

Concussion Return-to-Sport Considerations for Athletes who are Blind or Visually Impaired

Preamble

This document is designed to provide additional information for assessments and modifications that may be beneficial in an athlete who is blind or visually impaired when returning to sport after sustaining a concussion. It is important to follow the Return-to-Sport protocol as guided by a healthcare professional. This document is designed to support healthcare professionals with information to provide the proper care for athletes who are blind or visually impaired that have sustained a concussion.

Introduction

Athletes who are blind or visually impaired may benefit from additional assessments for vision-specific post-concussion changes. An orientation and mobility (O&M) assessment completed by a qualified orientation and mobility specialist prior to returning to sport may be helpful. If the athlete already works with an O&M specialist, the assessment would be to check for changes in an athlete's environmental awareness and movement. If the athlete does not already see an O&M specialist, it may be helpful to get an initial O&M assessment to test the athlete in how they can interpret and safely travel in their different environments. Student athletes who are blind or visually impaired may also benefit from a new functional vision assessment (FVA) form a qualified teacher of students with visual impairments (TSVI) to look for changes in the student athlete's functional vision, particularly if a previous assessment could be used for baseline comparison. An updated ophthalmology report would also be helpful. It is important to document any vision changes that the athlete may report. These additional assessments may prove necessary for proper recovery because some medical doctors or rehabilitation professionals may not have the appropriate expertise in vision impairment needed for an athlete who is blind or visually impaired recovering from a concussion.

The visual and the vestibular system are interlinked, such that when one is impaired, it can impact the other. Those with vision impairments may have pre-existing difficulties with their vestibular and oculomotor functioning. These pre-existing difficulties may worsen with a concussion, so it can be important to have baseline information documenting an athlete's symptoms and other medical conditions.

Vestibular and oculomotor testing by a qualified individual such as a physiotherapist or occupational therapist with training in vestibular and oculomotor rehabilitation) may be

beneficial to athletes who are blind or visually impaired. Vision therapy by a specialist trained in visual training/rehabilitation (examples: qualified optometrist, physiotherapist, or occupational therapist) may also be beneficial. These assessments are not included in the current version of SCAT5, but those who are visually impaired or blind may have changes in their vestibular, oculomotor, or visual function. There are many components to visual training, such as: dynamic VA, head movement, and stable and near point convergence.

Athletes who are blind or visually impaired may have a level of modification in their sport prior to the injury due to their vision impairment, such as using a Sport Guide, spotter, or specialized equipment (Table 1). It is important that in their progress through the return-to-sport protocol that they are being guided back to that same level of modification. However, keep in mind that extra modifications may be required in different stages of the athlete’s return-to-sport protocol. Throughout the return-to-sport protocol, ask questions for what the athlete needs and what they may feel is missing to better suit the individual’s recovery.

Table 1: Environmental Adaptations from LTAD BVI Resource Document	Tactile	Auditory	Visual
Adaptations to materials	<ul style="list-style-type: none"> • braille copies of rules and procedures for games and activities • braille score sheets • braille copies of facility rules and other important posted information 	<ul style="list-style-type: none"> • auditory copies of rules and procedures for games and activities • auditory of facility rules and other important posted information • accessible digital copies (e.g. Word or pdf files that can be accessed using screen reader software) of this information 	<ul style="list-style-type: none"> • large print copies of rules and procedures for games and activities • large print score sheets • large print copies of facility rules and other important posted information
Adaptations to equipment	<ul style="list-style-type: none"> • low-bounce or slightly deflated soccer balls • soft touch or foam balls • tap stick (a pole with a ball or piece of foam on the end) to signal when a swimmer is approaching the end of the pool 	<ul style="list-style-type: none"> • beeping balls • balls with bells • balls with sand or rice inside 	<ul style="list-style-type: none"> • brightly coloured balls that contrast with the surrounding environment • oversized balls, shuttlecocks, pucks, etc. • slower moving balls or balls with more hang time e.g., beach ball instead of volleyball • contrasting shirts or pinnies to identify team members • towel draped over high jump bar to increase visibility
Adaptations to field of play	<ul style="list-style-type: none"> • ropes or rails to indicate lanes • tactile boundary markers made of cord placed under tape • foot placement (starting position) guides for field events • a spray of water to signal when a swimmer is approaching the end of the pool • relocating the field of play so that natural boundaries, such as a track or sidewalk next to a grass field, can be used as the boundary of the field • mats or carpets to mark boundaries indoors 	<ul style="list-style-type: none"> • sound sources, such as beepers or music, to locate targets, such as basketball hoops, goal posts, or the finish line • beeping bases or pylons to locate bases • callers along the track for runners • teammates calling for a pass or to indicate a pass is coming 	<ul style="list-style-type: none"> • contrasting tape to outline boundaries of the court, long jump takeoff board, or the end of a diving board or gymnastics springboard • fluorescent pylons to indicate boundaries or bases • pylons to indicate lanes or the finish line • padded and brightly coloured goalposts • relocating the field of play so that natural boundaries, such as a track or sidewalk next to a grass field, can be used as the boundary of the field

Specific testing

Schneider's list of treatment options

- A. Cervical Spine Treatment
- B. Vestibular Rehabilitation
 - focus on target,
 - dynamic VA
 - head movement
 - stable and near point convergence.
- C. Sleep Management
 - blue light filters
 - consistent sleep schedule (no technology before bed, regular sleeping and waking times, etc.)
 - possible additional sleep issues if they had issues before or if seeing a specialist
- D. Low Level Aerobic Exercise
 - treadmill or bike (bike might be better – recumbent vs upright)
 - use of a guide - even if not used before.
 - training range – track HR with an accessible HR monitor (check with Canadian Blind Sports for the latest accessible HR monitor devices).
- E. Headache Management
 - may be impacted
 - additional eye strain?
 - see modifications in R2S or R2W
- F. Psychological Intervention
 - an understanding of issues VI athletes face may be important/beneficial
- G. Cognitive Rehabilitation
- H. Vision Therapy?
 - needs an understanding of the current VI
 - see baseline, check with optometrist.
- I. Other

Some will be similar, others (such as Vision therapy) will be quite different

Criterion for clearance, additional information for athletes who are blind or visually impaired:

- It is important to consider what is “normal” for each individual with a vision impairment
- athlete's normal value – baseline
- what criteria to give clearance
- follow up on clinical testing – point of caution here.

- trust relationship with athlete
- discussion with athlete vs numbers = are they back to their regular self in practice? Is testing been impacted?

Concussion Assessment Tools and Vision Impairment:

SCAT5

- The following tests are included in SCAT-5 and may be impacted in when the athlete is blind or visually impaired. These tests can be completed and compared to pre-injury baseline information if available:
 - o Tandem gait
 - o mBESS

Return-to-Sport Protocol with Possible Modifications for Athletes who are Blind or Visually Impaired

Stage	Aim	Activity	Goal of Each Step	Possible Modifications for Athletes who are Blind or Visually Impaired
1	Symptom-limiting activity	Daily activities that do not provoke symptoms	Gradual re-introduction of work/school activities	See “Return to School” and “Return to Work” (hyperlink here)
2	Light aerobic activity	Walking or stationary cycling at slow to medium pace. No resistance training	Increase heart rate	Routine check-in Safe environment with few obstacles, smooth surface Avoid environments that are over stimulating (e.g. lighting conditions, noise) Use of sport guide Lighting considerations: wearing a hat or

				<p>sunglasses, avoid bright lights</p> <p>Acoustic considerations: noise cancelling headphones, calm space option</p>
3	Sport-specific exercise	Running or sport-specific drills. No head impact activities	Add movement	<p>Routine check-in</p> <p>Activity considerations: individual activities, exercise with a guide, breaks, start orientation drills</p> <p>Environmental considerations: avoid environments that are over stimulating (lighting conditions, noise)</p> <p>Lighting considerations: wearing a hat or sunglasses, avoid bright lights or glares</p> <p>Acoustic considerations: noise cancelling headphones, calm space option</p>
4	Non-contact training drills	Harder training drills, i.e., passing drills. May start progressive resistance training	Exercise, coordination, and increased thinking	<p>Routine check-in</p> <p>Activity considerations: activities with a partner (teammate/coach/kinesiologist)</p> <p>Environment considerations: introduce additional stimulus as</p>

				appropriate (consult with eyecare professional as necessary)
5	Full contact practice	Following medical clearance	Restore confidence and assess functional skills by coaching staff	Routine check-in
6	Return to sport	Normal game play	Full return to sport	

Return to Sport Stages from Parachute, 2017 and CATT, 2020

Notes

- Not all individuals may make it to stage 6, as some may experience persistent symptoms that require continuous accommodations or modifications to their work and/or daily lives.
- Everyone experiences concussion differently and recovery is not a straight line. Every employee will need a unique amount of time and accommodations to recover fully.
- If symptoms increase or are not diminishing to pre-injury levels in Stage 3 (movement), the following assessments may prove beneficial for concussion management and recovery. The concept here is that symptom resolution be achieved before advancement.
 - o oculomotor assessment
 - o vestibular assessment
 - o vision therapy
- If symptoms increase or are not diminishing to pre-injury levels in Stage 4 (cognition), the following assessments may prove beneficial for concussion management and recovery. The concept here is that symptom resolution be achieved before advancement.
 - o visuo-spatial awareness
 - o maximal exertion assessment such as Buffalo Concussion Treadmill/Bike Test (cardio only)
 - o Sport related cardio testing such as custom interval, circuit training
- If symptoms increase or are not diminishing to pre-injury levels in Stage 5 (full team and sport integration, restore confidence). The athlete should be at full injury resolution and be physically “competition ready”.
 - o Full practice scenarios for skill, conditioning, and scrimmage conditions.

Appendix

“*Routine check-in*”: regular check in with the athlete about how they are feeling, what their symptoms are like, any changes with vision

“*Sport guide*”: any person who guides a person who is visually impaired either on or off the field of play for the purposes of competitive or recreational participation in physical activity or sport. (BC Blind Sports)

“*Sight classification*”: grouping Athletes into Sport Classes according to how much their Impairment affects fundamental activities in each specific sport or discipline. This is also referred to as Athlete Classification. (IBSA Classification Rules, 2018)

“*Orientation and Mobility*”: represents the skills, knowledge, and tools that students with visual impairments will need to travel safely, efficiently, and gracefully at home, school, and in the community. (PRCVI)

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