Whiplash and Cervical Spine Disorders: Evaluation and Management

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Definition by Quebec Task Force

“an acceleration-deceleration mechanism of energy transfer to the neck which may result from rear-end or side impact, predominately in motor vehicle accidents and from other mishaps. Energy transfers may result in bony or soft tissue injuries which may in turn lead to a wide variety of clinical manifestations”

Pain Generators

Rim Lesions, Endplate avulsions, Tears of the anterior longitudinal ligament, Uncinate process, Articular subchondral fractures, Articular pillar, Articular process, Ligament Tear

**Facet injury very important. Radiofrequency neurotomy very successful treatment

Greater occipital nerve: Nerve block

Quebec Task Force

Concluded that the scientific evidence regarding whiplash was "sparse and generally of unacceptable quality"

I: Neck complaint of pain, stiffness or tenderness only-No physical sign(s)

II: Neck complaint and musculoskeletal sign(s)- reduced ROM and point tenderness

III: Neck complaint and neurological sign(s)- loss/diminished deep tendon reflexes, objective muscle weakness, sensory loss

IV: Neck complaint and fracture or dislocation (is this really considered whiplash?)

Symptoms

Neck pain and stiffness

Headache (can be most disabling symptom)

Botox has evolving role. Approved for prevention of chronic daily migraine (over 15 headache days per month)

Shoulder pain and stiffness

Vertigo
Fatigue

TMJ symptoms

Arm pain

Paresthesias

Visual disturbances

**Myofascial Pain Syndrome** (a talk on it’s own!)

- Large group of common painful muscle disorders
- Syndrome of pain, muscle spasm, tenderness, stiffness, decreased ROM, weakness and occasional autonomic dysfunction
- Characterized by trigger points, taut bands and local twitch response
- Trigger point injections with local anesthetic very useful
- Dry needling such as effective, but a bit more painful
- No role for injecting Botox or steroids

**Investigations:**

- None often needed
- In acute injury follow Canadian C spine rules
- Generally not possible to make diagnosis in acute phase even with expensive modalities
- X-rays normal or slight flattening of normal lordotic curve (no prognostic value)
- Bone scan useful to rule out pathology and to plan interventional procedures (but “cold” bone scan does not prevent trial of medial branch block/radiofrequency neurotomy
- MRI of brain and neck normal
- EMG/Nerve conduction studies
  - The only functional test of nerve root
  - Rule out other causes of numbness and tingling ie CTS
Where’s the Science?

- Studies before 1980 are methodologically very poor; unfortunately this is where we get the foundations for our ideas on whiplash
- Animal models in which we base much of our knowledge of pathophysiology are flawed. Monkeys hurtled at great speeds with brain and spinal cord hemorrhages/contusion, often in coma for several hours
- Cochrane review 2007: insufficient evidence to assess effectiveness of commonly used medications or home exercise programs for the treatment of acute neck pain. Evidence for spinal manipulation is similarly limited

**Bottom line**

- Evidence for methylpredniolone IV infusion (1 study)
- Evidence for trigger point injections with lidocaine (not Botox)
- Some evidence for epidural steroid injections in those with arm pain
- Very little studies to look at medications
  - Questionable evidence for flexeril or benzos or NSAIDs
  - No other good medication studies
  - We have lots of good studies for low back pain for TCA’s, opioids, antiepileptics. Can we apply this research to the neck?

**Largest review of Literature for Treatment of WAD: Teasell 2010**

- The therapies that have been advocated for patients with WAD are quite diverse, which likely reflects several factors including the variable nature of WAD, our incomplete understanding of the disorder and the absence of any one treatment distinguishing itself as the most effective... While several conclusions were reached in the present review, there is a lack of research investigating the efficacy of interventions for patients at any stage on the WAD continuum. Clearly, further research is needed to determine which treatments are most effective at reducing the disabling symptoms associated with WAD.”
Treatment for Acute Whiplash

- Exercise programs, active mobilization, advice to act as usual improve recovery
- Limited evidence for
  - Pulsed electromagnetic field therapy
  - Methylprednisolone infusion
- Evidence does not support
  - Education
  - Laser acupuncture

Immobilization with soft collars may actually impede recovery

In general, “the longer the delay between injury and the commencement of therapy, the greater the risk that patients will go on to develop chronic symptoms.”

Treatment for Chronic Whiplash

- Exercise programs
- Interdisciplinary Interventions
  - Especially CBT
- Limited evidence for
  - Manual joint manipulation
  - Myofeedback training
- No evidence for “alternative” therapies (Gestalt, Rosen bodywork, and craniosacral)
- Australia guidelines: no evidence cervical pillow

Medications:

- Tricyclic antidepressants
- SNRIs
- Gabapentin
Pregabalin

- Well designed trials for neck pain are lacking and the literature is more robust for neuropathic pain states
- I don’t see role of Baclofen: This is for central spasticity ie post stroke

**Interventional Procedures**

- Strong evidence for Radiofrequency Neurotomy (we have some incredible interventional radiologists in Victoria)
  - Temporary relief only
  - Denature nerves involved in chronic pain of whiplash
  - McDonald Neurosurgery 1999
  - 28 patients
  - 71% reported long term complete relief of their pain
  - Median duration of pain relief of successful cases was 422 days
- No role for intra articular steroid injections
- Conflicting evidence for BTXA

**Role of Exercise**

- Spinal manipulation therapy more effective than medication in short and long term
- Home exercise program equivalent to spinal manipulation
- Gentle stretches, neck flexor strengthening
- Evidence that aggressive strengthening can be detrimental

**Australia Guidelines 2008 (found on MD Consult) ** Fantastic resource

- History:
- Psychological coping
  - Self Efficacy Scale or Coping strategies questionnaire
- Routine measure of pain intensity
Visual analogue score

>7/10 poor prognostic sign

Measure of disability

Neck Disability Index

>40 poor outcome

**Physical Exam**

- Posture
- Palpation of neck
- Neuro exam (strength, sensation, reflexes)
- Co-morbid injuries
- Psychological state
- Extras...
  - Cervical flexor muscle control
  - Widespread sensory hypersensitivity, especially sensitivity to cold

**Prognostic factors**

- Poor if initial VAS >7/10 or NDI >40
- On going pain
- Poor education
- Psychological factors (tested via SES or CSQ)
  - Low self efficacy
  - Catastrophizing
  - Anxiety
- No radiological factors help predict
- Regular review and earlier referral to specialist
Cognitive Behavioural Therapy (treat all aspects of Pain)

My opinion

Goal is to work towards an ACTIVE rehab program

No reliance on passive therapies (acute pain control to let you do the work)

IMS, trigger point injections

Aerobic exercise

Core stability

Pool therapy

Multidisciplinary rehab
**Key References**

- Peloso et al Medicinal and injection therapies for mechanical neck disorders. Cochrane Database 2007
- Whiplash and Other Useful Illness Andrew Malleson
- State of the Art Reviews Spine May 1998
- Australia Guidelines to Whiplash 2008 from MD Consult
**DAY 1**

- **Reassess patient** (see page 13)
  Include Visual Analogue Scale (VAS) and Neck Disability Index (NDI) questionnaires. [Grade A]

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**7 DAYS**

- **Improving**
  Continue recommended treatments.

- **Not improving**
  Review treatment regime. Other treatments not initially recommended may be considered.

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**3 WEEKS**

- **Reassess patient** (see page 13)
  Include the VAS and NDI. May include a more complex assessment such as a measure of psychological distress and/or assessment of cold sensitivity. [Grade A]

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**3 MONTHS**

- **Resolution expected**
  (approximately 50% of cases)
  Discharge from care. If patient still improving, continue treatment, but promote independence and active exercise. [Grade A] (see page 14)

- **Not resolving**
  Follow recommendation from specialists. Ensure coordinated care. **Follow chronic WAD pathway.** (see page 15)

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**Resolved**

- VAS <3/10
- NDI <3/10 – cease treatment

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**Resolved**

- VAS <3/10
- NDI <3/10 – cease treatment
History and physical examination (see text page 19 for details)

- Date of birth, gender, education level
- Prior medical history, general medical condition, and pre-existing psychological conditions
- Circumstances of, and time since, injury (these details inform the use of Canadian C-Spine Rule)
- Symptoms including stiffness, numbness, weakness, localisation (include onset of symptoms)
- Prior history of whiplash symptoms, neck injury or pain, or chronic pain symptoms
- Self-rated injury severity
- Observation of head position and posture
- Palpation for tenderness in the neck region
- Cervical range of motion
- Neurological testing of sensation, reflexes and muscle strength
- Assess associated injuries and co-morbidities

Baseline assessment
- Disability level using self report instrument (NDI)
- Pain intensity using a visual analogue scale (VAS)

Apply Canadian C-Spine Rule [Grade B]
Determine if X-ray is required (see page 21)

No X-ray required
- No Fracture
- Classify as WAD Grade I-III
- Identify poor prognostic indicators [Grade A]
  - High initial disability (NDI > 40/100)
  - High initial pain scores (VAS > 7/10)
  - Education level
  - Low self-efficacy
  - Cold sensitivity

X-ray required
- Fracture
- WAD IV
- Refer immediately for specialist management (ie, emergency physician, neurosurgeon, orthopaedic surgeon)

Initial management

1. Provide reassurance, advice and education material, including advice to ‘act as usual’ (Refer Appendix 5) [Grade B]
2. Prescribe appropriate neck strengthening exercises (Refer Appendix 6) [Grade A]
3. Provide advice regarding appropriate analgesia coverage

Good practice point

Adopt a positive and supportive approach. Acknowledge that the patient has been hurt and has symptoms. Advise that:
- symptoms are a normal reaction to being hurt
- maintaining as many pre-injury activities as possible is an important factor in getting better
- staying active, and undertaking light activity is important in the recovery process
- voluntary restriction of activity may lead to delayed recovery
- it is important to focus on improvements in function.

Remain mindful that psycho-social and other health and non-health issues may impact on recovery.
**History and physical examination**

(see text page 19 for details)

Complete a full initial assessment (see Figure 1) where patient presents for the first time in the chronic phase

**OR**

Where patient has progressed through the acute phase and requires ongoing treatment, reassessment using the NDI, VAS and measures of psychological functioning (such as the Self Efficacy Scale or K10) should be undertaken where appropriate.

Specialised assessment (ie, motor assessment, joint position error, hypersensitivity, psychological distress, and range of motion) should be considered where these have not already been conducted.

Assess functional abilities (for instance, in the home and/or at work) and general conditioning.

Additional radiological investigations are not routinely recommended. In a small percentage of cases diagnosis and the need for further investigations may need to be reconsidered.

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**Classify as WAD Grade I-III**

**Identify poor prognostic indicators**

[Grade A]

- NDI > 30/100
- Pain VAS > 7/10
- Education level
- Low self-efficacy (i.e. using the SES)
- Catastrophising (i.e. using the CSQ)
- Cold sensitivity

**Treatments that should NOT be undertaken**

- Collar immobilisation [Grade A]
- Prescribed rest ✗
- Intra-articular injections ✗
- Analgesic injections ✗

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1. Provide a clear explanatory model for symptoms.

2. Provide reassurance, education and advice to return to normal activities. (Refer Appendix 5) [Grade B]

3. Set obtainable yet challenging goals.

4. Prescribe appropriate exercises (based on functional deficits) involving functional exercises, range of motion exercises, strengthening of neck and scapular muscles, specific strengthening of deep neck flexors. (Refer Appendix 6) [Grade A]

5. Coordinate specialist referrals as necessary.