

CONCUSSION & STUDENTS

AN INTERPROFESSIONAL APPROACH TO CONCUSSION MANAGEMENT



AUTHORS



Barbara Csenge is the director of learning enrichment at St. Michael’s College School and oversees the concussion management program launched in 2011. In the past 20 years she has developed professional programs and resources in diverse educational settings including Holland Bloorview Kids Rehab, Queen’s University and the Durham Board of Education. Barbara is currently enrolled in Graduate Studies at the University of Toronto and her research focus is school re-integration of students with concussion.



Dr. Michael Hutchison oversees the clinical and research activities related to sport concussion at the David L. MacIntosh Sport Medicine Clinic at the University of Toronto. He holds a PhD in Rehabilitation Science and specializes in sport-related concussion research in various populations ranging from adolescent students, university level students, and professional athletes.

TEAM



Dr. Terence Sheridan is Principal of St. Michael’s College School. He holds a Master of Arts in Teaching from the Ontario Institute for Studies in Education (O.I.S.E.) and has recently completed a PhD in Educational Administration from O.I.S.E. Sheridan’s 20-year career in education has included a variety of roles in teaching, coaching and administration. During his time at St. Michael’s, Sheridan has been instrumental in curriculum development, advancing information technology, and the continued development of a learning enrichment centre.



Dr. Doug Richards has been the Medical Director of the David L. MacIntosh Sport Medicine Clinic at the University of Toronto for over 20 years. Doug has been team physician at both the national and international levels, including the Toronto Raptors, and the Canadian women’s national basketball and beach volleyball teams. Dr. Richards holds a faculty appointment as Assistant Professor in the Faculty of Kinesiology and Physical Education and his research focus is concussion in sports and physical activity, as well as the biomechanics of injury.



Dr. Paul Comper is a clinical neuropsychologist and research scientist at the Toronto Rehabilitation Institute – University Health Network. Paul has published and presented internationally in the area of mild traumatic brain injury and sports-related traumatic brain injury and holds faculty appointments at the University of Toronto in the Faculty of Kinesiology and Physical Education, the Graduate Department of Rehabilitation Sciences (Faculty of Medicine) and the Faculty of Graduate Studies.

ABOUT US



The David L. MacIntosh Sport Medicine Clinic (MacIntosh Clinic) has been treating sport-related injuries in the University of Toronto and surrounding communities for over 70 years. A comprehensive sport medicine care facility, the MacIntosh Sport Medicine Clinic services are available to anyone with sport- or exercise-related injuries.

Our Sport Medicine Clinic has been the facility for one of the first and most comprehensive programs in the country dedicated to concussion of student athletes. By drawing on the resources and research excellence at the University of Toronto as well as the rich athletic tradition, our program is made up of researchers and clinicians with a unique expertise in concussion.

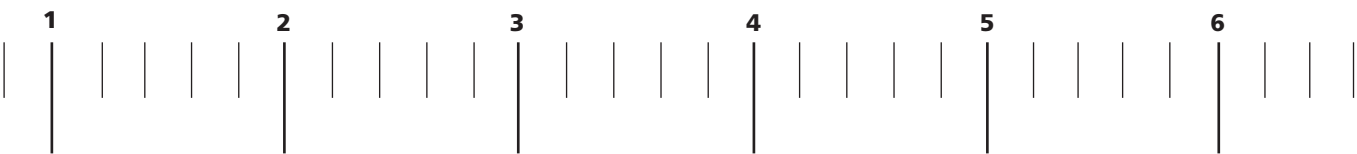


St. Michael’s College School has demonstrated a commitment to comprehensive education for young men for over 160 years. The standard of excellence within the school applies to academic, athletic and catholic community service.

The development of a school supported concussion management strategy that includes return to learn as well as play, supports the development of well-rounded young men through full school community participation. Concussion education and management and partnership with medical experts are consistent with the school’s high standard of excellence. St. Michael’s College School has demonstrated professional leadership through the establishment of this unique model of support for concussed students.

PROFESSIONAL PARTNERSHIP

This document was developed as a collaborative effort between the MacIntosh Clinic and St. Michael’s College School, to provide a comprehensive resource outlining the components of an effective concussion strategy, as well as setting out appropriate guidelines and processes for those involved in the management of students with concussion.



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INTERPROFESSIONAL APPROACH

Although concussion as a neurological phenomenon was well recognized even in ancient times, it is only in past decade that there has been intense public and scientific scrutiny of the condition, due in large part to the growth and international exposure of amateur and professional sports, where the associated risk and frequency of head injuries is high compared with the general population.

The management of concussion has typically focused on reintegrating the athlete to sport; most “return-to-play” guidelines are focused on the incremental stages of physical exertion. However, **the majority of concussions occur in school aged children and adolescents for whom return to school and the learning environment should be the priority.**

For students, the classroom environment and learning in particular represent the largest portion of activity within a typical day; academic student life is comprised of subtle and complex stressors. The interaction of this environment and how stressors impact the student recovering from a concussion are poorly understood.

A student recovering from a concussion may experience one or more symptoms that can be made worse with physical stress, as well as cognitive, sensory, and social stressors. In such cases, students may require academic accommodations such as a reduced workload, extended test-taking time, a shortened school day or periods of rest. The challenge for clinicians, parents and teachers is how to re-integrate students and optimize their recovery following concussion. To date, this process has largely been dependent on the school’s knowledge and experience of concussion management, if any such approach exists at all.

Unlike return-to-play guidelines, to date, there are no standardized guidelines for returning the students with concussion back to school and the learning environment.

Because concussion is a poorly understood condition, a successful school re-integration program requires the enhanced education of all school personnel (e.g., teachers, coaches, and administrative staff). Education should focus on prevention and awareness of risk factors that may delay recovery or promote increased symptoms. Such a program should also include rigorous monitoring and specific medical advice for the gradual return to full activity (i.e., physical, cognitive, sensory, social) of students with concussion.



COMMUNITY TEAMWORK

“Everyone – students, parents, teachers, coaches and volunteers – has a role to play to help prevent and manage concussions.... to ensure our students succeed.”

- Laurel Broton, Ontario Minister of Education 2012.

INNOVATIONS & INITIATIVES

Comprehensive school wide baseline testing

Computerized cognitive screening “baseline testing” and education initiated in September 2012

Coordinated communication strategy

Harmonized framework between clinic and school provides a consistent approach for concussion management

School faculty education

David L MacIntosh Sport Medicine Clinic provides professional development for faculty and staff

Community engagement

Ongoing dialogue and education involving parents and families with respect to the concussion strategy (e.g., Information Evening)

Professional outreach

School and clinic host concussion symposium to share content and insights amongst professional colleagues

Research and evaluation

The development of a comprehensive electronic management system has provided the foundation for rigorous program evaluation to inform future initiatives

MYTHS:

(1) You need be “knocked out” to have a concussion = FALSE!

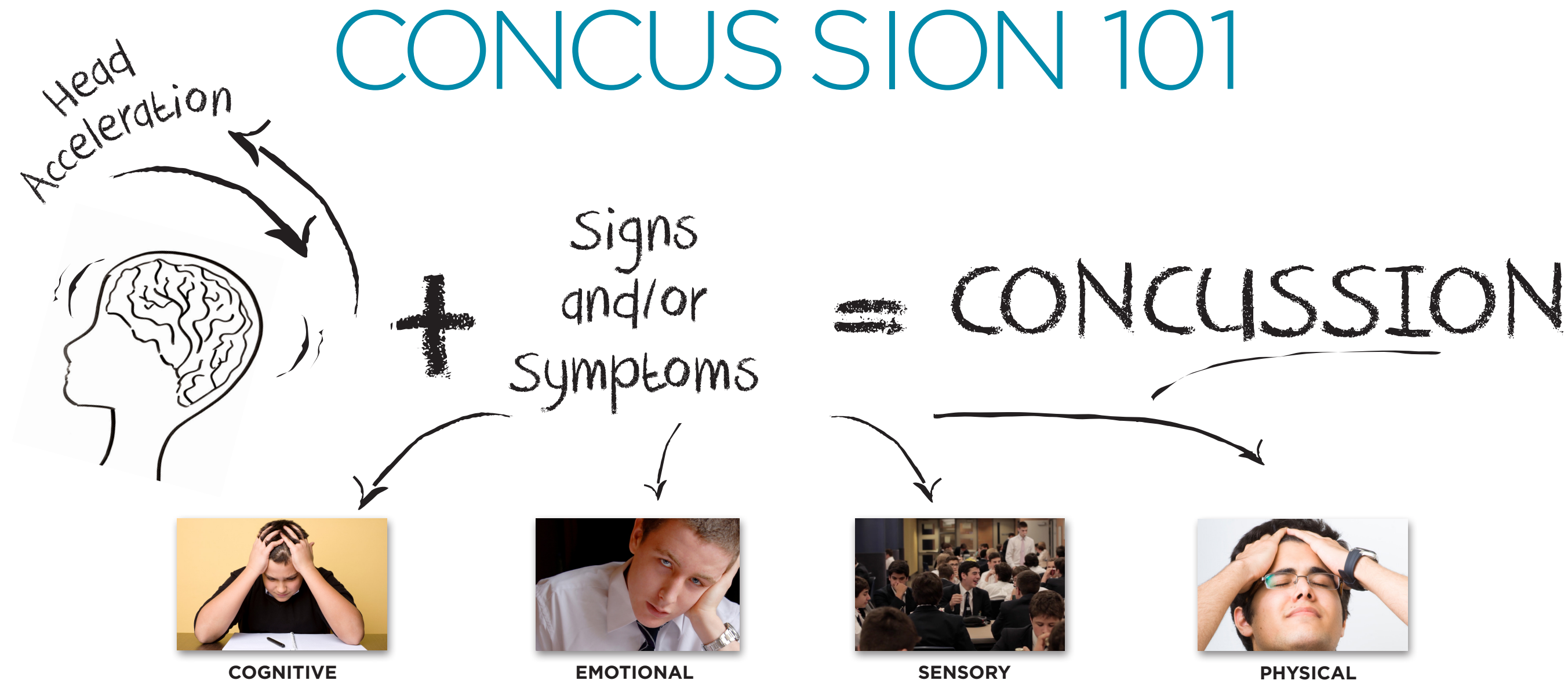
A concussion usually involves head trauma and this may cause the person to lose consciousness briefly; but most concussions occur without the person losing consciousness. Most frequently the only signs of concussion are headaches, dizziness, disorientation after the event, balance disturbance or memory loss for the event.

(2) If symptoms quickly ‘clear’, you can return to activity the same day = FALSE!

The symptoms of concussion may develop or evolve over the first few hours or even the next day. Therefore, despite feeling ‘normal’ on the sideline after a suspected concussion, be sure to seek medical evaluation and do not return to activity on the day of injury.

(3) Helmets or mouthguards (or any other type of device) will prevent concussions = FALSE!

While protective equipment protects against certain types of injury, helmet use has not been shown to prevent concussions. Mouth guards prevent peri-oral and dental injuries, but there is little evidence that mouth guards reduce concussion rates.



CON•CUS•SION - pronunciation (kn-kshn)
n. from Latin **concussion**, **concussio**, from **concutere** to shake violently, from **com-** + **quater** to shake.
A concussion - a type of traumatic brain injury - is recognized as a clinical syndrome of biomechanically induced alteration of brain function. A more appropriate operational definition of concussion is the recognition of two sequential events: traumatic acceleration of the head, followed by the presence of signs (observed by someone other than the patient) or symptoms (reported by the patient). As a clinical syndrome the diagnosis of concussion relies on the occurrence of the “event” (i.e., traumatic acceleration) and the association of one or more clinically recognizable features, which are signs and symptoms.

SIGNS
are characteristics that may be present and observed by someone other than the individual suspected of concussion.

SYMPTOMS
are reported by the individual suspected of concussion and categorized into four main categories.

SIGNS & SYMPTOMS

COGNITIVE

- Confusion
- Poor concentration
- Disorientation
- Memory difficulty
- Difficulty reading
- Feeling slowed down
- Sleep disturbance
- Answers questions more slowly or repeatedly
- Difficulty thinking clearly
- Loss of/or impaired consciousness
- In a fog
- ↓ Performance

PHYSICAL

- Dizziness
- Headache
- Nausea
- Vomiting
- Slurred speech
- Poor coordination/balance
- Feeling tired
- Low energy

EMOTIONAL

- Personality or behavioural changes
- Feeling depressed
- Moodiness
- Irritability
- Anxious
- Sadness
- Drowsiness

SENSORY

- Sensitivity to light
- Sensitivity to noise
- Ringing in the ears
- Double vision
- Numbness / Tingling

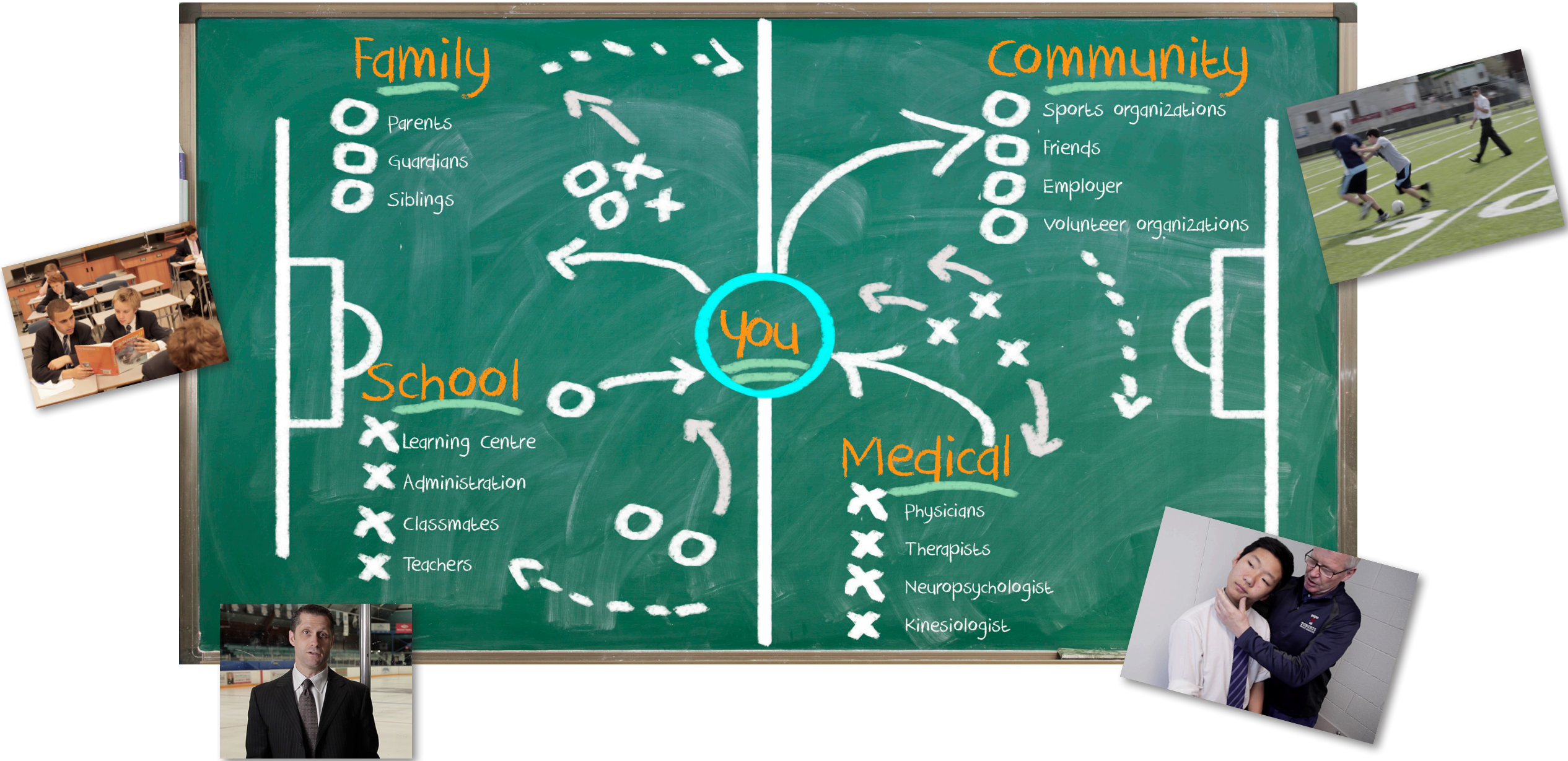
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FAQ'S

What is "baseline" testing?

Baseline testing is a cognitive screening process that often takes place at the beginning of the academic or athletic season conducted by a trained professional. Baseline tests are used to assess an individual's brain function (including learning and memory skills, ability to pay attention or concentrate, and how quickly he or she thinks and solve problems), as well as for the presence of any concussion symptoms. Results from baseline tests (or pre-injury tests) can be used and compared to a similar exam conducted by a health care professional during the season if the athlete sustains a concussion. Comparing post-injury test results to baseline test results can assist health care professionals in identifying the effects of the injury and making more informed return to school and play decisions.

STUDENT SUPPORT TEAM



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IMPORTANT FACTS

- (1) **Report it.** Never ignore symptoms even if they appear mild. Do not try to judge the seriousness of the injury yourself. Any person suspected of having a concussion should be removed from activity or play immediately; a medical evaluation should be sought.
- (2) **Each concussion is unique to the person.** Each person is different, each injury is different. Most people recover quickly once they have had a concussion, however, recovery depends on many factors, including age, health prior to concussion, and appropriate management following a concussion.
- (3) **Early Intervention.** Education and support benefits patients with concussions, meaning that it is important to provide patients the appropriate information and reassurance shortly after injury.



THE KEY PLAYERS:

Sport Medicine Physician: In our model, the sport medicine physician is the medical professional who can be thought of as the captain of the return to activity team. This type of doctor provides the ultimate advice as to whether a student can (or should) “return to activity” (school, sports or both). Typically, however, the doctor will consult with and/ or rely on other team members for their input as well. Importantly, because concussion symptoms can also mimic other medical conditions, the physician also evaluates and monitors for this possibility.

Therapist: A therapist (frequently a physiotherapist or athletic therapist) is a trained expert in preventing, recognizing, managing and rehabilitating injuries that result from physical activity. For students with concussions, the therapist performs a thorough functional assessment and designs a rehabilitation program to monitor symptoms and progression of recovery. Neck therapy, balance and eye-tracking therapy, as well as implementing a standardized progression of exertion are all components of their profession.

Neuropsychologist: The neuropsychologist is a licensed health care professional who is trained to evaluate and determine a person’s level of cognitive functioning as well as their psychological state (i.e., their emotions and mood). Evaluation of cognitive functioning or mood is typically done via a careful clinical interview and the use of a cognitive screening test battery. In the sports context, it is now common for athletes to be tested before the start of the competitive season, in order to establish a pre-injury “baseline”. If the athlete then suffers a concussion, the post-injury scores are compared to the baseline measures to see if changes exist. The neuropsychologist oversees baseline and post-injury cognitive evaluations.

MEDICAL MANAGEMENT

At the MacIntosh Clinic, we have developed “return-to-activity” (RTA) guidelines that include returning individuals with concussion to “School”, “Sport/Physical Activity”, “Work”, and “Social”.

We recognize that within each of the domains, there exist PHYSICAL, COGNITIVE, and SENSORY stressors. For each type of stressor, we have developed a 6-stage progression of stressor from rest to normalcy.

These general stages can be described as: (1) Rest; (2) Reintroduction of Stressors; (3) Low Level Stress; (4) Intermediate Stress; (5) Submaximal Stress; (6) Full Activity; there are specific descriptions of each stage for each of the 12 domain-stressor combinations. Collectively, we have represented the multidimensional

guideline as “Rules to Recovery” and each domain is represented as separate rulers and individual stages are marked by measurable increments along the visual ruler.

The management of concussion consists of three important components:

1. Initial “whole person” rest until the acute symptoms of concussion resolve. This consists of the reduction or elimination of all physical, social, and sensory stimuli. This means that if any symptoms are present in the early stages of recovery, the student should not attend classes or engage in physical activity, as well as avoid sensory overload from screens (e.g., television, computers, phones, texting, social media), music players, and loud or busy social scenes.



2. A graded or step-wise program of exertion. The graded or step-wise program of exertion means that once the student is without symptoms (i.e., is “asymptomatic”) with a certain degree of activity,

mean knowledge about concussion, what the symptoms of concussion are and what the student (and parents) might expect during the recovery process.

they are ‘cleared’ to proceed to a more challenging level. It is difficult to predict the time at each level, but even if the student is asymptomatic, each step in the process should take a minimum of 24 hours. If any concussion symptoms occur during the stepwise program, then the student should drop back to the previous level and try to progress again after a further 24 h period of rest has passed.

3. Education. By “education” we

FAQ’S

What’s included as a part of post-injury neuropsychological consult?

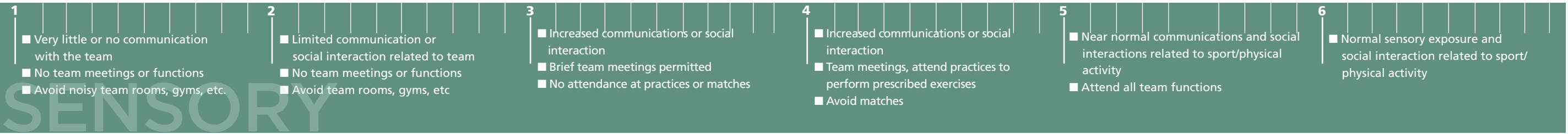
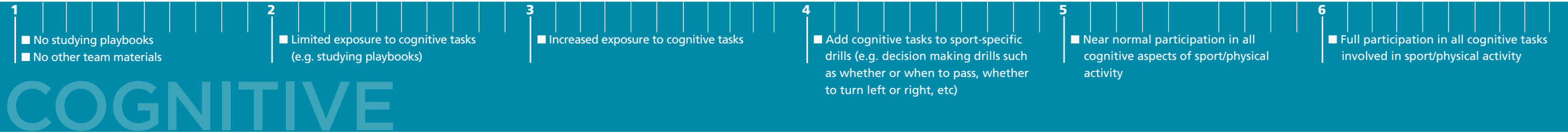
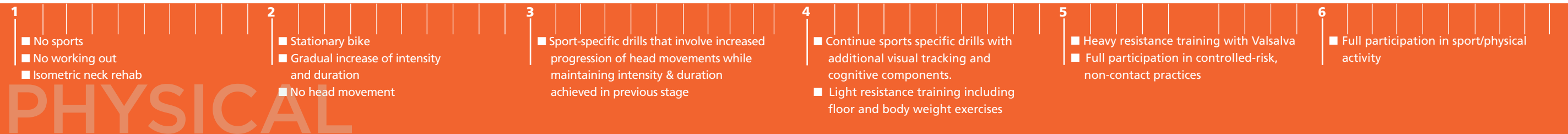
Neuropsychological assessment is often a part of the recovery process assessing the cognitive (mental) and behavioural effects of a concussion. In addition, the neuropsychological consult also determines the extent to which other conditions may alter or compromise brain functioning. Common causes of such disturbances may include ADD/ADHD, depression/ anxiety, learning disabilities, social difficulty, and substance/alcohol abuse.

The neuropsychological consult includes the use of standardized tests that involves assessment of a variety of cognitive skills including memory, attention and concentration, visual perception, problem solving and motor skills. These tests usually involve computerized and paper and pencil tests which are administered by a specially trained technician.

In addition, the neuropsychological evaluation also typically includes assessment of behavioural personality and mood related symptoms and coping ability. These types of tests involve completing a comprehensive inventory-checklist of symptoms.

Upon completion of the neuropsychological evaluation, results are provided by a clinical neuropsychologist who makes recommendations regarding diagnosis, relevant treatment interventions and any other required referrals.

RULES TO RECOVERY FOR SPORT / PHYSICAL ACTIVITY



KEY PLAYERS:

Learning Centre Teacher:
The Learning Centre Teacher coordinates the student support team with ongoing communication between parents, students and teaching faculty. Medical directions and corresponding school accommodations are documented and shared through the individual reintegration plan. The Learning Centre provides an alternative school environment and regular monitoring for students transitioning back to class.

School Administration:
The school principal supports educational initiatives for the school community and oversees appropriate individualized assessment strategies to ensure that students meet curriculum expectations and are accommodated through their recovery.

Classroom Teachers:
Classroom teachers support students with accommodations that correspond with medical direction for physical, cognitive and sensory progression. Accommodations are documented for the school team in the Individual Re-Integration Plan. Accommodations may include; breaks, partial attendance, reduced workload and provision of notes.

Coaching and Co-curricular Faculty:
Athletic coaches and co-curricular moderators s upervise student reintegration to school activities.

SCHOOL MANAGEMENT

DEVELOPMENT OF ST. MICHAEL’S CONCUSSION MANAGEMENT PROGRAM

St. Michael’s College School has a long history of providing educational opportunities for young men to embrace excellence in academics, athletics and community involvement. This mission is reflected in the development of a concussion management strategy in 2011 which provides education and leadership for the school community. Each student with concussion is medically directed and monitored through graduated reintegration to school activity.

School teams are established to support students through accommodations and monitoring. An Individual Re-integration Plan records medical direction and corresponding school accommodations. Students recovering from concussion can be overwhelmed

in school settings that typically promote academic, athletic and social activity. Concussion symptoms can be unfamiliar and confusing: students who must restrict participation require informed school support and monitoring. Establishing student support teams enables a comprehensive understanding of how concussion injury can uniquely impact social, athletic and academic participation in school.

The concussion management program at St. Michael’s College School recognizes the important leadership role that schools play in health promotion for students and athletes.



SCHOOL PRINCIPLES FOR CONCUSSION

- Report it:** students should be encouraged to inform coach, parent, teacher of suspected injury.
- Medical direction:** diagnosis, management and clearance to full activity.
- Individualized Re-integration Plan:** Student and support team are guided by documented accommodation based on medical direction.
- Monitoring:** The school team evaluates individual student recovery and communicates if adjustments are needed based on student symptoms.
- Concussion coordinator:** The Learning Centre provides a key person to manage a team approach, monitor and coach student recovery through education and development of an Individual Re-integration plan.

INDIVIDUAL RE-INTEGRATION PLAN

This documents medical direction and school accommodations for each stage of student recovery providing a record of the dynamic management strategy for the student and school team.

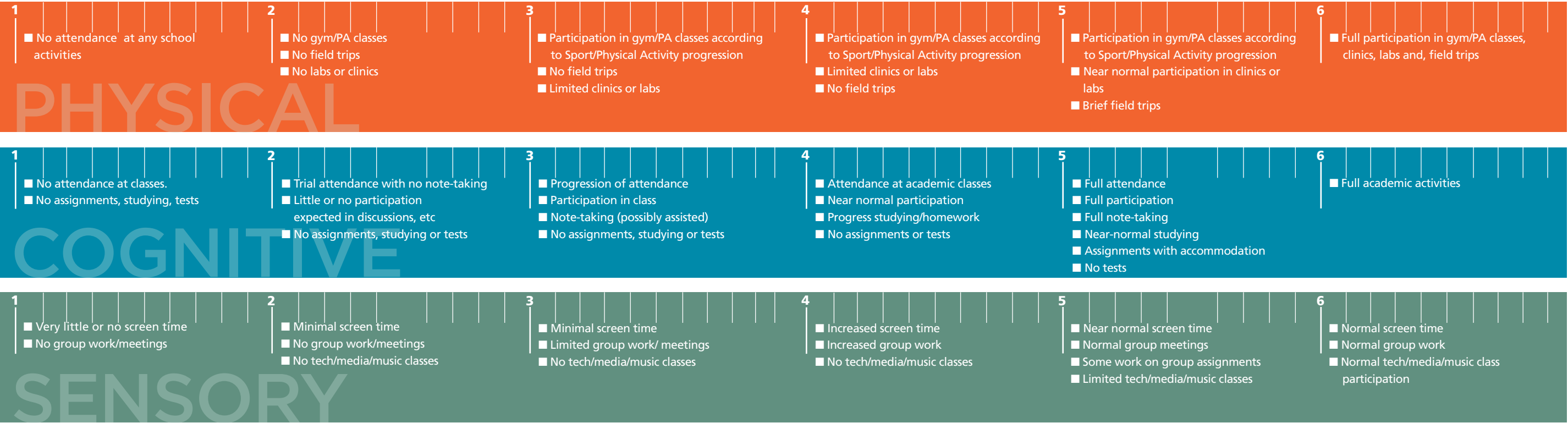
Frequent concussion symptoms

- Physical and cognitive fatigue
- Attention and concentration
- Memory – storing and managing
- Slowed processing speed
- Emotional– anxiety, irritability
- Visual and auditory sensitivities

School accommodations

- Partial class or school attendance
- Rest breaks, extended time
- Restricted attendance e.g., P.E., Music
- Providing preprinted notes
- Monitoring, advocacy, education
- Deferred or accommodated assignments/tests
- Modified co-curricular participation

RULES TO RECOVERY FOR SCHOOL



EXERCISE PROGRESSION

GENERAL PRINCIPLES

Each stage of exercise should be performed without symptom production either during or after (within an hour or so) exercise.

If a stage of exercise does produce symptoms, then the next session should the patient has to “go back” to the last stage that did not produce symptoms, and subsequently progressed with caution, after a day or two of asymptomatic exercise.

BY WHOM:

Ideally, such an exercise progression should be supervised and monitored by a qualified health professional.
However, patients may “supervise” their own progression if needed, so long as they understand both the principles involved, and the specifics.

HOW OFTEN to EXERCISE:

Sessions in an exercise progression after concussion are typically once daily.

In some cases (either severe injuries with prolonged symptoms, or mild injuries with fleeting symptoms) the frequency of these sessions may be reduced (to several sessions per week) or increased (to twice daily) as may appropriate in the clinical judgement of a supervising health professional.

HOW QUICKLY to PROGRESS:

This is not a time-based process; rather, it is based on successfully reaching “milestones”. Each stage is commenced only after the last stage has been completed successfully.

There is no “correct” rate of progression so long as the previous stage has been successfully passed.

In the mildest cases with quickest recovery, an athlete may potentially progress from one stage to another on the same day (if doing two sessions of exercise that day).

In severe or prolonged cases, it is generally prudent to perform exercise successfully (without symptoms or exacerbation) for at least several sessions before progressing to the next stage.

