

Sports-related concussion update

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Ironman Medical Symposium 2023

Thank you



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Outrigger Kona Resort – Kailua-Kona, Hawai'i
OCTOBER 8–12, 2023

Disclosures



The Reverend Dr. Jim MacDonald

Universal Life Church



Overview – 6th Intl Concussion Consensus Conference



- Amsterdam 2022-
Consensus Statement
– backstory
- Notable changes from
2016 Berlin (5th)
- **Major messages**
- On-going challenges

Major messages

- **It's a massive undertaking**
- The “R’s”
 - The highlights/changes
- **Get them moving (Level I evidence)**
- Prevention
 - Some promising findings
- **SCOAT6** and changes in the SCAT (5 → 6)

Needs

1. We need to diversify our evidence

1. The vast majority of the evidence comes from North America and Europe (*issues of generalizability remain*)

2. We need to study children ages 5 – 12 more

1. Adults studied fairly well
2. There is a ‘pediatric’ literature – but it focuses almost solely on post-pubescent/adolescents/teens

3. Continue to drill down to the particulars

1. Para athletes, women.

IOC Consensus Conferences on Sports-related concussion

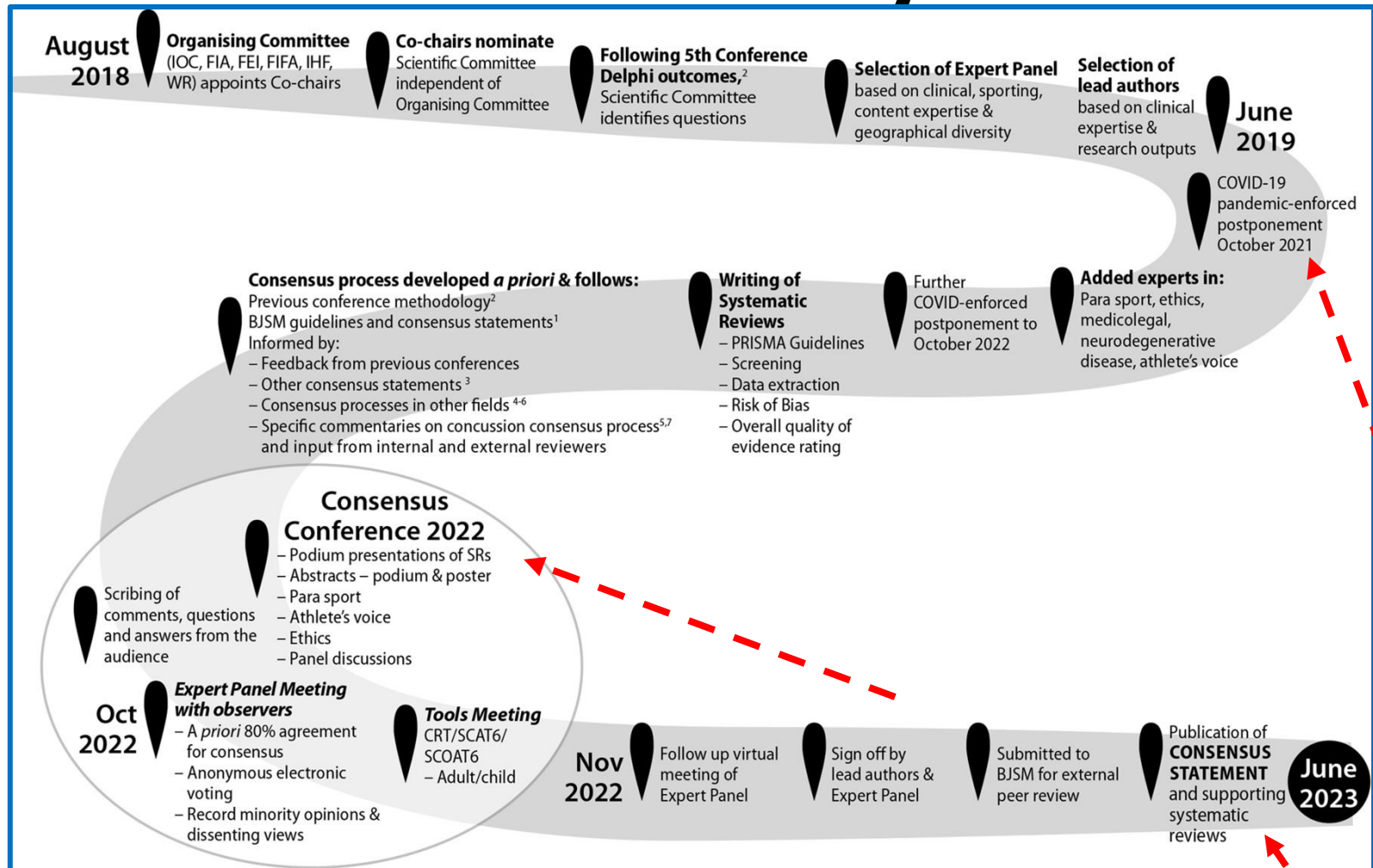
- 2001 Vienna
- 2004 Prague
- 2008 Zurich
- 2012 Zurich
- 2016 Berlin
- 2020 Paris?????

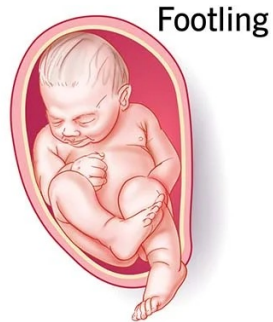
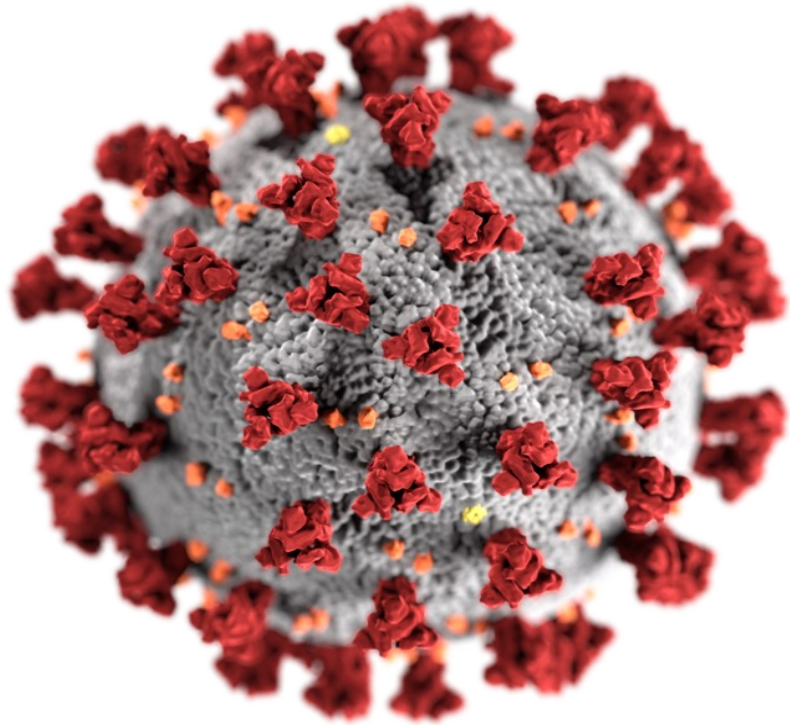
2022 Amsterdam

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The Journey





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Concussion in sport

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New plagiarism claims against sport concussion guru Paul McCrory

Exclusive: Expert who has downplayed link between concussion and traumatic brain injury is accused of 10 more cases of plagiarism

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 FÉDÉRATION
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- 31 authors
 - 6 women
- Consensus driven
 - Seeking > 80% (not always achieved)
- Prof Michael McNamee, Swansea University
 - Ethicist
- Independent observers
- ‘The Athletes’ voice’

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The Outputs



- <https://bjsm.bmj.com/content/57/11/695>
- <https://bjsm.bmj.com/content/57/11/712>
- <https://bjsm.bmj.com/content/57/11/617>
- <https://bjsm.bmj.com/content/57/11/722>
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- <https://bjsm.bmj.com/content/57/12/798>
- <https://bjsm.bmj.com/content/57/12/810>
- <https://bjsm.bmj.com/content/57/12/822>
- <https://bjsm.bmj.com/content/57/12/749>

**June 2023 BJSM – 12 manuscripts
consensus statement and
methodology paper
10 systematic reviews**

The Outputs (cont.)

- **12 papers**
 - Consensus statement
 - Methodology paper
 - 10 systematic reviews
- Child SCAT 6 and SCAT 6
- Concussion Recognition tool
 - CRT6
- Office assessment tools
(*new*)
 - *SCOAT6, Child SCOAT6*

**ALL OUTPUTS FREELY
AVAILABLE**

The “R’s”

- **Recognise**
 - definition
- **Reduce**
 - prevention
- **Remove**
 - Side-line evaluation
- **Re-evaluate**
 - Office assessment
- **Rest & exercise**
- **Refer**
- **Rehabilitation**
- **Recovery**
- **Return to learn/sport**
- **Reconsider**
 - Potential long-term effects
- ***Retire***
- ***Refine***
 - Para athletes; special populations



Recognize



Recognize

- Defining concussion is difficult (79.6%)
- “The conceptual definition does not provide specific diagnostic criteria.”
- No abnl seen on MRI or CT but in *research setting* abnormalities may be present in functional, blood flow or metabolic imaging

- Signs
 - LOC
 - Seizure
 - Tonic posturing
 - Ataxia
 - Poor balance
 - Confusion
 - Behavioral changes
 - Amnesia

“The CISG definition of concussion was updated while work continues toward a unified conceptual and operational definition.”

Minutiae

- **Amsterdam**

*SRC is a traumatic brain injury caused by a direct blow to the head, neck **or body** resulting in an impulsive force being transmitted **to the brain** that occurs in sports and exercise-related activities.*

- **Berlin**

*SRC 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.***

- Policy/rule changes
 - **Disallowing body checking in youth ice hockey** games works (↓rate of concussion 58%)
 - **Limiting # & duration of contact practices in American football** works (↓ rate of concussion 64%)
- **Mouthguards reduce concussion rate in ice hockey** across all age ranges
 - ↓ rate 28%
 - Much smaller effect for rugby

- NMT
 - **On-field NMT warmups** three times/week reduces concussion rates in **Rugby Union** across all ages



Photo: Wikimedia, [K.M. Klemencic](#) from Hudson, Ohio

Prevention

SCAT5 vs. SCAT6

Sport Concussion Assessment Tool 6 - SCAT6™



SCAT6™	Sport Concussion Assessment Tool For Adolescents (13 years +) & Adults	
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Athlete Name: <input style="width: 90%;" type="text"/>	ID Number: <input style="width: 90%;" type="text"/>			
Date of Birth: <input style="width: 25%;" type="text"/>	Date of Examination: <input style="width: 25%;" type="text"/>	Date of Injury: <input style="width: 25%;" type="text"/>		
Time of Injury: <input style="width: 25%;" type="text"/>	Sex: Male <input type="checkbox"/>	Female <input type="checkbox"/>	Prefer Not To Say <input type="checkbox"/>	Other <input style="width: 20%;" type="text"/>
Dominant Hand: Left <input type="checkbox"/>	Right <input type="checkbox"/>	Ambidextrous <input type="checkbox"/>	Sport/Team/School: <input style="width: 80%;" type="text"/>	
Current Year in School (if applicable): <input style="width: 30%;" type="text"/>	Years of Education Completed (Total): <input style="width: 60%;" type="text"/>			
First Language: <input style="width: 80%;" type="text"/>	Preferred Language: <input style="width: 80%;" type="text"/>			
Examiner: <input style="width: 95%;" type="text"/>				

Concussion History	
How many diagnosed concussions has the athlete had in the past?:	<input style="width: 35%;" type="text"/>
When was the most recent concussion?:	<input style="width: 90%;" type="text"/>
Primary Symptoms:	<input style="width: 90%;" type="text"/>
How long was the recovery (time to being cleared to play) from the most recent concussion?:	<input style="width: 20%;" type="text"/> (Days)

Immediate Assessment/News Screen (Not Required at Baseline)



What's a "SCOAT"?

What is the SCOAT6?*

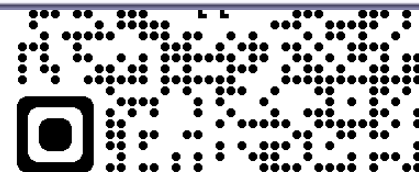
The SCOAT6 is a tool for evaluating concussion in a controlled office environment by Health Care Professionals (HCP) typically from 72 hours (3 days) following a sport-related concussion.

The diagnosis of concussion is a clinical determination made by an HCP. The various components of the SCOAT6 may assist with the clinical assessment and help guide individualised management.

The SCOAT6 is used for evaluating athletes aged 13 years and older. For children aged 12 years or younger, please use the Child SCOAT6.

Brief verbal instructions for some components of the SCOAT6 are included. Detailed instructions for use of the SCOAT6 are provided in an accompanying document. Please read through these instructions carefully before using the SCOAT6.

This tool may be freely copied in its current form for distribution to individuals, teams, groups, and organisations. Any alteration (including translations and digital re-formatting), re-branding, or sale for commercial gain is not permissible without the expressed written consent of BMJ and the Concussion in Sport Group (CISG).



Berlin vs. Amsterdam -- Exercise

2016 Berlin

'In addition, closely monitored active rehabilitation programmes involving controlled sub-symptom-threshold, submaximal exercise have been shown to be safe and may be of benefit in facilitating recovery.'



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2022 Amsterdam

- Stronger endorsement
- **Sub-symptom threshold exercise should be POSITIVELY ENCOURAGED**– has been shown to be beneficial
- When possible GXT
 - But don't let this stop you prescribing

Level 1 Evidence to get them moving (e.g. walking) early

Exercise & Youth SRCs

JAMA Pediatrics 2019 (RCT) Leddy

- N = 103 mean age 15.3
- 50/50 male/female
- 20 minute aerobic exercise vs. stretching
- Mean recovery
 - 13 d aerobic/17d stretching (p = 0.009)
- Trend toward lower rates of prolonged recovery (> 28d)

EBM Overview

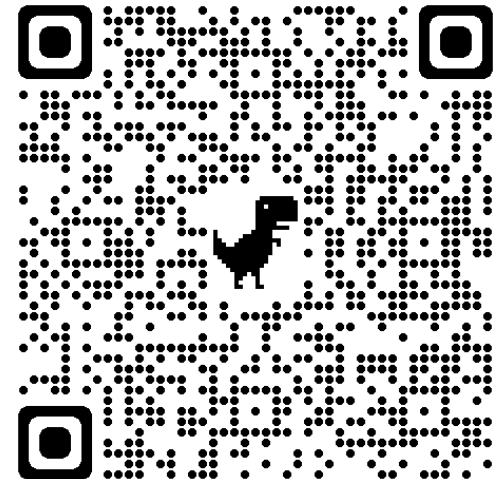
- Youth with SRCs engaging in physical activity ≤ 7 d of injury – more effective recovery
- However – if commenced too soon at inappropriate intensity, may be detrimental to recovery
- Specialist concussion services use objective decision making

Exercise prescription w/o exertion testing

- No Buffalo Concussion Treadmill Test (BCTT)
- Not full sport/avoid occasion for head injury
- Should not have sig vestibular/ocular symptoms

Karvonen method for HR_{max} (220 – age)

- Stage 1 50% HR_{max}
- Each stage go up 5% until 80%
- Exercise ‘without symptom exacerbation’
 - ≤ 1 on Likert scale move up
 - 2 on Likert scale – stay here for 2 days
 - 3 drop down a stage
 - 20 minutes



Retire

- No clear evidence of the factors, if present, would unequivocally lead to retirement
- Decision-making process should involve athletes and family after a comprehensive evaluation by a multi-disciplinary team.
- COIs should be clearly stated.
- Shared decision-making process.

Review:

Amsterdam Messages on SRCs

What we don't know

- Still discussing the definition of injury
- More is needed to 'prescribe intensity' of exercise, dosing
- **Paucity of research on youth**
 - egregious lack of information on true children
 - 80,000+ journal articles as part of the systematic review process
 - 0.7% analyze 5 to 12 year olds
- Potentially promising evidence regarding headgear, concussion management strategies, but evidence insufficient in MAs to endorse strongly



More Resources (free)

- BJSM Podcast
 - <https://podcasts.apple.com/ie/podcast/bj-sm-podcast/id330966919>
 - Several relate to the Amsterdam conference
- BJSM Video Abstract
 - <https://www.youtube.com/watch?v=bP4eRyVL8-4>
- **Upcoming spring 2024 MOOC**
 - <https://kinesiology.ucalgary.ca/current-students/online-concussion-course>

References (free)

- 2022 Amsterdam Concussion Consensus Statement
 - <https://bjsm.bmj.com/content/57/11/695>
- Statement on SCAT6 for adults, adolescents, children
 - <https://bjsm.bmj.com/content/57/11/722>
 - PDF:
<https://bjsm.bmj.com/content/bjsports/57/11/622.full.pdf>
- Statement on SCOAT 6 for adults, adolescents, children
 - <https://bjsm.bmj.com/content/57/11/737>
- Prevention strategies
 - <https://pubmed.ncbi.nlm.nih.gov/37316182/>

Thank you



“There is no such thing as strong beer. Only weak men.” 🍺🍺

seen on the streets of Amsterdam



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