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## **Cervical Myelopathy and Spinal Stenosis**

By David BenEliyahu

Cervical myelopathy is a disorder most commonly seen in the elderly population due to spondylosis with resultant cord compression.<sup>1</sup> There are many causes of myelopathy that include trauma, tumors, infection, vascular disease, degenerative conditions and demyelinating disorders.<sup>9</sup> Myelopathy can be seen in younger patients when central disc herniations compress the spinal cord.<sup>1</sup> Most typically, however, there are osteophytic changes and ligament thickening makes the canal stenotic. Patients will most typically present with weakness and clumsiness of the hands, paresthesias in the hand and gait disturbances.

Myelopathy due to spondylosis has no single "pathognomonic" sign or symptom. The diagnosis is established by association of a group of signs and symptoms. The diagnosis is often missed due to the subtle signs of early myelopathy, and the usual overshadowing of associated radicular/nerve root involvement.

Physical exam findings of cervical spondylitic myelopathy (CSM) vary quite a bit, depending on the level and degree of cord compression. In general, lower motor neuron findings are seen at the level of the lesion, while upper motor neuron findings will be seen below the level of the lesion/cord compression (i.e., hyporeflexia in the upper extremities and hyperreflexia in the lower extremities).<sup>1</sup> Another feature of CSM is that it will involve the axial skeleton and skip the head and face.<sup>9</sup>

Clark suggested that sensory findings usually include preservation of touch, loss of pain and temperature, loss of proprioception and vibration below the level of lesion.<sup>2</sup> Clonus, Lhermitte's sign, Babinski and Hoffman's pathologic reflexes may or may not be present. Lunsford found in his series of CSM patients that 87% had hyperreflexia; 50% had a positive Babinski; and 13% had a positive Hoffman's reflex. Motor weakness was seen in only 58%; sensory dysfunction in 41%; and abnormal proprioception in 39%.

Alarming, the inconsistency of the presence of neck pain, and Lhermitte's sign (cervical flexion and extension producing electric shocks down the arm and leg) was noted.

Cord syndromes can be seen, but not frequently in the chiropractic office, since these advanced cases usually go through medical offices. However, early cases do pass through our offices, especially in patients with advanced spondylitic degenerative changes in the cervical spine and central disc herniations.

*There are four basic subtypes of cord syndromes:*

1. lateral or radicular syndrome with nerve root pathology;
2. medial or spinal syndrome with spinal cord abnormalities;
3. combined medial and lateral; and
4. vascular syndrome.

A subtle gait abnormality may often be seen in the legs before upper extremity involvement. Clinical gait findings can include loss of balance; stiffness; unsteadiness; and loss of power in the legs. A "myelopathic gait" can appear, which is a broad base, and shuffle with disruption in smooth, rhythmic function. Bowel and bladder dysfunction is rare and in some studies was seen in only 15-18% of the patients seen.<sup>2,3</sup>

"Myelopathy hand" was coined by Ono and associates, which is characterized by a loss of power in adduction and extension of the ulnar fingers.<sup>4</sup>

The "finger escape sign" is sometimes present (the patient is asked to hold out their hand with fingers extended and the medial fingers drift into flexion). Good and associates found that with CSM between C3 and C5, the main finding was hand numbness, along with decreased vibratory sense, position sense and hyperflexia.<sup>5</sup>

Myelopathy may also occur as a result of central disc herniations. In a series of 26 patients, most cases were at the C3/4 level with impaired dorsal column function.<sup>6</sup> A classification system was designed by Nurick et al.<sup>7</sup>:

- Grade 1: spinal cord disease with no problem walking
- Grade 2: slight difficulty walking but can work
- Grade 3: difficulty walking and cannot work full-time
- Grade 4: can only walk with help of a frame walker
- Grade 5: chair-bound or bedridden

Radiographic imaging can help for spinal stenosis utilizing the Torg or Pavlov ratio.<sup>8</sup> This is calculated on a lateral cervical radiograph by measuring the width of the spinal canal and vertebral body. A ratio of less than 0.80 is indicative of spinal stenosis.

Advanced imaging that is helpful in these types of patients include MRI and/or CT myelography.<sup>16</sup> MRI is widely available to the practicing chiropractor and can visualize both spinal stenosis and cord compression. Negata et al. found MRI, particularly T1 weighted images, to be useful in the accurate diagnosis of myelopathy.<sup>13</sup>

Electrophysiologic testing that can be helpful as well includes somatosensory evoked potentials (SSEP).<sup>10,11,17</sup> Ulnar SSEPs were found to be sensitive in the assessment of myelopathy patients by Veilleux et al.<sup>11</sup> In another study, Restuccia et al. found that SSEPs were very useful for myelopathy patients as well.<sup>12</sup> They found a high percentage of N13 abnormalities within radial and median nerve testing.<sup>12</sup>

Treatment in a progressive case usually requires surgical intervention.<sup>1,10,14</sup> In all cases, neurological and/or neurosurgical consultation is indicated. However, surgical outcome rates vary from 50-74%, so a trial of conservative care may be prudent (with concurrent medical/neurologic care) and can include physiotherapy, traction, flexion distraction, and Activator technique, with avoidance of high-velocity, low-amplitude (HVLA) thrust techniques.<sup>13</sup> Vertebrobasilar infarcts have been seen in cases of CSM, so HVLA puts the patient at risk and are contraindicated.<sup>13</sup>

In a study by Nakamura et al., 64 patients with CSM were treated conservatively with traction and bed rest.<sup>15</sup> A rating of "no disability" was achieved in 27% and was maintained throughout the 3-10 year follow-up period.<sup>15</sup> The overall treatment success rate was 34%. This study suggests that in mild to moderate nonaggressively progressive cases, conservative care is an option. It must be reiterated, though, that osseous cervical adjustments (HVLA) thrust techniques are contraindicated! A new technique that this author finds useful with these types of patients is the cervical flexion distraction table developed by the Williams company. CFD is very similar to lumbar flexion distraction. In conjunction with CFD, traction and physiotherapy are also helpful in alleviating pain and spasm.<sup>14</sup>

## **Conclusion**

Cervical myelopathy with or without spinal stenosis is a significant cervicogenic neurologic disorder that can easily be missed. Careful history and physical examination is necessary since the subtle signs of early CSM can easily be overshadowed by concurrent radicular findings. Advanced imaging such as CT or MRI are indicated, and electrodiagnostic studies like SSEP are also helpful to assess the continuity of the somatosensory pathways of the cord. Since CSM can be progressive and lead to irreversible neurologic injury, neurosurgical consultation is advisable and surgery should be ruled out. Conservative care can be helpful as outlined above and should include concurrent neurologic care and exclude HVLA techniques. Nonforce techniques like Activator and cervical flexion distraction are advisable.

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