

## Treatment of neck-tongue syndrome by spinal manipulation

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### FROM ABSTRACT

Neck-tongue syndrome is characterized by occipital pain and ipsilateral tongue numbness aggravated by neck rotation.

Of the seven cases reported in the past only one was treated with partial success.

Three cases are presented in this report which were successfully treated by rotational manipulation of the cervical spine.

On the basis of this outcome and in light of the neuro-anatomical relationships in the upper cervical spine, we propose that this syndrome might be caused by local muscle spasm in the cervical spine rather than by the mechanism proposed in past studies.

### THESE AUTHORS ALSO NOTE:

"The neck-tongue syndrome is a rare but interesting condition characterized by transient occipital pain and subjective numbness of the ipsilateral half of the tongue aggravated by voluntary rotation of the head and neck."

Other common symptoms include "numbness of the upper part of the neck, tingling in the fingers, and a clicking sensation when the head is turned."

Often there is a history of head trauma before onset of symptoms.

It is not uncommon for symptoms to begin at a very young age, 8-14 years.

The symptoms can be chronic, with documented cases lasting 18 years or longer.

Radiographs and CT have not shown evidence of atlanto-axial instability.

Surgical assessment has shown fibrosis of the C2 anterior primary rami.

The C2 dorsal root ganglion and the C2 ventral ramus "are adherent to both the undersurface of the inferior oblique and the articular capsule of the atlanto-axial joint." **[Very Important]**

## CASE #1:

A 48-year old woman began having symptoms of neck tongue syndrome as a child, noting sharp right suboccipital pain with right head rotation.

Her examination, including radiographs, was unremarkable, with the exception of hard, tender suboccipital muscles on the right side.

**“The patient was given a two-week course of daily manipulations directed towards mobilizing the upper and lower cervical spine on the right side. She tolerated the treatment quite well, and reported that she was symptom free after these treatments. She was reviewed at two weeks, three months, one year and two years after therapy and reported no further trouble. On each occasion, she demonstrated a full painless range of motion in the cervical spine with no numbness of the tongue.”**

## CASE #2:

A 28-year old woman had been suffering from left-sided neck-tongue syndrome for a year. The syndrome began one day following a whiplash injury, and physiotherapy had not improved her condition.

Her examination, including radiographs, was unremarkable, with the exception of reduced left cervical rotation.

**“The patient was given a two-week regimen of daily spinal manipulations directed towards mobilizing the upper cervical spine. The first two treatments caused an increase in neck discomfort, but by the end of the first week she was very much improved. After two weeks of treatment the tongue numbness was gone and could not be provoked.” She had no further episodes of tongue numbness at three months and six months after treatment.**

## CASE #3:

A 57-year old woman had been suffering from left-sided neck-tongue syndrome for years. There was no history of trauma.

Her examination, including radiographs, was unremarkable, with the exception of reduced left cervical rotation and left suboccipital muscle spasm.

**“The patient was given a two-week course of daily spinal manipulations directed towards the upper cervical spine on the left side. She improved rapidly and was asymptomatic by the second**

**week. She reported no further episodes of neck pain or tongue numbness when reviewed after two and six months."**

Anatomical studies on human cadavers show that:

- 1) The C2 dorsal root ganglion (DRG) is extradural and is connected to the C1-C2 facet joint by a layer of strong fascia.
- 2) The ventral ramus of C2 curls around the superior articular process of C2 just below the C1-C2 joint space.
- 3) The C2 root is strongly attached to the undersurface of the inferior oblique muscle.

The C2 nerve root contains proprioceptive afferent fibers from the tongue. These tongue proprioceptive fibers travel through an afferent loop involving the hypoglossal-lingual-cervical (C1-C3) fibers pathway called the ansa cervicalis-ansa hypoglossi loop. Tongue proprioceptive fibers can also pass through the C1 and C3 nerve roots

Neck-tongue syndrome is primarily attributed to problems with the C2 nerve root. The nociceptive fibers of the C2 nerve root accounts for the reports of occipital pain. The tongue proprioceptive fibers in the C2 nerve root account for the tongue numbness.

The proposed mechanisms for the C2 nerve root dysfunction include:

- 1) C1-C2 instability that allows a subluxation [medical] to compress the C2 ventral ramus which contains the proprioceptive afferents from the tongue. Also, C1-C2 instability and [medical] subluxation could compress the C2 DRG, affecting upper cervical and posterior head pain afferents.

However, these authors note that there is "no direct evidence that atlanto-axial instability or subluxation exists in this syndrome."

- 2) Spasm of the suboccipital muscles, especially of the inferior oblique muscle, can influence the C2 nerve. Recall that the C2 nerve exits beneath the inferior oblique muscle and is attached to the muscle through strong fascial attachments, and surgical studies have identified abnormal fibrosis in the region. This suboccipital muscle spasm can be palpated, and it would account for the reduced range of cervical rotation. Recall, "the inferior oblique muscle controls the rotation at the atlanto-axial joint and could, if in spasm, apply pressure upon the C2 dorsal root ganglion and ventral ramus."

In the 3 cases presented in this article, "there was clinical evidence of local muscle spasm with reduced mobility at the atlanto-axial joint."

In this study, "symptomatic relief and an increased range of motion was achieved by rotational manipulation of the cervical spine," which is unlikely if the pathology was instability.

These authors cite references that support that spinal manipulation [adjusting] fires facet mechanoreceptors resulting in pain inhibition, muscle spasm inhibition, and increase range of motion. They note:

- 1) Joint injury can cause local and referred pain "with reflex spasm of overlying joints."
- 2) Joint manipulation [adjustment] inhibits pain and muscle spasm and increases the range of motion.

These authors describe manipulation as follows:

- 1) "The neck is positioned to its limit of rotation and a short thrust is applied with an audible crack."
- 2) "This crack is the result of cavitation in the apophyseal joints."
- 3) "In the hands of an experienced clinician the procedure is usually painless and relatively safe."

These authors conclude:

"We have been able to treat [neck-tongue syndrome] successfully with rotational manipulation of the cervical spine. We therefore suggest a short regimen of cervical manipulation for patients with neck-tongue syndrome before considering operative intervention."

#### KEY POINTS FROM DAN MURPHY

- 1) "The neck-tongue syndrome is a rare but interesting condition characterized by transient occipital pain and subjective numbness of the ipsilateral half of the tongue aggravated by voluntary rotation of the head and neck."
- 2) Other common symptoms include "numbness of the upper part of the neck, tingling in the fingers, and a clicking sensation when the head is turned."
- 3) There is often a history of head trauma, symptoms can begin at a very young age (8-14 years), and can last for decades.
- 4) Neck-tongue syndrome is probably not as a consequence of C1-C2 instability.
- 5) Standard medical radiographs are usually unrevealing.
- 6) The C2 dorsal root ganglion and the C2 ventral ramus "are adherent to both the undersurface of the inferior oblique and the articular capsule of the atlanto-axial joint." **[Very Important]**

- 7) Surgical assessment has shown fibrosis of the C2 anterior primary rami.
- 8) The C2 nerve root (and perhaps also C1 and C3) contains proprioceptive afferent fibers from the tongue.
- 9) Neck-tongue syndrome is primarily attributed to problems with the C2 nerve root. The nociceptive fibers of the C2 nerve root accounts for the reports of occipital pain. The tongue proprioceptive fibers in the C2 nerve root accounts for the tongue numbness.
- 10) These author propose that:
  - A)) C1-C2 facet joint injury can cause local and referred pain with reflex spasm of the inferior oblique muscle.
  - B)) The reflex spasm of the inferior oblique muscle adversely affects the C2 nerve, causing suboccipital pain and tongue numbness (altered proprioception), and reduced upper cervical range of motion.
  - C)) Rotational spinal manipulation [adjusting] fires upper cervical facet mechanoreceptors resulting in pain inhibition, muscle spasm inhibition, increase range of motion, and resolution of the neck-tongue syndrome.
- 11) These authors discuss manipulation as follows:
  - A)) "The neck is positioned to its limit of rotation and a short thrust is applied with an audible crack."
  - B)) "This crack is the result of cavitation in the apophyseal joints."
  - C)) "In the hands of an experienced clinician the procedure is usually painless and relatively safe."
- 12) These authors conclude:

**"We have been able to treat [neck-tongue syndrome] successfully with rotational manipulation of the cervical spine. We therefore suggest a short regimen of cervical manipulation for patients with neck-tongue syndrome before considering operative intervention."**



