CERVICAL SPINE DIAGNOSIS

PRINCIPLES:

Typical cervical vertebrae (C 2-7) operate under Law 2 of Fryette’s principles, i.e. they rotate and sidebend toward the same side. C spine has no physiological neutral because of the facet structure, thus the only way to perform Type I physiological motion is to apply traction to separate the facets. Cervical joint motion is influenced by the long muscles (scalene, tapezius, longus cervicis, splenius capitis and cervicis, semi-spinalis and sterno-cleido-mastoid. They may interfere with flexion, extension or side-bending, but the rotation of the vertebra is always into the concavity; or they rotate and side-bend to the same side (-RS). In examining the spine in moderate flexion, and side-bending restriction is present on one side, the facet on the opposite side is unable to open. Conversely, examining the C spine in moderate extension, and side-bending restriction is noted on one side, it indicates that the facet on the same side will not close.

The positional descriptors would be to the side opposite to those of the restricted joints. When the isometrics are applied, they would be in the direction of the positional diagnosis.

The typical vertebrae account for approximately 50% of cervical rotation.

The atlanto-axial (C1-C2) joint accounts for the other 50% of cervical rotation, and is stabilized by the dens of C-2. To localize to this joint, the neck must be hyper-flexed, then tested for rotation right, then left. One may put a mark over the clavicle where midline of the chin rests, and then compare the distance from the sternal notch, noting approximate degrees of rotation.

The occipito-atlantal (O-A) joint rotates one direction and side-bends the opposite side (-SR) whether in neutral, slight flexion or slight flexion; and the joint is easiest tested reclining by gentle side-bending. If side-bending is restricted to the left, rotation will be restricted to the right, and vice versa.

C-7 has the most prominent spinous process as well as the longest transverse process in the C spine. It requires different treatment technique than the typical cervical vertebrae.

In evaluating gross ranges of motion (ROM), one may do what most textbooks describe, i.e. include the thoracic motion that occurs. However, one is better able to reproduce findings if the motions are localized to the C spine by monitoring at the C7-T1 inter-spinous ligament for flexion and extension. With one finger over the ligament, the operator stands at the side of the patient, and flexes the neck until a slight stretch is felt on the ligament. By placing a pen from the external auditory canal and along the side of the head, one can measure the degrees the pen moves anterior. From neutral the patient extends until the operator feels a slight pinch or
shortening of the ligament, records the number of degrees of extension as the neck moved posterior.

To measure side-bending, the operator stands behind the patient placing hands alongside the head with the little fingers resting on the first ribs at the level of C7-T1 articulation; then gently side-bends the head until motion is felt under the little finger to the left, then to the right. One can imagine a straight line up from C-7, and note how far that line moves left, then right.

To measure rotation, the operator stands in front of the patient and rotates gently until the physiologic barrier is felt, then may place a pen mark on the skin over the clavicle, down from the middle of the chin. Compare the degrees of permitted motion by imagining the clavicle as a protractor ranging from the acromio-clavicular (A-C) joint to the sterna notch.

I have found this method reproducible and of help in caring for patients with neck injuries, as well as in testifying on their behalf if there is litigation. If you examine without C-7 monitoring in flexion and extension, place one hand over the upper thoracic spine to note how much of the textbook ranges include thoracic motion. That can vary so much from patient to patient.

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July 2013