

The Cervical Spine and Sacral Counternutation

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Counternutation is a sacroiliac mechanism described in *Physiology of the Spine, Volume 3*, by Kapandji, now out of print. The text was translated from French to English and contains detailed drawings and descriptions of spinal mechanics. A very important section deals with the topic of nutation and counternutation.

Briefly, *nutation* is movement of the sacral base anteriorly and inferiorly and simultaneous rotation of the ilia posteriorly and inferiorly, as in "PI" (posterior inferior) motion. The opposite is *counternutation*, occurring during lumbosacral flexion, during which the sacral base moves posteriorly and superiorly while the ilia move anteriorly and superiorly. Simply put, during lumbosacral flexion, the ilia rotate forward and upward (anterior superior); and during extension, the ilia rotate posterior and inferior. Also, during hip flexion, the ilia move posterior and inferior.

The PSIS is the reference point for ilium motion. Years and thousands of examinations have indicated that healthy, "normal" PSIS motion is anteriorly and superiorly during lumbosacral flexion, while seated motion can range between 1/2 inch to 3/4 inches or more. Abnormal motion is observed to be less than 1/3 inch to no motion at all.

In manipulation of the spine and sacroiliac joints at hypomobile levels of dysfunction, the most common region influencing the release of nutation fixation (with PI fixation), as demonstrated by forward flexion monitoring during motion palpation, is the upper cervical spine. Other levels of manipulation causing nutation fixation release and allowing AS (anterior superior) ilium motion and posterior sacral base motion are the lower half of the sacrum, adjusting posterior to anterior, and other cervical fixations.

By far, the upper cervical spine has been most consistent in its release of nutation sacroiliac fixation following adjusting. Occipital fixation on the left or right side can also release nutation fixation, allowing the sacral base to move posteriorly during L/S flexion. In adjusting the upper cervical spine, the following procedures are utilized based on the type of fixation:

- C1/2 fixations: These predominantly occur on the left side when testing from posterior to anterior and lateral to medial. The thrust by hand or instrument (highly effective) is on the left side. Anterior to posterior joint fixation blocks are seen and adjusted on the right side from anterior to posterior. For any other cervical segments or articulations, the same methodology is applied, with exceptions.
- Occiput/C1 articular fixations: The right side is usually dominant in its resistance to posterior to anterior motion, although the left side may also display blockage in P to A motion.
- Please keep in mind that all testing and adjusting described should be done in the supine position, which allows the most relaxation of paravertebral muscles and therefore more relaxed examination of the cervical joints.

The main point of this discussion is to emphasize that hypomobile dysfunction in the cervical spine (especially C1/C2, C2/C3, occiput/ C1, C7/T1) can and often does prevent sacral counternutation, during which the ilia move superiorly and anteriorly, while the sacral base moves posteriorly and superiorly during forward L/S flexion. The posterior to anterior occipital fixation is usually

associated with some degree of lateral flexion fixation. The occiput is adjusted by hand or instrument according to the required line of drive.

In relation to traditional chiropractic methodology, the posterior ilium fixation, especially on the left side, would be adjusted to correct a counternutation fixation, or the movement of the sacral base posteriorly and the ilium superiorly and anteriorly (PI ilium adjustment). If the practitioner were to examine motion of the ilium before and after adjusting for a PI ilium "subluxation" (even using the leg check), they would find no change in ilium motion during L/S flexion. However, adjusting and normalizing cervical motion would establish normal ilium motion (one or both ilia) in the anterior superior arc of motion during forward bending almost 100 percent of the time.

In practical terms, how does this relate to patient care? One has to picture sacroiliac, lumbar and erector spine (and maybe quadratus lumborum) mechanics. During lumbosacral flexion under *normal* counternutation mechanics, the ilia rock forward in an arc-like motion, reducing lumbar erector spinae stretch tension and reducing lumbar disc muscular compression. If there is sacroiliac fixation restricting counternutation (and AS ilium motion), then increased erector spinae tension and shortening can occur, causing increased lower lumbar disc compression during lumbosacral flexion.

It is also possible that upper lumbar, thoracolumbar and low- to mid-thoracic spinal joints would have to overwork and compensate with overflexion during forward bending. In time, this could create extension fixation in the thoracic and upper lumbar regions. In themselves, these can create local problems or internal and external peripheral disorders. For certain, thoracic and upper lumbar extension restrictions will cause (like a circle) more lumbosacral distress due to compensating lumbosacral extension. The events can go on and on, with radiation into the legs, abdomen and other areas as symptoms develop.

This is an example and illustration of the potential for cervical spine functional problems and pathology in distal areas, as well as local symptoms. More studies are needed in the areas of nutation and counternutation in relation to normal and abnormal functioning in the cervical spine and other regions of the body.

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