Dynamic Chiropractic

CHIROPRACTIC (GENERAL)

# Manual Muscle Testing for Cervical Radiculopathy (Pt. 2)

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Dr. John Bandy developed a protocol that associated specific muscles with myotomal nerve root levels.[12] The deltoid is associated with the C6 nerve root; the triceps with the C7 nerve root; and the finger abductors with the C8 nerve root.

Muscle Challenges

Bandy tests these three muscle groups or other shoulder girdle muscles. If inhibited, he instructs the patient to try different head positions to see if there is a change in muscle strength. Usually, extension will make a difference and some degree of rotation will bring the muscle back into maximum strength.

The doctor then finds the vector of challenge pressure that will maximize muscle strength while holding the vertebrae in that position. The physician checks and corrects all the neck stabilizing muscles. The vertebrae are adjusted in the direction that maximally strengthens the associated muscles, with the head in the position that also maximally strengthens that muscle.

After adjustment, the doctor rechecks the associated muscle group. If still inhibited, repeat challenge and head position, and observe for strengthening. Adjust with those new parameters. When the muscle has reached maximum strength, use it to re-challenge the associated vertebrae and make appropriate corrections.

Advise the patient to avoid putting his / her head in the position antagonistic to the position that strengthened the associated muscle. For example, if extension strengthened, avoid flexion.

Bandy further suggests[12] that the whole-person chiropractic clinician should check for further strengthening of muscles of the neck with:

- Therapy localization to the adrenal neurolymphatic reflexes
- Against a source of sulfates, and if this strengthens:
    - Check for liver detoxification
    - Check for gut imbalances
    - Check against a source of anti-inflammatory nutrients (NSAIDs will often strengthen)
    - Check against essential fatty acids, as well as manganese, magnesium, vitamin $B_6$, pyridoxal-5-phosphate, or vitamin E
    - Check muscles against therapy localization to gallbladder reflexes
    - Check blood sugar imbalances

Encouragingly, Yoss reported that a manual muscle test offers greater specificity than either the sensory or reflex testing, and that single root level involvement can be diagnosed clinically 75-80

percent of the time.[13]

Cervical Manipulation to Restore Cervical Muscle Weakness

A growing number of researchers report that cervical muscle weakness can be effectively restored using cervical manipulative therapy,[14-16] and that correcting muscular dysfunction in the neck covaries with the resolution of the neck pain symptomatology in these reports.

Carrick[17] evaluated the results of specific cervical manipulation of 50 patients who demonstrated cervical radiculopathy. The primary method of spinal evaluation was X-ray, including lateral flexion projections. Lateral flexion of the cervical spine should always be associated with vertebral rotation in which the spinous process moves to the convexity of the curve; e.g., on right lateral bending the vertebral body rotates right and the spinous process left. This is considered proper coupling movement of a motion segment.

In most cases, the level of radiculopathy occurred at the level of aberrant coupling movement; that is, at the location where there was no lateral flexion and concomitant rotation. In about 20 percent of the cases, there was demonstrable hypermobility at the clinical level of radiculopathy, which occurred above the aberrant coupling movement. Sensory, deep tendon reflexes and motor power improved as indicated by evaluation of a blind examiner.

Carrick[17] concluded that manipulation of the cervical spine must be designed to correct a particular area of dysfunction and the maneuver delivered in a specific manner. It should not be considered conservative therapy; rather, it is a most aggressive non-invasive procedure by which the normal mechanical attitudes of the motion segments can be restored.

"In all cases of cervical radiculopathy where there is demonstrable pathomechanics, it is recommended that manipulation be the primary treatment of choice, and that this therapy be prescribed and administered by qualified clinicians who have had extensive training in this science."

Case Study: AK Management of Cervical Radiculopathy

Maykel reported on the applied kinesiology management of cervical radiculopathy, following two motor-vehicle accidents, in a 37-year-old female. The patient was treated 49 times over a six-month period, and made a complete subjective and functional recovery. A pre-treatment MRI of the cervical spine showed "nucleus pulposus herniation at C5-6 level centrally and to the right," that "appear to impinge on the thecal sac and extend into the right neural foramen."

A CT scan following myelography showed the same findings. A post-treatment MRI of the cervical spine, however, showed that although the herniated disc was still present, the previous "annular bulging" had improved with a reduction in thecal sac impingement, and there was diminished foraminal encroachment (no extension to the right neural foramen on the post-treatment MRI study).[18]

Goodheart recommends nutritional supplementation in the form of superoxide dismutase (SOD), rather than manganese, which is usually given in applied kinesiology for other disc involvements.[19] Prior to treatment, SOD will neutralize the positive challenge and therapy localization when the patient chews the substance. Protection against tissue damage involving muscles, tendons, fascia and the connective tissues is provided by SOD.[20]

In a model of acute disc herniation, nucleus pulposus disruption caused elevation of epidural interleukin-6 (Il-6), tumor necrosis factor alpha, and interferon-gamma. This model may prove useful for the understanding of the biochemical processes by which nucleus pulposus induces inflammation-induced nerve root irritation and radiculopathy pain.[21] SOD in the CSF may play an important role in protecting against nerve-root involvement.[22]

*References*


1. Rodine RJ, Vernon H. Cervical radiculopathy: a systematic review on treatment by spinal manipulation and measurement with the Neck Disability Index. *J Can Chiropr Assoc*, 2012 Mar;56(1):18-28.
2. Magee DJ. *Orthopedic Physical Assessment. 5th Edition*. Saunders, 2008.
3. Wainner RS, et al. Reliability and diagnostic accuracy of the clinical examination and patient self-report measures for cervical radiculopathy. *Spine*, 2003 Jan 1;28(1):52-62.
4. Wei X, et al. Complementary and alternative medicine for the management of cervical radiculopathy: an overview of systematic reviews. *Evid Based Complement Alternat Med*, 2015;2015:793649.
5. Massey EW.  Hand weakness in elderly patients. *Postgrad Med*, 1989 Mar;85(4):59-60, 63-5, 70.
6. Gu R, et al. Differential diagnosis of cervical radiculopathy and superior pulmonary sulcus tumor. *Chin Med J* (Engl), 2012 Aug;125(15):2755-7.
7. Rhee JM, Yoon T, Riew KD. Cervical radiculopathy. *J Am Acad Orthop Surg*, 2007 Aug;15(8):486-94.
8. Awalt P, Lavin NL, McKeough M. Radiographic measurements of intervertebral foramina of cervical vertebra in forward and normal head posture. *Cranio*, 1989 Oct;7(4):275-85.
9. Kendall FP, McCreary EK, Provance PG, Rodgers MM, Romani WA. *Muscles: Testing and Function, With Posture and Pain*. Baltimore: Williams & Wilkins, 2005.
10. Lees F, Turner JW. Natural history and prognosis of cervical spondylosis. *Br. Med. J*, 1963;2(5373):1607-1610.
11. Polston DW. Cervical radiculopathy. *Neurol Clin*, 2007;25(2):373-385.
12. Bandy J. Cervical disc syndrome – a precise diagnostic and therapeutic procedure for correction of cervical disc lesions. Collected Papers International College of Applied Kinesiology, 1984:11.
13. Yoss RE, Corbin KB, MacCarty CS, et al. Significance of symptoms and signs in localization of involved root in cervical disc protrusion. *Neurology*, 1958;7(10):673-685.
14. Sterling M, Jull G, Wright A. Cervical mobilisation: concurrent effects on pain, sympathetic nervous system activity and motor activity. *Man Ther*, 2001 May;6(2):72-81.
15. Taylor HH, Murphy B. Altered sensorimotor integration with cervical spine manipulation. *J Manipulative Physiol Ther*, 2008 Feb;31(2):115-26.
16. Dishman JD, Burke J. Spinal reflex excitability changes after cervical and lumbar spinal manipulation: a comparative study. *Spine J,* 2003 May-Jun;3(3):204-12.
17. Carrick FR. Cervical radiculopathy: the diagnosis and treatment of pathomechanics in the cervical spine. *J Manipulative Physiol Ther*, 1983 Sep;6(3):129-37.
18. Maykel W. Case history: successful treatment of cervical radiculopathy accompanied by herniated nucleus pulposus with chiropractic, applied kinesiology and physical medicine modalities. Collected Papers International College of Applied Kinesiology, 2001-2002;1:139-144.
19. Goodheart GJ Jr. *Applied Kinesiology Workshop Procedure Manual, 18th Edition*. Shawnee Mission, KS: ICAK-USA, 1982.
20. Zelko IN, Mariani TJ, Folz RJ. Superoxide dismutase multigene family: a comparison of the CuZn-SOD (SOD1), Mn-SOD (SOD2), and EC-SOD (SOD3) gene structures, evolution, and expression. *Free Radic Biol Med*, 2002 Aug 1;33(3):337-49.
21. Cuéllar JM, et al. Cytokine expression in the epidural space: a model of noncompressive disc

herniation-induced inflammation. *Spine*, 2013 Jan 1;38(1):17-23.
22. Tamada T, Inoue H, Mori A. Superoxide dismutase activity in cerebrospinal fluid and its relation to compression of the lumbosacral nerve root. *Acta Med Okayama*, 1996 Aug;50(4):197-201.

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