

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Timely Treatment and Diagnosis of Adult Concussions: Clinical Effectiveness and Guidelines

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Research Questions

1. What is the comparative clinical effectiveness of diagnosing and treating concussion in adults within the first two weeks of sustaining a concussion versus after two weeks of sustaining a concussion?
2. What are the evidence-based guidelines regarding early recognition, diagnosis, treatment, and prognosis in adults who have a suspected or confirmed concussion?

Key Findings

Five evidence-based guidelines were identified regarding early recognition, diagnosis, treatment, and prognosis in adults who have a suspected or confirmed concussion. No relevant clinical evidence was identified regarding the clinical effectiveness of diagnosing and treating concussion in adults within the first two weeks versus after two weeks of sustaining a concussion.

Methods

A limited literature search was conducted by an information specialist on key resources including PubMed, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine’s MeSH (Medical Subject Headings), and keywords. The main search concepts were concussion diagnosis and timing. Filters were applied to limit the retrieval to health technology assessments, systematic reviews, and meta analyses, randomized controlled trials, non-randomized studies, and guidelines. The search was also limited to English language documents published between January 1, 2010 and February 26, 2020. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Q1-2: Adults with confirmed or suspected concussion, mild traumatic brain injury or chronic traumatic encephalopathy (e.g., from accidents, falls, head injury, work-related injuries, warfare [veterans], domestic abuse, or a dual diagnosis of polytrauma plus concussion) Sub-groups: High contact sports such as football, soccer, hockey, boxing
Intervention	Q1: Diagnosis and/or treatment of concussion within first two weeks of a concussion Q2: Early recognition/diagnosis of signs and symptoms, appropriate referral and follow-up, biomarkers, appropriate post-concussion care, management of symptoms, appropriate referral and follow-up, coordination of care, or education of signs and symptoms

Comparator	Q1: Diagnosis and/or treatment after two weeks of a concussion Q2: Not applicable
Outcomes	Q1: Clinical effectiveness: morbidity, mortality, quality of life, return to work, healthcare resource utilization, follow-up Q2: Recommendations regarding early recognition, diagnosis, or treatment of concussion (e.g., appropriate referral to follow-up clinics)
Study Designs	Health technology assessments, systematic reviews, randomized controlled trials, non-randomized studies, evidence-based guidelines

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports and systematic reviews are presented first. These are followed by randomized controlled trials, non-randomized studies, and evidence-based guidelines.

Five evidence-based guidelines¹⁻⁵ were identified regarding early recognition, diagnosis, treatment, and prognosis in adults who have a suspected or confirmed concussion. No relevant health technology assessments, systematic reviews, randomized controlled trials, or non-randomized studies were identified regarding the clinical effectiveness of diagnosing and treating concussion in adults within the first two weeks versus after two weeks of sustaining a concussion.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

Five evidence-based guideline¹⁻⁵ were identified regarding recommendations for the recognition, diagnosis, treatment and management of adults with suspected or confirmed concussion. Additionally, some of the guidelines provide information for referral and multidisciplinary collaboration for concussion management.²⁻⁴ A full summary of relevant guideline recommendations can be found in Table 2.

Table 2: Summary of Relevant Guideline Recommendations

Summary of Guideline Recommendations	
Silverberg, 2020 ¹	
Clinical presentation and diagnosis (from Figure 2, p385):	<ul style="list-style-type: none"> • “Establish plausible injury mechanism • Query signs and symptoms • Rule out confounding factors”
Treatment:	<ul style="list-style-type: none"> • The top priority of a primary care provider evaluating a patient with suspected mTBI is to rule out a neurosurgical emergency. (p385) • The patient and family members or caregivers should be provided with verbal and written education by a clinician. Education should include information regarding what an mTBI is, expectations for recovery, and management of symptoms. (p386) • Relative rest for 24-48 hours after mTBI is recommended to alleviate symptoms and reduce demands of the brain. (p386)

Summary of Guideline Recommendations

Referral:

- For patients with persistent symptoms, (e.g., symptoms lasting 4-6 weeks that do not resolve from primary care treatment), individuals may be referred to medical specialists or to a multidisciplinary mTBI clinic. (p389)
- Patients may benefit from early referral to medical specialists or a multidisciplinary mTBI clinic if the patient has a high symptom burden or is at risk for prolonged recovery (e.g. preexisting mental health disorder); patients are not able to return to normal activity after injury; or access to patient care is limited. (p389)

Canadian Guideline on Concussion in Sport, 2019²

Head injury recognition:

- Any athlete who sustains a significant impact to the head region or body and provides any visual signs or reports any symptoms of a concussion should be suspected to have a concussion. (p13)

Concussion management:

- Education about the signs and symptoms of concussion, strategies for management, risks of concussion, and recommendations for return to activities should be provided to athletes diagnosed with a concussion. (p17)

Multidisciplinary concussion care:

- Referral to a multidisciplinary concussion clinic for assessment and treatment should be made at the discretion of a medical doctor or nurse practitioner. (p20)
- If there is no access to a concussion clinic, referral to a medical doctor with clinical training should be considered. (p20)

Ontario Neurotrauma Foundation, 2018³

Diagnosis and Assessment of Concussion/mTBI:

- Concussions should be recognized and diagnosed as soon as possible to improve patient health outcomes. (p8) **(GoR: A)**
- The primary care provider should conduct a comprehensive review, which should include history, examination and cognitive screen for post-concussive symptoms, and review of mental health for each concussed patient. (p8) **(GoR: A)**
- Early neuroimaging should be determined according to the Canadian CT Head Rule; Plain skull x-rays are not recommended. (p8) **(GoR: A)**

Management of Concussion/mTBI:

- Initial treatment should be based on the patient's evaluation of signs and symptoms, pre-injury history, and potential for contributing factors of concussion. (p8) **(GoR: C)**
- First time patients should be advised that a full recovery of their symptoms is seen within as early as a few days to up to 3 months. (p8) **(GoR: A)**
- Referral for more comprehensive interdisciplinary evaluation is recommended for patients with comorbidities or persistent symptoms. (p8) **(GoR: C)**
- Risk of depression and anxiety should be routinely screened for by the primary care provider, and patients who screen positive should be referred to specialist services. (p8) **(GoR: B)**
- Education, including verbal and printed information, should be provided to the patients and their support persons. (p8) **(GoR: A,C)**

Department of Veteran Affairs and Department of Defence, 2016⁴

Diagnosis and Assessment:

- When communicating with the patient, use terms such as "history of mTBI" or "concussion" rather than "brain damage" or "patients with mTBI". (p19) **(SoR: Weak for)**
- Individuals who present with symptoms related to brain injury should be evaluated at initial presentation. (p19) **(SoR: Strong for)**
- Neuroimaging, serum biomarkers, and electroencephalogram should not be used to establish the diagnosis of mTBI. (p19) **(SoR: Weak against)**

Summary of Guideline Recommendations

- Comprehensive neuropsychological/cognitive testing should not be performed during the first 30 days post-injury. (p19) **(SoR: Strong against)**
- Comprehensive and focused neuropsychological testing should not be used in routine diagnosis and care of patients with mTBI symptoms. (p19) **(SoR: Strong against)**
- A focused diagnostic work-up specific to new symptoms that develop more than 30 days after mTBI should be used for patients. (p19) **(SoR: Weak for)**

Treatment:

- A primary care, symptom-driven approach should be offered in the evaluation and management of patients with mTBI. (p9) **(SoR: Weak for)**

Setting of Care:

- Routine referral to specialty care, in the majority of patients with a history of mTBI, should not be provided. (p21) **(SoR: Weak against)**
- Consultation and collaboration with an applicable specialist should be provided if symptoms do not resolve within 30-90 days and impact ADLs. (p21) **(SoR: Weak for)**
- Patients with persistent symptoms should be referred to case managers to provide additional support. (p21) **(SoR: Weak for)**

Giza, 2013⁵

Suspected Concussion

Use of checklists and screening tools:

- LHCPs should have knowledge of proper administration of standardized validated sideline assessment tools which should be used to evaluate the athlete with a suspected concussion and not be used to diagnose a concussion. (p5) **(LoE: B)**
- Results of these tools should be made available to clinical LHCPs evaluating the injured athlete. (p5) **(LoE: B)**
- Individual baseline scores on concussion assessment tools may be used by LHCPs for better interpretation of post-injury score. (p5) **(LoE: C)**
- Any athlete suspected of having sustained a concussion should immediately be removed from play. (p5) **(LoE: B)**
- Athletes should not be permitted to return to play until the athlete has been assessed by an experienced LHCP. (p6) **(LoE: B)**

Management of Diagnosed Concussion

RTP: Risk of recurrent concussion:

- Athletes with a concussion should be prohibited to return until an LHCP has cleared the athlete and the athlete is asymptomatic while off medication. (p6) **(LoE: B)**

RTP: Concussion resolution (e.g. symptom resolution, return to normal activity, return to baseline cognitive measures):

- Supplemental information, such as neurocognitive testing, may be used to assist clinical LHCPs in determining concussion resolution. (p6) **(LoE: C)**

ADL = activity of daily living; CT = computed tomography; GoR = grade of recommendation; LHCP = licenced health care provider; LoE = level of evidence; mTBI = mild traumatic brain injury; RTP = return to play; SoR = strength of recommendation

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

No literature identified.

Randomized Controlled Trials

No literature identified.

Non-Randomized Studies

No literature identified.

Guidelines and Recommendations

1. Silverberg ND, et al. Management of concussion and mild traumatic brain injury: a synthesis of practice guidelines. *Arch Phys Med Rehabil.* 2020 Feb;101(2):382-393. <https://www.sciencedirect.com/science/article/pii/S000399931931305X> Accessed 2020 Mar 10.
See: Clinical presentation and diagnosis and Figure 2, p383 and p835; Treatment, p385; Referral to a specialty clinic, p389.
2. Canadian guideline on concussion in sport. Toronto (ON): Parachute; 2017 Jul: <https://parachute.ca/wp-content/uploads/2019/06/Canadian-Guideline-on-Concussion-in-Sport.pdf> Accessed 2020 Mar 10.
See: Guideline Recommendations – 2. Head Injury Recognition, p13; 5. Concussion Management, p17; 6. Multidisciplinary Concussion Care, p20.
3. Guideline for concussion/mild traumatic brain injury & persistent symptoms. Third Ed. Toronto (ON): Ontario Neurotrauma Foundation; 2018 May: <https://braininjuryguidelines.org/concussion/fileadmin/media/adult-concussion-guidelines-3rd-edition.pdf> Accessed 2020 Mar 10.
See: Key Recommendations – Diagnosis/Assessment of Concussion/mTBI, p8; Initial Management of Concussion/mTBI, p8.
4. The Management of Concussion-mild Traumatic Brain Injury Working Group. VA/DoD clinical practice guideline for the management of concussion-mild traumatic brain injury. Washington (DC): U.S. Department of Veteran Affairs, Department of Defense; 2016 Feb: <https://www.healthquality.va.gov/guidelines/Rehab/mtbi/mTBICPGFullCPG50821816.pdf> Accessed 2020 Mar 10.
See: Recommendations – A. Diagnosis and Assessment, p19; Treatment, p19-21; Setting of Care, p21.
5. Giza CC, Kutcher JS, Ashwal S, et al. Summary of evidence-based guideline update: evaluation and management of concussion in sports: report of the Guideline Development Subcommittee of the American Academy of Neurology. *Neurology.* 2013 Jun 11;80(24):2250-7. <https://www.ncbi.nlm.nih.gov/pubmed/23508730> Accessed 2020 Mar 10.
See: Suspected Concussion, p5-6; Management of Diagnosed Concussion, p6. [PubMed: PM23508730](https://pubmed.ncbi.nlm.nih.gov/23508730/)

Appendix — Further Information

Systematic Reviews

Sports-Related Concussion – Comparator Not Specified

6. Feddermann-Demont N, Echemendia RJ, Schneider KJ, et al. What domains of clinical function should be assessed after sport-related concussion? A systematic review. *Br J Sports Med.* 2017;51(11):903-918.

[PubMed: PM29098983](#)

Randomized Controlled Trial

Alternative Intervention

7. Cooper DB, Bowles AO, Kennedy JE, et al. Cognitive rehabilitation for military service members with mild traumatic brain injury: a randomized clinical trial. *J Head Trauma Rehabil.* 2017 May/Jun;32(3):E1-E15.

[PubMed: PM27603763](#)

Alternative Comparator

8. Varner CE, McLeod S, Nahiddi N, Lougheed RE, Dear TE, Borgundvaag B. Cognitive rest and graduated return to usual activities versus usual care for mild traumatic brain injury: a randomized controlled trial of emergency department discharge instructions. *Acad Emerg Med.* 2017;24(1):75-82.

[PubMed: PM27792852](#)

Non-randomized Studies

Alternative Outcome

9. Lannsjö M, Raininko R, Bustamante M, von Seth C, Borg J. Brain pathology after mild traumatic brain injury: an exploratory study by repeated magnetic resonance examination. *J Rehabil Med.* 2013;45(8):721-728.

[PubMed: PM24002306](#)

10. Hou R, Moss-Morris R, Peveler R, Mogg K, Bradley BP, Belli A. When a minor head injury results in enduring symptoms: a prospective investigation of risk factors for postconcussional syndrome after mild traumatic brain injury. *J Neurol Neurosurg Psychiatry.* 2012;83(2):217-223.

[PubMed: PM22028384](#)

Alternative Comparator

11. McCauley SR, Wilde EA, Miller ER, et al. Preinjury resilience and mood as predictors of early outcome following mild traumatic brain injury. *J Neurotrauma.* 2013;30(8):642-652.

[PubMed: PM23046394](#)

Review Articles

12. Feddermann-Demont N, Straumann D, Dvořák J. Return to play management after concussion in football: recommendations for team physicians. *J Sports Sci.* 2014;32(13):1217-1228.
[PubMed: PM24902964](#)