

Cervical Radiculopathy: Manipulation

This protocol deals with an approach to manual therapy for patients with cervical radicular presentations, including cervical disc herniation. It does not include details regarding traction, flexion distraction, or McKenzie protocol.

Most patients with radicular pain from disc herniations achieve some relief from conservative therapy within a few months of onset. (Maigne 1994, Saal 1996)

In one study 40% of patients with cervical disc herniations experienced regression of the herniated material (based on MR). It therefore was concluded that migration-lateral type cervical disc herniations causing upper limb amyotrophy and radicular pain should be managed conservatively at least 2-3 months after onset. (Mochida 1998)

In Japan, patients with cervical radiculopathy are treated conservatively and rarely undergo surgery. (Tanaka 1998)

General Strategy

In patients with radicular syndromes associated with cervical disc herniations, the following strategy is followed.

1. Monitor neurological status.
2. Reduce inflammation and centralize or reduce pain.
3. Correct local biomechanics (which may also reduce pain).
4. Restore spinal stability.
5. Address co-factors and more distant weak links in the kinetic chain.

Initial intervention

Initial intervention can consist of some combination of the following therapies based on practitioner and patient choice as well as response to treatment.

1. Manipulation (thrust or mobilization)
2. Repetitive end-range loading (e.g., McKenzie approach)
3. Traction (Bland 1994, Rodgers 1998, Murphy 2000) or flexion distraction (Kruse 2001)

Summary of manipulation approaches

- Explore set ups that position the patient's neck in a way that centralizes any peripheral symptoms.
- Explore positions that unload the spine (distraction), and open the IVF on the symptomatic site (lateral bending away, rotation away).
- Consider abducting the symptomatic arm (if it relieves arm symptoms).
- Test individual motion units joints in multiple directions assessing symptom changes in the arms and neck.
- Assess tolerance by sustained positioning, and/or increasing grades of mobilization.
- Treat with mobilization, manipulation or MET.
- Adjust related areas.
- **Delay manipulative procedures if patient does not tolerate set up.**

The patient and practitioner have a variety of options when treating a suspected cervical disc herniation. Manipulation or graded mobilization may be considered.

Murphy (2002) suggests that joint dysfunction can co-exist at the level of the disc herniation and should be adjusted. Manipulation can also be directed to adjacent joints.

This is a common treatment for cervical disc herniations among the chiropractic profession. Croft's 1996 survey of 50,200 US chiropractors regarding the utilization of manipulative for cervical disc herniations received 3,510 responses. The mean number of years in practice was 13. 93% of the respondents manipulated spines of patients with known or suspected cervical disc herniations-- 60% did so, 33% did so occasionally. 68% would attempt to directly manipulate the involved segment.

Because these patients are thought to represent a higher risk group than simple mechanical neck pain or deep referred pain patients, an appropriate PARQ conference will need to be conducted and charted. The PARQ conference should include risks and alternatives (Croft 1996) as well as the role, timing, and risks of surgery as well as the possibility of conservative treatment without manipulation.

A Stepwise Approach

Note:

- Thrust manipulation is contraindicated in patients with signs or symptoms of cord compression.
- Manipulation and mobilization are contraindicated at levels and in directions that peripheralize symptoms during assessment.

There is no standardized sequence for assessing joints and applying manual therapy. The following model illustrates the factors that must be considered and presents a reasonable "graded tolerance" approach to assessing the type, direction, and forces appropriate for manipulating or mobilizing the patient with a cervical radicular syndrome.

1. The "set up": positioning the patient's neck through global, passive range of motion.

- **Arm elevation.** If the patient presents with Bakody's sign or has a positive shoulder abduction test, place the patient's symptomatic arm in a supported position of abduction. Hubka (1997) observed that

patients who experience relief of arm pain when they abduct their shoulder seem to tolerate cervical manipulation better when the symptomatic arm is passively abducted and supported during the application of manipulation. The effects of arm abduction on the tension of the nerve root are somewhat variable and so various degrees of abduction in conjunction with different degrees in neck flexion may need to be applied to explore a pain relief position. (Farmer 1994).

- **Monitoring response of the arm.** The patient's head and neck position is explored globally assessing patient tolerance, especially any change in distal symptoms (such as in the arm or interscapular region). Positions which cause peripheralization are to be avoided. Positions that cause centralization (i.e., decrease in the territory of the radiating symptoms), decrease in intensity of the radiating symptoms, or a change from sharp/ electrical pain to a dull ache are chosen for more specific positioning and joint palpation.
- **Joint distraction.** Distraction is tested first and maintained while exploring global, passive lateral flexion, rotation and flexion/extension.
- **Positions that open the IVF on the symptomatic side.** If distal symptoms cannot be centralized or otherwise improved, then positions that have a neutral effect on the distal symptoms are chosen. In these cases, set ups which tend to open the IVF on the symptomatic side should be favored (contralateral rotation and/or lateral bending) (Hubka 1997). Note: for some patients atypical positions may actually be necessary. For example, distraction may aggravate symptoms and/or ipsilateral rotation and/or lateral bending may be helpful (e.g., perhaps by reducing tension on the nerve root). The positioning should always be guided by reduction of the symptoms.
- **Sustained positioning.** Optionally, the practitioner may choose to maintain the patient's neck in the testing positions for a

sustained period of time (up to 1-3 minutes) to assess the patient's response.

2. Specific Segmental Joint Challenge

Individual joints are also challenged in different vectors using the same criteria.

- Graded mobilization is applied to assess tolerance. Joint levels or specific vectors that peripheralize should be avoided. If symptoms centralize, manual therapy can be administered (possibly, even if it causes local discomfort).
- If distal symptoms are unaffected, the choice of joint level and vector will be dependent primarily on local response. Joint challenging that results in local symptom improvement indicates where and in what vector manual therapy can be applied. In cases where there is no local pain improvement, manual therapy may be applied where there is good patient tolerance along with the usual signs of dysfunction (altered end feel, tenderness, soft tissue changes, etc). In the acute phase of care, the degree and nature of the any joint restriction is of secondary importance compared to issues of patient tolerance.
- The joint/disc level for treatment is largely based on patient response. Most chiropractors will apply manual therapy to the level of the injured disc if indicated.* In some cases, symptoms may centralize only when treatment is directed at the level of the injured disc. Other practitioners avoid the level of disc injury, and treat adjacent levels of dysfunction while the patient is acute or continues to have neurological deficits.
- Depending on the results of this assessment, manual therapy may consist of mobilization, sustained overpressure, and/or a high velocity, low amplitude thrust adjustment. Some practitioners may wish to explore a progression from small

* One survey of 3510 US chiropractors found that 68% of the respondents attempted to manipulate the involved segment if it was tolerated by the patient or there were no contraindications. (Croft 1996)

oscillations through various grades of rhythmic mobilization to determine the appropriate therapeutic intensity level.

- Within the framework outlined above, other manual therapy options may be considered:
 - ⇒ Deliver the treatment while maintaining a slight distractive force. Beware of releasing the distraction too quickly causing a rebound aggravation of symptoms; a gradual release is usually much better tolerated. This response may be more common with disc herniations compared to osteophytic nerve root compression.
 - ⇒ Unless the patient response to the assessment procedures suggests otherwise, favor treatment with the neck in contralateral rotation or lateral flexion to open up the IVF.
 - ⇒ Use a mechanical adjusting device (on a low or "cervical" setting), drop table technique (be certain that the drop piece is sensitive and in good working condition), or muscle energy techniques to treat the appropriate joint. Treatment can be aided by appropriate positioning of the head piece, portable headpiece, pillows, cervical support/block, or an "occipital float."

3. Treat related areas of joint dysfunction

- Adjust related joint dysfunction, including the upper cervical and upper thoracic. Consider upper thoracic adjusting to decrease cervical spasm, etc. If prone upper thoracic manipulation provokes patient's neck or arm symptoms, consider manual therapy in the supine position (Hubka 1997) or seated position.

Patient response to treatment

- Patient's neurological status should be carefully monitored each visit.
- Some authors report that with manipulation the neck pain often improves before upper extremity pain. (Conley 1994)

- Piva (2000) suggests that when there is a quick response to treatment, especially improvement in flexion, the prognosis is generally favorable.

Timing

The timing of manipulation and mobilization procedures is based on the patient's tolerance and neurological response to head positioning and joint play as well as the practitioner's skill and experience. A variety of options are possible.

Option 1: Employ manipulation (or mechanically assisted manipulation) in the acute phase of the disc herniation if symptoms either centralize or at the very least do not peripheralize.*

Option 2: Employ only graded mobilization or other non-thrust procedures at this stage (MET, traction, flexion-distraction, McKenzie, etc).**

Option 3: Delay manipulation or mobilization in the acute phase especially in cases of cervical disc herniation when there are accompanying neurological deficits. (Dvorak 1992)

Option 4: Piva (2000) suggests a strategy in which traction manipulations are used as soon as the patient is out of the acute phase. Intermittent traction is performed at various degrees of flexion until the patient has full active range of motion in flexion restored. Then thrust adjustments are added. The main treatment strategy is directed by the patient's response to movement tests.

* WSCC survey of staff revealed that 10/20 respondents thought that thrust adjustments could be used during the acute phase if they centralized pain. 18/20 respondents thought that cervical adjustments could be useful after the acute phase.

** WSCC faculty survey on cervical disc herniations. 14/19 of WSCC respondents thought that graded mobilization could be given within toleration in the early stages of intervention.

Side Effects and Complications

Good epidemiological data on side effects relative to manual therapy for cervical radicular syndromes is lacking.

A review of the literature on the nature of complications in manipulative therapy suggests that myelopathy is rare (Vadeboncoeu 1994). Increase in severity of radicular symptoms also appears to be relatively rare.

Reports from the literature

The following are the published reports which try to estimate the prevalence of serious neurological complications from manual therapy in general, performed by a variety of practitioners. While most of these reports seem to be of limited value, they generally reflect that serious complications appear to be relatively rare.

- Malone & Baldwin (2002), representing a single neurosurgical practice, reported over a 5 year period 172 patients with complications, of whom 155 had been recently seen by a chiropractor. There were 20 radicular syndromes presumably made worse and 11 with worsened myelopathy. In 5 patients, neurologic deterioration occurred during the course of treatment.
- Rivett & Miburn (1997) published the results of a retrospective postal survey of New Zealand DCs & PTs (146 practitioners, 5 year period). Complications reported included 7 cases of radiculopathy, and 3 specifically of disc prolapse. (Gross 2002)
- In Croft's 1996 survey of 50,200 US chiropractors (3510 respondents), 79% reported no complications from manipulating patients with known or suspected cervical disc herniations.
- In Lee's 1995 retrospective survey of 177 California neurologists, 51 cited negative responses they attributed to chiropractic manipulation over the prior 2 years. There

were 22 cases of radiculopathy and 13 myelopathy. (Gross 2002)

- Michaeli (1993) published a South Africa PT retrospective postal survey (153 practitioners, 1971-1989). Complications to manipulation included 3 cases of "brachialgia" and 1 case of brachialgia with deficit and for mobilization there were 4 cases of brachialgia and 6 cases of brachialgia with deficit. (Gross 2002)
- Klougart's 1996 DCs Denmark retrospective postal survey of Danish chiropractors (122 DCs practitioners, 1971-1988) found no cases with complications of radiculopathy. (Gross 2002)
- Sensrad 1997 survey was a prospective clinic-based survey regarding the previous 6 treatments of the next 12 consecutive patients (102 chiropractors were included). The reported range for an increase in "radiating discomfort" was 8-12 cases. (Gross 2002)

Although the prevalence of serious complications treating cervical disc herniations appear to be relatively rare, NCMIC reports (personal communication, 4/2/02) that negligence suits in this arena accounted for between 9.6% and 15.7% of total settlements for the years 1999 through 2001.

Consequently, it is important to properly select and chart the type of manual therapy utilized. Note patient's tolerance to the set up (e.g., whether the set up was well tolerated or symptoms centralized) and any special adaptation of the manual therapy (e.g., reduced force)

Supportive care for the adjustment

Pre-treatment. The practitioner can apply 10 minutes of hot pack/ice, high volt galvanic/

ultrasound combination, or IFC 4,000 Hz for acute pain block and/or 80-120 Hz for pain and edema. Treatment can include arm if the patient is very symptomatic. The anterior neck should be avoided when using electro-modalities. A pillow can be placed under the patient's neck then a cold pack and towel.

Post-treatment. Ice or some other cold pack can be applied post treatment for 5-6 minutes. The patient should be told to contact the practitioner if there is a severe increase in pain, worsening of arm symptoms, or the appearance of any leg symptoms.

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