**ABSTRACT**

**Objective:** To describe the use of intermittent cervical traction in managing 4 patients with cervical radiculopathy and large-volume herniated disks.

**Clinical Features:** Four patients had neck pain radiating to the arm. The clinical examination was typical in all cases for radiculopathy of cervical origin. Magnetic resonance imaging (MRI) of the cervical spine revealed large-volume herniated disks in all patients.

**Intervention and Outcome:** The treatment consisted of intermittent on-the-door cervical traction under the supervision of our physiotherapists. Complete symptom resolution for each patient occurred within 3 weeks. One patient who had an episode of recurrence 16 months after the first treatment was successfully managed again with cervical traction and physiotherapy.

**Conclusion:** Cervical spine traction could be considered as a therapy of choice for radiculopathy caused by herniated disks, even in cases of large-volume herniated disks or recurrent episodes. (J Manipulative Physiol Ther 2002;25:188-92)

**INTRODUCTION**

Normal cervical disks absorb stress applied to the spine and permit some degree of spinal motion. The water content and elasticity of the nucleus pulposus is highest in utero but aging gradually decreases the water content and elasticity. Cervical disk herniation usually occurs when flexion, extension, rotation, and their combination exceed the strength of the annulus fibrosis and the supporting anterior and posterior ligaments.1 Because the posterior longitudinal ligaments are relatively weak laterally, most herniations occur there. The most common levels of cervical disk herniation are C5-6 and C6-7 (about 90% of all cases).

The treatment for cervical disk herniation is essentially conservative, although surgical treatment may be necessary in cases of intractable pain or progression of neurologic deficits. Conservative treatment may include cervical traction, anti-inflammatory medication, chiropractic manipulation, and physiotherapy. Previous studies support the non-operative treatment of patients with cervical disk herniation, and document a success rate of 72% for management with chiropractic care.2 Cervical traction is becoming popular not only with physiotherapists but also with neurosurgeons and orthopedists.3-5 There is evidence that traction decreases the pressure within the vertebral disks and unloads the structures of the spine by stretching muscles and ligaments.6

It is probable that traction has an important role in breaking the “circle of pain” in cervical radiculopathy caused by a herniated disk. This cycle begins when nerve roots are compressed by a herniated disk, causing entrapment within the intervertebral foramina. The irritated nerve produces a reflex response to the patient’s cervical muscles, causing those muscles to contract. That contraction further narrows the foramina, and the neck pain is increased. Intermittent traction helps to relieve the inflammatory reaction of nerve roots by improving the circulation to the tissues and reducing swelling of the tissues. Gentle alteration of stretching and relaxation of the neck soft tissue structures prevents the formation of adhesions of the dural sleeve.7,8

Long-term effects of traction are not well described in the literature. We present 4 cases of radiculopathy, caused by large-volume herniated disks greater than 4 mm, in which
the patients were successfully treated by use of intermittent cervical traction.

CASE REPORTS

Case 1

A 35-year-old woman had severe neck pain radiating to her left arm. Her symptoms began 15 days earlier in the absence of a history of trauma of cervical spine.

She experienced tenderness to pressure, with spasm of the cervical muscles and restriction of head movement to the left and right. Spurling’s sign (ie, radicular pain reproduced when the examiner pressed on the vertex while tilting the head toward the symptomatic side) was positive to the left.9 Axial manual traction with the patient in the supine position resolved the symptoms. A shoulder abduction test was also positive, raising the suspicion of radiculopathy caused by cervical disk herniation. Neurologic examination revealed a left C6 radiculopathy with hypoesthesia of the upper arm and thumb and a diminished biceps reflex. Muscle strength was normal. Bowel and bladder function were normal. Magnetic resonance imaging (MRI) showed a large-volume C5-6 herniated disk (Fig 1).
On-the-door vertical traction of the cervical spine using a commercially available cervical traction system (which included an overdoor hanger, a traction cord, a head holder, and a weight bag that was filled with 5 pounds of water) was applied to the patient under the close supervision of our physiotherapists. The treatment was intermittent, with traction applied for 45 minutes, followed by 15-minute intervals with no traction. Muscle relaxants and anti-inflammatory medication were also prescribed. The patient received treatment for 6-8 hours a day, while she was watching television or reading a magazine. The rest of the day we recommended the use of a cervical collar (Philadelphia type). In total, she received treatment for 3 weeks. The patient’s symptoms resolved gradually after the second week, and she was subjectively asymptomatic after 1 month. Routine re-examination after 2 months was normal.

After 16 months, she was again referred to our department for neck pain that radiated to her left shoulder. This time, however, the symptomatology was a C5 radiculopathy with the pain more intense in her left shoulder. Neurologic examination revealed a left C5 hypoesthesia; reflexes and muscle strength were normal. Bowel and bladder function were unaffected. MRI examination of the cervical spine showed a large-volume C4-5 cervical disk and resolution of the C5-6 large herniated disk that was the origin of the pain 16 months earlier (Fig 2). We decided to manage the patient again with cervical traction. Three weeks of treatment, as previously described, was sufficient to resolve her symptoms. Re-examination 1 and 2 months later revealed that she was pain-free with full-range of cervical spine motion. No additional episodes of recurrence were observed during the last 2 years.

Case 2

A 41-year-old man had neck pain radiating to the right middle finger and was admitted to our department. The pain had started during physical exercise (weight-lifting) 1 week before and had gradually worsened.

The patient experienced neck muscle spasms with painful restriction of movement to the right side. Spurling’s sign was positive on the right. Axial manual traction with the patient in the supine position resolved the symptoms, and a shoulder abduction test was also positive on the right side. Neurologic examination revealed a C7 radiculopathy, with hypoesthesia to the middle finger and a decreased triceps reflex. Muscle strength was normal and bowel and bladder function were unaffected. MRI examination showed a C6-C7 large herniated disk extrusion on the right side that compressed the C7 root and the spinal cord.

On-the-door vertical traction of the cervical spine (as described in the previous case), with the aid of our physiotherapists, was the treatment of choice. Muscle relaxants and anti-inflammatory medication were also administered. The treatment lasted 3 weeks, and the patient’s pain, after a transient increase for 2 days, decreased from the second week onward. By the fourth week the patient was pain-free. Re-examination after 1 and 2 months confirmed the optimal situation of the patient, and the patient is recurrence-free 3 years posttreatment.

Case 3

A 31-year-old woman had neck pain radiating to the right upper arm and thumb. The pain had started insidiously 10 days before. Two days after the onset of pain, the patient used a soft cervical collar upon the advice of a general practitioner.

She experienced neck muscle spasms on the right side, with painful restriction of movement to the right. Neck pain was also aggravated during neck extension. Spurling’s sign was positive on the right side. Axial manual traction with the patient in the supine position resolved the symptoms, and again the shoulder abduction test was positive on the right side. Valsalva maneuver was positive for radicular pain. Neurologic examination revealed a C6 radiculopathy, with hypoesthesia to the thumb and slightly decreased biceps reflex. Muscle strength was normal and bowel and bladder function were unaffected. MRI examination showed a C5-C6 large herniated disk extrusion on the right side that compressed the C6 cervical root.

We decided again to use conservative treatment with on-the-door vertical traction of the cervical spine (as described above). Muscle relaxants and anti-inflammatory medication were also prescribed. The patient complained during the first week of treatment of temporomandibular joint pain due to chin pressure, but after our physiotherapists’ advice regarding the proper application of traction was heeded the symptom resolved. The treatment lasted 3 weeks, and the patient’s pain decreased after the third week and disappeared after 1 month. Re-examination confirmed the absence of residual pain or neurologic deficits; there has been no recurrence during the last 3 years.

Case 4

A 34-year-old man had neck pain radiating to 3 to 4 fingers on the right hand. The onset of the pain occurred 2 weeks earlier during physical exercise.

The patient experienced neck muscle spasms with painful restriction of movement to the right and to the left. Spurling’s sign was positive on the right side. Similarly, as with the 3 patients described above, axial manual traction performed while the patient was in the supine position resolved the symptoms, and a shoulder abduction test was also positive on the right side. Neurologic examination revealed a C7 radiculopathy, with hypoesthesia to the middle finger and an absent triceps reflex. Muscle strength was normal and bowel and bladder function were unaffected. MRI examination showed a C6-C7 large herniated disk extrusion on the right side that compressed the C7 root and the spinal cord (Figs 3 and 4).

This patient also responded well to on-the-door vertical traction of the cervical spine. Muscle relaxants and anti-
inflammatory medication were also prescribed. The treatment lasted 3 weeks and the patient’s pain decreased gradually, beginning with the second week of treatment. The fourth week the patient was pain-free.

**DISCUSSION**

Conservative treatment is generally believed to alleviate symptoms of cervical radiculopathy, at least for the short term. The long-term prognosis remains unknown, with studies reporting both positive and negative results. It is probable that different inclusion and evaluation criteria for the symptoms resulted in wide variances in reported outcomes.

Neck pain is usually mechanical and not neurogenic; treatment, therefore, ranges from immobilization with a collar and medications to physiotherapy, manipulation, and traction. In our department, more than 150 patients had radiculopathy of cervical origin and were treated by traction and physiotherapy during the last 6 years with positive results. During that same period, 85 patients with cervical spondylotic myelopathy or intractable pain from herniated disks underwent surgery. We use on-the-door traction of the

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**Fig 3.** Case 4: *Coronal view of cervical spine T-1 weighted MRI showing a large-volume disk protrusion at C6-C7 level.*

**Fig 4.** Case 4: *Axial view of cervical spine T-1 MRI of the same patient showing the large herniated disk on the right side, compressed root and spinal cord.*
cervical spine with a commercially available home cervical traction system. The correction of posture and orientation of the patient during the treatment are organized and assisted by our physiotherapists. The treatment involves intermittent traction, that is, traction applied for 45 minutes followed by 15-minute intervals without traction. We initiate the treatment in the morning with a pull of 2 to 3 pounds; after the second hour, we increase it to 5 pounds for the remainder of the day.

Patients receive treatment for 6 to 8 hours a day, while they watch television or read a magazine. We recommend that patients use a cervical collar (Philadelphia type) the remainder of the day. The usual treatment duration is 3 weeks. Muscle relaxants and anti-inflammatory medication are also prescribed.

Saal\(^3\) described a study of 26 patients with disk protrusions less than 4 mm and radiculopathy, in which neurologic deterioration did not occur in any of the patients, all of whom were managed with traction, physical therapy, and anti-inflammatory medications. In another study, Moeti\(^4\) used cervical traction to treat patients with radiculopathy and found that patients whose symptoms lasted more than 12 weeks showed less favorable improvement.

These 4 cases described here illustrate the potential for successful treatment with cervical traction in patients with large-volume herniated cervical disks or with recurrent episodes of radiculopathy. All patients received treatment soon after the initiation of symptoms (7 days to 2 weeks). This might be very important for the outcome, because early intervention is believed to be more successful.\(^4\) Some authors have studied the mechanisms affecting herniated disk regression and resorption,\(^12\) and their results suggest that once the herniated disk material is exposed to the vascular environment of the epidural space, cellular mechanisms contribute to regression. Because large and extruded disks have wider exposure to these resorption mechanisms, they tend to regress more rapidly and the response to early therapeutic intervention is better.

CONCLUSION

Neurosurgeons, orthopedics, chiropractors, and physiotherapists grapple in their daily practice with the decision to use surgical or conservative treatment for herniated cervical disks. We do not advocate conservative treatment in cases of herniated disks with myelopathy or with progressive neurologic deficits, but we believe that nonsurgical treatment should be always considered when radiculopathy is present, even cases with large-sized disk herniations or recurrences of pain.

REFERENCES