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## **The C2/C3 Joint and Neck Pain**

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Assessing function of the locomotor system is the key to successful treatment. Neck pain as every chiropractor knows is often due intersegmental joint dysfunction. One of the most common dysfunctions involves the C2/C3 joint. As every student of rehabilitation knows the key to facilitating a weak muscle such as the longus colli or capitus is adjustment of the key spinal fixation. The C2/C3 joint may not receive as much notoriety as its famous neighbors C0-C1 or C1-C2, but it is also an invaluable area to restore function in.

The cervical spine is a highly mobile, unstable structure. It has to balance the head, provide sensory feedback to motor regulatory centers, as well as protect the vital spinal cord. Most of the rotation which occurs takes place in the upper cervical spine above C2. Most of the flexion/extension occurs below C2. Therefore, the C2/C3 joint is a transitional joint which must accommodate varying demands of the neck above and below it. C2/ C3 is the site of more forward shift during flexion and backward shift during extension than any other cervical joint. The C2/C3 motor unit has more apophyseal joint tilt than any other cervical spine level. The C2/C3 apophyseal joints are difficult to visualize on lateral x-rays because of this tilt and the fact that the joints are frequently not parallel. This important joint in the kinetic chain is often ignored which unfortunately results in a great missed clinical opportunity.

The C2/C3 joint can be assessed for hypomobility by tucking the chin (upper cervical flexion) and rotating the occiput to its end range. According to Lewit this is best performed seated with the active hand on the occiput while the other hand cups the chin.<sup>1</sup> Care should be taken to avoid moving the axis of rotation away from the midline. You can easily compare the different range of motion in rotation of the neck in the neutral position vs. with the upper cervical's flexed. If C2/C3 dysfunction is found it can be treated easily with either a thrust or post-isometric relaxation technique.

According to Jirout tension in the contralateral sternocleidomastoid (SCM) typically accompanies C2/C3 dysfunction.<sup>2</sup> The best treatment for SCM trigger points or merely tension is to treat the primary joint dysfunction which is typically "upstream" of the muscular reaction. The importance of C2/C3 in treating neck pain or headaches cannot be overvalued. Many chiropractors who have shunned joint manipulation for nonforce or soft tissue techniques will find Lewit's simple joint evaluation and treatment to actually improve their results with soft tissue work!

Following manipulation of C2/C3 one can expect that the improvement in mobility and relaxation of tension will be accompanied by decreased neck pain or headaches. However, as with most pain syndromes, recurrences are the rule rather than the exception. If abnormal motor programs have been memorized by the cerebellum then further rehabilitative efforts will be required to ensure long lasting results.

The most common muscular imbalance in the neck involves overactivity or tightness of muscles having primarily a postural function and inhibition or weakness of muscles having more of a dynamic or phasic function. This typically occurs because in our modern sedentary society where we work long hours in constrained postures, the muscles with a postural function become overworked while the phasic muscles become inhibited from disuse. The major postural muscles in the cervical region are the SCM, upper trapezius, levator scapulae, pectoralis major, and suboccipitals. The most important phasic muscles in this area are the deep neck flexors (longus colli and capitus) and lower fixators of the scapulae (lower and middle trapezius, and serratus anterior).<sup>3</sup>

Specific exercises aimed at relaxing/stretching the muscles prone to hypertonicity and facilitating/strengthening the muscles prone to weakness will usually be necessary.<sup>4</sup>

These exercises include post-isometric relaxation techniques and self-stretches for the tight/overactive muscles. Manual resistance techniques like proprioceptive neuromuscular facilitation to initiate facilitation of the "weak link." Home exercises to retrain proper motor control, coordination, strength and endurance. Proprioceptive training of the somatosensory afferent system (i.e., rocker/wobble board training) involved in postural control of the entire kinetic chain from the feet to the head.

Prevention through ergonomic advice, relaxation strategies, and general postural re-education are also important. A job analysis should uncover if keyboard, telephone, pushing, pulling, sitting, carrying, reaching, etc., demands are poorly controlled or unsafe. Typical advice includes recommending a chair with appropriate height arm rests to relax the upper trapezius; use of a headset for prolonged telephone work; and

a computer monitor without glare and at the appropriate height will reduce the chin poking posture. Learning to breathe with the diaphragm will inhibit overactive upper trapezius and scalene muscles. Finally postural re-education to maintain the sternum "up" so that the rib cage does not collapse into the diaphragm will maintain the lumbar lordosis and the upright posture necessary for good neck posture.<sup>5</sup>

What does the C2/C3 joint tell us about rehabilitation of the locomotor system?

- 1) That we should focus on dysfunction not pain or pathoanatomy.
- 2) That we should palpate our patients and not overly on "high-tech" procedures.
- 3) That muscle dysfunction is usually secondary to joint dysfunction.
- 4) That even though muscle dysfunction is a reaction to joint dysfunction if abnormal movement patterns are repeated long enough the muscle imbalances will become memorized in the cerebellum as a faulty motor program.
- 5) That spinal adjustments are the most efficacious treatment of the locomotor system, but the results are often short-term.
- 6) That following spinal adjustments specific exercise to restore muscle balance and improve motor programming is often necessary to reduce high rates of recurrence.
- 7) That patient education about posture, repetitive strain, and relaxation strategies are also needed to optimize results.

In summary how does a chiropractic rehabilitation specialist approach conservative care of neck pain or headaches.

- First, address joint dysfunction
- Second, restore muscle balance
- Third, improve subcortical motor programs

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