



FAIR

Female, woman, and/or girl
Athlete Injury pRevention

IOC Consensus on Female, woman, and girl Athletes' Injury pRevention (FAIR)



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Liège, Belgium
11th June 2026

European Sport Concussion Conference, Nice, France



@FAIRconsensus



Female, woman and girls
Athlete Injury pRevention



UNIVERSITY OF CALGARY
FACULTY OF KINESIOLOGY
Sport Injury Prevention Research Centre



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Road to **FAIR**

Female, woman, and/or girl Athlete Injury pRevention consensus

Female, woman,
and/or girl athletes'
sport participation is
rising

Female, woman, and/or girl athletes'
injury rates are not abating

Need for current,
evidence-informed,
expert consensus on
injury prevention for
female/woman/girl
athletes

For female/woman/girl athletes:

- Systematic reviews on injury prevention & modifiable risk factors
- Scoping review on dissemination & implementation
- Concept mapping to explore gender/sex factors associated with injury



Consensus

Nair et al 2011

Consensus can...

01.

Provide guidance
when there is
no/limited
evidence

02.

Organises
subjective
judgements
across a range of
experts

03.

Allow for
inclusion of a
wide range of
knowledge &
experience

04.

Stimulate
constructive
debate

Consensus is **NOT** about everyone agreeing to the **SAME** thing

Consensus is **NOT** an **END** point, it should stimulate further inquiry and growth

Consensus recommendations are meant to **EVOLVE** over time.



Road to Lausanne

Stage 1

Convene Steering Committee
(Consensus co-leads: May 2023)

Stage 2

Develop Evidence Reviews aims, invite Review Leads
(Steering Committee: June 2023)

Stage 3

Invite Author Group members
(Steering Committee: July 2023)

Stage 4

Evidence Reviews
(Author Groups: September 2023 - February 2025)

Stage 5

Draft consensus recommendations
(Steering Committee: February - March 2025)

Stage 6

Round 1 voting
(Steering Committee & EAC chair: March - April 2025)

Stage 7

Face-to-face meet & Round 2 voting
(Steering Committee & EAC chair: March - April 2025)

Stage 8

Finalise practical recommendations
(Steering Committee, EAC: April - July 2025)

FAIR Steering Committee



Steering Committee



Steering Committee

% women



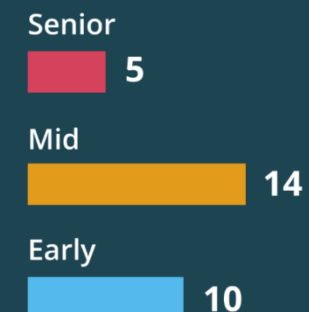
Broad research expertise



Experiences other than research



Career stage



Ray Crossley, Carolyn Emery, Cheri Blauwet, Garrett Bullock, Araba Chintoh, Paul Diikstra, Alex Donaldson, Emily Heming, Carly McKay, Merete Møller, Andrea Mosler, Margo Mount, Oluwatoyos, Dwoeye, Debbie Palmer, Brooke Patterson, Anu Räisänen, Andrew Ros, Schulz, Isla, Shill, Jane Thornton, Evert Verhagen, Jackie Whittaker, Nana Ad, William, Adams, Eva Ageberg, Osman Ahmed, Clare Ardern, Martin Asker, en Berg, Mario Bizzini, Caroline Bolling, Matthew Bourne, Steven Broglio, Casey, Naama Constantini, Molly Coventry, Sallie Cowan, Meghan Cr, enport, Marc-Olivier Dubé, Paul Eliason, Stacey Emmonds, Allison Ezzat, Hi, i-Miche, Galarneau, Eric Gibson, Michael Girdwood, Christina Gomez, Li, id, Martin, Hägglund, K. Alix Hayden, Mel Hayman, Sharief Hendricks, Omar Heywar, Kolesky, Ash, Kolsted, Jae Hyung Lee, Hanna Lindblom, Justin Losciale, Destiny Lutz, Hana Marmura, Geraldine Marrens, Chelsea Martin, Maitland Martin, Shreya McLeod, Marienke van Middelkoop, Rami Mizuta, Nonhlanhla Mkunbuzi, Izzy Moore, Christine Holm Moseid, Myles Murphy, Julinan Ocarino, Carole Akiny, Okoth, Kati Pasanen, Marcella Pazzinatto, Kerry Peek, Babette Pluim, Nancy Harrington, D. Christa Janse van, Rensburg, Elonne, Geoff Schneider, Shurub Sharma, Heather Shepherd, Stacy Sick, Clara A. Soligon, Da, Sugimoto, Kristian Thorborg, Rita Tomás, Larissa Treace, Yuka Tsukahara, Stuart Warden, Stephen West, Matthew Whalan, Vanda White, Rod Whiteley, Fiona Wilson, Kate Yung, Phathokuhle Zondi

109

FAIR authors

Let's
Celebrate!

Steering Committee & Author Group



109 participants, mostly female/woman/girl (68%)



From 6 continents

- majority identified as white (81%)
- 14% from low- or middle-income countries

Experience (participation as athlete, referee, practitioner, research or administrative role and at any level (community - elite): female/woman/girl athletes in Paraspport 49%; Youth sport 90%; Senior sport 85%

Review 01

Prevention strategies and modifiable risk factors for **lower-extremity injury**: systematic reviews & meta-analyses

Review 02

Prevention strategies and modifiable risk factors for **upper-extremity injury**: systematic review & meta-analyses

Review 03

Prevention strategies and modifiable risk factors for **concussion**
systematic review & meta-analyses

Review 04

Prevention strategies & modifiable risk factors for **spine, chest, abdominal and/or pelvic injury/pain**: systematic review & meta-analyses

Review 05

Dissemination and implementation of injury prevention interventions a scoping review

Review 06

Gender and sex considerations in injury prevention: A concept mapping study

Review 07

Research priorities for female/woman/girl injury prevention: A Delphi study

WHAT

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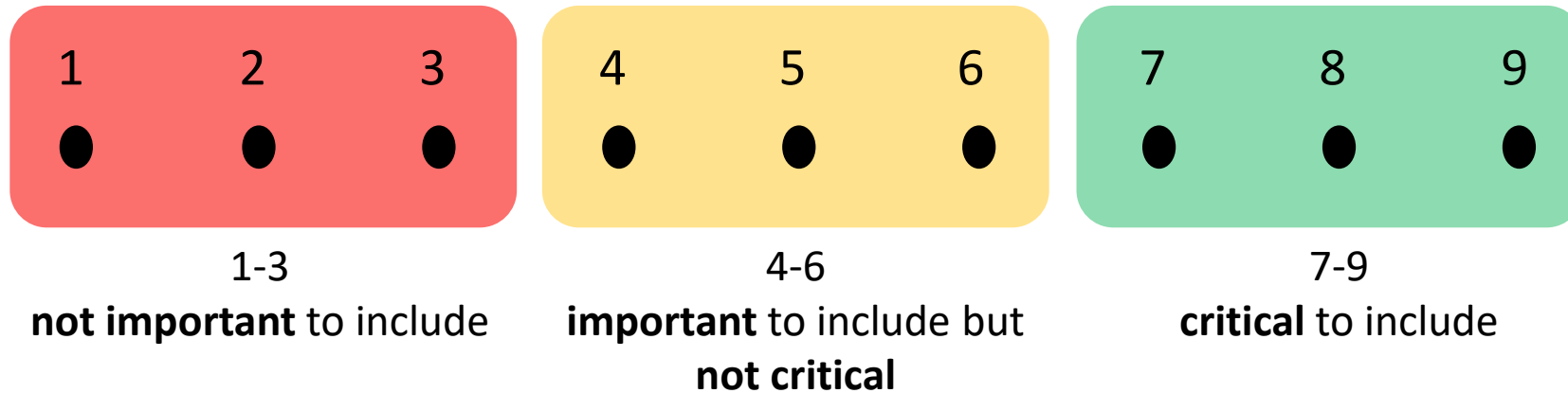
Research priorities for female/woman/girl injury prevention: A Delphi study

WHAT NEXT?

FAIR Recommendations: Voting

Not important to include

Critical to include



Definition of Consensus:

Consensus IN: Critical to include = $7-9 \geq 70\%$ and $1-3 \leq 15\%$

Consensus OUT: Not important to include = $1-3 \geq 70\%$ and $7-9 \leq 15\%$

Definition of no Consensus:

No consensus = neither criteria (i.e., $4-6 \geq 16\%$)



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IOC Consensus on Female, woman, and girl
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Prevention strategies & modifiable risk factors for
lower & upper extremity, concussion & spine+
injuries: Systematic reviews/meta-analyses



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Guiding Questions

In female/woman/girl athletes...

01

What prevention strategies (e.g., policy/rules, equipment, training, management) reduce

- Lower Extremity Injuries
 - Upper Extremity Injuries
 - **Concussions** (head impacts, head acceleration events)
 - Spine, Chest, Abdominal and/or Pelvic Injuries/Pain
- and are there any unintended consequences?**

02

What are the potential modifiable risk factors for

- Lower Extremity Injuries
- Upper Extremity Injuries
- **Concussions**
- Spine, Chest, Abdominal and/or Pelvic Injuries/Pain



Systematic Review **Methods**



Guidelines: The Cochrane Handbook guided conduct & PRISMA + PRISMA-search extension guided reporting of the review



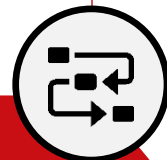
Data Sources & Search: 8 databases; search strategy with LE or UE injury, Concussion, Spine+ injury, sports & prevention & risk factor constructs; librarian scientist (Nov 2023)



Eligibility*: Primary data studies with a comparison group(s) investigating injury prevention strategies for injuries with ≥ 1 female/woman/girl in each study group



Data Extraction*: Study & participant features, outcome, intervention, estimates
Study Quality & Risk of Bias*: Downs and Black Quality Assessment Tool



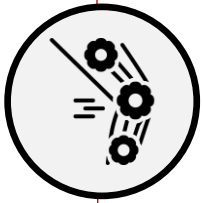
Synthesis: Meta-analyses if ≥ 3 studies with female/woman/girl data for a similar injury & statistic of effect. Semi-quantitative if ≤ 3 studies with heterogenous statistic.



Certainty of Evidence: GRADE or modified GRADE for interventions where a meta-analyses or semi-quantitative analyses was done

*Completed in duplicate

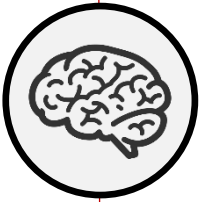
FAIR Systematic Review: **Results** → With a focus on prevention strategies



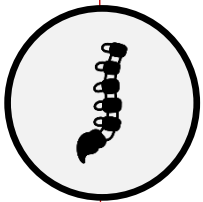
Prevention strategies and modifiable risk factors for **lower-extremity injury**: systematic reviews & meta-analyses



Prevention strategies and modifiable risk factors for **upper-extremity injury**: systematic reviews & meta-analyses

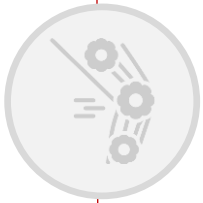


Prevention strategies and modifiable risk factors for **concussion (HIs & HAEs)**: systematic reviews & meta-analyses



Prevention strategies and modifiable risk factors for **spine, chest, abdominal & pelvic injury/pain**: systematic reviews & meta-analyses

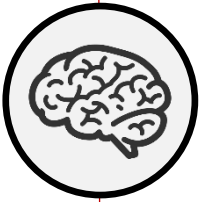
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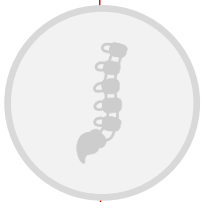
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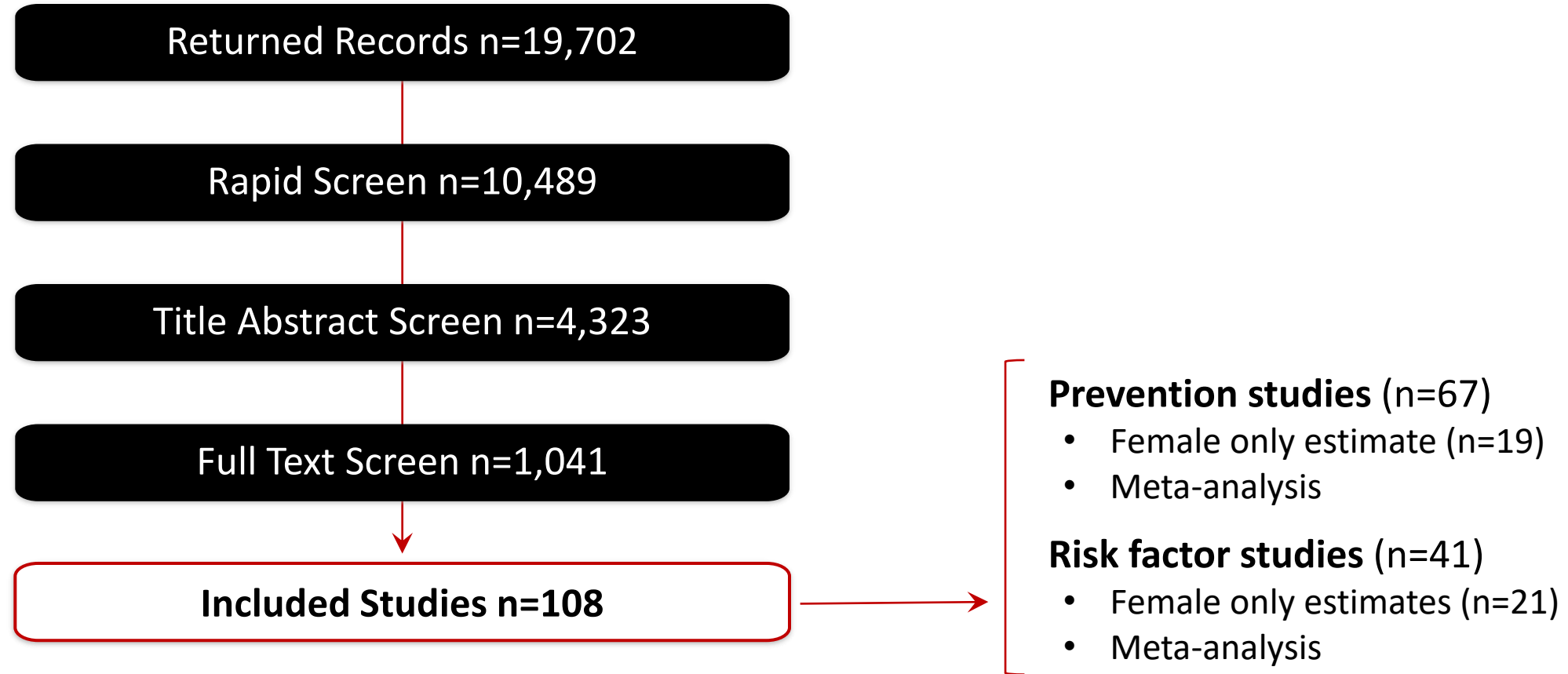


Prevention strategies and modifiable risk factors for **concussion (HIs & HAEs)**: systematic reviews & meta-analyses



Prevention strategies and modifiable risk factors for **spine, chest, abdominal & pelvic injury/pain**: systematic reviews & meta-analyses

Results: **Study Selection**

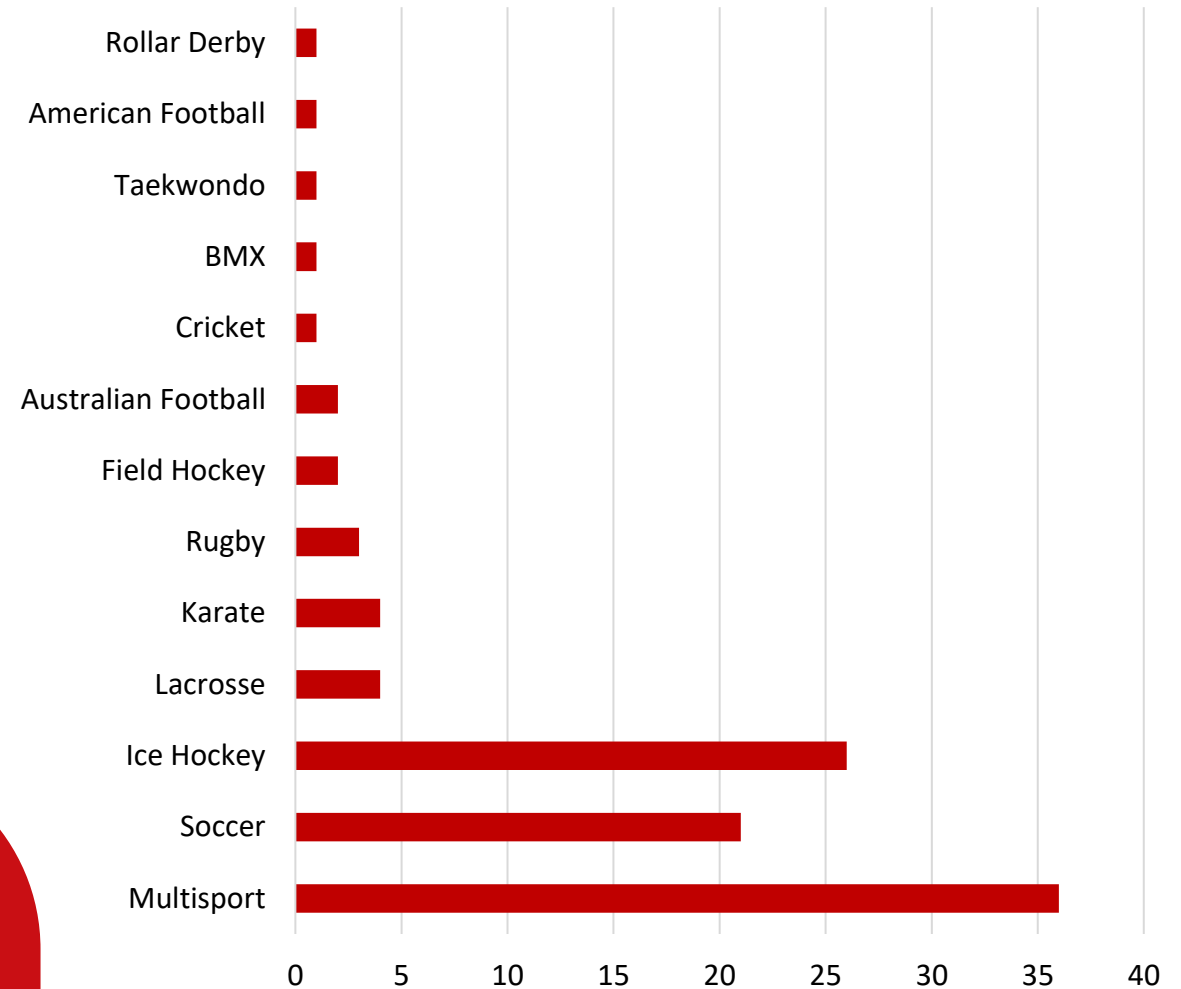


Results: Who

- n=108 studies (67 prevention, 41 risk factors)
- 37% with female/woman/girl-specific data
- ~451,635 participants*
- ~93,890* **(21%)** females/women/girls
- 67% ≤18 years of age
- 0% Para athletes

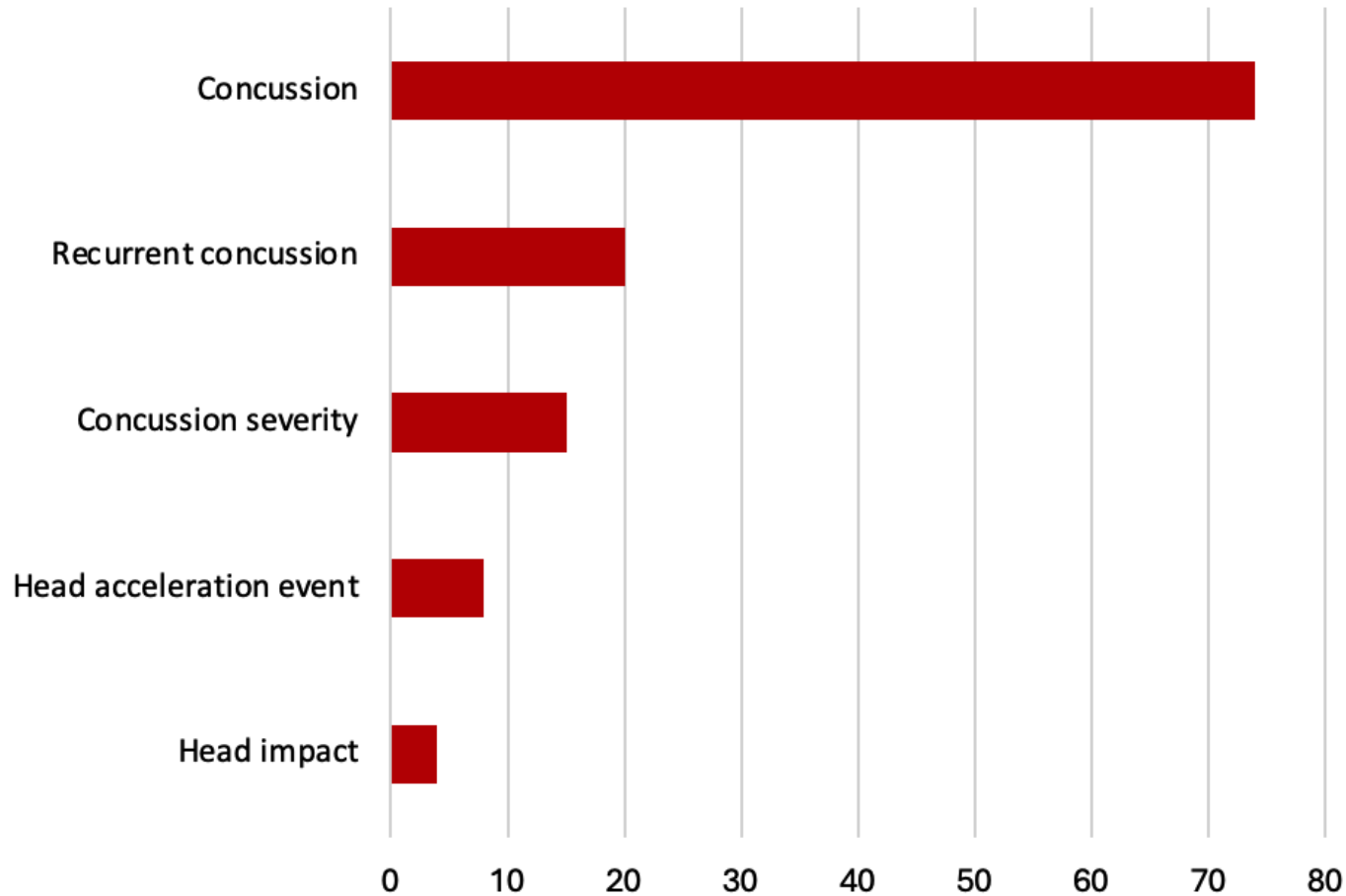
*13 papers reported player-matches, team-matches or athlete-exposures

13
sports



Number of Studies by Sport

Results: Injury Type



Number of Studies by Concussion Definition

5

concussion

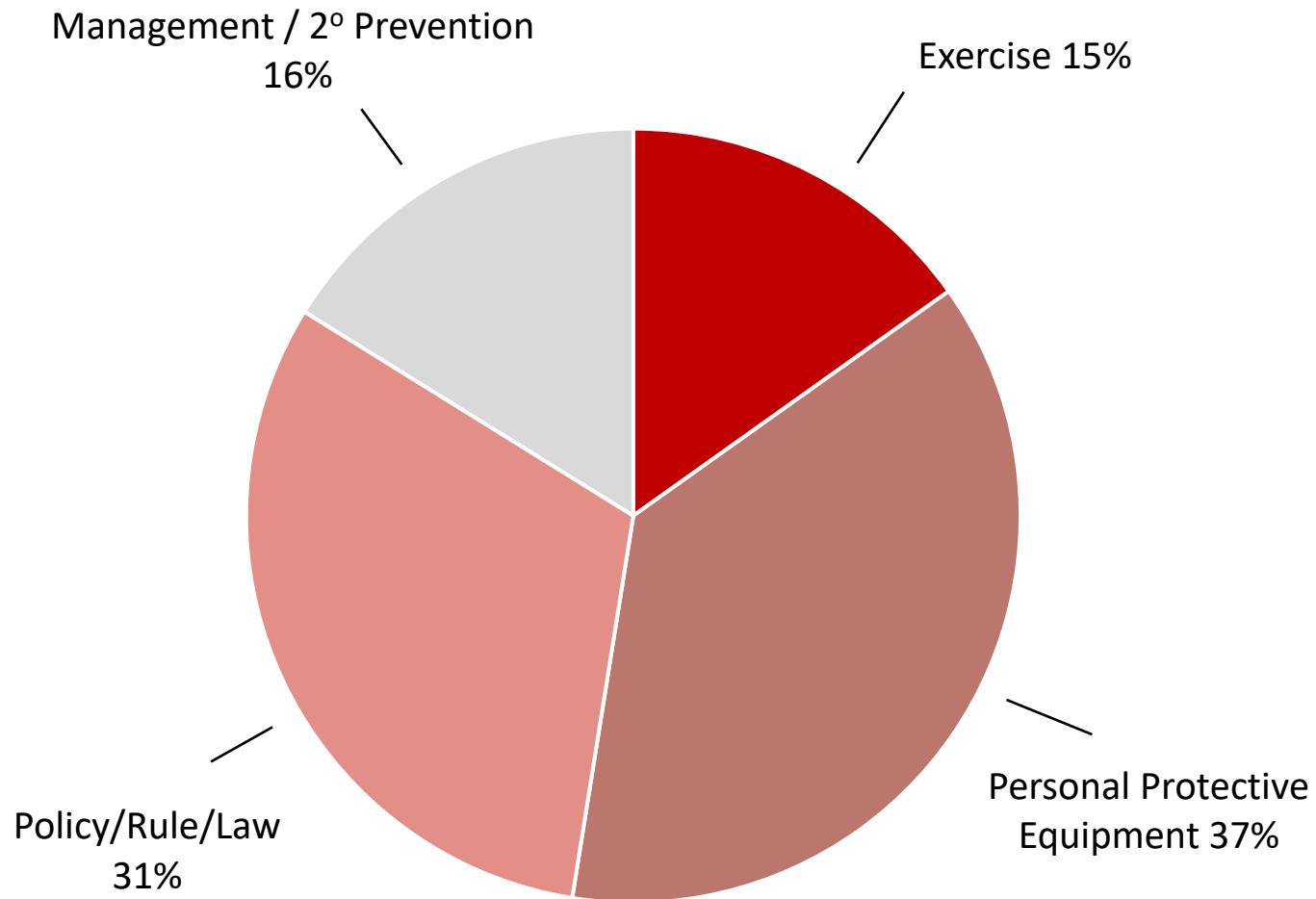
outcomes were included

69%

of studies focused on

concussion

Results: Prevention Strategies



28%
n=19



3+3



2

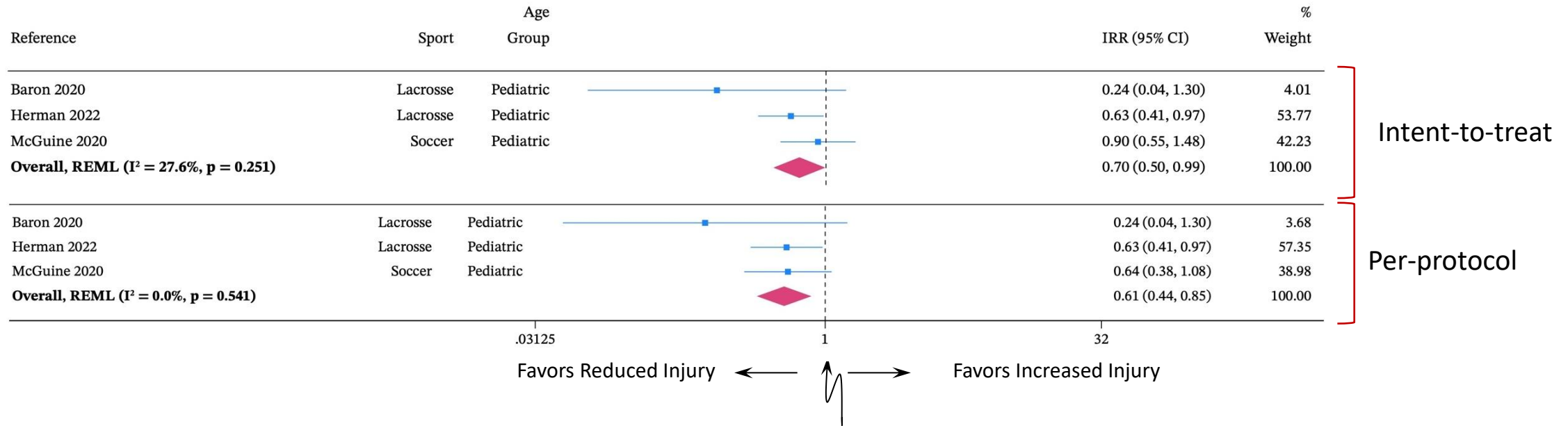
studies with
Female/Woman/Girl athlete data

assessed **headgear & eyewear**
(each) to prevent **concussion**

meta-analyses

- headgear
- eyewear

Results: Headgear & Concussions



Headgear reduces concussion by **30% (39% per protocol)**

IRR 0.61 (95%CI 0.44, 0.85)

(Very-Low Certainty Evidence)

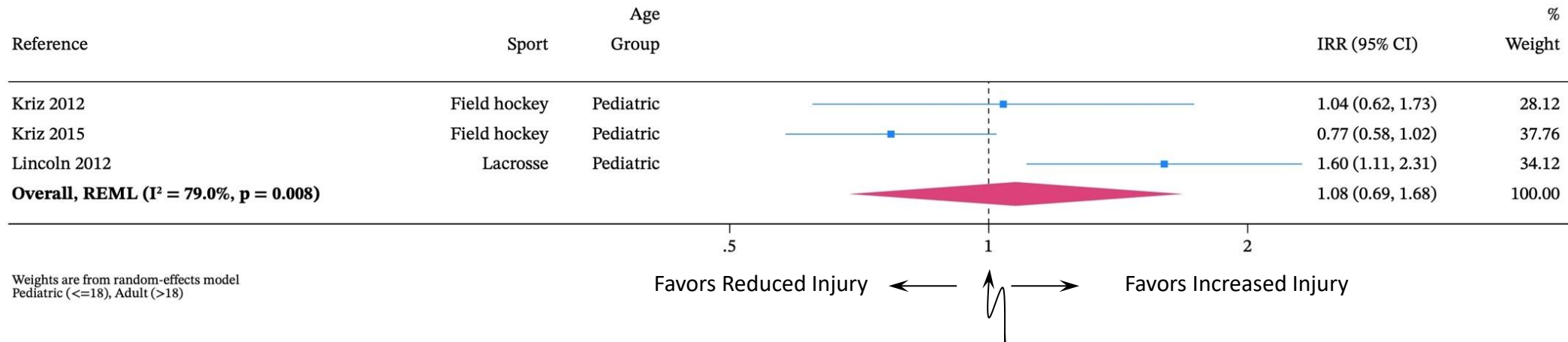


field lacrosse – hardshell



soccer – softshell

Results: Eyewear & Concussions



Eyewear DOES NOT reduce concussions

IRR 1.08 (95%CI 0.69, 1.68)

(Very-Low Certainty Evidence)

Results: Risk Factors

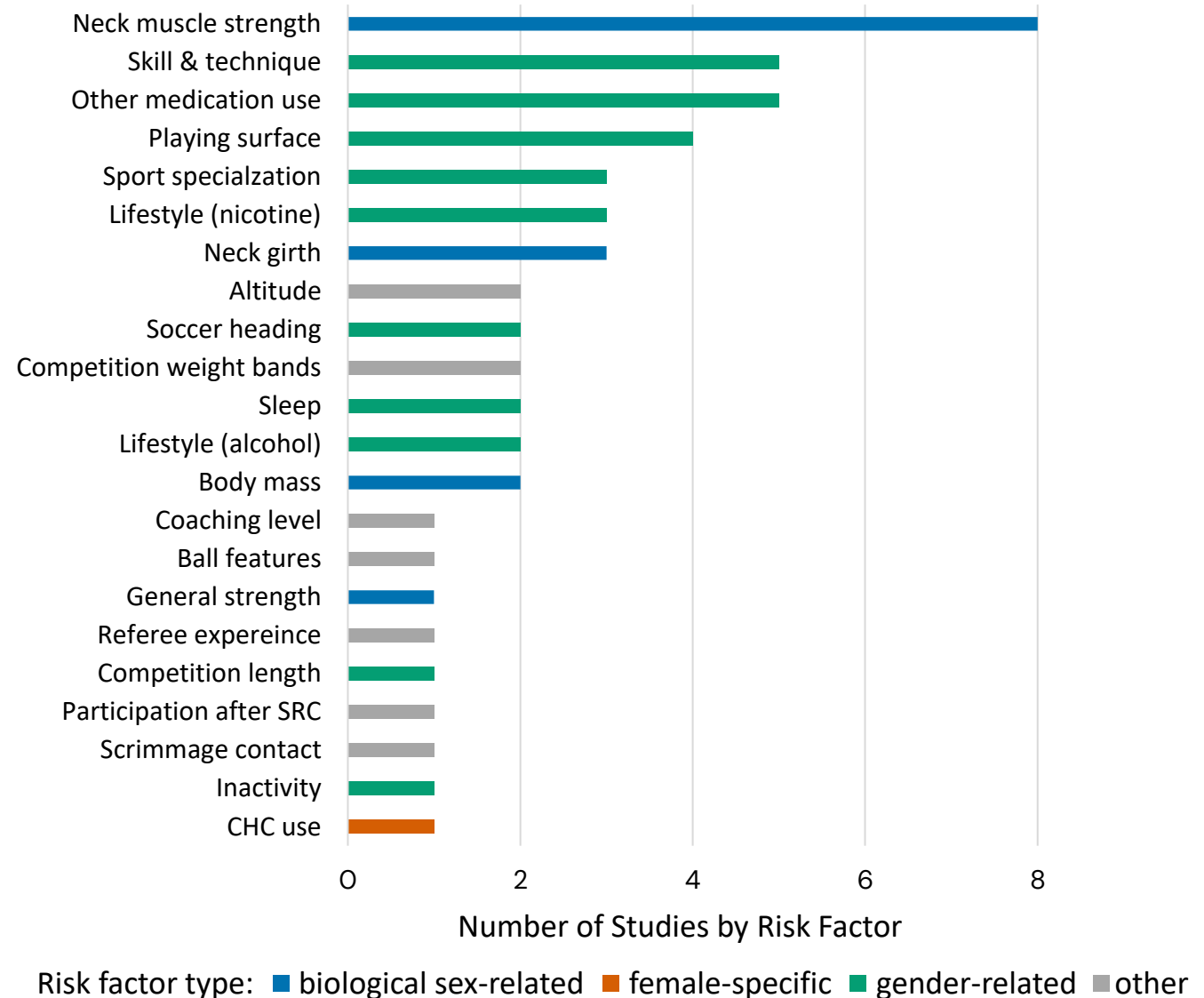
21 studies with Female/Woman/Girl data

34 risk factor categories

1 meta-analyses
- artificial turf

0 semi-quantitative analyses

1 narrative syntheses
- neck muscle strength



Results: Risk Factors for Concussion Summary

Insufficient Evidence	Unclear	No Relationship	Harmful	Protective
• anthropometric factors • lifestyle factors • training, • competition factors • skill & technique features • environmental factors • ball features	• neck muscle strength	• artificial turf (vs grass)		
				

Conclusions: Concussion Injury Prevention

Very-low certainty evidence that **Headgear REDUCE** F/W/G athletes' **concussion** (lacrosse & soccer))

artificial turf is NOT associated with F/W/G athletes' **concussions**

It is **UNCLEAR** if there are other gender/sex-specific modifiable risk factors

F/W/G athletes **MAKE UP ONLY 21%** of participants in concussion prevention or modifiable risk factors studies; and **ONLY 31%** of these studies report F/W/G athlete-specific findings



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Female, woman, and/or girl
Athlete Injury pRevention

IOC consensus on Female, woman, and girl
Athletes' Injury pRevention (FAIR)



Prevention Strategies Recommendations
Risk Factor Recommendations



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Female, woman and girls
Athlete Injury pRevention



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FAIR Prevention Recommendations

Policy/Rule/Laws

3 recommendations

Personal Protective Equipment

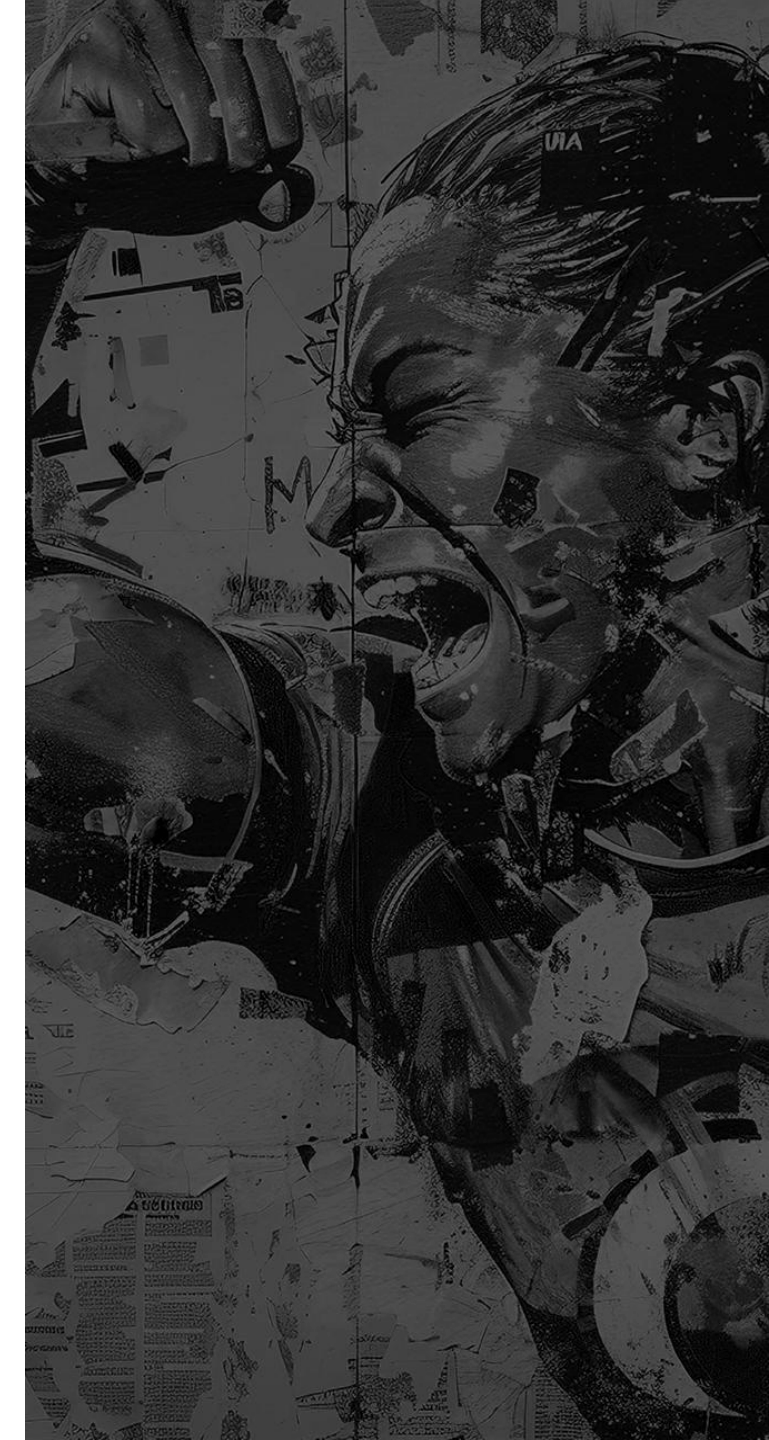
5 recommendations

Training (Exercise)

1 recommendation

Management / 2° Prevention

2 recommendations



FAIR Recommendations

SHOULD

COULD

MAY

MAY NOT

SHOULD NOT

UNCLEAR

SHOULD : very confident in the recommendation & the evidence matches with expert opinion

COULD : moderately confident in the recommendation & the evidence matches with expert opinion

MAY : evidence is weak (could be interpreted in different ways) & expert opinion supported the recommendation

MAY NOT : evidence is weak & expert opinion did not support the recommendation

SHOULD NOT : very confident in the recommendation & the evidence matches with expert opinion

UNCLEAR : insufficient and/or conflicting evidence

FAIR Prevention Recommendations

Policy/Rule/Laws

Personal Protective Equipment

Training (Exercise)

Management / 2° Prevention



FAIR Prevention Strategies Policy/Rule/Law

Limit contact practice



Limit contact practice

SHOULD be implemented in American football
(concussions, head impacts, head acceleration events)

FAIR Prevention Strategies **Policy/Rule/Law**

Reduce head-to-head & head-to-shoulder contact



Limit contact practice

Reduce head-to-head & head-to-shoulder contact

COULD be implemented in rugby & other collision sports
(head impacts)

FAIR Prevention Strategies **Policy/Rule/Law**

Ban heading in soccer



UNCLEAR in child & adolescent soccer
(concussions, unintended consequences including delayed skill development or future concussion)

Limit contact practice

**Reduce head-to-head &
head-to-shoulder contact**

Ban heading in soccer

FAIR Prevention Recommendations

Personal Protective Equipment

Policy/Rule/Laws

Training (Exercise)

Management / 2° Prevention



FAIR Prevention Strategies Equipment

Mouthguards



Mouthguards



SHOULD be mandated in child & adolescent ice hockey
(concussions & orofacial injuries)

MAY be used in adult & Para ice hockey (concussions & orofacial injuries)

MAY be used in all collision sports (orofacial injuries)

FAIR Prevention Strategies Equipment

Helmets



Mouthguards

Helmets

SHOULD be worn in cycling, snowboarding, skateboarding & equestrian (concussions)

COULD be worn in sports where helmets are mandated to prevent skull fractures & TBI (concussions)

FAIR Prevention Strategies Equipment

Hard-shell Headgear



Mouthguards

Helmets

Hard-shell headgear

COULD be worn in adolescent lacrosse (concussions)

FAIR Prevention Strategies **Equipment**

Neck guards/protectors



SHOULD be worn in collision/contact sports (neck lacerations)

Mouthguards

Helmets

Hard-shell headgear

Neck guards/protectors

FAIR Prevention Strategies Equipment

Face shields



MAY be worn in helmeted sports (orofacial injuries)

Mouthguards

Helmets

Hard-shell headgear

Neck guards/protectors

Face shields

FAIR Prevention Recommendations

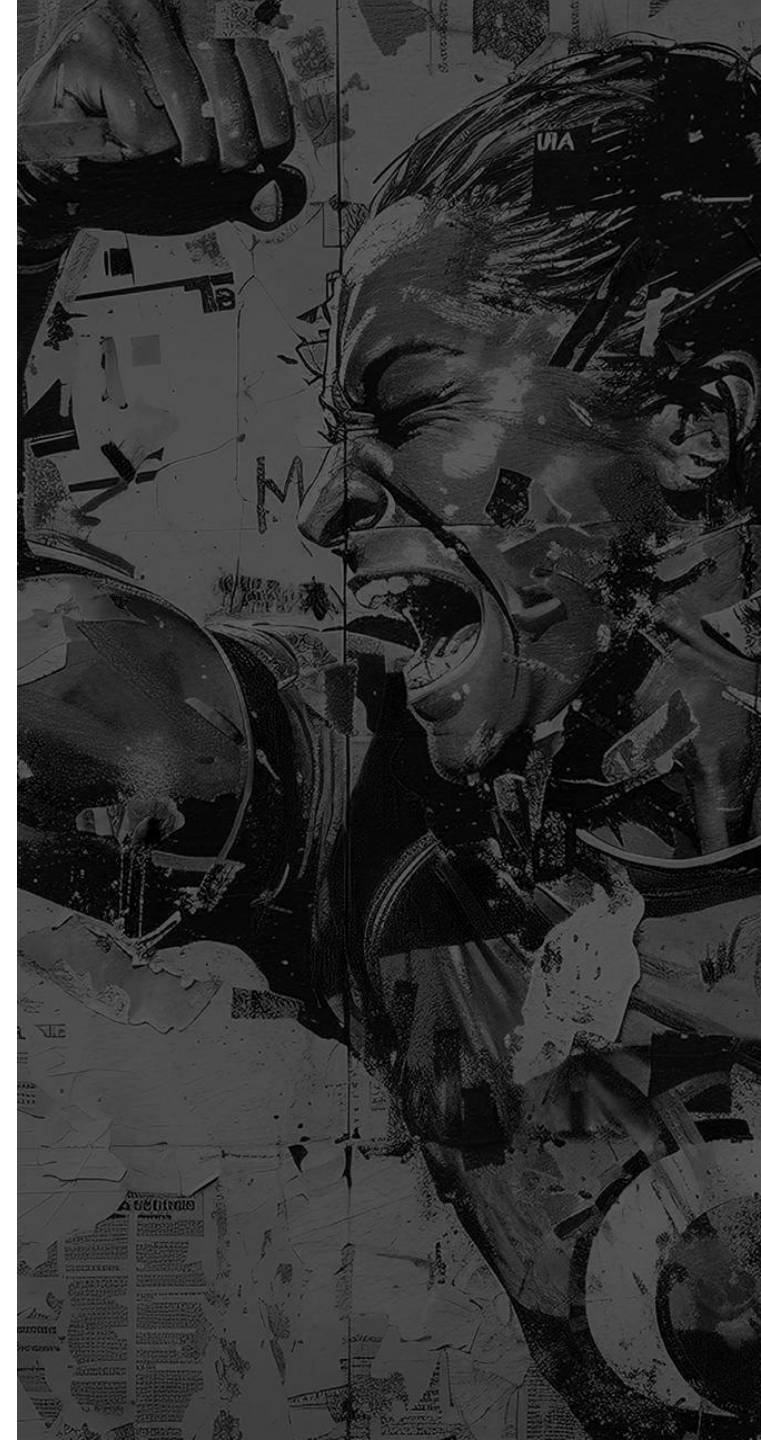
Policy/Rule/Laws

Personal Protective Equipment



Training (Exercise)

Management / 2° Prevention



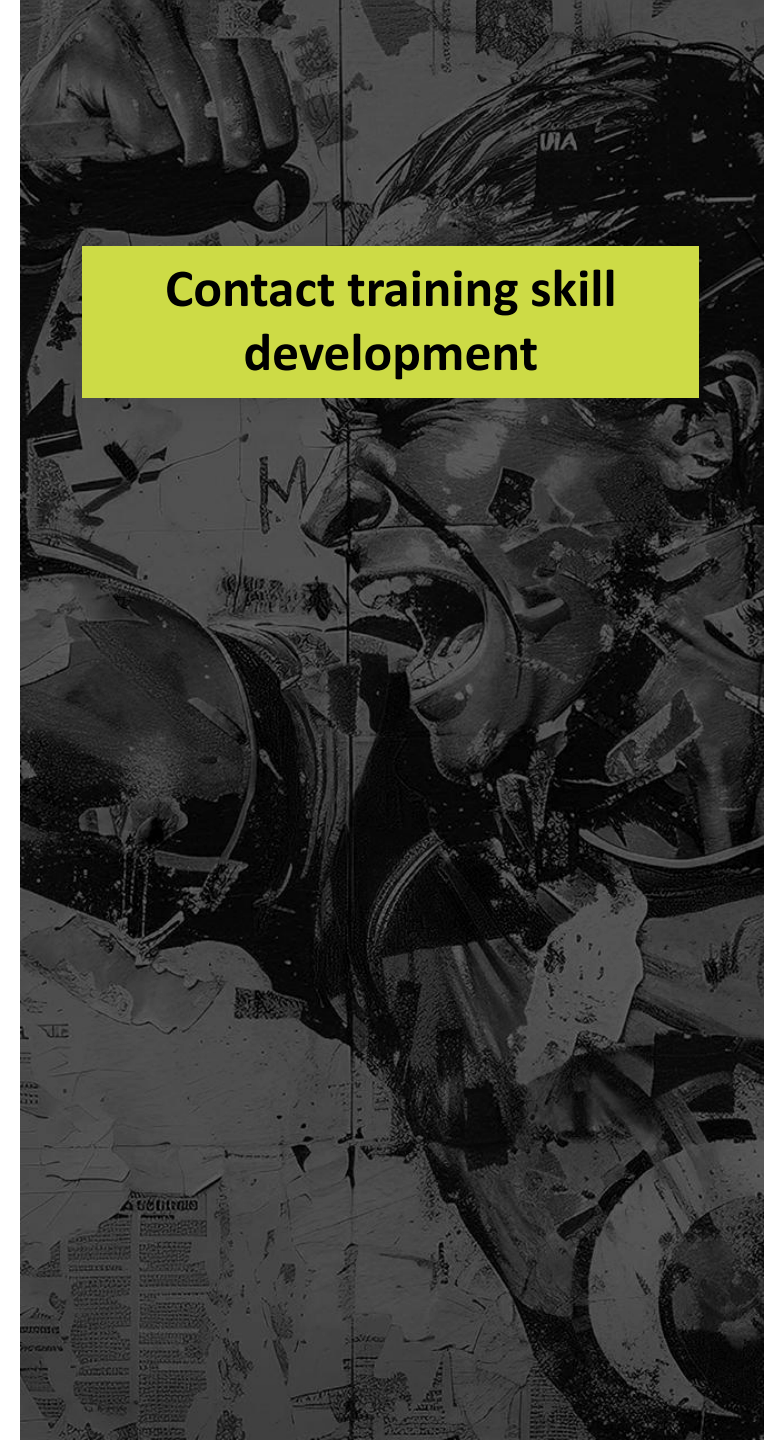
FAIR Prevention Strategies Training

Contact training skill development



MAY be used across all ages and collision sports, including Para sport (1st time & recurrent concussions)

Contact training skill development



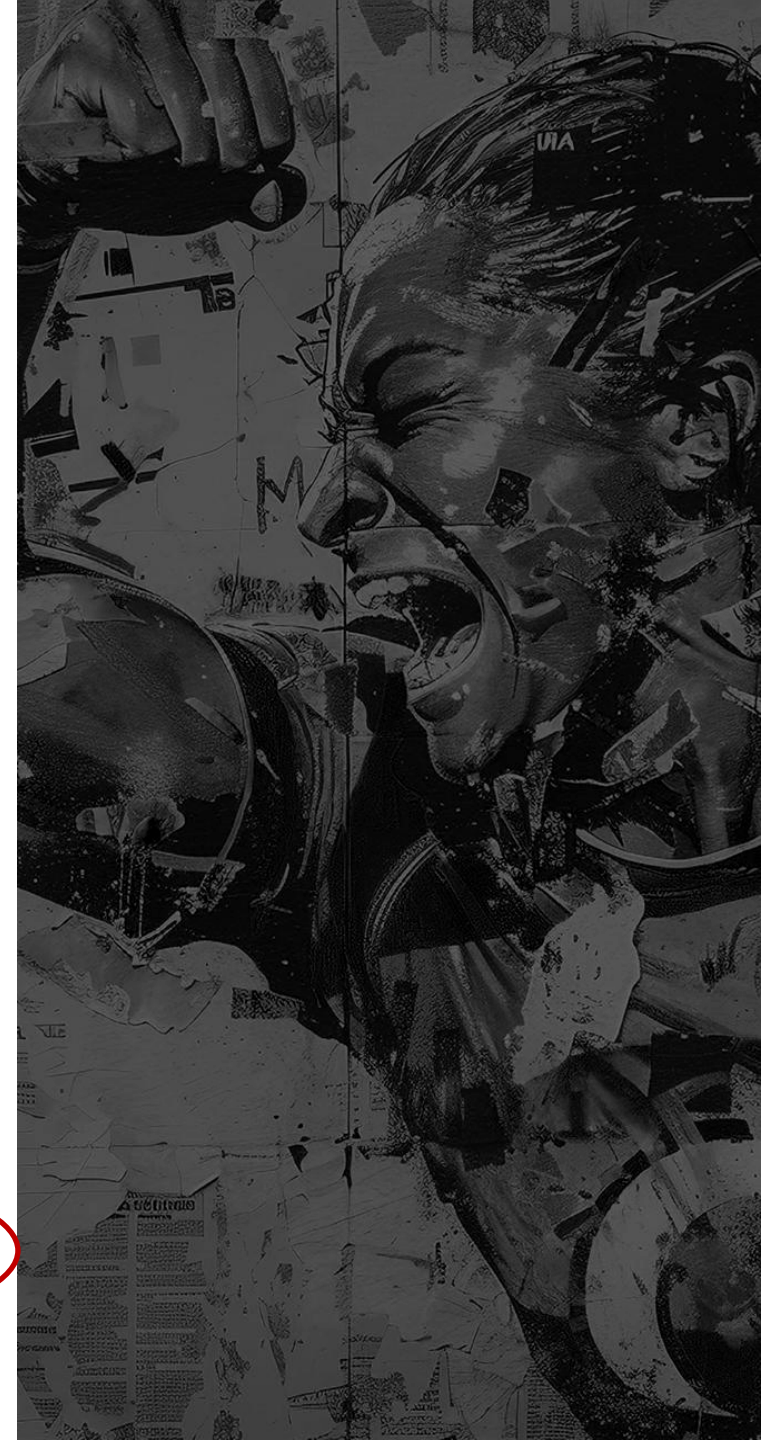
FAIR Prevention Recommendations

Policy/Rule/Laws

Personal Protective Equipment

Training (Exercise)

Management / 2° Prevention



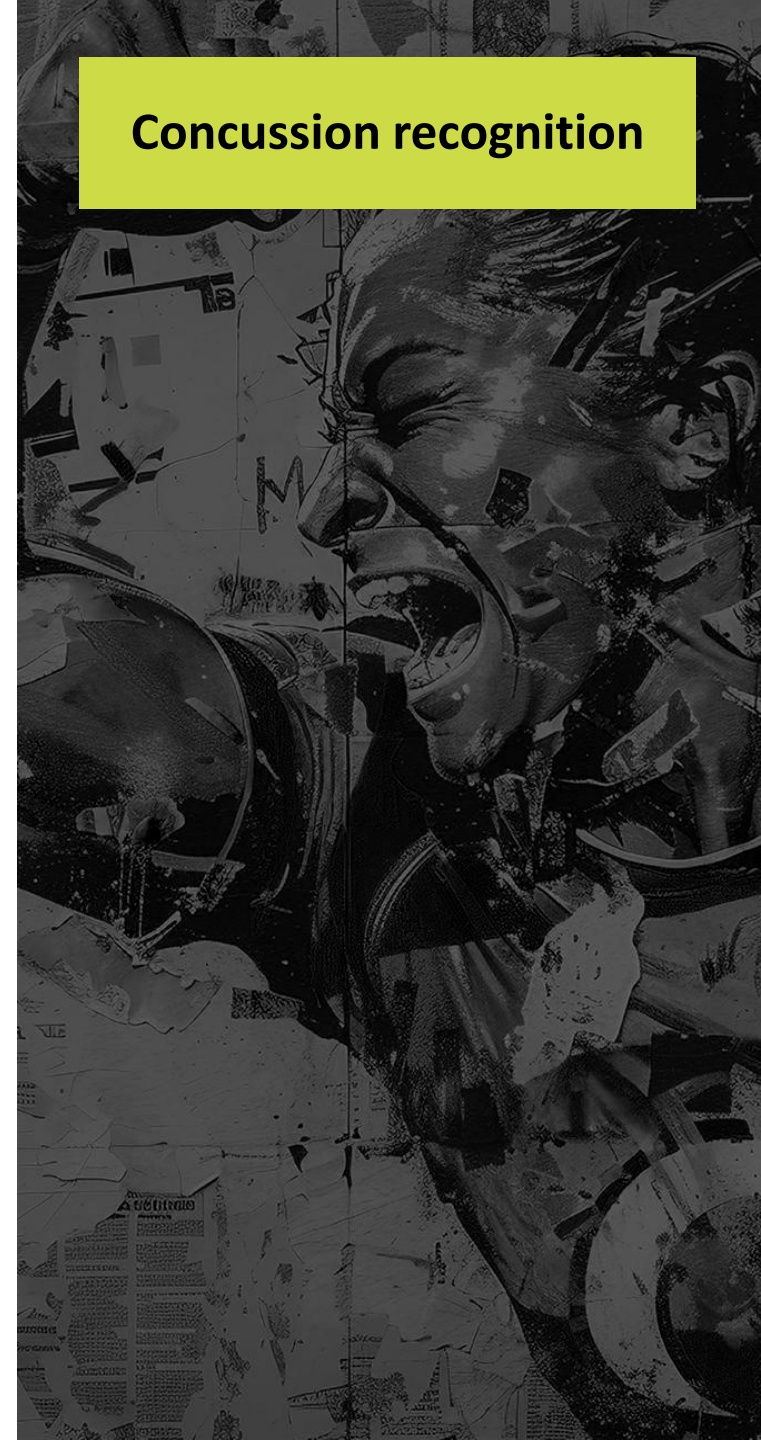
FAIR Prevention Strategies Management

Policies/rules/laws & referee training
to enable Concussion recognition



MAY be implemented in rugby & other contact/collision sports
(recurrent head impacts & concussions)

Concussion recognition



FAIR Prevention Strategies Management

Evidence-based injury management



SHOULD be mandated in all sports (recurrent injuries/concussions)

Concussion recognition

Evidence-based injury management



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Prevention Strategies Recommendations
Risk Factor Recommendations



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FAIR Risk Factor Recommendations

Concussion

3 recommendations



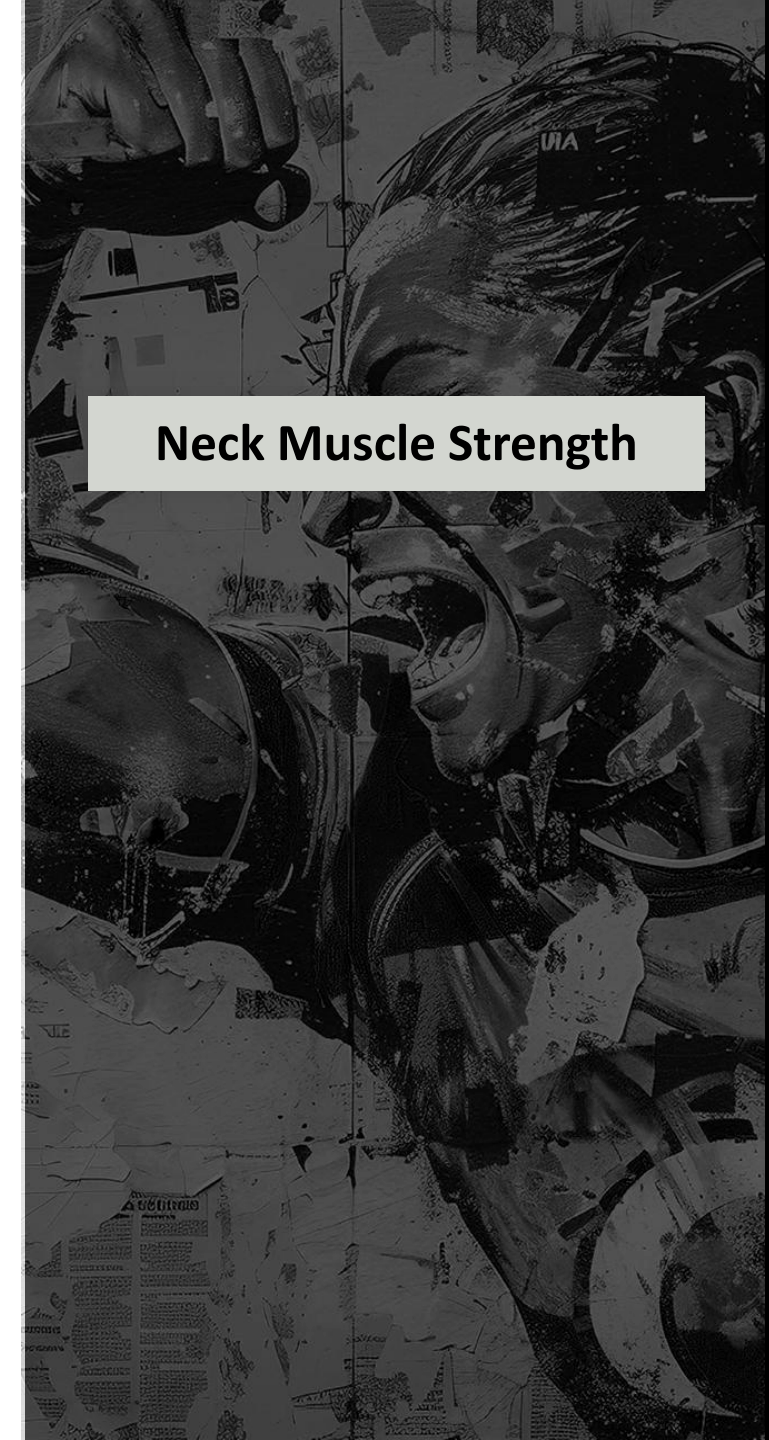
FAIR Risk Factor Recommendations

Concussion

- Head Impacts (neck)
- Concussion (neck)



Neck Muscle Strength



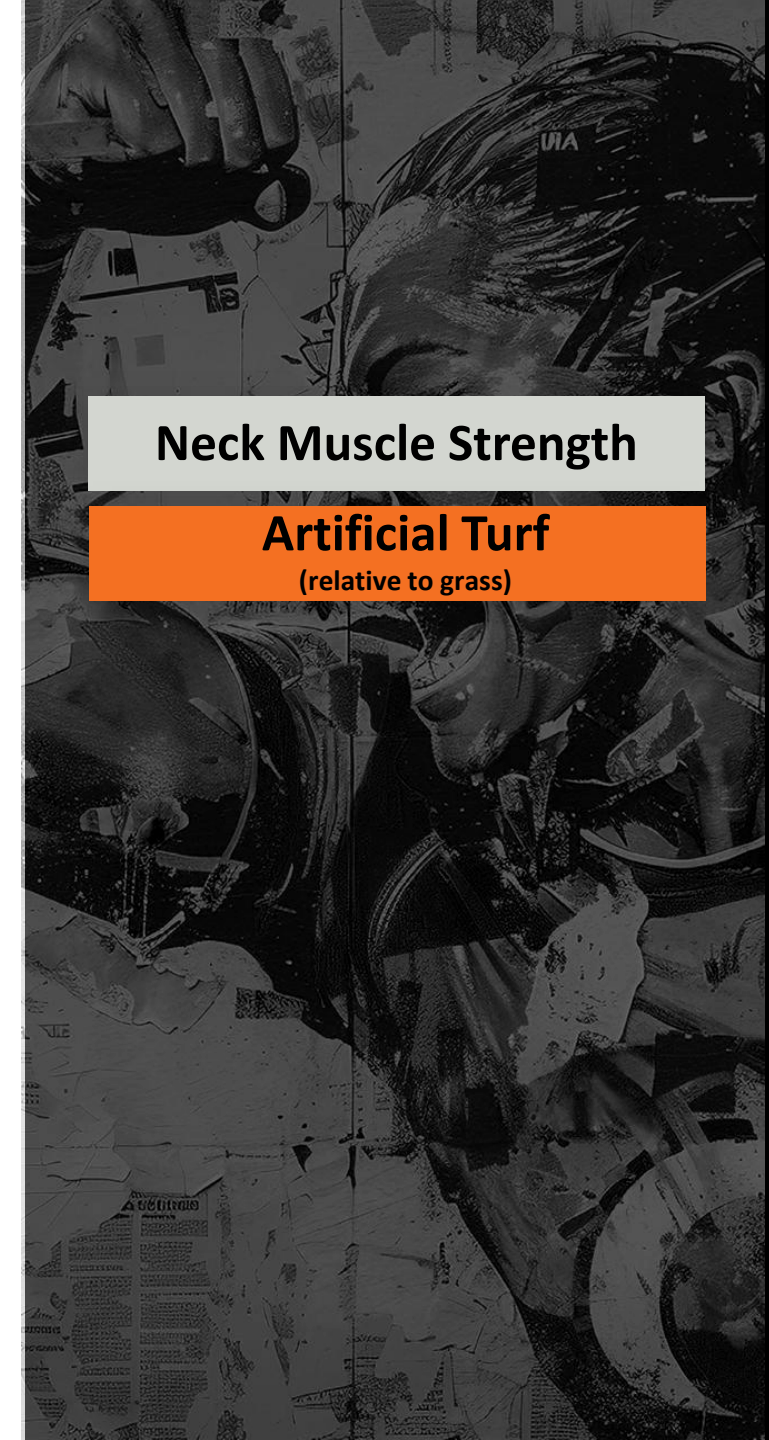
FAIR Risk Factor Recommendations

Concussion



Neck Muscle Strength

Artificial Turf
(relative to grass)



FAIR

Risk Factor Recommendations

Concussion

MAY neck muscle strength (head impacts)

MAY NOT artificial turf

UNCLEAR neck muscle strength (concussion)





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Acknowledgements

- Kay Crossley, Carolyn Emery & Jackie Whittaker for leadership
- Jackie Whittaker, Kay Crossley, Whiteleaf Solutions, and all Evidence Review Leads for the slides
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- 109 FAIR authors for their contributions
- Support from International Olympic Committee Health, Medical & Science Department & British Journal of Sports Medicine



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Athlete Injury pRevention



white leaf
SOLUTIONS



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What's FAIR?

FAIR stands for Female, woman, and/or girl Athlete Injury pRevention. FAIR is a global effort to improve injury prevention in female, women, and/or girl sport by turning research and real-world experience into clear, practical recommendations. These recommendations are designed to support athletes and the people around them – including coaches, parents, teachers, healthcare and exercise professionals, and sport leaders.

FAIR Activities

Synthesize evidence to:

Identify prevention interventions and modifiable risk factors for female/woman/girl athlete injuries, including:

- Lower extremity
- Upper extremity
- Concussion
- Spine, chest, abdomen, and pelvis

Describe best practices for disseminating and implementing injury prevention for female/woman/girl athletes.

Publications

Recommendations

Create **NEW evidence** on the gender/sex factors related to injury in female/woman/girl athletes:

Develop **practical recommendations**, informed by the empirical and experiential evidence for injury prevention in female/woman/girl athletes

Develop **research recommendations**, informed by a DELPHI study, for injury prevention in female/woman/girl athletes – coming soon

Engage with **sport partners** (athletes/players and their entourage – coaches, parents, teachers, health/exercise practitioners, administrators) to create outputs that are relevant and accessible

Author Group

Tip: Click any pin to see authors' names and clickable links to their profiles



Author Group: n = number of authors at that location. Note: author location is the country of residence at the time of the review

Who are FAIR?

The FAIR Consensus Steering Committee planned and designed this project.

One hundred nine authors from six continents conducted the Evidence Reviews.

FAIR Steering Committee



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E



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