CONCUSSION LAB™

EXAMINATION OF THE CERVICAL REGION

Potential of Vascular Pathologies of the Neck Following a Concussion

IFOMPT Framework

CONCUSSION LAB™

IMPORTANCE OF EXAMINING POTENTIAL VASCULAR PATHOLOGIES OF THE NECK

- Range of potential vascular pathologies of arterial system in neck, which supplies blood to the brain
- Vascular pathologies are ***rare*** but ***relevant*** to physiotherapists (PT) and healthcare providers (HCP) treating musculoskeletal conditions
- Vascular pathologies can potentially present as musculoskeletal pain & dysfunction

PRIORITY FOR PT DURING EXAMINATION

1. *Do No Harm*
2. *Clinical Reasoning & Differential Diagnosis*
   - HCPs cannot rely on results of **one** test to draw conclusions
   - Clinical decision-making process must be based on patient's full presentation throughout cervical evaluation and management
     - *"Patient Centered"* practice involves patient's preferences and individual clinical presentation

CONCUSSION LAB™

RANGE OF VASCULAR PATHOLOGIES OF THE NECK

Structure/site	Pathology	Symptoms/Presentation
Carotid artery	Atherosclerosis Stenotic Thrombotic Aneurysmal	Carotidynia[3], neck pain, facial pain, headache, cranial nerve dysfunction, Horner's Syndrome, transient ischaemic attack (TIA), stroke
Carotid artery	Hypoplasia	Commonly silent, rare cerebral ischaemia
Carotid artery	Dissection	Neck pain, facial pain, headache, TIA, cranial nerve palsies, Horner's syndrome
Vertebral artery	Atherosclerosis	Neck pain, occipital headache, possible transient ischaemic attack (TIA), stroke
Vertebral artery	Hypoplasia	Commonly silent, rare cerebral ischaemia
Vertebral artery	Dissection	Neck pain, occipital headache, TIA, cranial nerve palsy
Temporal artery	Giant cell arteritis	Temporal pain (headache), scalp tenderness, jaw and tongue claudication, visual symptoms (diplopia or vision loss – may be permanent)
Cerebral vessels	Reversible cerebral vasoconstriction syndrome (RCVS)	Severe 'thunderclap' headaches
Subarachnoid	Heamorrage	Sudden severe headache, stiff neck, visual disturbance, photophobia, slurred speech, sickness, unilateral weakness,
Jugular vein	Thrombosis	Neck pain, headaches, fever, swelling around neck/angle of jaw
Any cervico-cranial vessel	Vascular anomaly or malformation	Possible headache/neck pain i.e. un-ruptured carotid aneurysm

IFOMPT CERVICAL FRAMEWORK

- *IFOMPT Framework* is *best practice* & *evidence-based*
- Should be conducted prior to orthopaedic manual therapy (OMT) intervention including ***mobilisation, manipulation, & exercise***
  - **Mobilisation:** a passive articulatory movement applied to a single joint or joints in close proximity to each other with the intent to restore optimal motion, function, and/or reduce pain
  - **Manipulation**: a passive, high velocity, low amplitude thrust applied to a joint complex within its anatomical limit with the intent to restore optimal motion, function, and/or reduce pain
- *Goal*: relieve pain & optimise the patient's functional ability

KEY CHANGES TO IFOMPT CERVICAL FRAMEWORK FROM 2012:

- Removal of ***provocative, positional*** testing (frequently used in practice to provide challenge to vascular supply to the brain and monitor for signs of cerebrovascular ischaemia)
- Predictive ability for positional testing to identify at risk individual is lacking, therefore it is <u>not recommended</u>

CONCUSSION LAB™

PATIENT HISTORY
(Subjective Exam)

Is there any:

- Predisposition of vascular pathologies of the neck?
- Presence of frank vascular pathologies of the neck?

Clinical Presentation of Vascular Event

- Headache
- Neck Pain
- Visual disturbance
- Dizziness
- Paraesthesia (upper limb, lower limb, face)

Observation during Patient History

- Gait Disturbances
- Subtle signs of disequilibrium
- Upper motor neuron signs
- Cranial nerve dysfunction
- Behavior suggestive of upper cervical instability (anxiety, supporting head/neck)

***A high index of suspicion must be taken in cases of acute onset neck/head pain described as "unlike any other".**

CONCUSSION LAB

PATIENT HISTORY
(Subjective Exam)

Risk Factors for Vertebrobasilar & Internal Carotid Artery Pathologies *(dissection & non-dissection)*

- Recent trauma (mild-moderate, which may include recent OMT)
- Vascular anomaly
- Current or past smoker
- Migraine
- High Cholesterol
- Recent Infection
- Hypertension
- Oral contraception
- Family history of stroke

Important to not that an **absence of risk factors does not rule out the risk of a serious, spontaneous neuro-vascular event*

Signs of VBA or ICA Dissection

- Unsteadiness/ataxia
- Dysphasia/dysarthria/aphasia
- Weakness (upper & lower limb)
- Nausea/ vomiting
- Ptosis
- Facial palsy
- Drowsiness
- Loss of consciousness
- Confusion
- Dysphagia

CONCUSSION LAB™

PHYSICAL EXAMINATION
(Objective Exam)

BEFORE BEGINNING THE PHYSICAL EXAMINATION:

- Based on the information collected so far, the HCP needs to decide:
  - If there are any precautions to OMT?
  - If there are any contraindications to OMT?
  - What is the priority of these physical tests for this specific patient? Determine order of testing.
  - What physical tests need to be included or excluded in the physical examination, with consideration of any risks associated with performing the tests? Are there any necessary modifications?

    - *Caution regarding risk positions of head/neck: **rotation, extension** and **end of range** movements
      - Movements stress the cervical arteries and potentially neural structures
      - Caution in these positions and avoidance of end-range positions are recommended during diagnostic and ROM testing

- Results of the history and physical exam help identify if a *medical referral* is needed for further investigation or if it is safe to proceed with physical therapy management

CONCUSSION LAB

PHYSICAL EXAMINATION
(Objective Exam)

- Diagnostic utility of many of the recommended tests are *lacking*
- Recommended tests below are considered to have moderate to good utility in supporting further investigation

BLOOD PRESSURE (BP)

- To asses for risk of stroke, particularly from carotid origin
- To assess for acute arterial trauma in situ

Interpretation:

- An increase in BP may be related to acute arterial trauma (of the internal carotid and vertebral arteries)
- Positive correlation between increased systolic & diastolic pressure & risk of stroke

Referral:

- Patients with hypertension that have not been previously identified should be advised to discuss the implications with their primary care provider

CONCUSSION LAB™

PHYSICAL EXAMINATION
(Objective Exam)

NEUROLOGICAL EXAMINATION

- Upper Motor Neuron (UMN)
- *Cranial nerves* (CNs)
- Peripheral nerves

- Visit http://www.neuroexam.com/neuroexam/ for details
- Absence of clinical findings in these examinations does not rule out an underlying pathology or impending dissection, and should be viewed with caution

EXAMINATION OF CAROTID ARTERY

- Palpation
- Auscultation
  - Alteration of pulse is a feature of internal carotid disease
    - Asymmetry between left and right vessels is considered significant
    - A pulsatile, expandable mass is indicative of arterial aneurysm
    - A bruit on auscultation (controlling for normal turbulence) is indicative of a significant finding

- Examination of the vertebral arteries is not able to provide meaningful information due to the small diameter of the vessels and their relatively inaccessible anatomy.
- It is possible for dissections and disease of the carotid arteries to exist in the absence of aneurysm formation, therefore a negative finding should not be used to refute the hypothesis of arterial dysfunction.

CONCUSSION LAB™

REFERRAL FOR IMMEDIATE MEDICAL INVESTIGATION

- *Clinical decision* is made in absence of certainty and a decision should be based on a balance of probabilities.
  - When in doubt, the PT should consider not intervening.
  - Based on *clinical suspicion*.
- No standardised clinical guidelines for medical diagnostic work-up.
- Recommended that the PT follows *local policy* in referring for further investigation.
- Conventionally work-up consists of:
  - *Duplex ultrasound*
  - *Magnetic resonance imaging/arteriography*
  - *Computed tomography*
- In the event of an emergency situation or adverse reaction, the PT should immediately implement a plan of action.
  - If the patient becomes *unresponsive* → PT must implement an *emergency action plan* for *cardiopulmonary resuscitation*; initiate local procedure ie. *immediately call an ambulance*.