

**Evidence-Based Practice Group Answers to Clinical
Questions**

**“Concussion and the Development of Meares-
Irlen Syndrome”**

A Rapid Systematic Review

By

WorkSafeBC Evidence-Based Practice Group

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Clinical Services – Worker and Employer Services

About this report

Concussion and the Development of Meares-Irlen Syndrome

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About the Evidence-Based Practice Group

The Evidence-Based Practice Group was established to address the many medical and policy issues that WorkSafeBC officers deal with on a regular basis. Members apply established techniques of critical appraisal and evidence-based review of topics solicited from both WorkSafeBC staff and other interested parties such as surgeons, medical specialists, and rehabilitation providers.

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Objective

To determine whether there is evidence to support a (casual) association between concussion and the development of Meares-Irlen syndrome.

Methods

- A systematic literature search was conducted on September 26, 2019.
- The search was done on commercial medical literature databases, including Cochrane Database of Systematic Reviews® (2005 to September 11, 2019), ACP Journal Club® (1991 to August 2019), UK York University Database of Abstracts of Reviews of Effects® (1st Quarter 2016), Cochrane Clinical Answers® (August 2019), Cochrane Central Register of Controlled Trials® (August 2019), UK NHS Health Technology Assessment database (4th Quarter 2016), UK NHS Economic Evaluation Database (1st Quarter 2016), BIOSIS Previews® (1969 to 2008), Embase® (1974 to 2019 September 25), MEDLINE Epub Ahead of Print®, Medline In-Process & Other Non-Indexed Citations®, Medline Daily® and Medline Versions® (1946 to September 24, 2019), which are available through the Ovid® platform.
- The search was done by employing combinations of keywords, as follows:
 1. ((irlen **ADJ** syndrome\$) **OR** (Meares-Irlen **ADJ** syndrome\$) **OR** (Scotopic **ADJ** sensitivity **ADJ** syndrome\$)) **AND** (concussion **OR** (mild **ADJ** traumatic **ADJ** brain **ADJ** injury) **OR** (traumatic **ADJ** brain **ADJ** injury))
 2. ((irlen **ADJ** syndrome\$) **OR** (Meares-Irlen **ADJ** syndrome\$) **OR** (Scotopic **ADJ** sensitivity **ADJ** syndrome\$))
- No limitations, such as on the language and date of publication, were implemented in any of these searches.
- A manual search was also conducted on the articles that were retrieved in full.

Results

- Search results:
 - Search No. 1 was conducted to specifically identify studies investigating the association between concussion and Irlen syndrome. Three⁽¹⁻³⁾ published studies were identified and upon examination of the titles and abstracts of these three⁽¹⁻³⁾ studies, two^(2,3) were thought to be relevant and were retrieved in full for further appraisal.

- A broad search on Irlen syndrome was also done in search No. 2. There were fifty-three⁽⁴⁻⁵⁶⁾ published studies identified through this search. Upon examination of the titles and abstracts of these 53⁽⁴⁻⁵⁶⁾ studies, one⁽³⁰⁾ was thought to be relevant and was retrieved in full for further appraisal.
 - Two^(57,58) more studies were identified from manual searches.
 - Hence, there were five^(2,3,30,57,58) studies that were retrieved in full, for further appraisal, in this systematic review.
- In 1980, Helen Irlen identified a condition initially known as 'scotopic sensitivity', and subsequently termed Irlen syndrome or Meares-Irlen syndrome. This condition was believed to be potentially correlated to the inability for some people to read fluently^(57,58). Individuals with this syndrome experience visual perceptual distortions caused by the reflections of certain background wavelengths and intensities of light. To date, the etiology of Irlen syndrome is still unknown, although genetics is suspected to play a major role in its etiology^(57,58). With regards to prevalence, the Irlen syndrome is estimated to be present in about 25% of general population⁽³⁰⁾.
- Of the five^(2,3,30,57,58) studies that were retrieved in full, only one⁽³⁾ provided data on the prevalence of Irlen syndrome in patients with traumatic brain injury (TBI). A small survey (n=45) (level of evidence 4. Appendix 1), published as an abstract only, investigating the prevalence of Irlen syndrome among patients with TBI was reported by Tosta and Johnson⁽³⁾. The authors reported that of the 45 TBI patients in the study, 53% demonstrated symptoms of Irlen syndrome. *It should be noted that both diagnostic criteria for the syndrome and patient selection criteria were not clearly defined within the study, and there was a lack of discussion as to whether a temporal association between TBI and the occurrence of Irlen syndrome was investigated. Given the available data, it is not possible to investigate the size of the association between TBI and Irlen syndrome.*

Summary

- Although there is some evidence indicating the occurrence of Irlen syndrome among patients with TBI, it is not possible to determine from this evidence as to whether the occurrence of Irlen syndrome among TBI patients is causal in nature.

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Appendix 1

WorkSafeBC - Evidence-Based Practice Group Levels of Evidence (adapted from 1,2,3,4)

1	Evidence from at least 1 properly randomized controlled trial (RCT) or systematic review of RCTs.
2	Evidence from well-designed controlled trials without randomization or systematic reviews of observational studies.
3	Evidence from well-designed cohort or case-control analytic studies, preferably from more than 1 centre or research group.
4	Evidence from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled experiments could also be included here.
5	Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees.

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