

Upper Cervical Ligament and Vertebral Artery Testing

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Knowing how and when to perform testing of the upper cervical ligaments and the vertebral artery is essential for the safety of the client. Damaged, disrupted, overstretched ligaments can lead to pathological pressure on the spinal cord. Certain treatment positions used by the manual therapist can result in injury to the spinal cord in the patient with upper cervical instability.

Positive tests of the ligaments will produce cord signs, which are observable changes related to nervous system physiology.

Cord Signs

- Bilateral, quadrilateral, or facial paresthesia
- Nystagmus; rhythmical oscillation of the eyeballs
- Sweating
- Nausea
- Vomiting
- Lump in the throat

Tectorial Membrane

- Continuous with the posterior longitudinal ligament
- Spans from the atlas to the occiput
- Limits flexion of the occiput on the atlas.

Test

1. Patient sits while therapist stands behind patient.
2. Therapist grips patient's head on either side with palms on the temporal/parietal area. Therapist's forearms are on patient's shoulders to hold them in place.
3. Therapist applies traction to patient's head and neck then nods head forward at the OA joint.

Transverse Ligament of the Atlas

Attached to the tubercles of the atlas on the posterior aspect of the anterior arch. This ligament holds the dens of the axis against the anterior arch of the atlas and prevents it from making contact with the spinal cord.

Test

1. Patient is supine.
2. Therapist sits at patient's head and contacts both tips of the transverse processes of C1 on the posterior aspect.
3. Therapist moves the transverse processes anteriorly (toward the ceiling).

Alar ligament

Attaches to the posterior lateral aspect of the dens and to the occiput. This ligament moves dens in the same direction of cervical spine sidebending.

Test

1. Patient is supine.
2. Therapist sits at patient's head. One hand palpates the spinous process of C2 and the other hand holds the top of the patient's head.
3. The therapist adds slight compression and then side bending at the OA joint.
4. The C2 spinous process should move away from the side of side bending within the first 15 degrees of side bending. Toward the therapist's hand palpating the C2 spinous process.

Atlanto-axial ligament

Attached to the dens lateral to the alar ligament. Restricts rotation at the AA joint.

Test

1. Patient is supine.
2. Therapist hand position is the same as for the alar ligament test.
3. Instead of side bending the therapist rotates the head and again the C2 spinous process should move away from the direction of rotation.

Vertebral artery

The vertebral artery passes through the transverse foramina of the cervical vertebrae. Rotation of the cervical spine can occlude this artery. Testing of the vertebral artery is controversial and there are various test procedures. Some authorities recommend testing before and after every cervical technique. Most recommend testing before the intervention is sufficient.

Test

1. Patient is sitting.
- The therapist guides the patient's head and neck into the following motion:
2. Extension for 10 seconds and then released for 10 seconds.
 3. Rotation to the right for 10 seconds and then released for 10 seconds.
 4. Rotation to the left for 10 seconds and then released for 10 seconds.
 5. Combined right rotation and extension for 10 seconds and the released for 10 seconds.
 6. Combined left rotation and extension for 10 seconds and the released for 10 seconds.

Positive vertebral artery test will produce the the "5 D signs":

1. Diplopia, double vision
2. Dizziness
3. Drop attacks, falling as in fainting without the loss of consciousness
4. Dysarthria, difficulty with speaking
5. Dysphagia, difficulty swallowing
6. Nystagmus, rhythmical oscillation of the eyeballs
7. Nausea, vomiting.