A treatment approach for Headache and Cervical-Cranial Dysfunction

Trochlear nerve palsy: A Case-Based Clinical Tutorial

Background

Trochlear nerve palsy (fourth cranial nerve palsy) is an uncommon cranial neuropathy affecting the superior oblique muscle of the eye, typically presenting with diplopia, visual disturbance, and compensatory head positioning. Although the neurological deficit often resolves spontaneously, secondary musculoskeletal symptoms such as headache, cervical stiffness, and temporomandibular dysfunction may result and persist. The anatomical and neurological relationships between ocular motor control, the upper cervical spine, and suboccipital musculature suggest that cranio-cervical somatic dysfunction may contribute to symptom persistence.

Case Presentation

A 50-year-old female presented with progressive headaches, peri-orbital discomfort, temporomandibular joint (TMJ) tension, and suboccipital stiffness following medically diagnosed trochlear nerve palsy. The onset occurred suddenly during a period of acute psychological stress. Emergency investigations including CT and MRI imaging excluded central neurological pathology, and ophthalmological assessment confirmed isolated trochlear nerve palsy.

Osteopathic assessment revealed increased resting tone within the suboccipital musculature, tenderness around the greater occipital nerve, and reduced upper cervical mobility. Palpation suggested elevated sympathetic tone through the sternocleidomastoid and upper trapezius musculature, with associated tension across the cranio-cervical junction.

Intervention

Osteopathic management focused on reducing resting tissue tone and addressing functional relationships between the ocular and suboccipital musculature. Treatment included gentle suboccipital decompression, cervical soft tissue techniques, and an indirect muscle energy approach utilising guided ocular movement (“ocular pre-tone”). This technique aimed to influence neuromuscular activity between the extraocular muscles and suboccipital region and reduce potential tension through the Myo-dural bridge.

Outcome

Immediate reduction in headache and improved cervical mobility were reported following treatment. Over subsequent sessions, headache frequency and intensity decreased alongside reduced suboccipital muscle tension. Visual symptoms continued to improve in line with the expected neurological recovery trajectory.

Conclusion

This case highlights the potential role of osteopathic treatment in managing secondary cervico-cranial symptoms associated with trochlear nerve palsy. Addressing resting tissue tone and cranio-cervical neuromuscular relationships may support symptomatic relief during neurological recovery. The case forms the basis of a clinical tutorial demonstrating assessment of resting tone and a gentle ocular-assisted technique for reducing suboccipital tension.

Practical Technique - Ocular Pre-Tone Inhibition of the Suboccipital Muscles – potency of intention

Clinical Context

This technique was developed while treating headache and cervico-cranial tension associated with head and neck trauma. The approach focuses on subtly reducing hypertonicity in the suboccipital muscles through gentle manual inhibition combined with subtle ocular motor intention.

It is this “intention” practical, the goal is to appreciate the wonderous anatomical connections of the body and what subtle influence both of us as practitioners and our patients can elicit when harmonising together in a clinical setting.

It has potent connections to the autonomics, cranial nerves and dura

Patient Position

- Patient lies supine
- Bolster under knees to reduce dural tension
- Head fully supported
- Patient asked to relax and breathe slowly

Instruction to patient:
"Allow your body to rest and your head to feel heavy and supported in my hands."

Practitioner Position

Practitioner seated comfortably at the head of the table.

Hands form a modified vault / cradle hold:

- Occiput supported in palms
- Index & middle fingers resting around SCM
- Ring & little fingers contacting upper trapezius and posterior cervical muscles
- Fingertips gently approaching the suboccipital region near C2

Allow tissues to settle before intention of treatment.

Step 1 – Establish Resting Tone - neutral

Observe tone in:

- SCM
- Upper trapezius
- Posterior cervical muscles

SCM and traps are innervated by the posterior primary rami of C1-5 and the Accessory nerve (CN11). They have a first line response in the increased sympathetic tone, which engages these muscles as

Wait for tissue relaxation and neutral tone.

Step 2 – Localise Suboccipital Tension

Move fingertips slightly superior into the suboccipital triangle.

- Obliquus capitis inferior - ~242 spindles/g
- Obliquus capitis superior - ~190 s/g
- Rectus capitis posterior minor - ~98 s/g
- Rectus capitis posterior major - ~98 s/g

Step 3 – Ocular Pre-Tone Technique, using rotation

Patient keeps eyes closed and still.

Example: Right-side tension

1. Lightly contact suboccipital muscle
2. Ask patient:

"Without moving your eyes, imagine looking to the right." – this also gives the patient a subtle focus before disengaging.

3. Palpate subtle muscle activation- intention tone
4. Hold briefly (3–5 sec) 1-2 breaths
5. Allow patient to relax their intended gaze back to neutral

Repeat 3–4 cycles.

Step 4 – Extension Pre-Tone

To address rectus capitis posterior muscles:

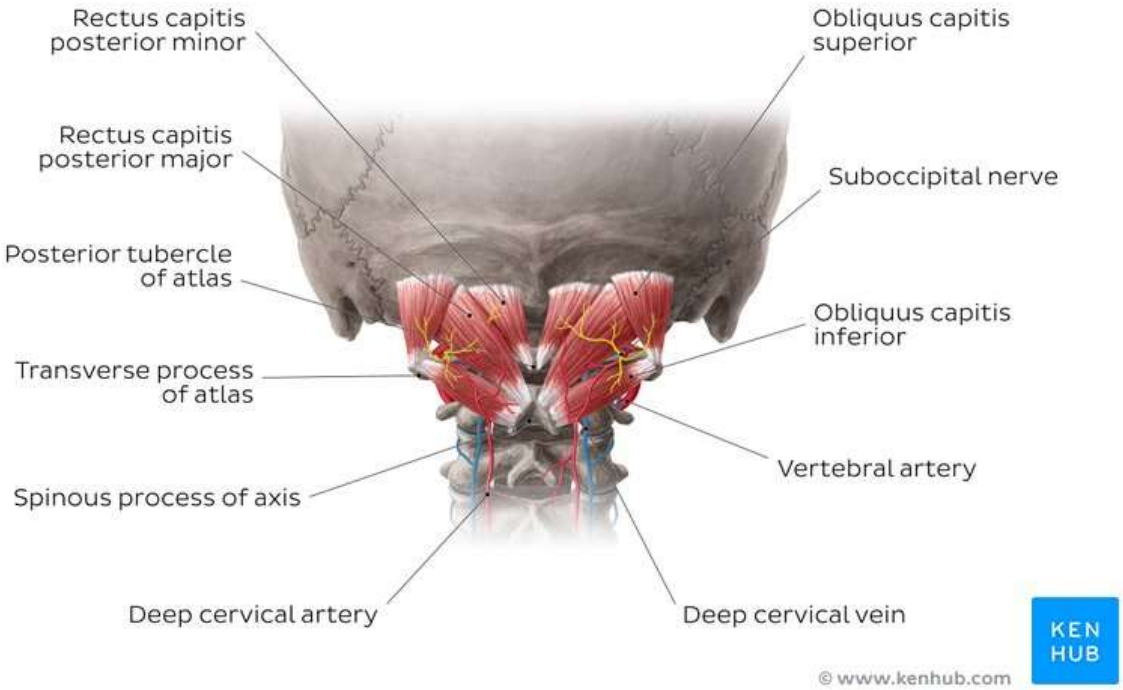
Instruction:
"With your eyes closed, imagine gently looking upward towards me." – the INTENTION

Palpate subtle contraction and allow relaxation.

Repeat 3–4 cycles.

Step 5 – rebalance – neutral

Return to the original hold and wait a few cycles, around 10 breaths allowing the patient to reach a deeper neutral. Let the Health do the rest of the work


Rectus capitis posterior minor
Obliquus capitis superior
Rectus capitis posterior major
Suboccipital nerve
Posterior tubercle of atlas
Obliquus capitis inferior
Transverse process of atlas
Vertebral artery
Spinous process of axis
Deep cervical artery
Deep cervical vein
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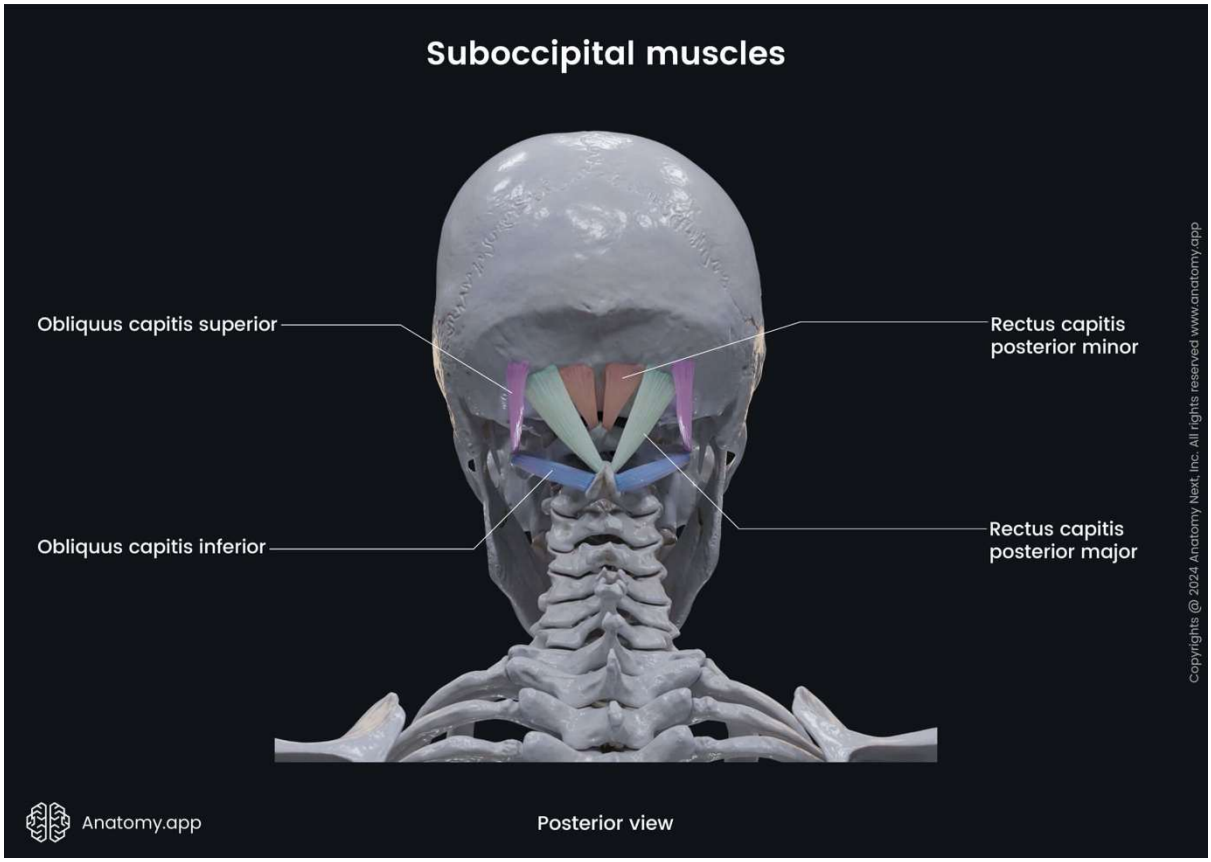
Suboccipital muscles
Obliquus capitis superior
Rectus capitis posterior minor
Obliquus capitis inferior
Rectus capitis posterior major
Anatomy.app
Posterior view
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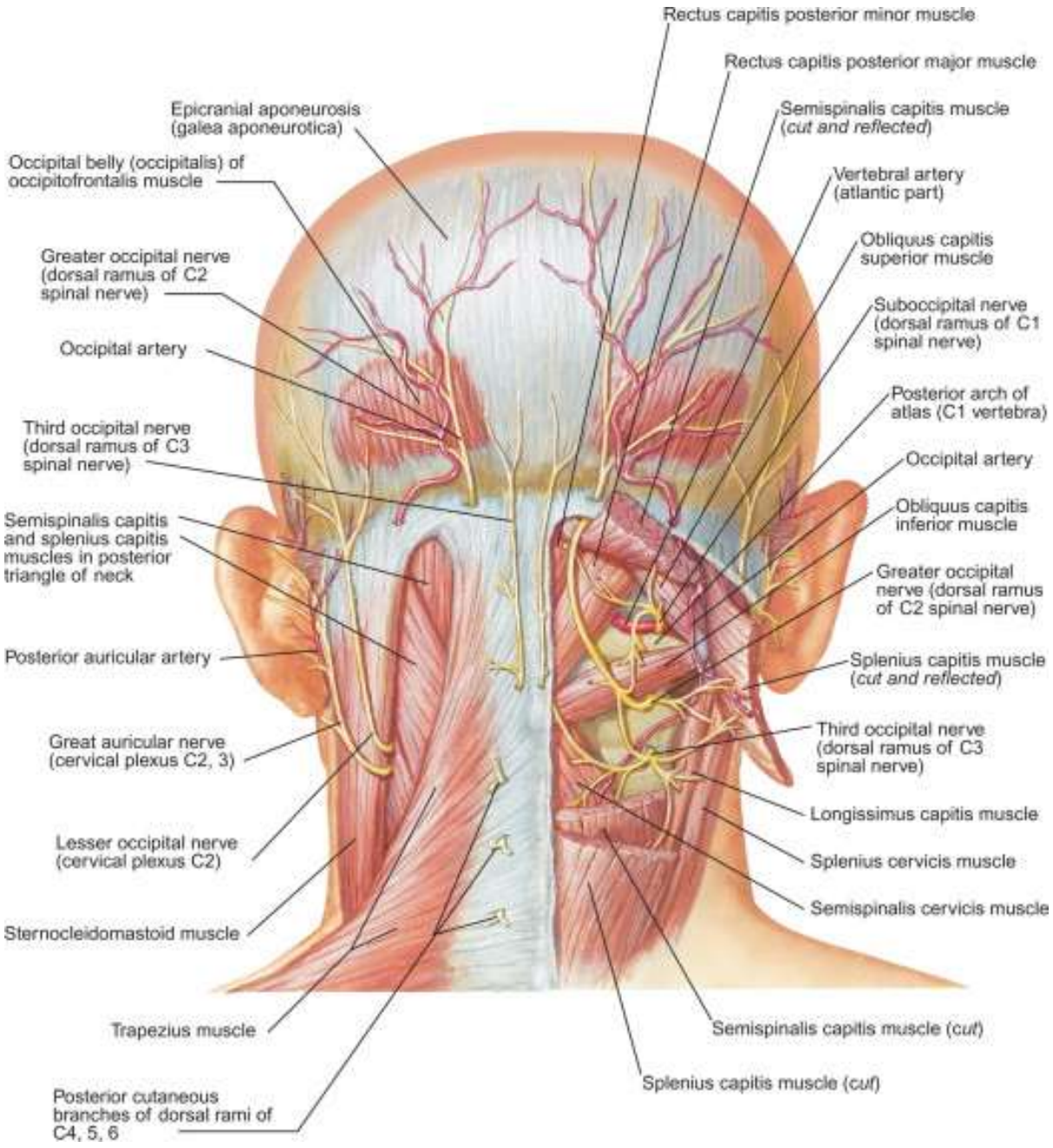
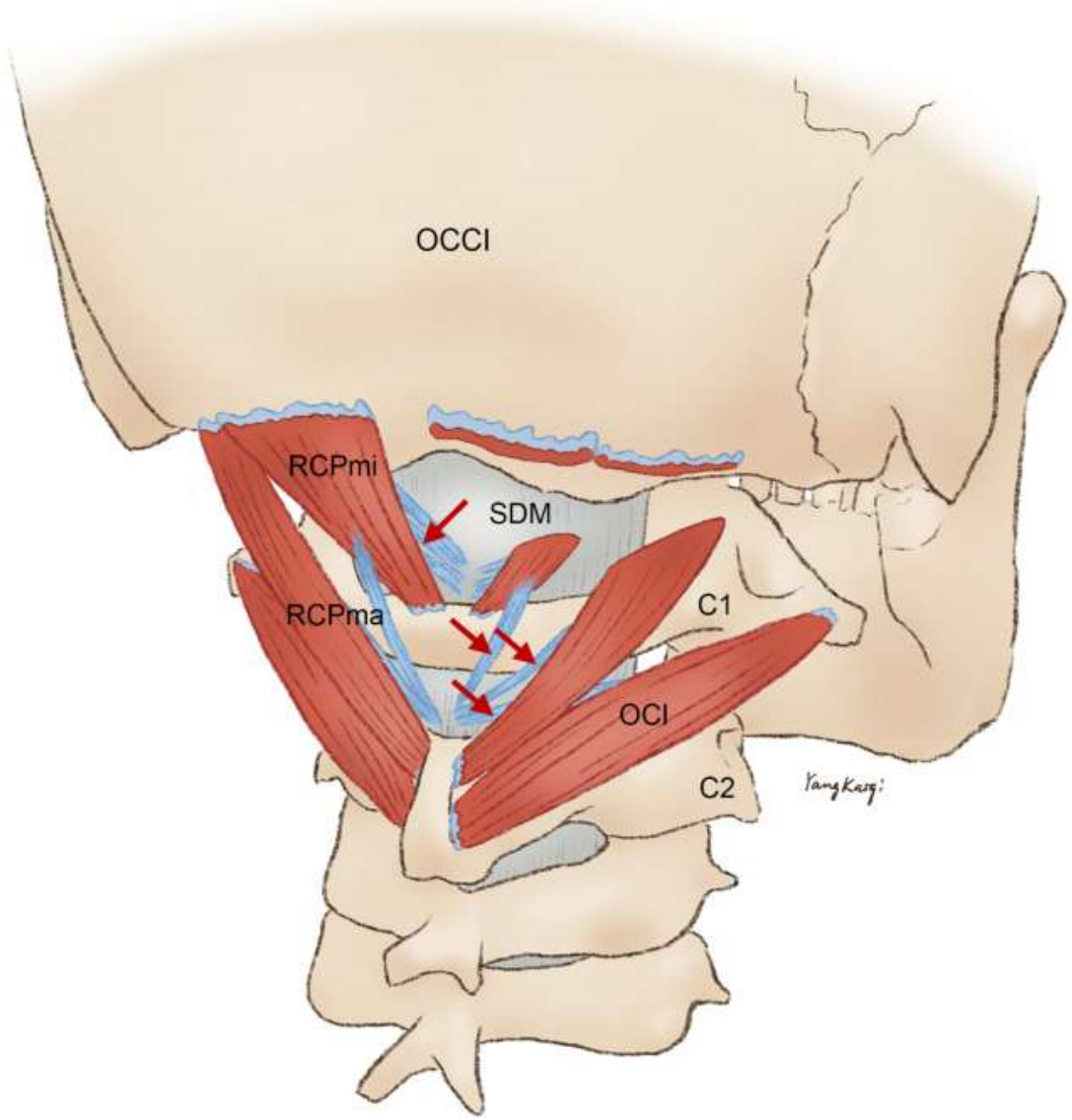
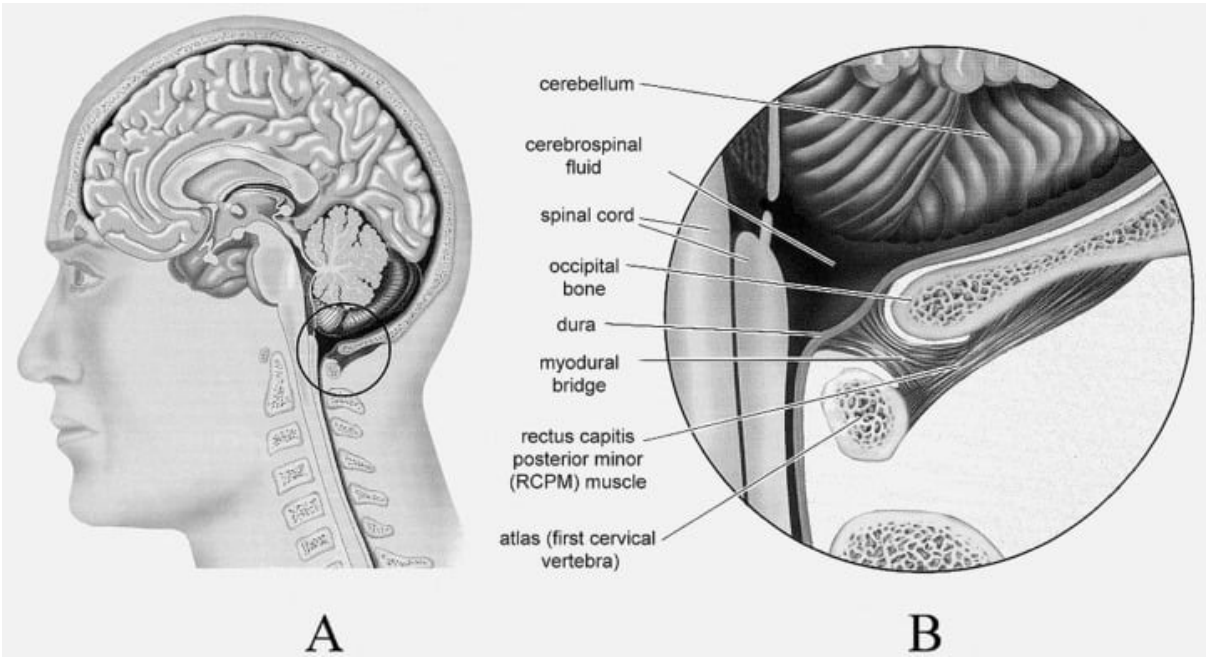

Rectus capitis posterior minor muscle
Rectus capitis posterior major muscle
Epicranial aponeurosis (galea aponeurotica)
Semispinalis capitis muscle (*cut and reflected*)
Occipital belly (occipitalis) of occipitofrontalis muscle
Vertebral artery (atlantic part)
Obliquus capitis superior muscle
Greater occipital nerve (dorsal ramus of C2 spinal nerve)
Suboccipital nerve (dorsal ramus of C1 spinal nerve)
Occipital artery
Posterior arch of atlas (C1 vertebra)
Third occipital nerve (dorsal ramus of C3 spinal nerve)
Occipital artery
Obliquus capitis inferior muscle
Semispinalis capitis and splenius capitis muscles in posterior triangle of neck
Greater occipital nerve (dorsal ramus of C2 spinal nerve)
Posterior auricular artery
Splenius capitis muscle (*cut and reflected*)
Great auricular nerve (cervical plexus C2, 3)
Third occipital nerve (dorsal ramus of C3 spinal nerve)
Longissimus capitis muscle
Lesser occipital nerve (cervical plexus C2)
Splenius cervicis muscle
Semispinalis cervicis muscle
Sternocleidomastoid muscle
Trapezius muscle
Semispinalis capitis muscle (*cut*)
Splenius capitis muscle (*cut*)
Posterior cutaneous branches of dorsal rami of C4, 5, 6


OCCI
RCPmi
SDM
RCPma
C1
OCI
C2


cerebellum
cerebrospinal fluid
spinal cord
occipital bone
dura
myodural bridge
rectus capitis posterior minor (RCPM) muscle
atlas (first cervical vertebra)
A
B