

The Vertebral Artery Test

Adapted with permission from material created by
Euson Yeung

Department of Physical Therapy
University of Toronto

Underlying principles

Detection of **Cervical Artery Insufficiency (CAI)** is based on two inter-related principles:

- The underlying pathology (including atherosclerosis) may predispose a vessel to dissection
- Mechanical forces are generated on the cervical arterial system as a result of (neck) movement or biomechanics

What is the Vertebral Artery Test?

The vertebral artery test consists of Subjective & Objective components:

- The **subjective** component consists of specific questions that helps the clinician determine the presence of CAI
- The **objective** component is a provocation screening tool aimed at assessing the integrity and function of the vertebral arteries

The goal of the vertebral artery test is to provoke symptoms of CAI by progressively increasing stress/altering blood flow on the vertebral artery through sustained cervical movements

Vertebral Artery Test

When to use this test:

- Patient reports dizziness and/or neck pain in subjective history (clinician needs to determine if symptoms are from CAI)
- To assess risk of CAI prior to applying mobilization or manipulation techniques to the cervical spine
- As patient's cervical ROM increases, the clinician needs to re-determine risk of CAI. Therefore, test needs to be repeated as ROM improves

Vertebral Artery Test: part 1

SUBJECTIVE component

- History taking is the most important component of the Vertebral Artery Test
- Subjective questioning must be thorough and specific
- Clinicians must include questions about:
 - The 5 D's and 3 N's
 - The RISK FACTORS for **Arterial Disease** & **Stroke** in order to determine appropriateness of vertebral artery testing

Risk Factors for Arterial Intimal Damage & Stroke

Risk factors to consider in subjective assessment:

- Hypertension (BP>140/90)
- High blood cholesterol level
- Diabetes
- Smoking
- Family history of
 - MI/CVA/PVD/TIA/Angina
- BMI > 30
- Men>women
- Older than 65 years
- Repeated/recent 'injury' (whiplash, manip, mob, exs)
- Ethnicity: Hispanic, African, First Nations/Aboriginal Peoples, South Asian
- Hormone Replacement Therapy
- Drug abuse
- High alcohol consumption
- Upper cervical instability
- Inactive lifestyle

** This is not an exhaustive list.*

Vertebral Artery Test: part 2

OBJECTIVE component

1. Prior to conducting the Vertebral Artery Test, the clinician must determine the integrity of the upper cervical region:
 - Cranial Nerves function (baseline): * remember the 'typical' ischemic presentation of VBI
 - Stability of the upper cervical region
- ** This will ensure that it is safe to proceed with the Vertebral Artery test

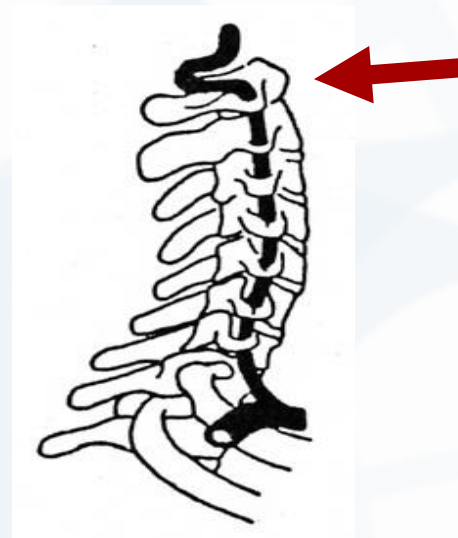
Assessment of Cranial Nerve Function

- **Purpose:** identifies specific cranial nerve dysfunction resulting from vessel compromise
 - Recall the ischaemic signs and symptoms of vertebral artery dissection
 - Recall the non-ischaemic signs and symptoms of internal carotid artery dissection
- **Testing Procedure:** see next slide

Cranial Nerve	Function	Test
I. Olfactory	Smell	Identify odors
II. Optic	Vision	Peripheral vision with 1 eye covered
III. Oculomotor	Eye movt, pupil reaction	Peripheral vision, reaction to light
IV. Trochlear	Eye movement	Ability to depress/adduct eye
V. Trigeminal	Face sensation/mastica'n	Face sensation, clench teeth
VI. Abducens	Eye movement	Abduct eye past midline
VII. Facial	Facial muscles, taste	Close eyes, smile; detect sweet, sour, salty, bitter
VIII. Vestibulocochlear	Hearing & balance	Hearing, feet together, eyes open/closed
IX. Glossopharyngeal	Swallow, voice, gag	Swallow, say 'ahh', elicit gag reflex (tongue depressor)
X. Vagus	Swallow, voice, gag	As per Cr. IX
XI. Spinal Accessory	SCM, trapezius	Rot/SF neck; shrug shoulders
XII. Hypoglossal	Tongue movement	Protrude tongue (? Lat. Deviation)

Assessment of Upper Cervical Stability

- This must be performed prior to vertebral artery testing
- We will review how to assess the integrity of the Alar ligament and Transverse ligament in lab



Vertebral Artery Test: part 2

OBJECTIVE component (con't)

2. Test Procedure: the sequence of the following test movements progressively increase provocation on vertebral artery:
 - i. **Active** cervical Rotation (to one side then to other side)
 - ii. **Active** Cervical Extension
 - iii. **Active** Cervical Rotation-extension combined
 - iv. Repeat the above cervical test positions **passively**

Vertebral Artery Test: part 2

OBJECTIVE component (con't)

- Sustain each of the above test positions for a minimum of 10 seconds (as per Australian guidelines)
- Allow for rest period of 10 seconds between test movements
- At a minimum, the following movements should be tested to clear the patient of CAI:
 - sustained (L) & (R) rotation
 - the position that provoke the patient's symptoms

Monitoring of Patient During Assessment

- Throughout the assessment, the patient's signs & symptoms must be closely monitored
- Educate the patient on what is to be expected (normal) post treatment and what is abnormal. For example, acute post treatment pain/headache which is *worsening*, OR any *deteriorating symptoms*

Monitoring of Patient During Assessment

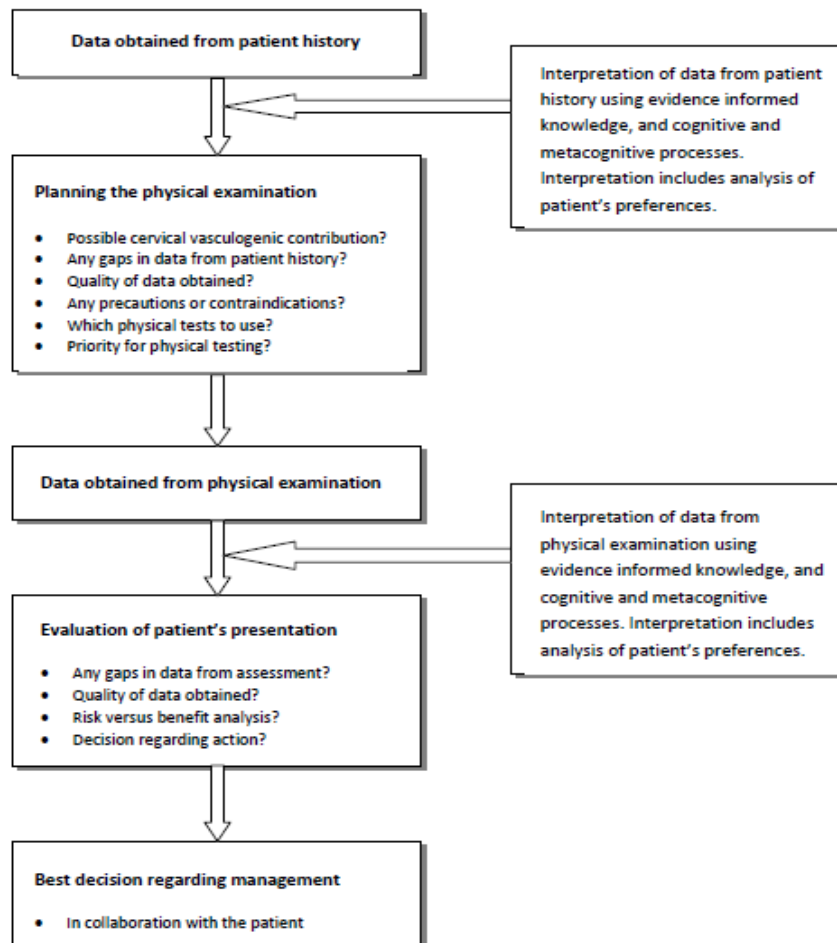
- If sign & symptoms of arterial injury are present the Physical Therapist needs to determine whether urgency vs emergency care is required and make appropriate referral
- In situations of urgency, providing the patient with supporting documentation of your findings and suspicions can be helpful to the receiving Health Care Professional

Best Practice: CAD Screening

The clinical practice guidelines below will serve as references for how the vertebral artery test should be employed:

- [Australian Physiotherapy Association guidelines for assessing Vertebrobasilar Insufficiency](#)
- [Manipulation Association of Chartered Physiotherapists CAD Review Document](#)
- International Federation of Orthopaedic Manipulative Physical Therapy (IFOMPT) Document on the Examination of the Cervical Region

International Framework for Examination of the Cervical Region



Self-Check

1. Jamie presents to your clinic with neck pain and stiffness, but denies any of the symptoms of vertebral artery compromise. Why is it still important to perform the vertebral artery test?

Self-Check

2. You are conducting the vertebral artery test and your patient suddenly reports numbness and weakness in the face, arm and leg. What should you do?

Answers to Self-Check

1. We always perform the VA test in anyone presenting with neck pain because:
 - We don't know if there are any predisposing factors to VA compromise ie- osteophytes, atherosclerosis etc.
 - We need to do our best to clear this if we will be performing any manual therapy techniques on the neck
 - It is considered best practice to do so... safety first

Answers to Self-Check

2. Stabilize the neck, call 911, continue to monitor patient for any change in symptoms and reassure patient. Send a note documenting your findings with the client. Document all assessment techniques and findings appropriately. Follow up with the patient within 24 hours.