



Concussion Assessment in the Primary Care Setting

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Faculty/Presenter Disclosure

- **Faculty:** Mike Robinson CAT(C) ATC PhD(ABD)
- **Relationships with financial sponsors:**
 - No relationship exists with any financial sponsors.

Disclosure of Financial Support

- **This program has received no financial support.**
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- **Potential for conflict(s) of interest:**
 - No potential conflicts of interest exist regarding any topic discussed during this program.

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Learning objectives:

1. Apply best practices in concussion assessment
2. Identify patients who are susceptible to a longer recovery
3. Identify red flags that would require referral to more advanced care



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Definition: Concussion

- Acute neurophysiological event
- May be caused either by a direct blow to the head, face, neck or elsewhere on the body with an impulsive force transmitted to the head
- Typically results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously.
 - in some cases, signs and symptoms evolve over a number of minutes to hours.
- May result in neuropathological changes, but the acute clinical signs and symptoms largely reflect a functional disturbance rather than a structural injury and, as such, no abnormality is seen on standard structural neuroimaging studies
- Results in a range of clinical signs and symptoms that may or may not involve loss of consciousness

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Initial Assessment Goal

- Establish the diagnosis of concussion
 - Diagnosis of exclusion
 - Rule out
 - More severe forms of TBI
 - Cervical spine injuries
 - Medical and neurological conditions that can present with concussion-like symptoms

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Initial Assessment Key Components



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Red Flags

- Presence of clinical risk factors that indicate the need for a CT using the Canadian CT Head Rules
- Persistent abnormal GCS or focal neurological deficit
- Persistent abnormal mental status
- Vomiting/ severe headache
- Presence of known coagulopathy
- Persistent drug or alcohol intoxication
- Presence of multi-system injuries
- Presence of concurrent medical problems
- Age > 65

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Clinical Interview

General Medical History

- Pre-existing medical and mental health conditions
- Medications
- Psychosocial factors
- Learning disorders
- Substance abuse
- Previous concussion history
 - Number and severity

Injury Specific History

- Sport/Position/Level of Sport
- Mechanism of injury
 - Video if available
- Severity and duration of any altered LOC
- Immediate symptoms
- Amnesia
- Presence of co-occurring injuries
- Current symptoms
 - Number and severity
 - Symptom evaluation tools

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Concussion Symptom Evaluation Tools

Sport Concussion Assessment Tool Symptom Evaluation

Symptom	0	1	2	3	4
Headache	0	1	2	3	4
Nausea	0	1	2	3	4
Balance	0	1	2	3	4
Memory	0	1	2	3	4
Attention	0	1	2	3	4
Concentration	0	1	2	3	4
Thinking	0	1	2	3	4
Light Sensitivity	0	1	2	3	4
Double Vision	0	1	2	3	4
Residuals	0	1	2	3	4

The Rivermead Post-Concussion Symptoms Questionnaire

Headaches	0	1	2	3	4
Feelings of Dizziness	0	1	2	3	4
Nausea and/or Vomiting	0	1	2	3	4
Noise Sensitivity	0	1	2	3	4
easily upset by loud noise	0	1	2	3	4
Sound Sensitivity	0	1	2	3	4
Fatigue, being more easily	0	1	2	3	4
being irritable, easily angered	0	1	2	3	4
Feeling Depressed or Tearful	0	1	2	3	4
Feeling Frustrated or Irritated	0	1	2	3	4
Forgetfulness, poor memory	0	1	2	3	4
Poor Concentration	0	1	2	3	4
Taking Longer to Think	0	1	2	3	4
Blurred Vision	0	1	2	3	4
Light Sensitivity	0	1	2	3	4
Easily upset by bright light	0	1	2	3	4
Double Vision	0	1	2	3	4
Residuals	0	1	2	3	4

Are you experiencing any other difficulties?

1. _____ 0 1 2 3 4

2. _____ 0 1 2 3 4

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Core Physical/Neurological Examination



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Core Physical/Neurological Examination

Cervical Spine

- Palpation
 - Cervical spine
 - Posterior paraspinal musculature
 - Anterior paraspinal musculature
- Range of motion
- Focal areas of tenderness
- Spasm
- Hypertonicity

Temporomandibular Joint

- Range of opening
- Tenderness
- Dislocation

BRACE YOURSELF



PALPATION IS COMING

Core Physical/Neurological Examination

Vital Signs

- Seated, supine and standing
 - Heart rate
 - Blood pressure

Cerebellar Testing

- Finger-to-nose
- Dysdiadochokinesia testing
 - Pronation/Supination Test
 - Heel to Shin Test

Cranial Nerve Testing

- Fundoscopy
- Pupillary function
- Visual acuity
- Visual fields
- Extra-ocular movements
- Facial sensation and function
- Hearing
- Palate symmetry
- Trapezius strength
- Tongue movements

Core Physical/Neurological Examination

Cognitive

- Cognition
- Language

Auditory

- Hearing screen
- Otoscopic exam

Vision

- Acuity
- Tracking
- Saccades
- Nystagmus
- Vergence
- Diplopia
- Pupil symmetry and reactivity
- Visual fields to confrontation

Core Physical/Neurological Examination

Sensory

- Dermatomes
- Proprioception

Motor

- Power
- Pronator drift
- Asymmetrical weakness
- Reflexes
- Coordination

Vestibular

- Head impulse
- Head shake
- Vestibular Ocular Reflex Suppression (VORS)
- Dynamic Visual Acuity (DVA)
- Positional Testing

Core Physical/Neurological Examination

- | | |
|---|---|
| <p>Functional Activities</p> <ul style="list-style-type: none"> • Romberg <ul style="list-style-type: none"> – Eyes open/closed • Modified Balance Error Scoring System <ul style="list-style-type: none"> – Double leg stance – Single leg stance – Tandem stance | <p>Gait</p> <ul style="list-style-type: none"> • Walking • Tandem walking • Turning |
|---|---|

Treat
Educate
Refer
Monitor



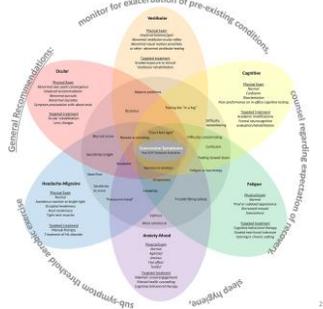
Treatment & Management

- Identify primary and secondary symptoms to treat in a hierarchical manor
- Multidisciplinary approach
 - Refer other health care providers if required
- Provide education
- Support gradual and safe return to school/work/sport
- Identify patients who are at risk for extended recovery and monitor for persistent symptoms

Treatment Hierarchy

<p>Primary Symptoms (to be addressed early) Depression/anxiety/irritability Sleep disorder Post-traumatic headache</p>
<p>Secondary Symptoms (to be addressed secondarily) Balance Dizziness/vertigo Cognitive impairment Fatigue Tinnitus/noise intolerance</p>

Treatment: Clinical Domains



Risk Factors – Prolonged Recovery

- | | |
|--|--|
| <p>Medical Factors</p> <ul style="list-style-type: none"> • History of previous concussion • History of previous physical limitations • History of previous neurological or psychiatric problems • Skull fracture • Early onset of pain, in particular HA, within 24 hours • Confounding effects of other health-related issues • Anxiety • High number of symptoms reported early after injury | <p>Contextual Factors</p> <ul style="list-style-type: none"> • Motor vehicle accident • Potential influence of secondary gain issues related to litigation and compensation • Not returning to work or significant delays in returning • Being a student • Presence of life stressors • Older age • Lack of social support • Lower education/low social economic status • Female • Lower resilience • Returning to a contact/risk of contact sport |
|--|--|

Education

- Education should be tailored based on the patient’s history and symptom
- Symptoms and expected outcomes
- Normalizing symptoms
 - Education that current symptoms are expected and common
- Reassurance about expected full recovery in a majority of patients
 - 90% recover within ~28 days without intervention
- Encourage gradual and progressive sub-symptom activity
 - Rest should only be encouraged during the acute phase (48-72 hours)

Return to Activity

School	Work	Play
Daily activities at home that do not provoke symptoms	Symptom limited activity	Symptom limited activity
School activities at home that do not provoke symptoms	Modified hours	Light aerobic activity
Return to school part-time	Modified duties	Sport-specific activity
Return to school full-time	Full return to work	Non-contact training drills
		Full contact practice
		Return to sport

Resources

- Consensus Statement on Concussion in Sport
– <https://bjsm.bmj.com/content/51/11/838>
- Parachute Canada
– <https://parachute.ca/en/>
- Ontario Neurotrauma Foundation
– <https://braininjuryguidelines.org/>
- American Medical Society for Sports Medicine Position Statement on Concussion in Sport
– <https://bjsm.bmj.com/content/53/4/213>

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