

# **"Internationalising the approach to concussion management in para athletes: the current landscape and future trajectories"**

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# Financial Disclosures

- **Employed roles:**

- *The Football Association, UK*
- *University Hospitals Dorset NHS Foundation Trust, UK*



# About me

- Physiotherapist based in England
- PhD on Sports Concussion and Facebook
- 20 years clinical experience in Disability (Para) Football including x2 Paralympic Games
- Para Football Physiotherapy Lead at the Football Association (England)
- Multiple voluntary Para Sport governance roles
- Co-Chair of “Concussion in Para Sport Group”



# Contents

- Current landscape of concussion in para sport
- The work of the Concussion in Para Sport group
- International efforts and collaborations
- Future trajectories
- Resources and references



# Terms and definitions

## Para athlete

- A general term for athletes with a disability who play sport but have not competed at a Paralympic Games/play in a sport not affiliated to the Paralympic Games.

## Paralympian or Paralympic athlete

- An athlete is Paralympian once they have taken part in a Paralympic Games.



# Historical perspective on concussion in para sport pre-2021

- Para clinicians and para athletes were guided by previous Summary/Agreement and Consensus statements....
- ....but all statements upto 2016 had no mention of para athletes or para concussion
- “Diverse heterogeneity” in para athletes, with different and unique challenges to clinical care
- No framework or guidance to assist management of para athletes
- Not equitable care for para athletes with concussion





# Concussion in Blind football



# The Concussion in Para Sport (CIPS) Group

- Formed in 2020 via snowball recruitment
- Initial aim of CIPS group to create a preliminary guidance document to help shape the management of concussion in the Para athlete
- Broader purpose to translate clinical research on concussion for the benefit of the Para athlete
- No funding or commercial associations for CIPS
- 11 tri-annual online meetings conducted to date
- Athlete representation as part of group
- Currently gaps remain in geographical representation (especially Asia, Africa, Australasia)





# 1<sup>st</sup> Position statement of the Concussion in Para Sport group- 1<sup>st</sup> aim achieved!



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Tools



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Consensus statement

## Concussion in para sport: the first position statement of the Concussion in Para Sport (CIPS) Group

 Richard Weiler<sup>1, 2, 3</sup>,  Cheri Blauwet<sup>4, 5</sup>, David Clarke<sup>6</sup>,  Kristine Dalton<sup>7</sup>,  Wayne Derman<sup>8, 9</sup>,  Kristina Fagher<sup>10</sup>,  Vincent Gouttebarga<sup>1, 11</sup>,  James Kissick<sup>12, 13</sup>,  Kenneth Lee<sup>14</sup>,  Jan Lexell<sup>10</sup>,  Peter Van de Vliet<sup>15</sup>,  Evert Verhagen<sup>1</sup>,  Nick Webborn<sup>16</sup>,  Osman Hassan Ahmed<sup>3, 17, 18</sup>

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PDF



PDF +  
Supplementary  
Material



XML



# Para concussion management guide from the CIPS Position Statement

**Table 1**

Para concussion considerations for return to play

	Concussion suspected—remove athlete from play	Brief period of physical and cognitive rest	Gradual and progressive increase in activity while staying below their cognitive and physical thresholds (activity should not worsen symptoms)	Graduated return to school should come before return to sport.	Return to school strategy: 1. activities at Home that do not produce symptoms, 2. School activities at home, 3. Return to school part time, 4. Return to school full time	Return to sport strategy: 1. symptom limited activity, 2. Light aerobic exercise, 3. Sport specific exercise, 4. Non-contact drills, 5. Return to sport	Management of persistent symptoms (symptoms which persist beyond 10–14 days in adults, or beyond 4 weeks in children)
Impaired muscle power—spinal cord injury	No variation from standard management	For w/c users, physical rest may need to include considerations regarding manual w/c use and transfers	Mechanism for testing submaximal exercise challenge may need modification; balance testing and testing of reaction time may need to be augmented to accommodate baseline weakness and balance deficits	No variation from standard management	No variation from standard management	Mechanism for return to sport should be sport-specific and adapted to the individuals Para sport (ie, generic approach not appropriate)	Mechanism for implementing certain aspects of vestibular therapy requires augmentation for w/c users; Mechanism for implementing c-spine rehabilitation may require augmentation for those with h/o cervical SCI
Impaired muscle power - lower motor neuron	No variation from standard management	For w/c users, physical rest may need to include considerations regarding manual w/c use and	Mechanism for testing submaximal exercise challenge may need modification; balance testing and testing of	No variation from standard management	No variation from standard management	Mechanism for return to sport should be sport-specific and adapted to the individuals Para sport (ie, generic approach	Mechanism for implementing certain aspects of vestibular therapy requires augmentation for w/c users;



# Additional outputs from CIPS Position Statement

## BJSM Podcast



## BJSM Infographic

**The 1st Position Statement of the Concussion in Para Sport (CIPS) Group**

Weiler, R., Blauwet, C., Clarke, D., Dalton, K., Derman, W., Fagher, K., Gouttebauge, V., Kissick, J., Lee, K., Lexell, J., Van de Vilet, P., Verhagen, E., Webb, N., & Ahmed, O.H. *BJSM*. doi: 10.1136/bjsports-2020-103696

Infographic by Adam Virgile

### THE CONCUSSION IN PARA SPORT (CIPS) GROUP

- Previous International Concussion in Sport Consensus Statements have not addressed the needs of para athletes.
- The CIPS group was formed to provide a framework for the assessment, treatment, and return to play after concussion in the para athlete.
- The CIPS contributors are a diverse, multidisciplinary group with athlete representation, dedicated to improving para sport concussion research and standards of care.

### STANDARD POST-CONCUSSION RETURN TO PLAY PROTOCOL: MODIFICATION AREAS FOR PARA ATHLETES

Many areas of standard concussion protocols require special attention and/or modification of these recommendations for para athletes, depending on the unique nature of impairment.

■ Standard management    ▲ Modifications advised for para athletes

	PARA SPORT IMPAIRMENT								
	Impaired muscle power-spinal cord injury	Impaired muscle power-lower motor neuron	Impaired passive range of movement	Amputee or limb deficiency	Leg length difference	Short stature	Upper motor neuron conditions	Visual impairment	Intellectual impairment
Rest	▲	▲	■	■	■	■	▲	■	▲
Active rest	▲	▲	▲	▲	▲	■	▲	■	▲
Gradual return to activities	■	■	■	■	■	■	■	■	▲
Return to school/work progression	■	■	■	■	■	■	▲	▲	▲
Return to sport progression	▲	▲	▲	▲	▲	■	▲	▲	▲
Persistent symptom management	▲	▲	▲	▲	▲	■	▲	▲	▲

### MAIN TAKEAWAYS

- 1 The Sport Concussion Assessment Tool 5 (SCAT5) should be used for concussion assessment for para athletes; the CIPS appendices should guide the interpretation of the SCAT5 results.
- 2 The SCAT5 should not be used by itself to diagnose concussion in para athletes; para athletes may have a concussion even if their SCAT5 is deemed to be 'normal'.
- 3 Periodic baseline pre-participation evaluations (including the SCAT5) are essential to determine a baseline reference point for concussion symptoms in para athletes.

### CIPS ASSESSMENT TOOLS

**ON-FIELD TOOLS**

**OFF-FIELD TOOLS**





# The Concussion in Para Sport Group

**Osman Hassan Ahmed**

**Kristine Dalton**

**David Clarke**

**Carolyn Emery**

**Kristina Fagher**

**Vincent Gouttebarge**

**Kenneth Lee**

**Peter Van de Vliet**

**Evert Verhagen**

**Richard Weiler**

**Cheri Blauwet**

**Wayne Derman**

**Jamie Kissick- RIP**

**Nick Webborn**

**Carolyn Emery**

**Francois Prince**

**Francine Pilon**

**Anna Guenther**

**Ryan Moran**

**Phoebe Runciman**

**Tamerah Hunt**

**Katie Mitchell**

**Racheal Smetana**

**Shelina Babul**

**Mohammed Nadir Haider**



# Collaboration to date with the Concussion in Sport Group

- CIPS members (myself and Dr Cheri Blauwet) invited onto the Concussion in Sport Group Scientific Committee
- Delivered session at 2022 Amsterdam CISG conference on Para sport
- Para athlete “Athlete voice” session
- Recognition in all keynote sessions and Systematic Reviews of absence of Para-related content
- Para sport input in post-conference consensus meeting and outputs





## Para sport

*Participation in sport across the lifespan for people with disabilities, estimated at 15%–25% of the global population, is increasing.<sup>89</sup> Modern definitions of disability are broad-ranging and inclusive of impairment types that span the Paralympic movement (eg, physical disability, blind/low vision, intellectual disability), Special Olympics (eg, intellectual disability, developmental disability) and Deaflympics (eg, deaf, hard of hearing).<sup>90</sup> Many people with disabilities also participate, train and compete in mainstream sporting environments.*

The concussion experience of the para athlete is unique, due to the interaction of the individual's primary impairment and the pathophysiology of concussion. Para athletes may experience a concussion in widely played sports like ice hockey and soccer, as well as in para athlete-specific sports such as wheelchair racing and para swimming.<sup>91 92</sup> Commonly used SRC tools (eg, SCAT) are not validated in the para athlete population, who require a more individualised approach.

*Although the literature describing SRC in people with disabilities is limited, elite Paralympic athletes are known to be at higher risk of injury when compared with athletes with no disability.<sup>93–95</sup> Additionally, athletes with visual impairment may be at even greater risk of concussion, as the mechanisms of injury in this population are primarily through collisions or direct head contact.<sup>96 97</sup> Moreover, it is likely that prevention approaches, detection of initial symptoms, diagnosis, recovery (ie, potential for persisting symptoms of concussion) and treatment strategies*

*may be impacted by the characteristics of the individual's underlying impairment.*

*The recent position statement of the Concussion in Para Sport Group summarised expert opinion regarding concussion prevention, assessment and management in para sport participants.<sup>96</sup> Most significantly, (1) individuals may benefit from baseline testing given the variable nature of their disability and the potential for atypical presenting signs/symptoms of concussion, (2) individuals with a history of central nervous system injury (eg, cerebral palsy, stroke) may require an extended period of initial rest, (3) testing for symptoms of concussion through recovery may require modification such as the use of arm ergometry as opposed to a treadmill/stationary bike and (4) RTS protocols must be tailored and include the use of the individual's personal adaptive equipment and, for applicable participants with visual impairment, partnership with their guide.*

*Future research is needed to enhance our knowledge of concussion assessment and management in para sport participants. This should include longitudinal injury surveillance to examine modifiable risk factors and prevention strategies, establishing reference data for commonly used assessment tools, evaluating outcomes of concussion and the intersection of the individual's primary impairment type and understanding the unique challenges of under-researched subpopulations such as the female and child/adolescent with a disability.*



# What do (don't?) we know about concussion research in para sport right now?

- Limited number of data-driven studies, especially prospective studies with sole focus on concussion
- IPC data collection started at 1996 Paralympics and has now expanded to all summer and winter Paralympic games
- Resource, capacity, and expertise limit data collection for para athletes outside of Paralympic sports and major events
- Particular gaps in knowledge for female and paediatric para athletes, in keeping with concussion research more broadly



# Sweden

- 107 elite Swedish male and female para athletes
- Weekly self-report using a smartphone app
- Majority of injuries (69%) sustained during training
- Athletes with visual impairment had some of highest rates, along with female athletes
- Incidence of concussion comparable to able-bodied sport

> [Brain Inj.](#) 2021 Jul 3;35(8):971-977. doi: 10.1080/02699052.2021.1942551. Epub 2021 Jun 29.

## **Incidence of sports-related concussion in elite para athletes – a 52-week prospective study**

Jan Lexell <sup>1</sup> <sup>2</sup>, Gustav Lovén <sup>1</sup>, Kristina Fagher <sup>1</sup>





# USA



- 21 wheelchair athletes (male and female) from University basketball and tennis squads
- Wheelchair Error Scoring System (WESS) used as a modified balance assessment across stable/unstable surfaces
- Athletes in study reported more baseline symptoms than normative reference values for college athletes
- WESS is a viable alternative to the BESS for para athletes

*Journal of Athletic Training* 2020;55(8):856–862  
doi: 10.4085/1062-6050-294-19  
© by the National Athletic Trainers' Association, Inc  
www.natajournals.org

*Concussion*



## **Exploring Baseline Concussion-Assessment Performance in Adapted Wheelchair Sport Athletes**

Ryan N. Moran, PhD, ATC\*; Steven P. Broglio, PhD, ATC†; Karla K. Francioni, PhD, ATC‡; Jacob J. Sosnoff, PhD§

# Japan



- Novel methodology used to assess head collisions in blind football across 18 games at 2020 Paralympic Games
- Significant differences noted between the phases of game when head impact occurred (esp when dribbling/attacking)
- Potential to inform future injury prevention approaches
- Same research group published work into video analysis into falls during wheelchair rugby from Tokyo 2020

Observational Study

> [Am J Phys Med Rehabil.](#) 2023 Sep 1;102(9):836-839.

doi: [10.1097/PHM.0000000000002187](https://doi.org/10.1097/PHM.0000000000002187). Epub 2023 Jan 12.

## Head Impact in Blind Football During the Tokyo Paralympics: Video-Based Observational Study

Shogo Tsutsumi <sup>1</sup>, Junpei Sasadai, Noriaki Maeda, Reia Shimizu, Akira Suzuki, Kazuki Fukui, Satoshi Arima, Tsubasa Tashiro, Kazuki Kaneda, Mitsuhiro Yoshimi, Rami Mizuta, Honoka Ishihara, Hinata Esaki, Koki Tsuchida, Tomoki Terada, Makoto Komiya, Yukio Urabe



# England

- Qualitative study of 9 blind footballers' concussion experiences from England (6 current players, 3 retired players)
- Lack of awareness of what to expect when concussed- "was I even concussed?"
- Perceived visual bias towards concussions testing from athletes
- Audio narration of whole paper by Peter Drury, high-profile English football commentator



Article  
Text



Article  
info



Citation

Original research

Concussion through my eyes: a qualitative study exploring concussion experiences and perceptions of male English blind footballers FREE

 Richard Weiler<sup>1, 2, 3</sup>,  Osman Hassan Ahmed<sup>4, 5, 6</sup>,  Willem van Mechelen<sup>1, 7, 8, 9</sup>,  Evert Verhagen<sup>1</sup>, 

Caroline Bolling<sup>10</sup>





# CONCUSSION EXPERIENCES AND PERCEPTIONS THROUGH THE EYES OF ENGLISH BLIND FOOTBALLERS

## Do I have a concussion?



**What is a concussion?**  
Mechanism & perceived symptoms



**Did I have a concussion?**  
I don't know  
Maybe I did  
I know as I already had one



**Report or not report?**  
I want to play  
Fear of long-term sequelae  
Impact on performance



**Diagnosing concussion**  
Pitch-side assessment  
Medical staff know me and tell me  
Barriers to diagnosis: baseline, visual bias, lack of specific tools, blindfolds, orientation

## Why am I concussed?



**Game specific factors**  
Contact sport  
Fewer high force challenges



**Player specific factors**  
Experience  
Level of play



**Visual impairment factors**  
Cannot see  
Reduced spatial awareness



**Environment**  
Wind and rain  
Sighted intervention

## How can we prevent and better manage concussion?



**Rules and polices**  
Voy rule  
Spotters  
Temporary concussion substitutes



**Referee factors**  
Experience and level  
Consistency and Voy rule enforcement





**Protective equipment & environment**  
Padded headguards and blindfolds  
May result in unintentional added risks  
Resource dependent



**Education**  
Players, coaches and medical staff  
Player responsibility

# Concussion Through My Eyes: A Qualitative Study Exploring Concussion Experiences and Perceptions of Male English Blind Footballers

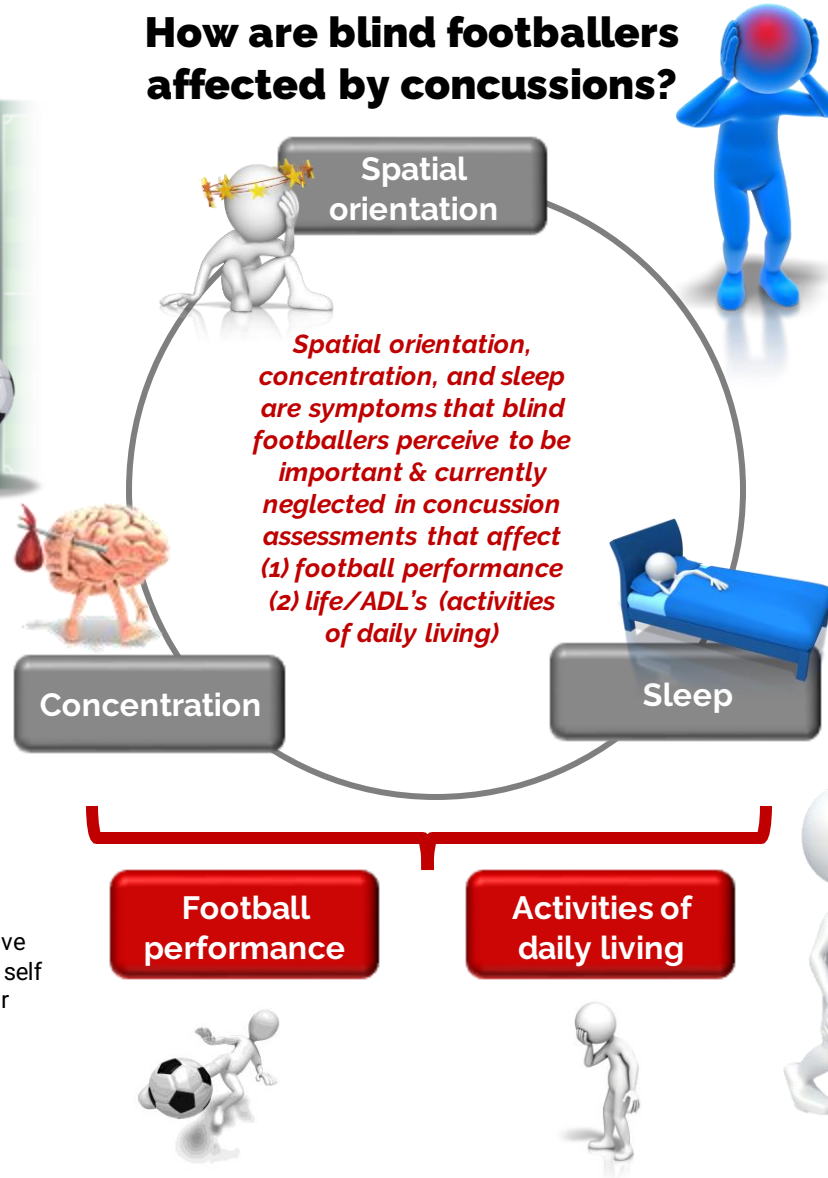
 Weiler, R., Ahmed, OH, Van Mechelen, W, Verhagen, E, Bolling, C. *BJSM*  
 Infographic by Adam Virgile

## Study Goal

The primary goal was to understand English blind 5-a-side footballers' perceptions of concussion, concussion risks, and concussion prevention to improve para concussion diagnosis and clinical care. To understand their experiences, 9 semi-structured interviews were conducted with current/retired male English blind footballers, applying a pragmatic approach and thematic data analysis.



## How are blind footballers affected by concussions?



## Why are concussions underreported in blind footballers?

### Athlete issues

Athletes lack understanding of what to experience when concussed – they rely on medical professionals to witness and confirm concussions

Athletes perceive that assessments and tests for concussions are “visually biased”

### Medical staff issues

To assess and diagnose suspected concussions, medical staff must know their athletes baseline neurocognitive function when well, have relevant concussion knowledge and medical experience.

Medical staff must be present, which is resource dependent (1) to witness and (2) to assess & diagnose a concussion

## Main Findings

### Blind footballers...

- 1 lacked understanding of what to experience when concussed and are therefore unable to recognise their own concussion.
- 2 perceived concussion differently from a person with vision and assessment tools as visually biased.
- 3 perceived they need more concussion information to improve their ability to recognise concussion and improve their own self reporting. They also mentioned that this might be helpful for their medical and support staff.
- 4 perceived post-concussion severity of symptoms and impact on daily life as more important than whether they sustained a concussion.

## Concussion in Para Sport (CIPS) Assessment Tools

Player, medical & support staff para concussion education perceived important.

Links for medical staff assessment tool guides for para sport:

### On-field Tools



### Off-field Tools





# Future trajectories for para concussion management

- **Spread the word of the 1st CIPS Position Statement to Para sport clinicians, athletes and coaches**
- **Stimulate research projects to increase the evidence base of all aspects of para concussion care**
- **Collaborate with the CISG to work towards a systematic review on para concussion in the next consensus statement**
- **Enhanced/expand epidemiological studies across para sport broadly (not just at Paralympic events )**



# New para concussion multimedia resources

YouTube GB Search

The video player shows a title card with the 'neuro BYTES' logo and the text 'CONCUSSION CARE FOR ATHLETES WITH DISABILITIES'. The video is from the American Academy of Neurology. The player interface includes a progress bar at 0:01 / 4:30 and various control icons.

**neuro BYTES**

**CONCUSSION CARE FOR ATHLETES WITH DISABILITIES**

AMERICAN ACADEMY OF NEUROLOGY

CONCUSSION CARE FOR ATHLETES WITH DISABILITIES - American Academy of Neurology

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The banner features a woman with blonde hair and a woman wearing a VR headset. A colorful target graphic is in the background.

**Online Concussion Course**

Next course: Winter 2024. Sign up for an alert below.

New protocols for concussion management

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Individuals with a Pre-Existing Disability

The image shows three athletes in a game, wearing green eye protection. One athlete in a green jersey is in the foreground, while two others in white jerseys are behind him.



# Closing thoughts

The only true wisdom is in  
knowing you know nothing.

Socrates



WE  
NEED  
MORE  
DATA

# Acknowledgements

- **The Concussion in Para Sport Group for their tireless efforts**
- **Dr Richard Weiler**
- **Dr Cheri Blauwet**

## **Dr Jamie Kissick**



Photo credit- Dr. Ross Outerbridge of Outerbridge Photography



# Resources

- Concussion in Para Sport: what should every SEM clinician know? With Dr Richard Weiler (Ep#472):  
<https://soundcloud.com/bmjpodcasts/concussion-in-para-sport-what-should-every-sem-clinician-know-with-dr-richard-weiler-ep-472>
- BJSM Concussion through my eyes- a qualitative study. BMJ Talk Medicine. Available at:  
[https://soundcloud.com/bmjpodcasts/bj-sm-concussion-through-my-eyes-a-qualitative-study/s-HFZPFJHImOW?ref=clipboard&p=a&c=0&si=c6cd9ca56fb84673895e7dce43dc01d0&utm\\_source=clipboard&utm\\_medium=text&utm\\_campaign=social\\_sharing](https://soundcloud.com/bmjpodcasts/bj-sm-concussion-through-my-eyes-a-qualitative-study/s-HFZPFJHImOW?ref=clipboard&p=a&c=0&si=c6cd9ca56fb84673895e7dce43dc01d0&utm_source=clipboard&utm_medium=text&utm_campaign=social_sharing)
- Concussion Care for Athletes with Disabilities- American Academy of Neurology:  
<https://www.youtube.com/watch?v=fN16r8f6cGA>

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**ANY QUESTIONS?**

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