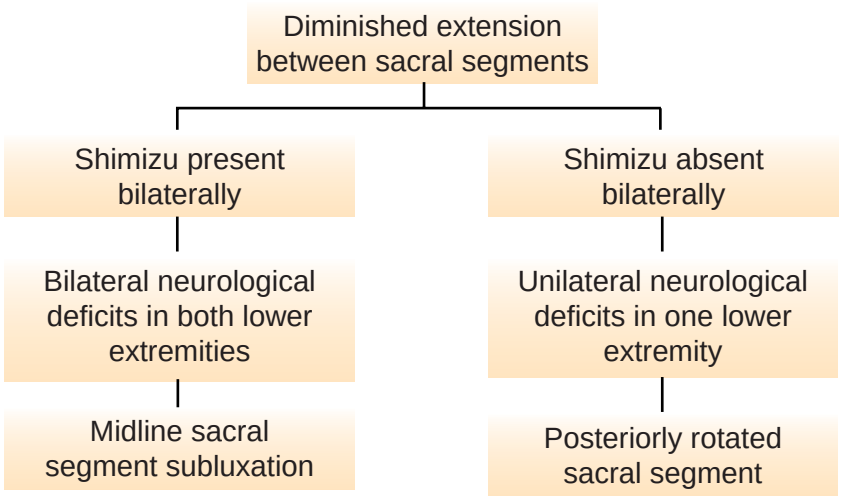
Regardless of whether the subluxation is at S1 or sacrum, the Shimizu reflex will determine if it is midline (bilateral), or torsional and therefore unilateral. Neurological loss in the lower limb will be consistent with the Shimizu indications and the kinesiopathology in the pelvis. A Shimizu reflex present bilaterally will be associated with bilateral neurological deficit in the lower limb while an absent Shimizu reflex is associated with a unilateral neurological loss in the lower limb

The Posterior Sacral Segment Subluxation

Sacral segment subluxation is identified by examining each intersegmental primordial disc in extension such as S2/S3 as shown opposite, the patient positions being identical to those used for inducing extension at the L5/S1 junction described earlier. Posterior subluxation of a sacral segment widens the disc immediately above the affected segment and therefore prevents full extension. Sacral segments may subluxate posteriorly in the sacral midline (Ie rotate about the X-axis) or rotate posteriorly on one side (Ie about the Y-axis). There can also be mulitiple segmental subluxation with individual segments rotating posteriorly in opposite directions or towards the same side.
The neurological examination will clearly identify if the sacral subluxation is midline or unilaterally rotated. The full extent of the pattern of neurological deficit related to sacral segment subluxation is as follows;

Fig 51

Fig 52

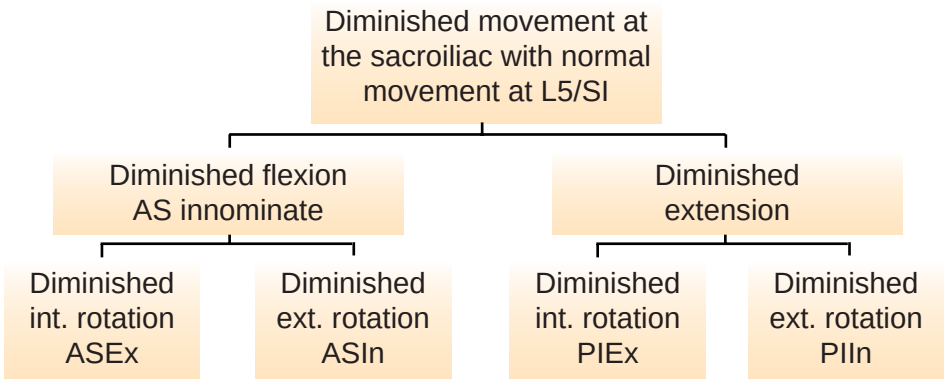


~Notes~

The Innominate Subluxation

The innominate must only be considered to have met the criteria for subluxation when there is normal flexion and extension at L5/S1.
In order for there to be an innominate subluxation, firstly there would need to be a loss of movement at one or both sacroiliac joints in either flexion or extension. The affected joint would then be examined in internal and external rotation. Loss of internal rotation (right) implies an externally rotated innominate. Note the difference in technique for inducing the rotary movement between the older school age child and the baby and younger child. In the baby and younger child the leg is used in a pump handle manner to induce rotation at the sacroiliac joint. Loss of external rotation (left) implies an internally rotated anomenate. Once again note the difference in technique in initiating the movement at the sacroiliac joint for the different age children. The possible combinations of movement loss and their clinical interpretation is shown below. Postural and point specific pain findings will confirm the listing.

~Notes~



The Pubic Symphysis Subluxation

Apart from subluxation of the three joint complex which makes up the posterior elements of the pelvis, there is always the possibility of subluxation occurring at the pubic symphysis. Pubic symphysis subluxation should be suspected in the event there is the usual loss of upper cervical and shoulder girdle motion accompanied by either hypermobility at the L5/S1 junction and the sacroiliac joints, or motion losses inconsistent with any known subluxation pattern such as a loss of flexion at both the sacroiliac joints and the lumbosacral junction – a condition referred to as paradoxical kinesiopathology.

Pubic symphysis subluxation may take the form of a separation of the synchondrosis, torsion of the pubic rami with one side superior and the other inferior (a true midline subluxation), or unilateral superior or inferior movement of one pubic rami. The same motion losses in the upper cervical complex and the shoulder girdle that are associated with the posterior element subluxation complexes will apply equally to the pubic symphysis.
Rather than attempt to motion palpate this joint, confirmation of the listing is arrived at by the identification of point specific pain findings in school age children and assessment of the psoas and rectus abdominus muscles, also in school age children. The psoas will be universally weak on the involved side and there will be pain over the origin of the rectus abdominus also on the involved side – ipsilateral in unilateral subluxation and bilateral with midline subluxation. In the infant, toddler and younger child the most effective way to identify the pubic symphysis subluxation is by adjustive neurological pre-testing, this is performed by generating adjustive impulse in the direction of vector correction by going back and checking the motion of the upper cervical complex and the neurology if a Shimizu was present to begin with. In order to accomplish this one will need the assistance of the mother as shown opposite.

~Notes~

IMPORTANT CLINICAL NOTE!

In the event the upper cervical and shoulder girdle motion imply a pelvic subluxation, but examination of the pelvis posteriorly and anteriorly fails to identify a subluxation complex, the problem will be found somewhere in the lower extremity. The rules of bilaterality and unilaterality associated with the pelvis apply equally to the lower extremity

Pelvic Neuropathology

Apart from the pattern of neurological deficit seen as a present or absent Shimizu reflex, there will be a lost or diminished S1 reflex and weakness in the L4, L5 & S1 myotomes. When the Shimizu reflex is absent, one can expect unilateral loss of the reflexes and myotomes in the lower extremity and conversely, when the Shimizu reflex is present bilaterally, one can expect to see bilateral loss of the reflexes and myotomes in the lower extremity.

In the subluxated condition, there will always be predictable consistency between the presence or absence of the Shimizu reflex and the bilateral or unilateral neurological deficits in the lower extremities as the case may be. Inconsistency implies that the true primary subluxation has not been identified.

Point Specific Pain Findings

For each of the pelvic listings there will be a reliably reproducible pattern of bony, muscular or connective tissue related point specific pain findings. These are only useful in chilren who's cognative development is such that they can reliably give qualitative information in relation to this examinatio. The pattern of painful points are identified in Table 14.

~Notes~

Listing	Description of location of pain points
BP Sacrum	S2 tubercle and the inferior tip of the L5 spinous
BA Sacrum	Inferior tip of the L5 spinous and upper half of both sacroiliac joints
Posterior sacral rotation	Lower half of the affected sacroiliac joint and immediately lateral to the contralateral PSIS in the substance of the gluteus medius muscle
Anterior sacral rotation	Inferior tip of the L5 spinous and the upper half of the right sacroiliac joint ipsilaterally
PI component of ilium	Upper half of the sacroiliac joint
AS component of ilium	Lower half of the sacroiliac joint
Ex component of ilium	immediately lateral to the PSIS in the substance of the gluteus medius muscle
L5 rotation	Ipsilateral side of spinous and opposite mamillary process. There is no relationship to the lateral widening of the disc
Pubic symphysis	Over the anterior surface of the pubis in a synchondrosis separation, pubic tubercle when the ramus is superior and inferior pubic arch when the ramus is inferior

Table 14 Pattern of painful points related to specific pelvic listings

Postural Examination

For each of the pelvic listings there will be a predictable change in the postural examination. Once again for this examination, to be valid, is very age related in terms of the childs ability to stand comfortably still while thevarious aspects of the examination are carried out. If a child is restless and unable to stand still, this examination has limited or no value . These relationships are listed in Table 15

~Notes~

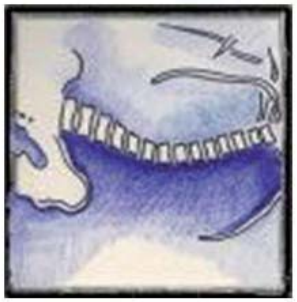
Postural finding	Associated listing
Elevated iliac crest	PI innominate, anterior sacrum
Low iliac crest	AS innominate, posterior sacrum
Increased lumbar lordosis	PI innominate, anterior sacrum
Decreased lumbar lordosis	AS innominate, posterior sacrum, L5
Narrowed gluteal bulk	Ex innominate
Widened gluteal bulk	In innominate

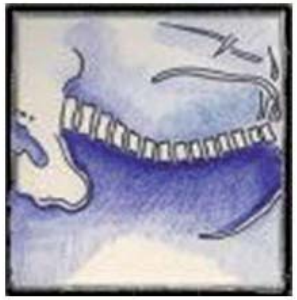
Table 15 Relationship of postural findings and pelvic listings

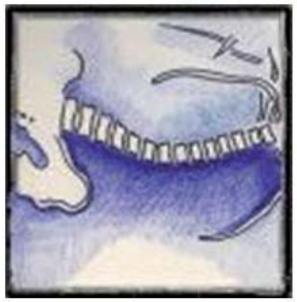
IMPORTANT CLINICAL NOTE!

The subluxation is a neurological entity and as such behaves predictably. To qualify as a subluxation, kinesiopathology, neuropathology and the expected compensation pattern must be demonstrated.

Examination of the Lower Cervical Spine







Assessment of Lower Cervical Spine Motion

Fig 53

The first step is to examine the motion segments of the lower cervical spine in flexion as shown opposite. Loss of flexion occurs at the subluxated level accompanied by hypermobility at the level above. For example, when C6 is subluxated, flexion will be impaired at the C6/C7 level and the level above will be hypermobile in flexion.

Fig 54

Fig 55

Once this relationship has been demonstrated, and only then, should the affected motion segment be examined in rotation (Below left) and lateral flexion (Right). The reference point for rotational and lateral flexion loss is the spinous process. In rotation, the spinous process may be to the left or the right.

Fig 56

Fig 57

It is deemed to be right when no motion can be detected between C2 and C3 spinouses on right head rotation (see figure to left) and of course the same principle holds true with loss of motion on left head rotation
In lateral flexion, the spinous process fails to move in rotation when lateral flexion is initiated indicating an open wedge at the disc ipsilaterally

Fig 58

~Notes~

Flexion	Rotation	Lateral Flexion	Listing
Restricted	R-L restricted	Right restriction	PRS
Restricted	L-R restricted	Left restriction	PLS
Restricted	L-R restricted	Right restriction	PLI-La
Restricted	R-L restricted	Left restriction	PRI-La
Restricted	L-R/R-L restricted	Bilateral restriction	PI

Table 16. Possible combinations of motion loss at Axis/C3 and their clinical interpretations

When a lower cervical subluxation is present, reflexes, myotomes and sclerotomes may all show deficits related to the affected spinal level.

Reflexes

Fig 59

Fig 60

Fig 61

Fig 62
C5. Absent or diminished with C5 subluxation

Fig 63
C6. Absent or diminished with C6 subluxation

The pectoral (Fig 59 & 60) and scapulohumeral (Fig 61) reflexes are either both present or both absent when the lower servical spine is the site of primary subluxation.

Fig 64
C7. Absent or diminished with C7 subluxation

Fig 65
The Shimizu reflex (shown opposite) will invariably be absent

~Notes~

IMPORTANT CLINICAL NOTE!

The nerves which are involved in both the pectoral and scapulohumeral reflexes have a common root level. It is therefore illogical to think that a lower cervical subluxation can affect one but not the other. In reality, loss of these reflexes due to lower cervical subluxation is a variable finding.

Myotomes

The myotomes relative to the C5, C6 and C7 levels are readily assessable in a school age child and adolescent. The examiner tests the strength of the biceps, brachioradialis and triceps as shown below.

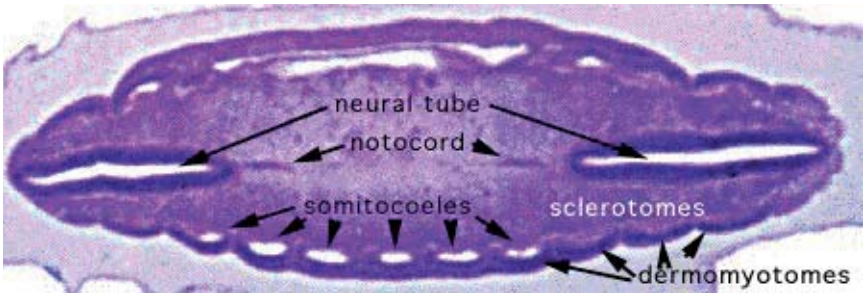
Fig 66
C5 myotome, the biceps. The patient is asked to push their fist towards the ceiling

Fig 67
C6 myotome, the brachioradialis

Fig 68
C7 myotome, the triceps. Note how the patients fingers are pointing upward with no flexion or extension of the wrist.

~Notes~

Sclerotomes



Embryology:

The above represents a tangential section taken through the lower curvature of the embryo (neural tube cut twice). In this picture, newly formed somites containing somitocoeles and consisting of dark, lateral dermomyotomes and more diffuse, medial sclerotomes can be seen..

Neurology:

While dermatomes and particularly myotomes are very spinal level specific at any given point in the body, sclerotomes demonstrate a lot of overlap in the bony tissue. In the upper limb, there are two areas of exception to this rule. The distal radial head is exclusively innervated by the C6 sclerotome and the proximal radial head is innervated exclusively by the C7 sclerotome. These two areas offering the chiropractor a unique and valuable assessment opportunity.

Fig 69

Fig 70

The clinical evaluation involves the application of sustained moderate pressure over the bony area innervated by the C6 dermatome (Above left) and then the C7 sclerotome (Above right). Sharp pain suggests subluxation at that level. This clinical impression is reinforced if the pain can be significantly reduced by placing the head in such a position as to reduce the subluxation vectors which have been previously identified on examination. Conversely, pain can be produced in sclerotomes that are pain free on initial examination when the subluxation vectors are

~Notes~

exacerbated by head position.
For each of the lower cervical listings there will be a reliably reproducible pattern of bony and soft tissue, point specific pain findings. Obviously this aspect of the examination can only be performed on a child who's cognative ability is at a level where their responses can be considered valid. The pattern of painful points are identified in Table 17 below.

Listing	Description of location of pain points
PRS & PRI-La	Pain over the right side of the axis spinous and the left lamina
PLS & PLI-La	Pain over the left side of the axis spinous and the right lamina
Axis PI	Pain over the point of bifurcation of the axis spinous process in the segmental midline

Table 17 Relationship of point specific pain findings and lower cervical listings.

~Notes~

Postural Examination

This examination is only of value in a child who is capable of standing comfortably still for a period long enough to allow the examination to be performed. Forward head carriage is characteristic of lower cervical subluxation, it being axiomatic that the lower in the cervical spine (and even into the upper thoracic spine) the subluxation is, the more obvious the forward head carriage will be.

~Notes~

Assessment of Thoracic and Upper Lumbar Spine Motion

Motion assessment of the thoracic and upper lumbar spinal motion segments follows exactly the same protocols as those described for the lower cervical spine. Flexion (Fig 71) is followed by rotation (Fig 72) and then finally lateral flexion (Fig 73). The interspinous space is the palpatory location and the spinous process of the upper vertebra in the motion segment being examined is the reference point for clinical interpretation of the assessment findings.
Loss or minimization of flexion is always associated with hypermobility in the motion segment above. Table 18 below sets out the possible outcomes of the motion assessment.

Fig 71

Fig 72

Fig 73

~Notes~

Flexion	Rotation	Lateral Flexion	Listing
Restricted	R-L restricted	Right restriction	PRS
Restricted	L-R restricted	Left restriction	PLS
Restricted	L-R restricted	Right restriction	PLI-T (Thoracic) or PRI-M (Lumbar)
Restricted	R-L restricted	Left restriction	PRI-T (Thoracic) or PRI-M (Lumbar)
Restricted	L-R/R-L restricted	Bilateral restriction	PI

Table 18. Possible combinations of motion loss in the thoracic and upper lumbar spinal areas and their clinical interpretations

Neuropathology

When a thoracic or upper lumbar subluxation is present, pain will be elicited on gentle percussion with the reflex hammer over the spinous process of the subluxated vertebra.
In a special case scenario, paraspinal skin rolling will produce severe pain on the side of the open wedge when the subluxation is at the thoracolumbar junction.
Abduction of the arms at the glenohumeral joint will also be affected by thoracic subluxation, the degree to which the abduction is impaired being associated with the level of the subluxation.

Degree of abduction reduction	Expected level of thoracic subluxation
90 degrees of reduction	Upper one third of the thoracic spine (T1 – 4)
45 – 60 degree of reduction	Middle one third of the thoracic spine (T5 – 8)
10 – 15 degrees of reduction	Lower one third of the thoracic spine (T9 – 12)

~Notes~

Table 19. Relationship between degree of reduction of abduction of the humerus and the thoracic subluxation

Sclerotomes

Embryology:

The ribs are formed by outcropping of the sclerotomal layer from the adjacent vertebrae.

Neurology:

This examination, because it involves a patient report of pain level, can only be performed on a child who's cognative ability is at a level where reliable valid information can be relayed to the examiner.
Palpation over the rib angle of either rib adjoining the subluxated vertebral level will be painful. This pain is eased when gentle pressure is applied to the affected vertebra in the direction of vector correction.

~Notes~

Point Specific Pain Findings (Myopathology and Connective Tissue Pathology)

This examination, because it involves a patient report of pain level, can only be performed on a child who's cognative ability is at a level where reliable valid information can be relayed to the examiner.
For each of the thoracic and upper lumbar listings there will be a reliably reproducible pattern of bony and soft tissue, point specific pain findings. The pattern of painful points are identified in Table 20 below.

~Notes~

Listing	Description of location of pain points
PRS PRI-T or M	Pain over the inferior tip and right side of the spinous and the left transverse process for the thoracic vertebrae and the mamillary process for the lumbar vertebrae
PLS PLI-T or M	Pain over the inferior tip and left side of the spinous and the right transverse process for the thoracic vertebrae and the mamillary process for the lumbar vertebrae
PI	Pain over the inferior tip of the spinous process

Table 20. Relationship of point specific pain findings and thoracic and upper lumbar listings.

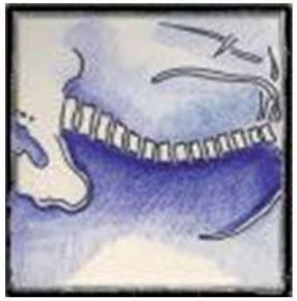
Postural Examination

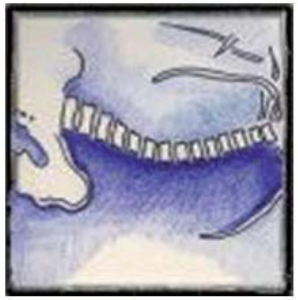
This examination is only of value in a child who is capable of standing comfortably still for a period long enough to allow the examination to be performed. (Fig 74)
In the thoracic spine, local elevation of the paraspinal musculature is seen at the affected level on the side opposite that of spinous process rotation

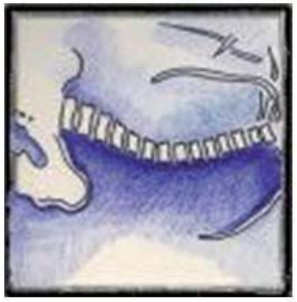
~Notes~

Fig 74

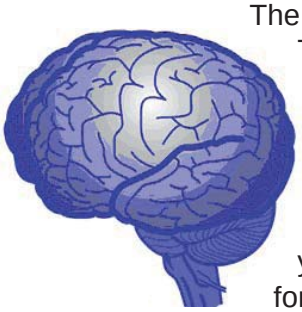
NeuroImpulse Protocol Adjusting







Principles of NIP Adjusting



The technique is named “neuro” and “impulse” as these two words best describe what is done. The focus of the assessment is on **cortical function** and the adjustment is an impulse style thrust that aims to restore functional balance to the brain and cord. There is no emphasis on “moving” anything and manipulative techniques are never employed.

In everyday language, an impulse is something you have - “I just had an impulse, so I bought a new coat.” In physics, an impulse is something else (you suspected that, didn’t you...) In physics, an impulse is something that you apply to an object. When you apply a force on an object, you also exert an impulse on it. When something exerts a force on you, it also exerts an impulse on you. Forces and impulses always go together.

More force means more impulse - in fact, **impulse is directly proportional to the applied force**. Double the force, double the impulse - triple the force, triple the impulse, etc. Impulse, however, is not the same as force. Impulse also depends on how long the force is applied. More time, more impulse. **Impulse is also directly proportional to the time for which the force is applied** - twice as long means twice the impulse, three times as long means three times the impulse.

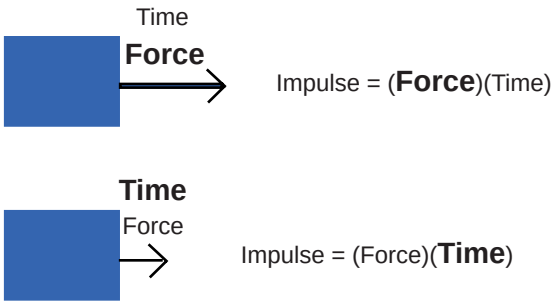
So, in accordance with Newton’s second law, the impulse exerted on an object depends directly on both how much force is applied and for how long the force is applied. Impulse is the product of the force and the time.

Impulse = (force)(time) = Ft

Impulse is a vector quantity that has the same direction as the applied force. The fact that impulse depends on both force and time means that there is more than one way to apply a large impulse to an object - you can apply a very large force for a short time, or apply a light force for a longer time (or both!).

You can get the same impulse by applying a large force for a short time, or applying a small force for a long time, or both.

The underlying principle of NeuroImpulse Protocol adjusting is in fact to take advantage of both the time and force elements that go to make up total impulse. Light contacts are held for prolonged periods and are then followed by a toggle recoil which is high force but very short time. The nett result is an adjustment that is highly acceptable to the patient but still provides maximum impulse. This protocol is also synchronous with recent chiropractic research that demonstrates via surface EMG that high velocity low amplitude thrusts achieve neurological change where long lever slow adjusting does not.



~Notes~

Occiput

Listing(s): PS, PS-RS & PS-LS

Contact: Tip of the middle finger on the superior aspect of the mastoid

Pt position: Prone with head in midline for all listings

Protocol: Hold a light sustained force for 10 seconds followed by a fast shallow thrust P-A, L-M and S-I

Listing(s): AS, AS-RS & AS-LS

Contact: Tip of the middle finger on the anterior aspect of the mastoid at the level of the external auditory meatus

Pt position: For the straight AS listing, the patient is supine with the head in the midline position

For the unilateral contact, the patient lies supine and turns their head 45° towards the side to be contacted. This has the effect of bringing the condyle into the vertical plane and eliminates the necessity for any M-L element in the direction of thrust

Protocol: Hold a light sustained force for 10 seconds followed by a fast shallow thrust A-P and S-I

Fig 75
Unilateral anterior occiput adjustment

~Notes~

Fig 76
Straight anterior occiput adjustment

Fig 77
Unilateral posterior occiput adjustment

Fig 78
Straight posterior occiput adjustment

Atlas

Listing(s): All atlas listings

Contact: Tip of the middle finger over the transverse process of the atlas

Pt position: Sidelying with involved side up for all listings

Protocol: Hold a light sustained force for 10 seconds followed by a fast shallow thrust. The direction of thrust will vary with the listing as per table 21

Rotation	ASLA	AILA	ASLP	AILP	ASRA	AIRA	ASRP	AIRP
Z-axis	L-M	L-M	L-M	L-M	L-M	L-M	L-M	L-M
Y-axis	A-P	A-P	P-A	P-A	A-P	A-P	P-A	P-A
X-axis	CCW	CW	CCW	CW	CW	CCW	CW	CCW

Table 21 Direction of thrust for atlas listings. With torque, cw = clockwise and ccw = counterclockwise

~Notes~

Fig 79
Contact for a right atlas adjustment

Axis and Lower Cervicals

Listing(s): PLS, PRS, PI
Contact: Tip of the middle finger over the spinous process of the affected vertebra

Pt position: Prone with the head in the midline position for all listings

Protocol: Hold a light sustained force for 10 seconds followed by a fast shallow thrust. The direction of thrust will vary with the listing as per table 22

Listing(s): PLI-La, PRI-La
Contact: Tip of the middle finger over the lamina opposite the side of spinous rotation of the affected vertebra

Pt position: Prone with the head in the midline position for both listings

Protocol: Hold a light sustained force for 10 seconds followed by a fast shallow thrust. The direction of thrust will vary with the listing as per table 22

~Notes~

Rotation	PLS	PRS	PLI-La	PRI-La	PI
Y-axis	L-M	L-M	L-M	L-M	Neutral
X-axis	P-A	P-A	P-A	P-A	P-A
Z-axis	CCW	CW	CW	CCW	None

Table 22 Direction of thrust for axis and lower cervical listings. With torque, cw = clockwise and ccw = counterclockwise

Fig 80
C6 spinous contact adjustment. In this case the listing is PLS

Fig 81
C6 lamina contact adjustment. In this case the listing is PLI-La

Fig 82
Axis lamina contact adjustment. In this case the listing is PLI-La

Fig 83
Axis spinous contact adjustment. In this case the listing is PLS

Adjusting the Thoracic Spine

Listing(s): PLS, PRS, PI

Contact: Tip of the middle finger over the spinous process of the affected vertebra

Pt position: Prone with the head in the midline position for all listings

Protocol: Hold a light sustained force for 10 seconds followed by a fast shallow thrust. The direction of thrust will vary with the listing as per table 23

Listing(s): PLI-T, PRI-T

Contact: Tip of the middle finger over the transverse process opposite the side of spinous rotation of the affected vertebra

Pt position: Prone with the head in the midline position for both listings

Protocol: Hold a light sustained force for 10 seconds followed by a fast shallow thrust. The direction of thrust will vary with the listing as per table 23

~Notes~

Rotation	PLS	PRS	PLI-T	PRI-T	PI
Y-axis	L-M	L-M	L-M	L-M	Neutral
X-axis	P-A	P-A	P-A	P-A	P-A
Z-axis	CCW	CW	CW	CCW	None

Table 23 Direction of thrust for thoracic listings. With torque, cw = clockwise and ccw = counterclockwise

Fig 84
T6 spinous contact adjustment. In this case the listing is PLS

Fig 85
T6 spinous contact adjustment. In this case the listing is PLS

Adjusting the Lumbar Spine

Listing(s): PLS, PRS, PI

Contact: Tip of the middle finger over the spinous process of the affected vertebra

Pt position: Prone with the head in the midline position for all listings

Protocol: Hold a light sustained force for 10 seconds followed by a fast shallow thrust. The direction of thrust will vary with the listing as per table 24

Listing(s): PLI-M, PRI-M, (PLS-M, PRS-M – applies to L5 only)

Contact: Tip of the middle finger over the mamillary process opposite the side of spinous rotation of the affected vertebra

Pt position: Prone with the head in the midline position for both listings

Protocol: Hold a light sustained force for 10 seconds followed by a fast shallow thrust. The direction of thrust will vary with the listing as per table 24

Rotation	PLS	PRS	PLI-M	PRI-M	PI	PLS-M	PRS-M
Z-axis	L-M	L-M	Neutral	Neutral	L-M	Neutral	Neutral
Y-axis	P-A	P-A	P-A	P-A	P-A	P-A	P-A
X-axis	CCW	CW	CW	CCW	Neutral	CW	CCW

Table 24 Direction of thrust for lumbar listings. With torque, cw = clockwise and ccw = counterclockwise

~Notes~

Fig 86
L4 spinous contact adjustment. In this case the listing is PLS

Fig 87
L4 lamina contact adjustment. In this case the listing is PLI-M

Adjusting the Sacrum and Coccyx

Rotated Sacral Segments

Listing(s): P-L, P-R sacral segments

Contact: Tip of the middle finger over the sacral or coccyx segment on the posteriorly rotated side

Pt position: Prone with the head in the midline position for all listings

Protocol: Hold a light sustained force for 10 seconds followed by a fast shallow thrust. The direction of thrust will be P-A for all sacral contacts and P-A and slightly S-I for the coccyx listings

Posterior Sacral Segments

Listing(s): P sacral segments and coccyx

Contact: Tip of the middle finger over the of the tubercle of the affected sacral segment or overt eh midline of the coccygeal base

Pt position: Prone with the head in the midline position

Protocol: Hold a light sustained force for 10 seconds followed by a fast shallow thrust. The direction of thrust will be P-A for all sacral contacts and P-A and slightly S-I for the coccyx listings

~Notes~

Fig 88
S1 straight posterior adjustment

Fig 89
Adjustment of contralaterally rotated sacral segments. In this case the listing is S2 P-L/S3 P-R and the impulse is applied to both the right and left sides of the sacrum at the same time.

Fig 90
Posteriorly rotated sacral segment adjustment. In this case the listing is S3 P-L

Posteriorly Rotated Sacrum

Listing(s): P-L, P-R

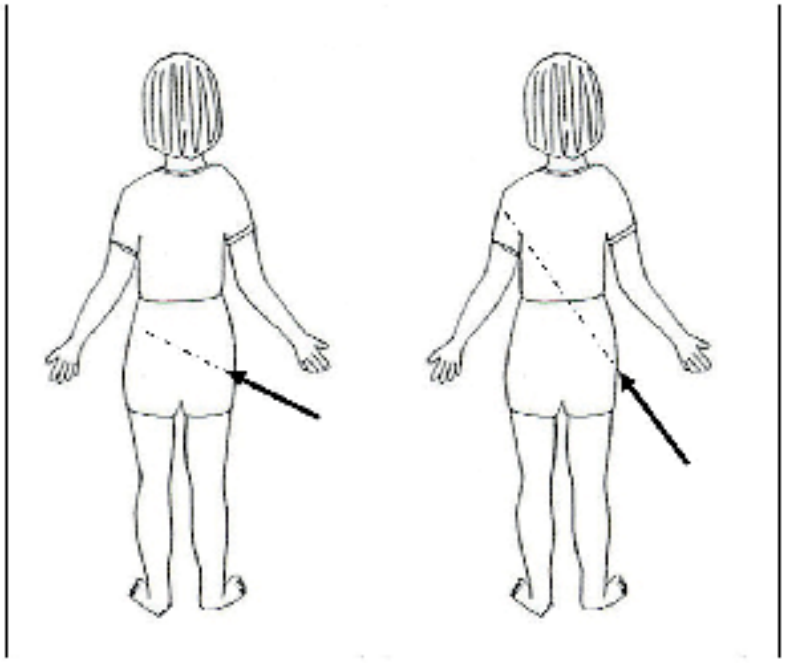
Contact: Tip of the thumb placed over the musculature inferior and posterior to the greater trochanter on the involved side

Pt position: Prone with the head in the midline position

Protocol: Hold a light sustained force directed with a P-A vector and towards the crest of the ilium on the side opposite contact (see fig below on left) until normal pelvic girdle respiratory driven movement is restored. At that point, which is frequently accompanied by a sigh or change in respiratory depth, alter the direction of force towards the shoulder on the side opposite contact (See fig below on right). Now palpate the occiput and feel for the restoration of cranial rhythm. When this is achieved, the contact time is complete and a fast shallow thrust is applied.

Fig 91
Tronchanteric contact adjustment for the posteriorly rotated sacrum. In this case the listing is P-R

~Notes~



a) Initial direction of contact b) Final direction of contact
Fig 92

Anteriorly Rotated Sacrum

Listing(s): LAIS, RAIS

Contact: Tip of the thumb placed over the musculature inferior and anterior to the greater trochanter on the involved side

Pt position: Prone with the head in the midline position

Protocol: Hold a light sustained force directed with an A-P vector and towards the crest of the ilium on the side opposite contact (see fig above on left) until normal pelvic girdle respiratory driven movement is restored. At that point, which is frequently accompanied by a sigh or change in respiratory depth, alter the direction of force towards the shoulder on the side opposite contact (See fig above on right). Now palpate the occiput and feel for the restoration of cranial rhythm. When this is achieved, the contact time is complete and a fast shallow thrust is applied.

~Notes~

Fig 93
Tronchanteric contact adjustment for the anteriorly rotated sacrum. In this case the listing is RAIS

Midline Sacrum

Listing(s): Base posterior sacrum (BP)

Contact: Tips of the thumbs placed over the musculature inferior and posterior to the greater trochanter on both sides

Pt position: Standing with trunk very slightly flexed at the lumbosacral junction

Protocol: Hold a light sustained force with both thumbs directed with a P-A vector towards the crest of each opposite ilia until normal pelvic girdle respiratory driven movement is restored. At that point, which is frequently accompanied by a sigh or change in respiratory depth, alter the direction of force towards each opposite shoulder. Hold this contact direction for a further 60 seconds and then apply a fast shallow thrust

Listing(s): Base anterior sacrum (BA)

Contact: Tips of the thumbs placed over the musculature inferior and anterior to the greater trochanter on both sides

Pt position: Standing with trunk very slightly flexed at the lumbosacral junction

Protocol: Hold a light sustained force with both thumbs directed with an A-P vector towards the crest of each opposite ilia until normal pelvic girdle respiratory driven movement is restored. At that point, which is frequently accompanied by a sigh or change in respiratory depth, alter the direction of force towards each opposite shoulder. Hold this contact direction for a further 60 seconds and then apply a fast shallow thrust

~Notes~

Fig 94
Trochanteric contact adjustment for the base anterior sacrum

Fig 95
Trochanteric contact adjustment for the base posterior sacrum

Atypical Sacral Subluxation

Listing(s): P-R/LAIS, P-L/RAIS (Bilateral torsional subluxation)

Contact: Tips of the thumbs placed over the musculature inferior and anterior to the greater trochanter on the anterior sacral side and inferior and posterior to the greater trochanter on the posterior sacral side

Pt position: Standing with trunk very slightly flexed at the lumbosacral junction

Protocol: Hold a light sustained force with both thumbs directed with an A-P vector towards the crest of the opposite ilium on the anterior sacral side and with a P-A vector towards the crest of the opposite ilium on the posterior side until normal pelvic girdle respiratory driven movement is restored. At that point, which is frequently accompanied by a sigh or change in respiratory depth, alter the direction of force towards each opposite shoulder. Hold this contact direction for a further 60 seconds and then apply a fast shallow thrust. It is critical to an efficient adjustment that the appropriate P-A and A-P directions are maintained throughout the procedure.

~Notes~

Adjusting the Ilium

The Posterior Ilium

Listing(s): PIIn, PIEx

Contact: The contact will be over the posterior surface of the PSIS on the involved side for the PIEx and over the medial surface for the PIIn

Pt position: Prone with the head in the midline position

Protocol: For the PIEx, a light sustained force is first held in a P-A, L-M and I-S direction. After 10 seconds a very fast, light thrust is made in that direction with the addition of counter-clockwise torque for the left side and clockwise torque for the right.

For the PIIn, a light sustained force is first held in a P-A, M-L and I-S direction. After 10 seconds a very fast, light thrust is made in that direction with the addition of clockwise torque for the left side and counter-clockwise torque for the right

~Notes~

Fig 96
PI ilium adjustment. Torque accounts for the rotational (In or Ex) components

The Anterior Ilium

Listing(s): ASIn, ASEx

Contact: The contact will be over the ischial spine on the involved side

Pt position: Prone with the head in the midline position

Protocol: For the ASEx, a light sustained force is first held in a P-A, L-M and S-I direction. After 10 seconds a very fast , light thrust is made in that direction with the addition of counter-clockwise torque for the left side and clockwise torque for the right.

For the ASIn, a light sustained force is first held in a P-A, M-L and S-I direction. After 10 seconds a very fast, light thrust is made in that direction with the addition of clockwise torque for the left side and counter-clockwise torque for the right.

Fig 97
AS ilium adjustment. Torque accounts for the rotational (In or Ex) components

~Notes~

The Internal Ilium

Listing(s): In

Contact: The contact will be over the medial surface of the PSIS at the midpoint of the sacroiliac joint

Pt position: Prone with the head in the midline position

Protocol: A light sustained force is first held in a M-L direction. After 10 seconds a very fast, light thrust is made in that direction without the addition of any torque

~Notes~

Fig 98
Contact for the In ilium adjustment. In this case the listing is R-In

The External Ilium

Listing(s): Ex

Contact: The contact will be over the lateral surface of the PSIS at the midpoint of the sacroiliac joint

Pt position: Prone with the head in the midline position

Protocol: A light sustained force is first held in a L-M direction. After 10 seconds a very fast, light thrust is made in that direction without the addition of any torque

~Notes~

Fig 99
Contact for the Ex ilium adjustment. In this case the listing is R-Ex

The In-Ex Pelvis

Listing(s): LEx-RIn, REx-LIn

Contact: The contact will be over the lateral surface of the PSIS at the midpoint of the sacroiliac joint on the Ex side and over the medial surface of the PSIS at the midpoint of the sacroiliac joint on the In side

Pt position: Prone with the head in the midline position

Protocol: The Dr stands on the side of the Ex ilium and holds a light sustained force in a L-M direction for the Ex. After 10 seconds a very fast, light thrust is made at both contact points simultaneously in that direction without the addition of any torque

~Notes~

Fig 100
Contact for the Ex-In pelvis adjustment. In this case the listing is R-Ex/L-In

Adjusting the Pubis

Listing(s): Synchondrosis separation

Contact: Pisiforms of each hand are placed lateral to the pubic synchondrosis on the anterior surface of the pubis

Pt position: Supine

Protocol: Apply an increased L-M pressure to “close” the synchondrosis on the expiratory phase of respiration. Perform this procedure through 5 phases of respiration and make a light fast thrust at the completion of the fifth cycle

Listing(s): Superior pubic ramus

Contact: Pisiform over the superior pubic ramus on the involved side

Pt position: Supine

Protocol: Apply an increased S-I pressure to the superior pubic ramus on the expiratory phase of respiration. Perform this procedure through 5 phases of respiration and make a light fast thrust at the completion of the fifth cycle

Listing(s): Inferior pubic ramus

Contact: Pisiform over the inferior pubic ramus on the involved side

Pt position: Supine

Protocol: Apply an increased I-S pressure to the inferior pubic ramus on the inspiratory phase of respiration. Perform this procedure through 5 phases of respiration and make a light fast thrust at the completion of the fifth cycle

Listing(s): Inferior/superior pubic rami

Contact: Pisiform of the inferior hand over the inferior pubic ramus on the inferior pubic side and pisiform of the superior hand over the superior ramus on the superior pubic side

Pt position: Supine

Protocol: Apply an alternating increased I-S pressure to the inferior pubic ramus on the inspiratory phase of respiration followed by an increased S-I pressure to the superior pubic ramus on the expiratory phase of respiration. Perform this procedure through 5 phases of respiration and make a light fast thrust with both hands at the completion of the fifth cycle

~Notes~

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