

# CHIROPRACTIC NEUROLOGY RESEARCH BRIEF

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## Part 2: Rehabilitation of Cervical Lordosis

### Introduction

Maintaining the normal, forward-arching curve in the neck (cervical lordosis) and low back are necessary components for spinal health. Orthopedists and neurosurgeons recently recognized the importance of the cervical lordosis in cervical fusion cases (1-4). We chiropractic neurologists speak of its importance when alterations are seen in lateral cervical radiographs and have employed treatment methods to rehabilitate it and/or reversals (kyphotic deformity) of the curve (5).

### Why Rehabilitate Cervical Lordosis?

The cervical lordosis is a primary spinal curve that is formed at approximately 10 weeks of fetal development (6). Kyphotic deformities of the neck can develop from neck injuries that occur in childhood falls and later in life from sports injuries, head trauma, stress and whiplash (7). Detrimental activities-of-daily living are: sleeping with one's head elevated higher than the neck from two pillows under the head, the neck placed in a flexed position while side-lying and viewing low computer screens. These bad postures increase the load on the vertebral bodies, by forcing the weight-bearing of the head to move anterior of the normal weight-bearing line (longitudinal axis), and intervertebral disks by pushing them posterior. A reversed neck curve predisposes patients to premature spinal degeneration (due to outstretching of the posterior musculature and contracture of the anterior musculature), neck pain (7-10), tension-type and migraine headaches (11-13).

### Cervical Traction: A Common Treatment Method

Cervical traction has been used since Hippocrates' era to treat fractures, dislocations, neck pain, radicular symptoms, and spondylosis (14). Currently, the most often employed traction is axial (vertical) traction in the seated position. Although traction with the head in the neutral position (not in extension which produces a cervical lordosis) unloads the cervical disks and increases the posterior disk and intervertebral foramina spaces, when the traction is removed, there is no evidence to suggest that it improves cervical lordosis.

In the 1970's, neurosurgeon Alf Brieg discovered that cervical kyphosis caused adverse tension in the cervical spinal cord and that a normal lordosis actually relaxed the cord. He developed a surgical procedure to permanently induce lordosis in patients with kyphosis and published the results for treating: nerve root compression syndromes, trigeminal neuralgia, multiple sclerosis, and other neuromusculoskeletal conditions (15).

Then, in the 1980's, some chiropractors began utilizing traction with the cervical spine in extension which yielded improved lordosis and contributed to the alleviation of cervicogenic symptoms. This lead researchers to develop clinical trials in the '09s to evaluate its efficacy.

### **Chiropractic Traction Methods and Studies**

The normal range for cervical lordosis is 34-42 degrees (measured between the end plates of C2 and C7) and is the most desirable clinical outcome for the curve (16). In an effort to rehabilitate cervical lordosis, I place the neck in extension during manipulation, stretching, isotonic (resistance with movement) and isometric rehabilitation exercises. This stretches the anterior longitudinal ligament and remodels the lordosis.

Three separate studies have been published documenting the efficacy of cervical extension during traction for the rehabilitation of cervical lordosis.

1. The first study's control group of 30 people received no health care for 10-14 weeks. The treatment group of 35 patients received diversified spinal manipulation (which I render, although much less often than regular chiropractors) and cervical extension-traction five times per week for 10-14 weeks. The control group of 30 patients, also, received diversified spinal manipulation and no traction five times per week for 10-14 weeks.

The outcome was derived from measurements taken from pre- and post- lateral cervical radiographs taken 10-14 weeks apart. No statistically significant changes in overall lordosis occurred in the control group, whereby, in treatment group with traction, the C2 - C7 angle increased an average of 13.2 degrees. (Interestingly, 24 of the 35 subjects had segmental or regional kyphotic deformities before treatment, but afterward, only six of the subjects had kyphotic deformities.) The group without traction had no statistically significant change in lordosis (17). This was the first study to show that cervical kyphosis can be brought to a lordotic configuration through conservative traction methods.

2. The next study consisted of 30 patients with cervicogenic symptoms (neck pain, headaches, arm pain and/or numbness) and 24 controls. The treatment group received cervical spinal manipulation for the first three to four weeks followed by two-way cervical traction three to five sessions per week for  $9 \pm 1$  weeks. The control group showed NO statistically significant change in cervical lordosis between pre- and post-

radiographs and no change in VAS pain ratings. However, the treatment group showed improved VAS pain ratings and radiographic measurements.

VAS ratings before treatment averaged 4.3 and reduced to 1.6 afterward and radiographic measurements showed statistically significant improvements ( $P < .008$ ) with the lordosis improved 14.2 degrees between C2 - C7 along with improved head placement (14). The long-term follow-up of 15 1/2 months showed 25 of 30 with only a minimal loss of lordosis (3.5 degrees).

3. The third study sought to determine if seated-traction involving cervical retraction in extension and compression with a transverse load applied at the area of kyphosis would cause tension in the anterior longitudinal (cervical) ligament, anterior disk and muscle structures, to restore cervical lordosis.

Thirty patients with chronic neck pain were compared to 33 control subjects that were matched for age, sex, height, weight, and pain levels and type. The treatment group received cervical manipulation for the first three weeks followed by seated cervical extension-traction.

The control group reported no change in VAS pain ratings and had no statistically significant changes in cervical lordosis. In the treatment group VAS ratings were 4.1 pre-treatment and 1.1 post-treatment. Lateral cervical radiographs were repeated after an average of 38 visits over 14.6 weeks. All measurements had statistically significant improvements; including overall cervical lordosis (mean 17.9 degrees) and anterior head translation (mean 11 mm). Follow-up 14-months later showed the treatment group maintaining improvement in cervical lordosis and anterior weight bearing (18).

### **Clinical Significance**

Numerous studies demonstrate that a loss or reversal of the normal cervical lordosis is responsible for producing abnormal loads on spinal tissues, pain and premature degeneration. Different forms of cervical traction with extension are effective for restoring the cervical lordosis. We utilize these methods as a conservative option for patients suffering pain from a loss or reversal of the cervical lordosis.

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