

Whiplash Injuries

by **Isabell Biddle**

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"The following is the last in a series of articles written especially for the Bulletin by Isabell Biddle, in which she has described the concepts and approaches she derived from the work of the great anatomist and philosopher, Swedenborg.

Taken together, these articles provide quite a comprehensive view of Swedenborgian anatomy; hence they are of historical and philosophical significance as well as of current anatomical interest. Swedenborg became versed in anatomy in the course of his quest to understand Man. His primary interest (for which he is most widely known) was in the psychological and spiritual functioning of man, but he realized, as these articles indicate, that a highly fruitful way to approach these is through an understanding of man's structure and physiological functioning.

In this article Dr. Biddle explores the topic of whiplash. She provides a few general suggestions of how one might work with someone who has suffered from whiplash, but as in her earlier articles, her major emphasis is on structure: if we can understand what whiplash does to people, she says implicitly, the "undoing" will follow naturally."

Kalen Hamman

What is whiplash, how is it obtained and how alleviated? "Whiplash" is a blanket term for a strain, a quick movement generally unexpected and produced by outside sources on the patient and is reacted to according to the patient's consciousness of the impact. Stub your toe, hit a door or suffer any other sudden action and a whiplash may result, yet the effect it has on you is nothing but an effort on the part of nature to stop a sudden strain or shock along a series of tissues as easily as possible.

The neck feels it the most, generally speaking, because it has the greatest freedom of motion and the least support.

I. ANATOMY

Let us look at the anatomy of balanced function. The body is an alive structure and must know how organized movement is initiated. This takes place at the base of the spine so the pelvic muscles are to be considered first, for they are the largest and strongest, since they control the movement for any change of position of the body mass in space.

The Pelvic Muscles

There are thirty-six of these muscles extending well up into the trunk and down into the legs forming important supporting parts of the body wall beside their moving functions. They unite the main units of weight of the skeleton, joining thorax, trunk, legs and even head, with pelvis.

Five of the deepest layers of muscle adjust the pelvis with the spine, maintaining free and balanced movement with the hip joints, these are the psoas major and minor, iliacus, pectineus, internal and external obturators and piriformis. For the upright posture the psoas are most important, for the bulky psoas major lies along the sides of the bodies of the largest vertebrae from the twelfth thoracic to the fifth lumbar, being attached to the transverse processes, with the quadratus lumborum and forms a prominent part of the lower abdominal wall. Its fibers arise from the lowest thoracic and first lumbar vertebra, and from the transverse processes of all the lumbar, passing down and forward over the pelvis, here uniting with the iliacus for a common insertion on the femur.

The psoas minor, which is a separate part of the major, lies on its ventral surface arising from the bodies of the last thoracic and first lumbar vertebrae. At the level of the fourth lumbar its fibers converge into a tendon which extends like a strap to insert in the iliac fascia near the front of the pelvis.

The iliacus arises from the upper half of the anterior surface of the crest of the ilium and iliac fossa, its fibers converging downward in a fan-shaped form and unites with the psoas major forming a common tendon inserting into the trochanter, generally referred to as the "iliopsoas." They are completely covered throughout their course by the iliac fascia, which is attached to the arcuate ligaments of the diaphragm above and to the fascia of the transversalis and has important connections in the pelvis as a part of the breathing apparatus, the psoas minor serving to tense the iliac fascia.

The pectineus arises from the pectineal line on the anterior surface of the ilium and from the superior pubic ramus, that portion of the pubis which, with its mate, forms the anterior joint of the pelvic girdle, the "symphysis", and inserts itself on the posterior aspect of the femur below the iliopsoas group. The obturator internus and externus oppose this iliopsoas group, for the obturator externus arises from the surface of the lower half of the obturator membrane (a thick triangular structure which covers the obturator foramen lying mesial to the acetabulum and from the rami of the pubis and ischium which bound the lower portion of the foramen; its fibers converge in a round tendon, inserted into the floor of the digital fossa of the femur above and in the same plane with the iliopsoas group). The obturator internus arises from the inner surface of the rami of the pubis and ischium and the smooth surface of the bone posterior to the acetabulum and from the whole surface of the obturator membrane. Passing downward and backwards, its fibers converge to a strong tendon, bend around the border of the ischium near the lesser sciatic foramen, through which it passes outward, to be inserted on the inner surface of the greater trochanter just above the digital fossa. Its shape is extraordinary; in action it rotates the leg slightly outward and pulls the front of the pelvis downward. N.B., if the iliacus and psoas are stretched the obturators may pull the pelvis downward to the extent of jeopardizing the support of the load at the fifth lumbar vertebra. Remember, a balanced action here

keeps the pelvis a working unit for weight transference between thighs and spine.

The piriformis, arising from the ventral surface of the sacrum, passes through the greater sciatic notch to be inserted near the top of the great trochanter close to the internal obturator, supplementing its action in rotating the thigh lateral.

The pelvic floor is made up of two muscles acting as a diaphragm, almost completely separate from the perineal region, extending across from the pubis and the sides of the ischia to the coccyx. The levator ani and coccygeus lie entirely within the pelvis with no outside attachments below. These three muscles, coccygeus, levator ani, together with the piriformis (which is above the coccygeus and, extending across the sacrum, forms the posterior wall of the pelvis), are united by loose connective tissue and thus are continuous. Together they resemble the diaphragm between the thoracic and abdominal cavities, both being closely related in breathing.

If the heads of the femora are to balance and steady the acetabulum the centralized thrust directed through the pelvis toward the sacrum, the action of the iliopsoas and pectineus group must be equal to and oppose that of the obturators and piriformis.

The Ligaments

There are many ligaments, including Pouparts ligaments, on all sides of the points of the pelvis to the composite structure for safe transference of weight, which are very strong structural tissue forming canals through which important structures pass.

The intra-spinous ligaments, anterior and posterior longitudinal spinal ligaments, and in fact all ligaments in spine, sacrum and ribcage, as well as the occipito-atlantal and atlanto-axial ligaments, should be examined for tension and structural change. The posterior-longitudinal ligament extends from the occipital bone to the coccyx, its expansion being at the first and second sacral contacts or segments; this gives us posteriorly the connection with the spinous processes, supra- and interspinous ligaments, as well as the ligamentum nuchae. Since it is inferior to the articular strains of the cervical and thoracic area, the sacrum suffers more. All ligamentous articular surfaces shift automatically and physiologically for functioning by a person, but this finely tuned adjustment is now broken. In the ar-

chae involved, these surfaces become fixed fulcrums unable to function normally until the strained ligaments are released; for the sacrum, unable to make its physiological movement, blocks the thoracic and cervical physiological movements. Accordingly, until this sacral tension is released no changes in the thoracic or cervical fixation can be made. This sacral tension does not show up as a lesion of noticeable structure but as a lesion of internal tension and it must be released or no cure is possible. This diagnosis depends upon the ability of the respiratory excursion being normalized.

The dura is broadly and strongly attached to the sacrum at its lumbosacral joint, for it carries the final central nervous system into the sacrum. On inspiration this lifts the sacrum so that the respiratory excursion can be complete. No muscles move the iliosacral area, only ligaments.

The three sets of ligaments, with pelvic muscles and fascia, bind the parts and complete the walls of the pelvis, making it a secure basis for the support of the pelvic viscera. They form really one system, for the ligaments binding the femora with various parts are so directly and closely associated as to make one system. These, with the synovial membrane, insure a strong connection and maximum capacity for movement at this ball and socket joint. There are many ligaments, synovial and fascial, including the capsular ligament which encloses the ball and socket joint, covering the head and neck of the femur as far as the trochanter so that it moves within a flexible tube.

The Fascia

The fascia plays an important part in whiplash because the superficial and deep fascias are connected and cover all the muscles. For example, we have the fascia lata which begins at the coccyx and the sacrum, extends along the entire length of the ilium, and medially along Poupart's ligament to the body of the pubis. It then passes backward and downward along the inferior ramus of the pubes to the ischium, is carried by the greater sacrosciatic ligament and back to its starting point. Below, it passes over the knee and becomes continuous with the fascias of the lower leg.

The iliac fascia covers the entire iliopsoas muscle group from its origin at the thoracic level through the pelvis and down the leg. It is near the diaphragm at its upper end; in the pelvis, it is closely related to the pelvic

fascia; and with the formation of the femoral canal and femoral ring it becomes, below, continuous with the fascia lata of the leg. The tightening of the fascia lata acts as a jacket about the thigh muscles and prevents any one muscle from over-working to the extent of seriously jeopardizing the safety of the joint.

The psoas minor inserts into the iliac fascia by a long strap tendon, serving to tighten it more and thus integrate the action of nerve and blood depend upon muscular freedom. Remember, muscles move bones. No bones or fluids move by themselves, for all fluids flow through nerves, vessels, ducts and glands.

Overall Structure

The bony structure of the spine is built in the same manner as the structure of a bridge, being made a working unit by the universal anterior and posterior longitudinal ligaments extending from one end of the spine to the other. These resemble the trussings and ties of the spinal column, some vertebrae having a single and some a double trussing, to meet the compression stress. These are the anterior and posterior ligaments, the supraspinous and flava, the flava being a highly elastic ligament playing an important role in the integration of the spine.

Keep the body in mind as a unit. Elastic connective tissue is yellow, as is also the dura mater; it is the strongest tissue in the body. Its long flat bands connect the lamina (the top portions of the neural arches and rim throughout the flexible portions of the spine from axis to sacrum). They are inseparable from the fibers of the capsular ligaments between the vertebrae and prevent folds from forming in these capsules. They also tend to bring the bones back into position if slightly stressed or lesioned. They also hold the axial skeleton (ribs, head and sternum). The head containing brain and spinal cord develops from the notochord. In the dorsal canal, in front lie the digestive apparatus, respiratory, urinary and reproductive systems, as differentiated from the appendicular skeleton, which embryonically develops its supporting framework from the limbs by developing two girdles, the shoulder and pelvic, both of which have long (bony) levers, arms and legs, i.e., long upper bones, two lower bones to which are attached smaller bones differently arranged for function but similar in pattern.

The pelvic girdle (ilia, ischia and pubes) is attached to the spine, firmly forming part of the base and wall of the abdominal and pelvic cavities. Remember, the fifth lumbar vertebra lies below the crests of the ilia and is firmly attached to the sacrum, hence the fourth lumbar is more easily disturbed on strains and stresses.

We must remember the curves of the spine, how and why they are formed. The fact that the shoulder girdle is superimposed upon the skeleton, since it has no bony attachments except at the sternum, makes us see how a blow from any direction can strain muscular and ligamentous attachments according to the tonus of tissues involved.

All force and direction of movement, standing, walking, or sitting is initiated at the hip joint in response to change of head balance with a follow-through in shoulders, spine and pelvis. The entire weight of the pelvis and all parts above it rest on the head of the femora, for here also gravity is met by the upward thrust of the centered thigh. In standing or walking, the legs are the prime movers, and coordination must be maintained. There must be a balance between the upward pull of tensile members in front to hold in balance the downward compressive forces operating in the body, so if the tensile muscles and ligaments are not sufficient to equal the compressive forces from spine to sacrum, the tensile muscles at the back will have to make up the difference and this would "unseat" the load at the sacrum and open up the pelvis at the keystone. The function of the extensor muscles of the spine is to pull down and back, not up and forward.

Muscles attached to the pelvis both inside and out and along its various ridges run up to the neck, out to the arms, down through the thighs to the legs below the knees and all about and through the abdominal wall. This is so the large muscles of the body are attached and drawn together so as to be under organized control.

The head is an axial load on top of the spine sitting evenly balanced upon the atlas, the type of load which can be borne most easily by an erect curved and moving column. The condyles, here convexly curved surfaces, are situated on the base of the skull, half way between the front of the upper jaw and back of the head, fitting smoothly on to the concavely curved atlas on which they articulate. This allows anterior and posterior movement without displacement.

The head sits upon the spine at a point just back of the articulation of the jaw in line with the entrance to the ear, hence rocks easily on a cradle at the center of the base.

Taking the head as a whole, its center would be marked by a line crossing the two axes of balance at the condyles. This centering of the head is necessary as the organs of the inner ear, housed in the vestibule, respond to the slightest change in the position of the head through the sense organs therein and these responses are instantly conveyed via the cerebellar reflexes to the eye muscles (so that the eyeball rolls to adjust to the new level of vision). This type of sensitive mechanism requires the balanced weight to be exactly centered with the center of gravity of the head directly in line with the center of the articulating surfaces. An upset of this balance is what happens in some whiplash cases, for the head is then held by the outside muscle force. This fatigues the muscles and confuses the proprioceptive mechanism. This intricate arrangement of muscles and ligaments connecting the head with the neck, shoulders, and trunk, and the various vertebrae, is very sensitive.

The ligaments uniting head, atlas, and axis with each other give maximum strength and flexibility. All of these ligaments are protected and provided with lubrication through the synovial membranes. The condyles present a wedge-shaped slant downward from the midline, limiting the rocking motion by the head on the atlas and preventing sidebending and rotation, this being taken care of by the atlas and complicated arrangements of muscles and ligaments with the entire neck. So in anterior and posterior movement (nodding) the atlas and axis work or act together. In rotary movement the atlas turns or pivots on the axis mechanism and furnishes a strong platform for the double basis of the condyloid articulation.

The spine provides the head with a secure upright support by its opposing curves and powerful longitudinal muscles and ligaments as well as many guy ropes, tough muscles and tendons running down the sternum, ribs, scapulae and clavicles, reinforced by interosseus, flava and side ties to ribs and vertebrae.

The articulations of the bones of the head are so arranged that a blow on any bone is picked up by the dura and carried to its extremity in the body by tremulations just as a message of injury to any part of the

body is carried back to the brain.

If the head is off-center, the upper cervical curve is disturbed and loses its balanced opposition to the underlying spinal curves, and compensatory strains are set up through the entire length of the spine to restore the axis support.

Stress

We may have compression and tensile stresses, i.e., axial and shearing, torsion and bending, which may interfere with the axial through pushing or pulling. Torsion occurs if the push or pull force is so exerted upon a structure as to cause its particles to twist about an axis involving an alternate compression and tension without disturbing the axis but weakening the structure.

Shearing Stress is caused by a force directed at an angle to its axis, causing one part to slide over the other. This disrupts the axis.

Bending is a combination of tension and compression applied in such a way as to curve the axis and weaken it as a support. This may be caused by an unevenly disposed side load or too heavy top load, the most serious of the stresses to counter. If the stress goes beyond the ability of the part to resist, the structure, if brittle, may break; if elastic, may go past its ability to react and so elongate or shorten, for the molecular cohesion may have been so injured it cannot return to its normal positions. N.B., the point at which the integrity of a substance begins to be interrupted marks the beginning of strain. It need not manifest its tearing or injury so that we can see it, but it *feels*. The body acts and reacts at all times, and its opposition is not always discernible, since it *opposes force with a living force and is capable of bringing supplies to a part in need* so that weight may be balanced by energy instead of by weight alone.

The body is composed of substances of all degrees of fluidity and density, from water to bone. This is why the body is constantly in reaction or play to universal forces without it being noticed. Stresses may be found through direct or referred pain. Nature does for the body what the engineer does for the bridge.

DIAGNOSIS AND TREATMENT

There are no two whiplash syndromes alike any more than there are two people alike, so let us look at the patient in an upright

position; are his innominates even; shoulders even; head straight? Also in what position are the head and sacrum held? If this body was in normal alignment before the injury the angle at which the person or the vehicle was struck is important; any malposition before the injury took place will also have had its effect.

The body is always in motion through respiration, and this leads us to find out whether the jolt occurred when the patient was inhaling or exhaling.

Where will you begin with a whiplash? The head furnishes the clue for the rest of the body. It is necessary to analyze the curves of the spine by their pinched and stretched areas along the spine; the position of the sacrum to the fourth and fifth lumbar and the twelfth and fifth thoracic and fifth cervical.

From the posterior superior spine of the ilium, the line of force crosses at the fifth thoracic, going on up to the condyle on the opposite side.

From the anterior superior spine they cross at the fifth cervical and go on to the condyles, so look to the jaw bones for deviations as well as the position of the head.

I have found that I seldom get a whiplash case soon after it occurred. Whiplash patients usually seek osteopathic and homeopathic aid as a last resort after the body has effected many changes, for nature always adjusts the structure to any new stresses. Until release is given, there is always pain around the twelfth and fifth thoracic as well as the neck and base of the brain.

Check the patient's posture; it will be abnormal. You ask the average person to stand straight and he invariably thrusts his shoulders back and expands and lifts his upper ribs, stiffens his back and pulls in his chin which strains the action of the chest and shoulders, for man has changed his habit of body economy and raised his sense of power from the base with its center of gravity to the shoulders and pulls the ends of the ribs upward and forward instead of letting them hang down through their bony attachments at the spine; this disperses the mass of chest weight from its alignment with head and pelvis, thus raising the center of gravity of the mass too high for easy carriage on the supporting structure. Consequently, when the lower end of the sternum is drawn forward through the expansion of the lower ribs, the upper end is de-

pressed, not necessarily perceptibly but by interfering with the soft parts enough to affect the circulation in this important area. This effect reduces the anterior and posterior diameter of the upper chest between the first three thoracic vertebrae and manubrium. The compactness of the upper abdominal area is lost, visceral support suffers because the ribs are lifted and spread in front widening the costal angle; hence we see that the liver, stomach, pancreas and spleen, and the greater part of the kidneys and transverse colon have lost their compact support. We also see change in the various pulls of the muscles connecting the shoulders and rib cage for the arms pull through the latissimus dorsi, the shoulder girdle, the pectoralis, trapezius and rhomboids, and the neck mainly through the trapezius, so that upper muscles combine to carry the loads that could and should be carried at the vertebral levels of each pair of ribs (twelve vertebral levels). The added extra burden is placed upon the spine in the upper thoracic region and the cervical region tends to bend at its weakest points, causing increased lordosis of lumbar and cervical areas.

The entire upper structure bends forward from the tenth to the twelfth thoracic, thus throwing added strain to that section of the spine where the weight must be redirected from the tenth thoracic to the fourth lumbar. Muscular development must take place to help integrate the spinal curves incident to meet the shearing stress of the downcoming load and upward thrust of supporting bones, where the weight is being directed forward upon the lumbar curve. These forces are acting at a slant and must be made to meet as directly as possible within the bodies of the vertebrae so that the balance of the spine is retained.

If the muscles of the lower spine are stretched, the seating of the load upon the sacrum at the fifth lumbar is jeopardized and the obliquity of the pelvis exaggerated, and this places muscles throughout the structure in an unnecessary strain.

Correct what you find, and watch the patient to see if the corrections hold; if they do not, you have not analyzed the main cause correctly and re-established normal respiration.

Because I am an osteopath, I approach the whiplash patient first from this standpoint, releasing the sacro-lumbar articulation and by individually abducting each leg on ex-

piration of the patient for three breaths, then lifting the distal end of the sacrum on the patient's exhalation; this is also done three times. Or, the patient may lie on his back on a hard surface, i.e., the floor, and breathe deeply fifteen or twenty times then relax.

Homeopathically I use Arnica rubbed into the sacro-lumbar and acetabular areas of the hip as well as given orally. Also I use Hypericum, ruta and Symphytum in the two hundred or 1-M potency, given orally alternating every hour or every day depending on the symptoms.

The remedies that follow specific technique and release of symptoms are selected according to the individual's needs. I generally check Kent's Repertory, Pages 896 through 915, with the references found there for spinal pain.

I would welcome any suggestions from you on the treatment of whiplash for I am still only a student of homeopathy. During my years of practice though, I find that the medical profession has yet to come up with a cure for whiplash that osteopathy and homeopathy have not already succeeded in providing the laity. □

Editorial emendations by SP.