Whiplash Associated Disorder: The pathway from acute to chronic pain
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Learning Objectives
• Able to demonstrate:
  • Clinical plan to evaluate a post-traumatic, whiplash type injury
  • Appropriate interview process to commence differential diagnosis process
  • Appropriate evaluation process to rule in and rule out diagnoses
  • A differential diagnosis that includes a working diagnosis
  • A continuum of diagnosis as patient progresses with care
  • Therapeutic recommendations
  • Prognosis

Diagnosis is the key to successful treatment!
Richard C. Ackerman, DC, FACO
Patient Presentation

- 23 year-old female, self-employed lawyer with two associates
- She is properly insured with disability, health insurance and med-pay
- Rear-ended 7 days prior to initial encounter in your office
- Denies prior neck injuries or neck pain
- Chief concern of neck stiffness and aching in the lower cervical and upper thoracic spine
- Able to work but distracted because of aching discomfort later in the work day

How Do You Determine the Prognosis with this Whiplash Type Injury?

How Do You Grade this Injury?
Is the Whiplash Type Injury in a Chronic or Acute State?

How Do You Determine if the Patient Will Develop a Chronic Pain Condition?

Differential Diagnosis Process

- Intake form with pertinent data regarding injury
- Medical records from ER or other providers
- Patient interview or history taking
  - Create list of potential diagnoses
- Physical examination
  - Rule-in and rule-out diagnoses
- Working diagnosis(es)
Pathoanatomical Lesions in the Whiplash Injury

1. Cervical Facet joints (Zygapophyseal Joints)
2. Dorsal Root Ganglion (DRG) and Nerve Roots
3. Cervical Ligaments
4. Intervertebral Disc Injuries
5. Muscle Injuries
6. Fractures

Whiplash Injury Symptoms

- Pain,
- dizziness,
- visual and auditory disturbances,
- temporomandibular joint dysfunction,
- photophobia,
- dysphonia,
- dysphagia,
- fatigue,
- cognitive difficulties such as concentration and memory loss, anxiety, insomnia, and depression

Diagnosis and prognosis are the keys to successful treatment of whiplash associated disorder.
Subjective Data

- Elicit a patient history and record the subjective findings in order to list potential diagnoses and use objective testing to rule-in and rule-out potential conditions.

Post-Whiplash Type Injury Interview

- Intake form to cover all injury data (MVI, Slip and fall, lifting, etc.), past medical history, etc.
- Medical records including ER
- Focused L-T acronym
- Chief concern
- Open-end questions
- Closed-end questions

Focused Interview or History Taking Process

- Location of pain/injury
- Mechanism of injury
- New injury/condition
- Old injury/condition
- Palliative/Provocative
- Quality of pain
- Radiations/Referred pain
- Severity
- Timing and Treatment
Subjective Data

Identify the Pain Generating Tissue

- Location of pain
- Use finger point test
- Palpate to confirm the pain generating tissue and specific location
- Example:
  - Pain with palpation at right C1-3 posterior cervical muscles, facet capsules and the ligamentum nuchae

Subjective Data

Be Specific

- Location of pain
  - Right posterior upper cervical spine C1-3
  - Ligamentum nuchae C1-3
  - Potential tissues injured and painful
    - Cervical muscles (Strain)
    - Capsular ligaments and ligamentum nuchae (Sprain)
    - Osseous tissues (Fracture)

List of Potential Diagnoses Based on Subjective Data

- Cervical strain
- Cervical sprain
- Cervical dislocation
- Cervical fracture
Persistent Pain: A Chronic Illness

• Acute pain usually goes away after an injury or illness resolves. But when pain persists for months or even years, long after whatever started the pain has gone or because the injury continues, it becomes a chronic condition and illness in its own right.

List of Potential Diagnoses Based on Subjective Data

• Are these potential diagnoses acute or chronic?
  - Cervical strain
  - Cervical sprain
  - Cervical dislocation
  - Cervical fracture

Grading of Spinal Injury

• Is the whiplash type injury an acute, mild, moderate, or severe soft tissue injury?
• Is there a fracture?
Soft Tissue Injury Grading

- Grade 1 sprain of ligament/joint (Mild)
  - Overstretch or tear up to 5%
- Grade 2 sprain of ligament/joint (Moderate)
  - Tear up to 50%
- Grade 3 sprain of ligament/joint (Severe)
  - Rupture or complete 100% tear
- Grade 4 sprain of ligament/joint/bone (Avulsion)
  - Complete tear with avulsion of bone

Soft Tissue Injury Grading

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  - Tear up to 50%
- Grade 3 strain of muscle/tendon (Severe)
  - Rupture or complete 100% tear
- Grade 4 strain of muscle/tendon/bone (Avulsion)
  - Complete tear with avulsion of bone

Case One = WAD I

- Patient presents with neck complaints including stiffness or tenderness in the neck regions and no physical signs of injury.
- Most likely diagnosis is acute, mild cervical strain
- Prognosis is good
- Spontaneous recovery within 2-3 weeks is common.

Case Two: WAD II

• Patient presents with neck complaints including stiffness or tenderness, and some physical signs of injury, such as point tenderness or trouble turning the head.

• Acute, moderate cervical sprain/strain is most likely DX
• Prognosis is difficult to predict
• Current management does not appear to lessen transition from acute to chronic pain status
• Physical and psychological impairment poorly addressed by treatments predictive of poor recovery

Case Three: WAD III

• Patient presents with neck complaints including stiffness or tenderness and neurological signs of injury such as deep tendon reflex or motor deficits.

• Acute, moderate sprain/strain with resultant cervical radiculopathy
• Current management does not appear to lessen transition from acute to chronic pain status
• Physical and psychological impairment poorly addressed by treatments predictive of poor recovery

Case Four: WAD IV

• Patient presents with neck complaints with a fracture or dislocation of the cervical spine.
List of Potential Diagnoses Based on Subjective Data

- Are these potential diagnoses mild, moderate or severe?
- Cervical strain
- Cervical sprain
- Cervical dislocation
- Cervical fracture

Objective Data
Ruling-in and Ruling-out Diagnoses

- Observation
- Palpation
- Range of motion
- Orthopedic testing
- Neurological testing
- Laboratory

Objective Data
Observation

- Appearance
  - Stated age
  - Well-nourished
  - Well-developed
  - Distinguishing findings
- Posture
  - Antalgic
  - Erect
  - Scoliosis (functional or structural)
- Gait
  - Smooth or limping
Objective Data
Observation of Posture

• What do you see with this young patient?
• Does she have scoliosis?
• If yes, is it structural or functional?
• What could be the cause (s) of this postural deviation?

Objective Data
Postural Evaluation

• Adam’s positon
• Increased dorsal rib hump or increased curvature indicates a structural scoliosis
• Reduction of spinal curvature indicates a functional scoliosis
• What could be a cause (s) of functional scoliosis?

Objective Data
Long Sit Testing
Objective Data

Palpation (Flat/Pinching/Static)

- Signs of inflammation
  - Dolor
  - Rubor
  - Calor
  - Tumor Provocative or pain producing
- Painful ligaments
- Painful, nodules in muscle
- Painful muscles

Palpation

Cervicogenic Headaches

Neurogenic

- Neurogenic
- Occipital neuralgias
- Greater Occipital (2nd Cervical)
- Third Occipital
Cervicogenic Headaches
Neurogenic

• Differentiate Cranial and Occipital neuralgias

Objective Data
Range of Motion (ROM)

• Active
  • First ROM
  • General findings of pain and restriction or full ROM without pain
• Passive
  • Pain and restriction indicates ligament and/or joint injury (Sprain)
• Resistive
  • Pain and restriction indicates muscle and/or tendon injury (Strain)

L’Hermitte’s Sign
Spinal Cord Compression Pain

• Stabbing or lightning-like pain shooting down the spine and any combination of the extremities
• Active or passive flexion or extension of the cervical spine
Objective Data
Orthopedic Testing

• An orthopedic test is most often a provocative maneuver that reproduces the chief concern pain in order to identify the painful/injured tissue.
• An orthopedic test may be positive when palliative.
• Describe your findings
• Do not list + or – indicators alone

Objective Data
Orthopedic Testing

• Passive compression of the cervical spine in lateral flexion, rotation, and extension produced localized pain at C 5-6 left with radiating pain down the left upper extremity to the thumb and index finger.
Objective Data
Orthopedic Testing

- Chart the specific findings in order to determine the injured tissue
- Cervical compression + does not tell the story or demonstrate objective findings.

Upper Cervical Alar Ligament Sprain Injuries
Sharp Purser Test

- Stand to the side of the patient and stabilize the C2 spinous process using pincer grasp.
- Gently apply a posterior translation force from the palm of the hand into the patient’s forehead
- Assess symptoms for degree of linear translation and/or symptom provocation
- Positive test would be reproduction of myelopathic symptoms during forward flexion or displacement during AP movement

Neurological Examination

- Mental status
- CNS examination
- Cranial nerve examination
- Three-part peripheral nerve examination
  - Deep tendon reflexes
  - Motor function
  - Sensory perception
Differentiate Upper Motor vs Lower Motor Neuron Lesions

**UMNL**
- Spastic paralysis
- Clonus present
- Increased deep tendon reflexes
- Pathological reflexes present
- Weakness with atrophy absent

**LMNL**
- Flaccid paralysis
- Clonus absent
- Reduced deep tendon reflexes
- Pathological reflexes absent
- Weakness with atrophy present
Neuromusculoskeletal Examination Videos
Timothy Conwell, DC, FACO

- Central Nervous System examination
  https://www.youtube.com/watch?v=kZOx0cWx4
- Peripheral Nervous System examination
  https://www.youtube.com/watch?v=7YF4vCBisQ
- Spine and paraspinal examination
  https://www.youtube.com/watch?v=HegByhhb8sl

Babinski reflex - an UMN sign
- Adult response: plantar flexion of the big toe and adduction of the smaller toes
- Pathological (Infant) response: dorsiflexion (extension) of the big toe and fanning of the other toes
- Indicative of upper motor neuron damage

Babinski reflex and corticospinal tract lesion
Diagnosis and prognosis are the keys to successful treatment of whiplash associated disorder.

**Prognosis Post Whiplash Type Injury**

**End of Healing Stage**

- Sprained ligaments heal with a cheaper grade of mesenchymal tissue = cicatrix or scar.
- A scar left by the formation of new connective tissue over a healing sore or wound.
- Scar tissue is avascular, pale, contracted, and firm after the earlier phase of soft tissue healing.
Prognosis Post Whiplash Type Injury

- Post-traumatic chronic pain syndrome
- Chronic myofascial pain syndrome
- Degenerative joint and disc disease or “Cervical Spondylosis”

Cervical Spine Video Fluoroscopy
Laxity of Cervical Ligaments


Recommendations prior to treating patients with whiplash injuries.

- Discover mechanism of injury
- Determine history of neck pain prior to whiplash injury
- Reveal pain severity with Numerical Pain Rating Scale (NPRS)
- Identify the injured tissues and pain generators
- Understand biopsychosocial factors
- Perform differential diagnosis
- Determine a reasonable prognosis
- Offer appropriate treatment with the use of a team of health care providers
- Avoid nocebo effect and promote placebo effect...
Diagnosis, Prognosis and Treatment Recommendations

• How you advise your patient of the diagnosis, prognosis and treatment may affect the patient response.

Placebo versus Nocebo Effects

• The “placebo” effect is related to the perceptions and expectations of the patient
• If the intervention is viewed as helpful, it can heal, but, if it is viewed as harmful, it can cause negative effects, which is known as the “nocebo” effect.

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Engaged Learning Task (30 minutes)

- Form groups of 3-4
- Select a spokesperson who will provide a brief presentation
- Determine appropriate evaluation including history and physical examination
- Perform differential diagnosis
- Recommend treatment plan
- Give prognosis
- Chart with SOAP process

Spokesperson Will Present and Defend Your Work

- Another group will be selected to question the presentation.
- Do you agree with evaluation?
- Do you agree with list of potential diagnoses and working diagnosis?
- Do you agree with the prognosis and treatment recommendations?
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References

Thank You!