

Concussion in the Classroom

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**"In theory there's no difference
between theory and practice. In
practice there is."**

-Yogi Berra

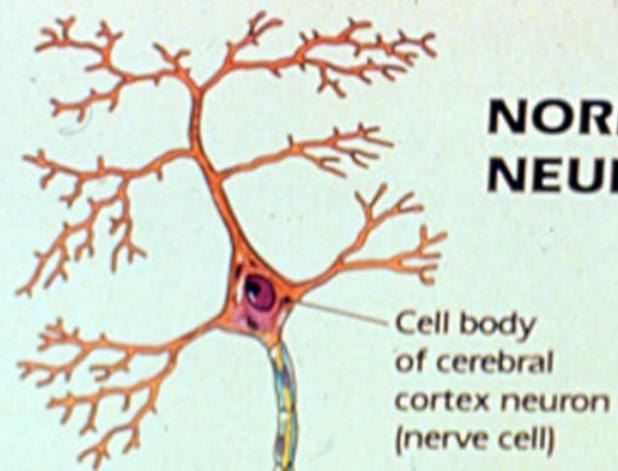
Heightened Awareness

- New York State Law - S 3953 (2011)
 - *...The legislation also requires the immediate removal of any student who has or who may have suffered a concussion. No student who has or who may have suffered a concussion may return to athletic activities unless the student has been symptom free for at least twenty-four hour and **a licensed physician** has authorized the student's return.*
- National Federation of High Schools (NFHS)
 - Governing body for sports (rules, officiating, etc.)
 - Officials may now remove athletes from play
- Multiple high profile injuries over recent years
- Lawsuits



What is a Concussion?

- A complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces
 - Direct or Indirect
 - Impairment of neurologic function that resolves spontaneously
 - Neuropathologic changes
 - Functional rather than structural
 - May not involve Loss of Consciousness
 - No radiologic Abnormalities on standard imaging



Axon of first cell

Dendrite of next cell

Presynaptic terminal

Synapse

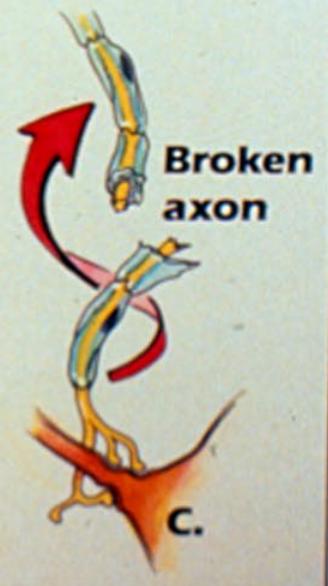
Postsynaptic membrane

Axon to next cell

Dendrite of next cell

Terminal endings of axon

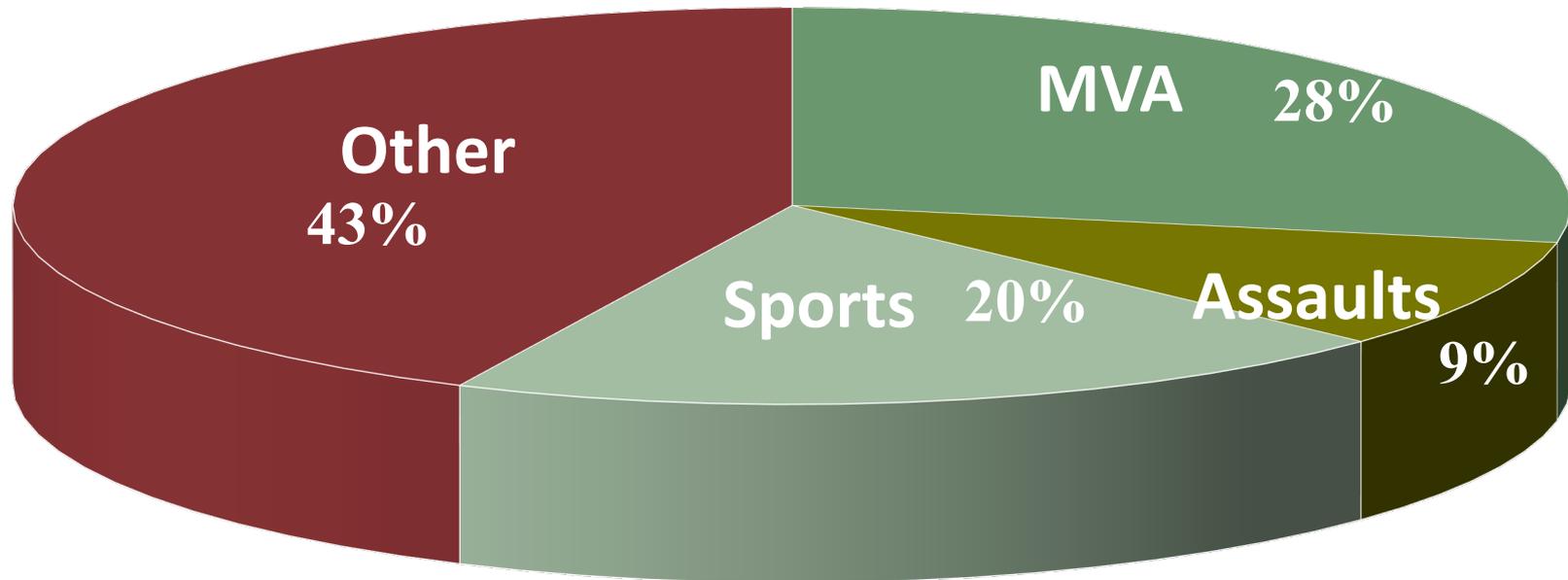
DIFFUSE AXONAL INJURY



Concussion

- 1.6-3.8 million concussions annually in young people
- Average of 7-10 days to resolve
 - Adolescents and children can normally take up to 28 days
 - Some have problems for months....
- Impairs ability to function in everyday life and activities, including school based activities
- May look physically normal

Causes of TBI

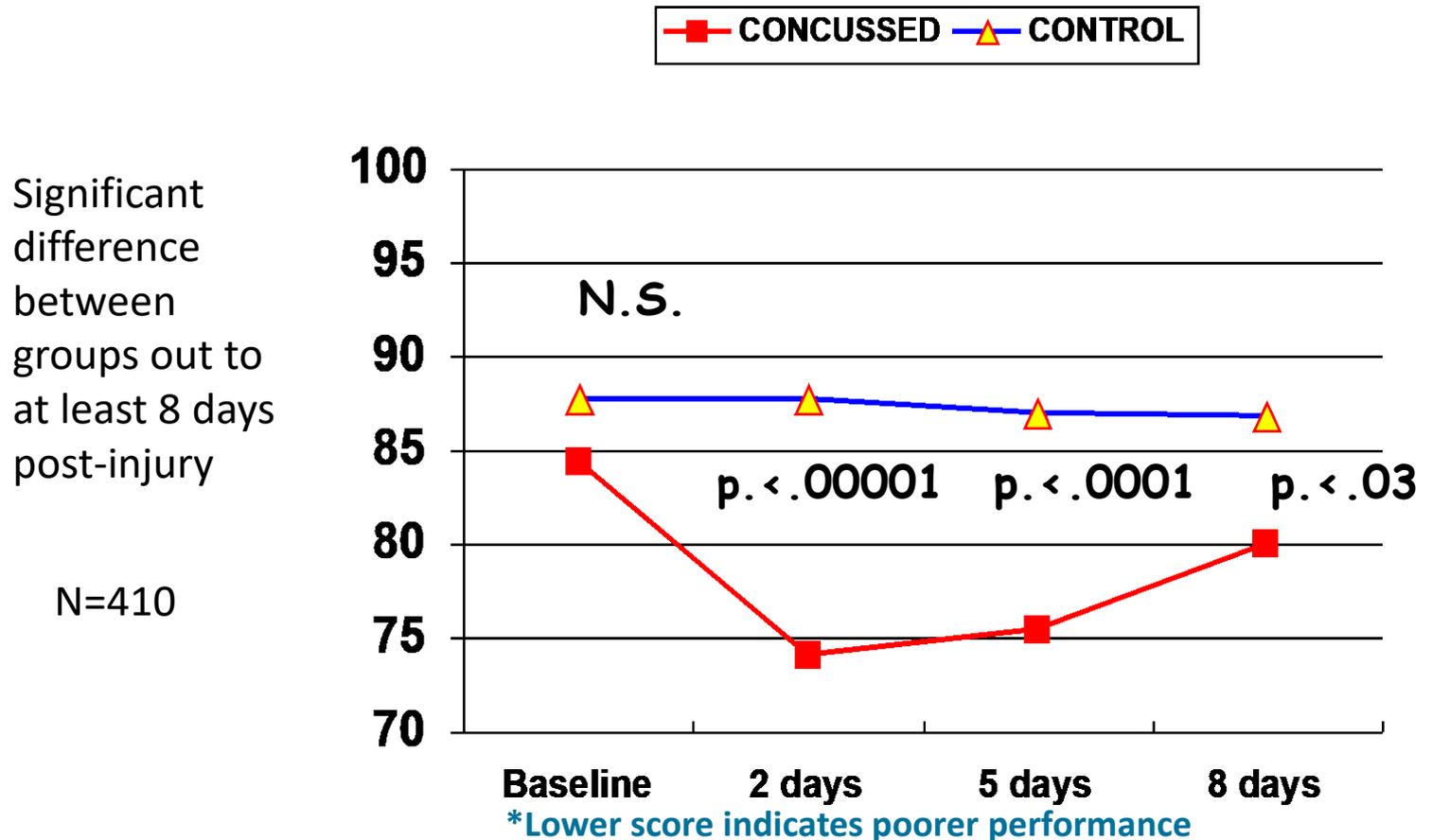


Why is concussion a big problem for those affected?

- Memory and learning difficulties
- Decreases in attention, processing speed, and problem solving abilities
- Weaker planning ability and impaired future memory
- Sleep disturbance, fatigue, headaches, fogginess, and somatic complaints
- Decreased ability to cope with stress, increased irritability

MEMORY COMPOSITE

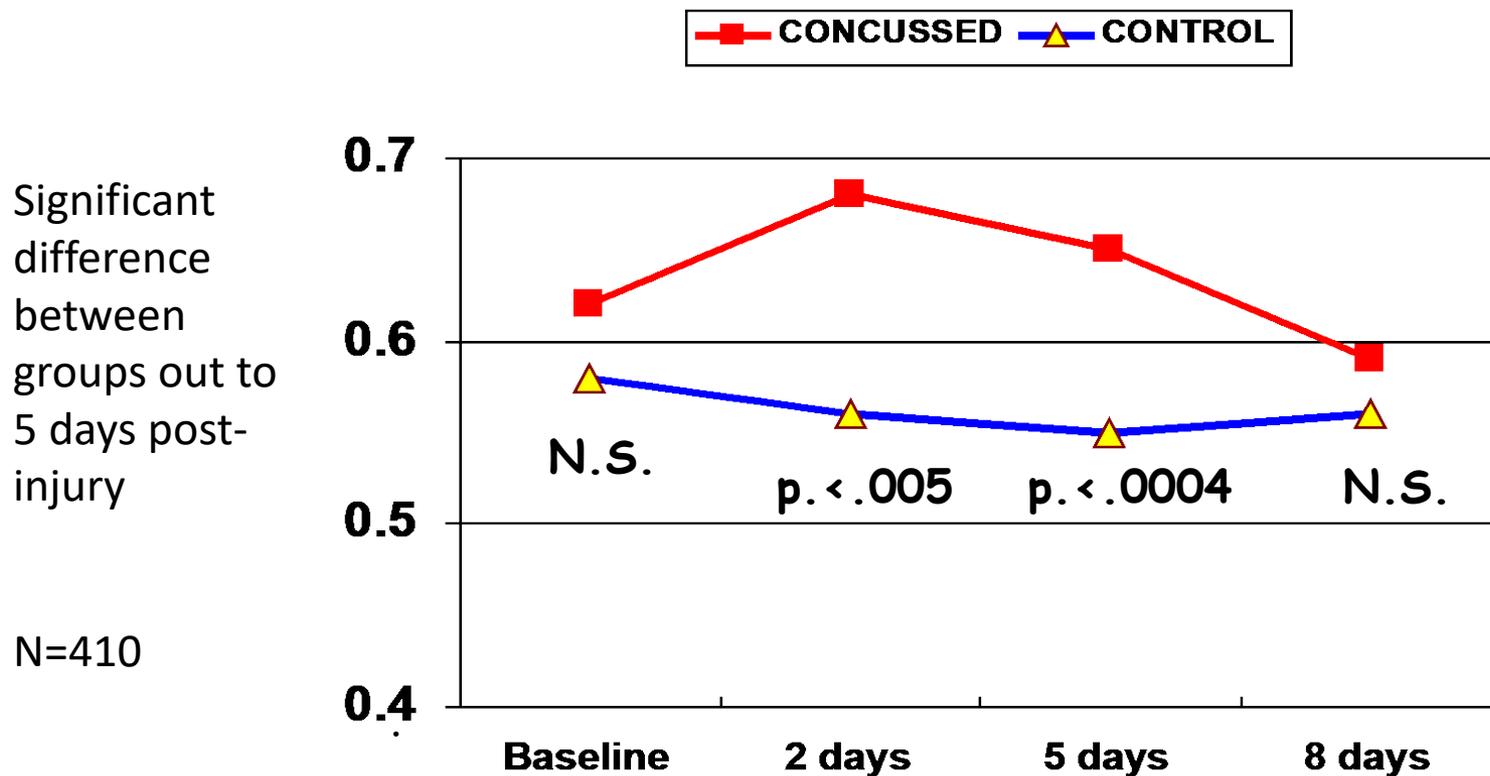
Control vs. Concussed Athletes



Collins MW, Lovell MR, Maroon et al. Medicine and Science in Sports Exercise, 34:5;2002

REACTION TIME COMPOSITE

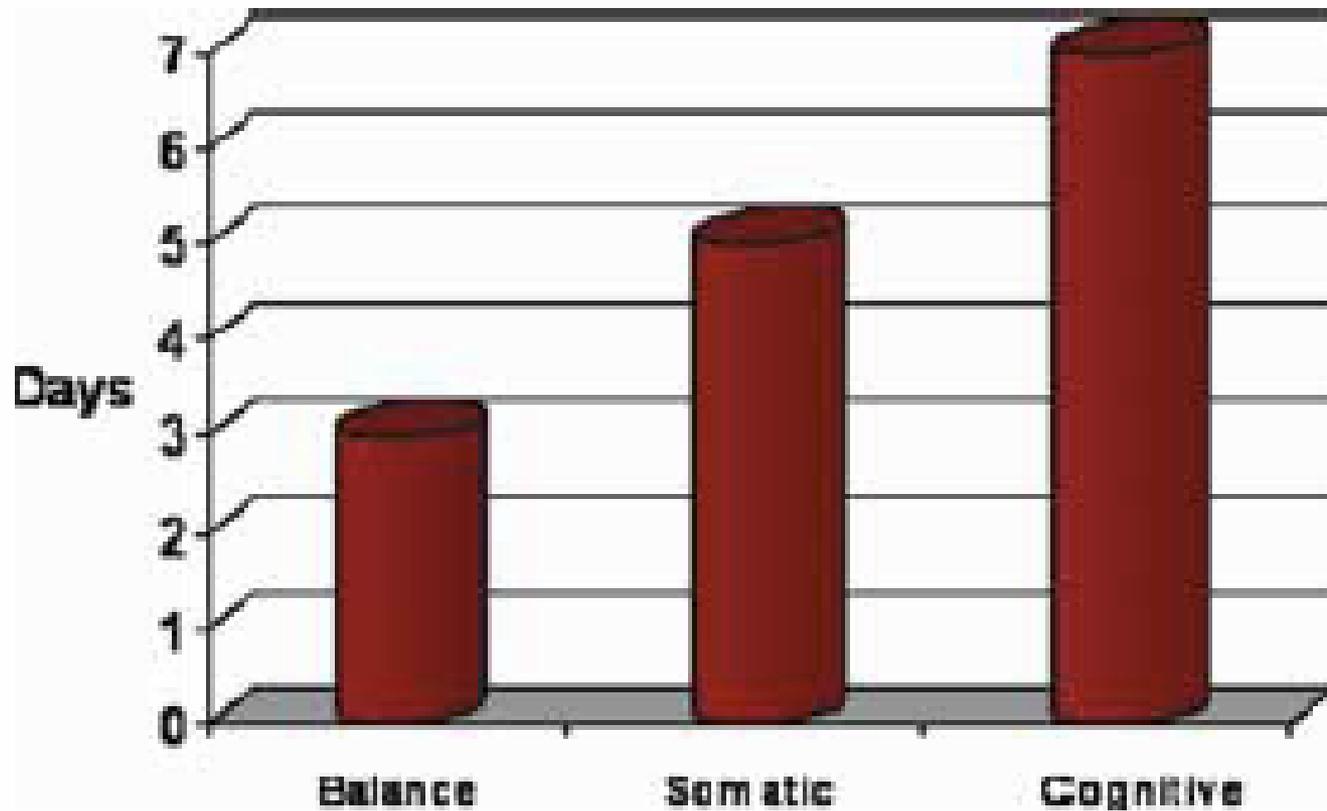
Control vs. Concussed Athletes



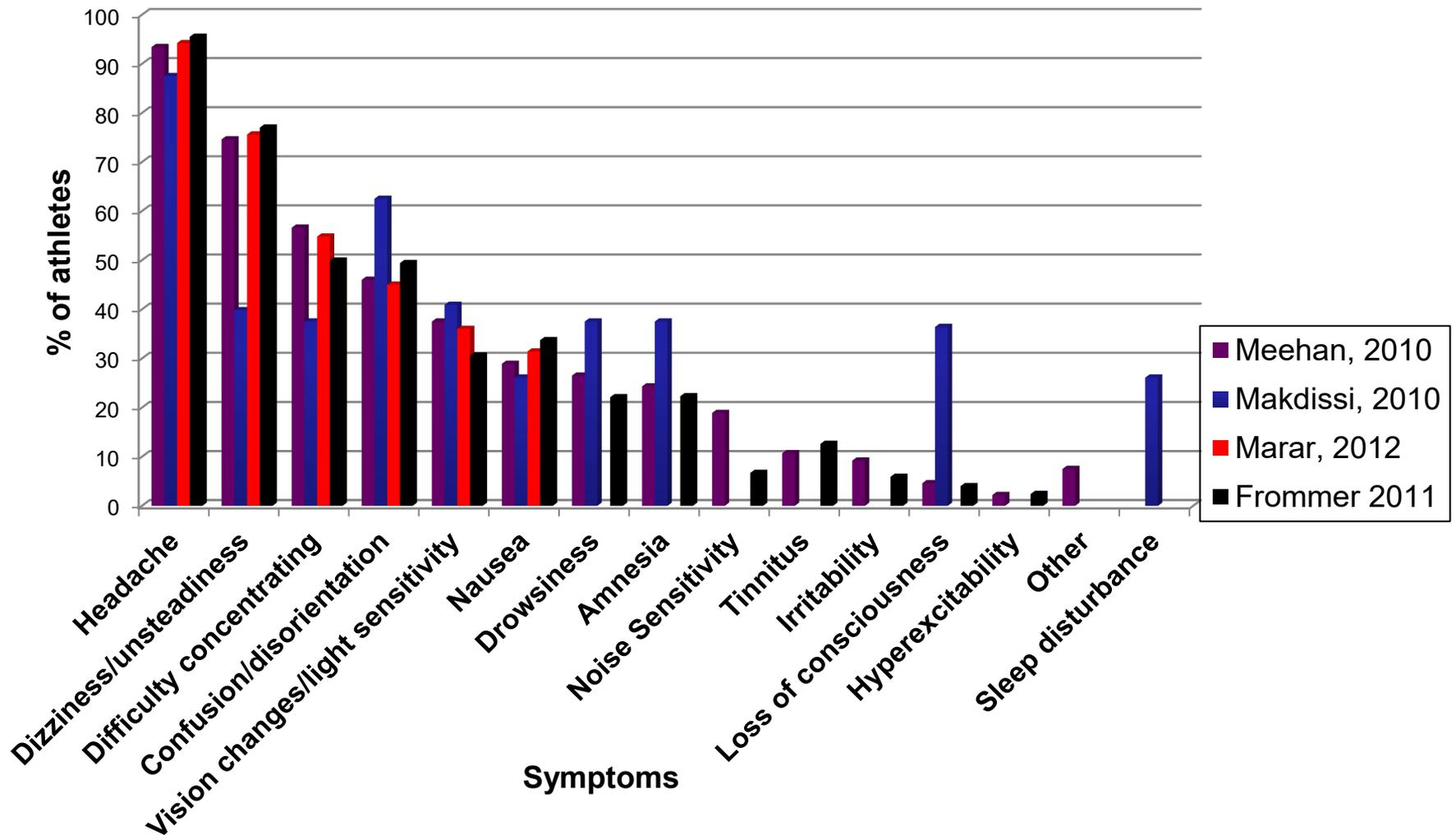
*Higher score indicates poorer performance

Lovell MR, Collins MW, Maroon et al. Medicine and Science in Sports Exercise, 34:5;2002

Recovery



Assess the Concussed Athlete: Immediate and Delayed Symptoms



Headache

Implications

- Most common symptom
- Distracting
- Variable throughout day
- Trigger
 - Noise
 - Light
 - Concentration

Adjustments

- Frequent breaks
- Identify triggers and reduce exposure
- Rests/Naps in Nurse's office/quiet area

Dizziness

Implications

- Indication of vestibular system injury
- Typically last longer
- Positional changes
- Provoked by
 - visual stimulus, especially videos
 - moving targets

Adjustments

- Allow to put head down
- Leave class early for classroom changes

Visual Symptoms

(Light sensitivity, double or blurry vision)

Implications

- Difficult to manage with high visual demands in classroom
- Artificial lighting
- Difficulty reading and copying
- Computers
- Smart Boards
- iPads
- Slide presentations

Adjustments

- Reduce screen brightness
- Allow hat or sunglasses
- Consider use of audiotapes
- Turn off fluorescent lights
- Seat student closer to center/front

Noise Sensitivity

Implications

- Lunchroom
- Some classes
 - Music, Shop, Phys Ed
- Crowded hallways
- Organized sports activities
- Social school activities
 - Pep rallies, school dances, loud sporting events

Adjustments

- Allow lunch in quiet area with classmate
- Limit or avoid loud class time
- Consider ear plugs
- Early class dismissal to avoid crowded hallways

Difficulty Concentrating or Remembering

Implications

- Learning new tasks
- Comprehending new material
- Recalling and applying previously learned material
- Lack of focus
- Trouble with test taking
- Troubles with standardized tests
- Difficulty reading
- Trouble with distractions (driving)

Adjustments

- Avoid testing or major projects when possible
- Provide extra time for nonstandardized tests
- Postpone standardized tests (may require 504)
- Consider 1 exam per day
- Consider pre-printed notes or scribe
- Consider oral reader for test-taking

Sleep Disturbances

Implications

- Excessive fatigue
- Hamper memory and focus
- Excessive napping may lead to further disruptions of sleep-wake cycle

Adjustments

- Consider shorter school days
- Allow rest breaks
 - Quiet meditation vs naps

Reentry to School

- Identification – consider using liaison (nurse, psychologist, teacher) to coordinate
- Accommodate gradual increase in cognitive and physical activity
- Allow rest periods as needed
- Increase time allowed for tests/assignments
- Manageable pieces

Return to Learn

- Very symptomatic students will often be held out of school
 - Unable to perform work of even up to 30 minutes
- Half days
 - Usually when student can tolerate 30-45 minutes of work at a time
 - Consider alternating first and second halves
 - Consider full days, but attending alternating classes

Academic Accommodations

- Academic “adjustments”
 - Typically 1-3 weeks during recovery phase
 - Do not jeopardize the curriculum
 - Do not require alterations in standardized testing
- Academic Accommodations
 - Typically longer than 3-4 weeks
 - Consider team evaluation
 - Evaluation process for 504 plan or IEP
 - Involvement of TBI specialist

Individualized education plan (IEP)

- Formalized educational plan protected under the Individuals with Disabilities Education Act (special education), that provides for classification or coding of a student under 1 of 13 federally designated categories and allowances for modification of regular education without penalty to the student.

504 Plan

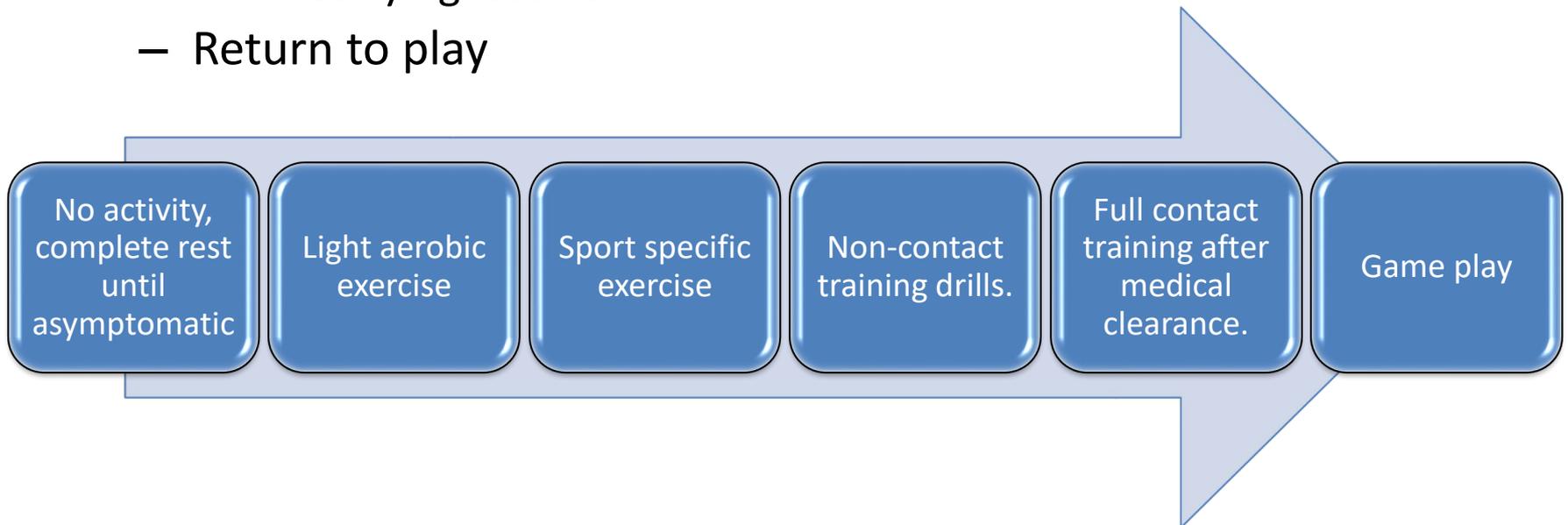
- Section 504 of the Rehabilitation Act and the Americans with Disabilities Act provides for a student who is not eligible for special education under an IEP but who requires accommodations in regular education on the basis of bona fide medical need, as documented by a physician and validation by the educational home.

Why are some kids more adversely affected?

- Neural Reserve
 - Younger may be more affected
- High achievers
- ADD/ADHD or Learning disabilities
- Migraine sufferers or family history
- Mood disorders, new or pre-existing
- Pre-injury alcohol consumption or marijuana/drug use

Consensus Guidelines on Sport Related Concussion

- Concussed athletes must be evaluated and treated **INDIVIDUALLY**
 - Grading / severity
 - Prospective grading scales abandoned in favor of combined measures of recovery
 - Modifying factors
 - Return to play



Baseline Testing

- Snapshot in time
- Serves as a reference point following injury
- May not be accurate for some individuals with several or severe learning disabilities
- Validity of a baseline

Driving while Impaired – delayed reaction time



Why create a formal concussion management program?

- Facilitate best care for injured student
- Provide a liaison between doctors, teachers, administrators and parents
- Insure continued academic progress and good health while healing
- Standardizing practice reduces misses

Preparation and awareness

- Educate the school community
 - Coaches, administrators, nurses, and teachers
 - Staff should recognize alterations in normal behavior patterns, or diminished academic performance in athletes
- Attempt to identify athletes at risk for more severe concussions, i.e. those with modifying factors
- Consider pre-season baseline neuro-cognitive testing

Preparation and awareness

- Monitor sports equipment
- Insure staff available for injury assessment and referrals for further medical care.
- Advocate for concussion and safe play.
- Be aware of concussions that occurred during the school year and on vacation
- Follow injured athletes as they transition between sports

Preparation and awareness

- Postseason debriefing
- Review injuries
- Discuss improvements in action plan