



Concussion 2013

A Program For Logan County

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Consensus Statement on Concussion in Sport

4th International Conference on Concussion in Sport
Zurich, November 2012

3rd International Conference on Concussion in Sport
Zurich, 2008

2nd International Conference on Concussion in Sport
Prague, 2004

1st International Conference of Concussion in Sport
Vienna, 2001

Copyright Concussion in Sport Group, 2009

Plan

- **Concussion Basics**
- Ohio Youth Concussion Law
- Concussion Evaluation
- Concussion Treatment
- Logan County Program

Concussion Facts

Center for Disease Control (CDC)

- **Common condition:** 400-600/100,000 population, or a minimum 200+/year Logan County
- >10 % of the 30 million children & adolescents who participate in sports in USA experience sports-related concussions, **more than ½ unreported or diagnosed**
- **10-15%** of those diagnosed with concussion experience persistent disabling problems, i.e. 85% recover in 7-14 days
- **Females** per exposure sustain more concussions, report more symptoms, and have longer recovery times than do men playing the same sport (2.3-5 times)

Concussion Facts (continued)

June 2013 study in *Pediatrics*:

- youths with no previous concussions took on average 12 days to recover;
- those with history of any concussions took 22 days to recover
- those with history of concussion within a year took an average of 35 days to recover

Concussion Facts (continued)

- **JAMA**, June 2013 study from Ontario:
- 20% of participants (ages 11-20) reported having been hospitalized or knocked unconscious at least once=concussion or mild TBI
- Among students receiving poor school grades, the likelihood of having suffered a traumatic brain injury was almost **four times** greater than those with high grades.
- Those who reported a severe blow to the head in the past year were **seven times** more likely to report frequent use of alcohol and **four times** more likely to report frequent marijuana use (cause/effect issue)

Not Just a Football Problem

Injury rate per 100,000
player exposures

- **Football** 52
- Girls' Lacrosse 39
- **Girls' soccer** 35
- Boys' Lacrosse 32
- Wrestling 22
- Girls basketball 20
- **Boys' soccer** 17
- Softball 15
- Boys basketball 7
- Bicycle racing tops all



And Not Just an Adolescent Sports Problem

- Almost twice as many adults are disabled yearly from traumatic brain injury (TBI) as are disabled from strokes.
- Although this Logan County program is aimed at sports concussions in student athletes, it can be adapted for adult concussion victims.

Concussion

Definition

- A concussion is defined as a:
 - *complex pathophysiologic process affecting the brain,*
 - *induced by traumatic biomechanical forces secondary to direct or **INDIRECT** (think “shaken baby”) forces to the head.*
- Loss of consciousness (LOC) is **not** necessary for diagnosis and not documented in most cases!!!! (10%)

4 Symptom Categories

Physical

- Headache (most common)
- Fatigue
- “Dizziness”
- Sensitivity to light and/or noise
- Nausea
- Balance problems/ BPPV
- Orthostasis
- Altered muscle function

Sleep

- Drowsiness
- Sleeping less than usual
- Sleeping more than usual
- Trouble falling asleep

Emotional

- Irritability
- Sadness
- Feeling more emotional
- Nervousness

• Cognitive/Neuropsych

- Difficulty remembering
- Difficulty concentrating
- Feeling slowed down
- Feeling mentally foggy
- Anterograde amnesia
- **Reduced reaction time**

Everyday Functional Effects

all about short term memory

■ Home

- Difficulty completing tasks at home
- Reduced play/ activity
- Irritability with challenges

■ School

- Concentration
- Remembering directions
- Disorganized
- Completing assignments
- Fatigue
- Fall behind, fail tests, reduced grades

Second Impact Syndrome

- This is not just a repeat concussion
- *“Diffuse cerebral swelling with delayed catastrophic deterioration, a known complication of brain trauma postulated to occur after repeated concussive brain injury in sports”.*

Second Impact Syndrome

- Second Impact Syndrome (SIS) occurs nearly exclusively in children and teens.
- There has **never** been a reported case of second impact syndrome in an asymptomatic patient, throwing some doubt on the importance of neuropsychological testing in asymptomatic athletes (since abnormal scores persist well past recovery)
- **Mortality** → 50-100% from brainstem herniation

CTE

(Chronic Traumatic Encephalopathy)

- **Center for the Study of Chronic Traumatic Encephalopathy** (Cantu>Boston University):
Repetitive brain trauma in NFL players leads to:
 - degeneration of brain tissue with buildup of Tau proteins causing memory loss, confusion, impaired judgment, impulse control problems, headaches, vertigo, aggression, depression, and, eventually, progressive dementia> **Sounds like concussion symptoms?**
- Recent studies on some football players who never played beyond high school show similar findings.

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Ohio Youth Concussion Law

March 20, 2013

- **Mandated education** for coaches involved in youth sport (all these rules apply to Little League and Pop Warner as well)
- Student athletes are not allowed to participate in sports until parent or guardian returns a signed **concussion information form** > ODH website
- Student athletes must **immediately be removed** from participation in practice or game when a concussion is suspected > coach, trainer, official, or “an official of the sports organization who is supervising that practice or competition”
- Student athletes removed from play for concussion cannot return to play until **medically cleared** by a licensed health care provider > can be trainer if collaborating with a doctor

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Parent/Athlete Concussion Information Sheet

A concussion is a type of traumatic brain injury that changes the way the brain normally works. A concussion is caused by bump, blow, or jolt to the head or body that causes the head and brain to move rapidly back and forth. Even a "ding," "getting your feet tangled," or what seems to be a mild bump or blow to the head can be serious.

WHAT ARE THE SIGNS AND SYMPTOMS OF CONCUSSION?

Signs and symptoms of concussion can show up right after the injury or may not appear or be noticed until days or weeks after the injury.

If an athlete reports any or several symptoms of concussion listed below after a bump, blow, or jolt to

Did You Know?

- Most concussions occur without loss of consciousness.
- Athletes who have, at any point in their lives, had a concussion have an increased risk for another concussion.
- Young children and teens are more likely to get a concussion and take longer to recover than adults.

the head or body, the athlete should be kept out of play the day of the injury and until a health care professional, experienced in evaluating for concussion, says the athlete is symptom-free and it's OK to return to play.

SIGNS OBSERVED BY COACHES/STAFF	SYMPTOMS REPORTED BY ATHLETE
Appears dazed or stunned	Headache or "pressure" in head
Is confused about assignment or position	Nausea or vomiting
Forgets an instruction	Balance problems or dizziness
Invariant of game, score, or opponent	Double or blurry vision
Moves clumsily	Sensitivity to light
Answers questions slowly	Sensitivity to noise
Loses consciousness (even briefly)	Feeling sluggish, lazy, foggy, or groggy
Shows mood, behavior, or personality changes	Concentration or memory problems
Can't recall events prior to hit or fall	Confusion
Can't recall events after hit or fall	Just not "feeling right" or "feeling down"

Pocket Concussion Recognition Tool

Pocket CONCUSSION RECOGNITION TOOL™

To help identify concussion in children, youth and adults



RECOGNIZE & REMOVE

Concussion should be suspected if **one or more** of the following visible clues, signs, symptoms or errors in memory questions are present.

1. Visible clues of suspected concussion

Any one or more of the following visual clues can indicate a possible concussion:

- Loss of consciousness or responsiveness
- Lying motionless on ground/Slow to get up
- Unsteady on feet / Balance problems or falling over/Incoordination
- Grabbing/Clutching of head
- Dazed, blank or vacant look
- Confused/Not aware of plays or events

2. Signs and symptoms of suspected concussion

Presence of any one or more of the following signs & symptoms may suggest a concussion:

- Loss of consciousness
- Seizure or convulsion
- Balance problems
- Nausea or vomiting
- Drowsiness
- More emotional
- Irritability
- Sadness
- Fatigue or low energy
- Nervous or anxious
- "Don't feel right"
- Difficulty remembering
- Headache
- Dizziness
- Confusion
- Feeling slowed down
- "Pressure in head"
- Blurred vision
- Sensitivity to light
- Amnesia
- Feeling like "in a fog"
- Neck Pain
- Sensitivity to noise
- Difficulty concentrating

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3. Memory function

Failure to answer any of these questions correctly may suggest a concussion.

"What venue are we at today?"

"Which half is it now?"

"Who scored last in this game?"

"What team did you play last week / game?"

"Did your team win the last game?"

Any athlete with a suspected concussion should be IMMEDIATELY REMOVED FROM PLAY, and should not be returned to activity until they are assessed medically. Athletes with a suspected concussion should not be left alone and should not drive a motor vehicle.

It is recommended that, in all cases of suspected concussion, the player is referred to a medical professional for diagnosis and guidance as well as return to play decisions, even if the symptoms resolve.

RED FLAGS

If ANY of the following are reported then the player should be safely and immediately removed from the field. If no qualified medical professional is available, consider transporting by ambulance for urgent medical assessment:

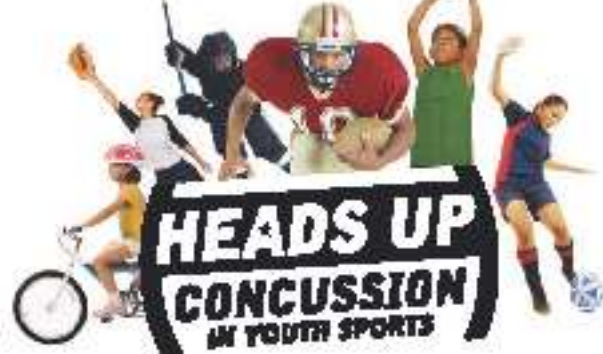
- Athlete complains of neck pain
- Increasing confusion or irritability
- Repeated vomiting
- Seizure or convulsion
- Weakness or tingling/burning in arms or legs
- Deteriorating conscious state
- Severe or increasing headache
- Unusual behaviour change
- Double vision

Remember:

- In all cases, the basic principles of first aid (danger, response, airway, breathing, circulation) should be followed.
- Do not attempt to move the player (other than required for airway support) unless trained to do so
- Do not remove helmet (if present) unless trained to do so.

from McCrory et. al, Consensus Statement on Concussion in Sport. Br J Sports Med 47 (5), 2013

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SIGNS AND SYMPTOMS

SIGNS OBSERVED BY PARENTS OR GUARDIANS

If your child has experienced a bump or blow to the head during a game or practice, look for any of the following signs and symptoms of a concussion:

- Appears dazed or stunned
- Is confused about assignment or position
- Forgets sports plays
- Is unsure of game, score, or opponent
- Moves clumsily
- Answers questions slowly
- Loses consciousness (even briefly)
- Shows behavior or personality changes
- Can't recall events prior to hit or fall
- Can't recall events after hit or fall

SYMPTOMS REPORTED BY ATHLETE

- Headache or "pressure" in the head
- Nausea or vomiting
- Balance problems or dizziness
- Double or blurry vision
- Sensitivity to light
- Sensitivity to noise
- Feeling sluggish, lazy, foggy, or groggy
- Concentration or memory problems
- Confusion
- Does not "feel right"

WHAT SHOULD YOU DO IF YOU THINK YOUR CHILD HAS A CONCUSSION?

1. **Seek medical attention right away.** A health care professional will be able to decide how serious the concussion is and when it is safe for your child to return to sports.
2. **Keep your child out of play.** Concussions take time to heal. Don't let your child return to play until a health care professional says it's OK. Children who return to play too soon—while the brain is still healing—risk a greater chance of having a second concussion. Second or later concussions can be very serious. They can cause permanent brain damage, affecting your child for a lifetime.
3. **Tell your child's coach about any recent concussion.** Coaches should know if your child had a recent concussion. Your child's coach may not know about a concussion your child received in another sport or activity unless you tell the coach.

IMPORTANT PHONE NUMBERS

FILL IN THE NAME AND NUMBER OF YOUR LOCAL HOSPITALIST BELOW:

Hospital Name: _____

Hospital Phone: _____

Hospital Name: _____

Hospital Phone: _____

For immediate attention, CALL 911

It's better to miss one game than the whole season.

For more information and to order additional materials free-of-charge, visit:

www.cdc.gov/ConcussionInYouthSports

Pocket SCAT2

Pocket SCAT2



Concussion should be suspected in the presence of **any one or more** of the following: symptoms (such as headache), or physical signs (such as unsteadiness), or impaired brain function (e.g. confusion) or abnormal behaviour.

1. Symptoms

Presence of any of the following signs & symptoms may suggest a concussion.

- Loss of consciousness
- Seizure or convulsion
- Amnesia
- Headache
- "Pressure in head"
- Neck Pain
- Nausea or vomiting
- Dizziness
- Blurred vision
- Balance problems
- Sensitivity to light
- Sensitivity to noise
- Feeling slowed down
- Feeling like "in a fog"
- "Don't feel right"
- Difficulty concentrating
- Difficulty remembering
- Fatigue or low energy
- Confusion
- Drowsiness
- More emotional
- Irritability
- Sadness
- Nervous or anxious

2. Memory function

Failure to answer all questions correctly may suggest a concussion.

- "At what venue are we at today?"*
- "Which half is it now?"*
- "Who scored last in this game?"*
- "What team did you play last week / game?"*
- "Did your team win the last game?"*

3. Balance testing

Instructions for tandem stance

"Now stand heel-to-toe with your non-dominant foot in back. Your weight should be evenly distributed across both feet. You should try to maintain stability for 20 seconds with your hands on your hips and your eyes closed. I will be counting the number of times you move out of this position. If you stumble out of this position, open your eyes and return to the start position and continue balancing. I will start timing when you are set and have closed your eyes."

Observe the athlete for 20 seconds. If they make more than 5 errors (such as lift their hands off their hips; open their eyes; lift their forefoot or heel; step, stumble, or fall; or remain out of the start position for more than 5 seconds) then this may suggest a concussion.

Any athlete with a suspected concussion should be IMMEDIATELY REMOVED FROM PLAY, urgently assessed medically, should not be left alone and should not drive a motor vehicle.

Neuropsychological Testing

- Bottom line, at present, is that **targeted testing** may provide added value when an athlete or parent is overly anxious, symptoms are not believed to be brain related, or there is still concern about symptom underreporting.
- “At present, there is insufficient evidence to recommend the widespread use of baseline NP testing”, CIS 2012
- Pediatric and adult *n Impact* testing is available for selected cases at Mary Rutan Rehab. In the future it may be offered pre-participation
- Full neuropsych testing is available at Nationwide Children’s Hospital and OSU hospital

Provocative Exercise Testing

- Studies show specificity of 89% for ruling out concussion just using heart rate
- The practicality of this testing is that the intensity of the symptoms provoked makes it relatively easy for the tester to determine the failed test
- This is the final piece in the Mary Rutan Rehab program



<https://www.youtube.com/v/yQQ7lmeWqBI?version=3&start=107&end=137&autoplay=1>

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- Handouts

Anatomical Timeline of a Concussion

Defining the Key Factors

C. Risk Factors

A. Injury Characteristics

B. Symptom Assessment

Pre-Injury Risks

Retro-grade Amnesia
20-35%

CONCUSSION

LOC
<10%

Antero-grade Amnesia
25-40%

Neurocognitive dysfunction
&
Post-Concussion Symptoms

Sec-Hrs

Sec-Min

Sec-Hrs

Hours - Days - Weeks+

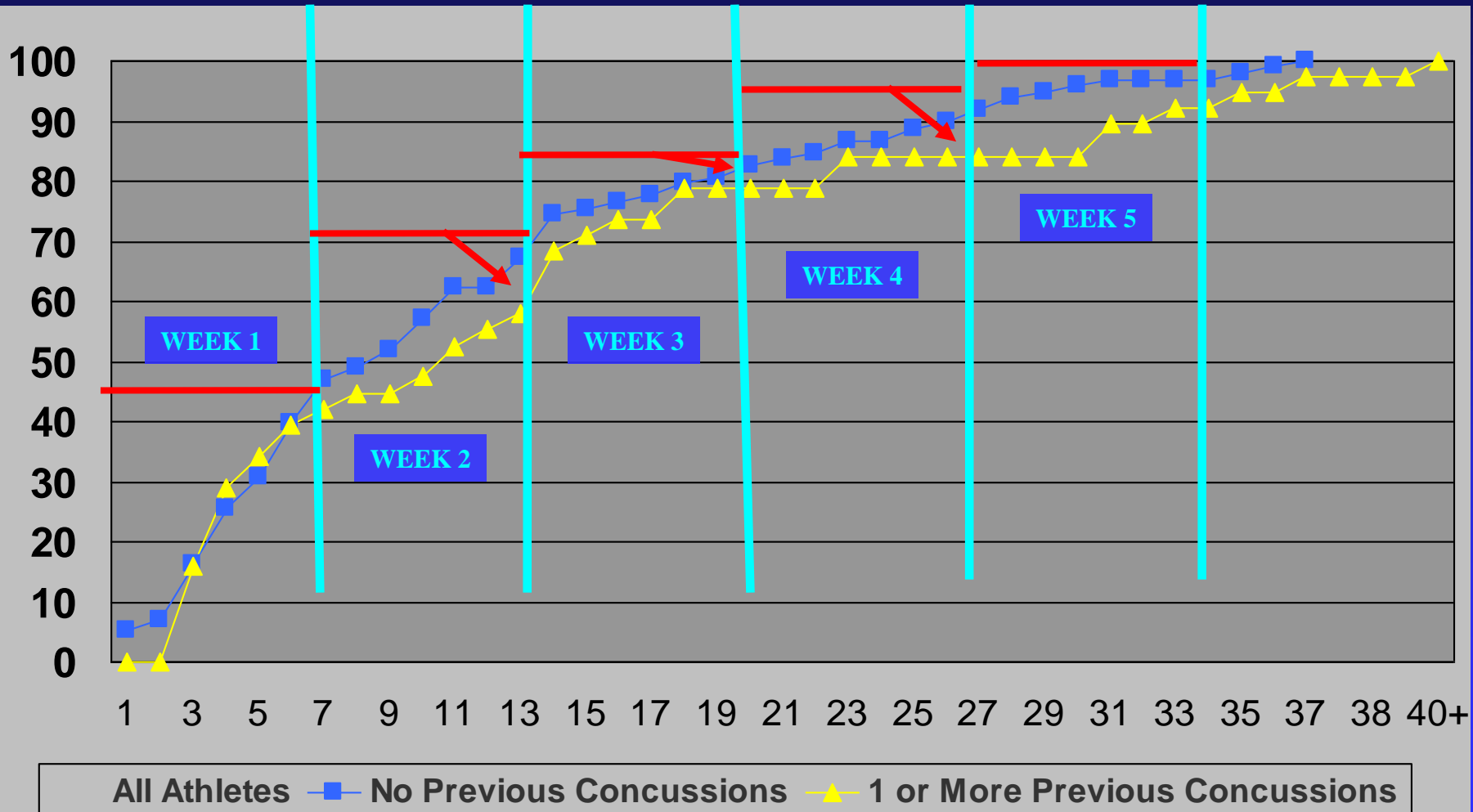


Importance of Pre-Injury Risk Factors

Although we don't yet have good data on risk of concussion for all of the risk factors, we do know the following factors slow recovery from concussion:

1. Number of prior concussions, 2-6 X higher risk for another concussion > **CRITICAL HISTORY**
2. Chronic headaches especially true migraine
3. Learning disabilities/ADD
4. Mood disorders
5. Females sustain more concussions than males in similar sports

Recovery From Concussion: How Long Does it Take?



N=134 High School athletes

Collins et al., 2006, Neurosurgery

Acute Concussion Management

- CORNERSTONE = rest until asymptomatic
 - **Rest from activity**
 - No training, playing, exercise, weights
 - Beware of exertion with activities of daily living
 - **Cognitive rest**
 - NO television
 - NO reading
 - NO video games or computer work
 - NO texting
 - NO prolonged concentration, homework or class

REST = ABSOLUTE REST!

REST

- Excellent study in the Journal *Pediatrics* in 2012 showed that a weeks rest, anywhere in the process of concussion recovery produced a dramatic improvement
- The discovery of the healing effects of rest on brain recovery has been the most dramatic change in treatment in the last 15 years
- Two stories-a 15 year old football player
 - a “slow learner”

Academic Accommodations

- No gym class
- Stay home/half-days
- Naps/rest time
- Extended time to complete assignments
- Extended time to take tests
- Classroom “buddy”
- Allow time to visit school nurse for treatment of headaches, if needed
- Written instructions for homework
- Repeat and present new information slowly
- Share progress and difficulties

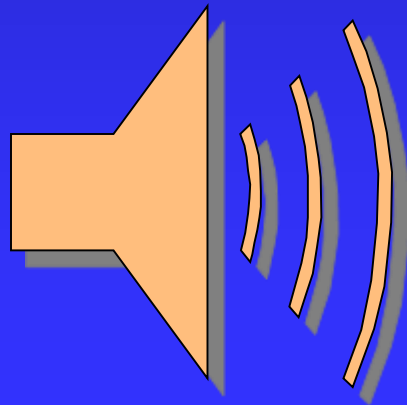
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A CONCUSSION PROGRAM FOR LOGAN COUNTY

Based on 4th International Congress
on Concussion in Sports

Zurich 2012



Concussion Program

1. Education & Awareness (Pre-Injury). Athletes, coaches, parents (Ohio Youth Concussion Legislation)
2. Modified BESS test during sports physical required
3. On Field Recognition
 - Team physician or ATC ideally
 - Coaches / Referee
4. Standardized Sideline Assessment (SCAT 2).
5. No return to play – if failed SCAT2
6. Do not leave alone overnight
7. Family doctor or ER evaluation

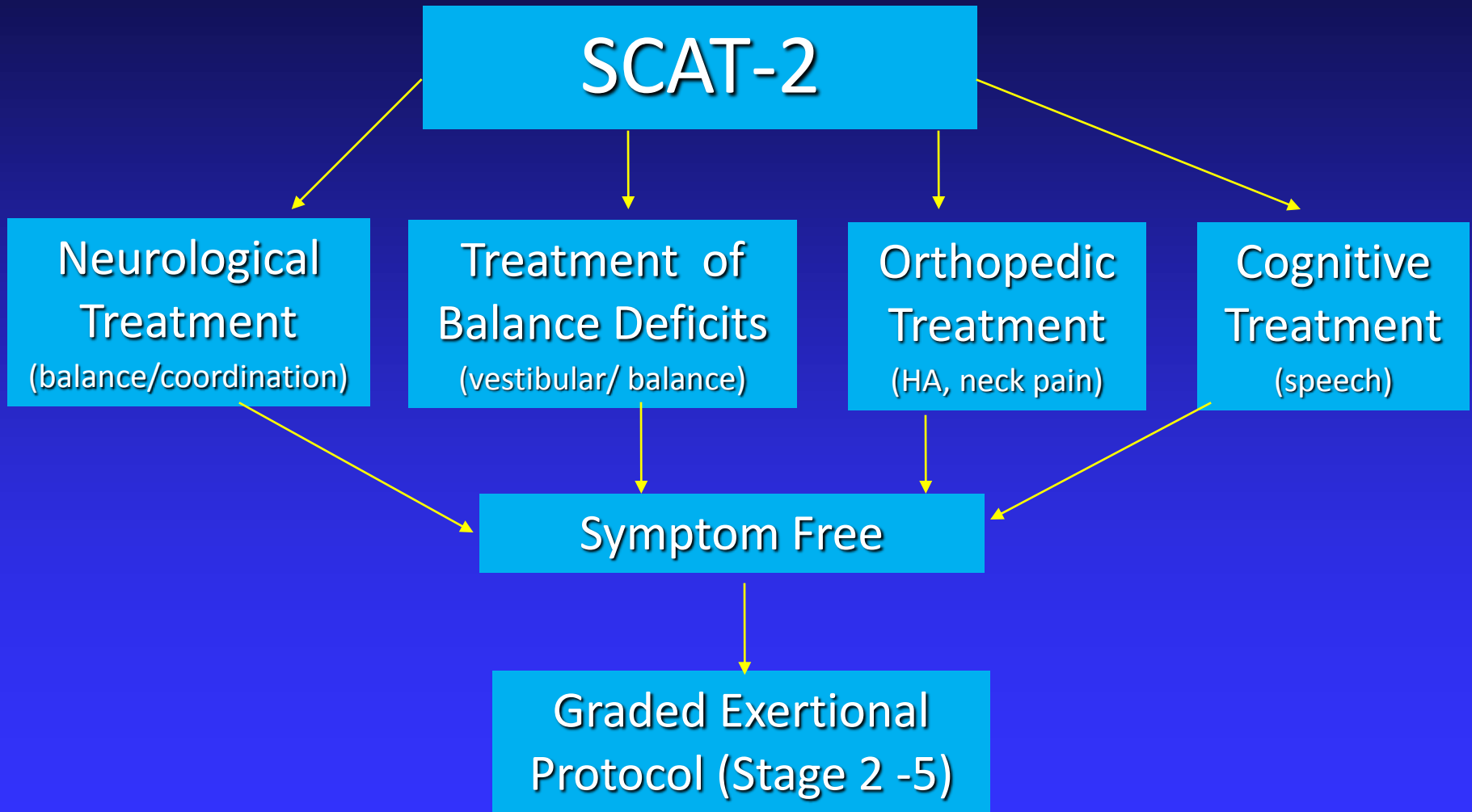
How Referred ?

- **Emergency Room visit** - automatic referral to Concussion Rehab Program at MRH Rehab
- **Family Physician Office Consultation**
 - If asymptomatic upon visit and no balance / neurological signs with examination then begin gradual return progression independently
 - If still symptomatic upon visit with balance, neurological and/or cognitive signs, refer to Concussion Rehab
 - Trainer or parent may refer, **BUT** plan of care must be signed by a physician

Logan County Concussion Program

- Mary Rutan Rehab concussion program includes:
 - Baseline assessment (SCAT2)
 - Neurological treatment
 - Cognitive treatment
 - Balance treatment / Vestibular rehab
 - Orthopedic treatment
 - Graded exertional protocol for RTS
 - Selected use of Neuropsych tests
- Refer back to family doctor for return to play approval

MRH Protocol



Graded Exertion Protocol

Rehabilitation stage	Functional exercise at each stage of rehabilitation	Objective of each stage
1. No activity	Complete physical and cognitive rest.	Recovery
2. Light aerobic exercise	Walking, swimming or stationary cycling keeping intensity < 70% MPRH No resistance training.	Increase HR
3. Sport-specific exercise	Skating drills in ice hockey, running drills in soccer. No head impact activities.	Add movement
4. Non-contact training drills	Progression to more complex training drills e.g. passing drills in football and ice hockey. May start progressive resistance training)	Exercise, coordination, and cognitive load
5. Full contact practice	Following medical clearance participate in normal training activities	Restore confidence and assess functional skills by coaching staff
6. Return to play	Normal game play	

- 24 hours per step
- If there is recurrence of symptoms at any stage, return to previous step

When Return to Play?

Criteria for RTP

- No longer have symptoms
 - No longer need medicine to control symptoms.
- Cognitive/ thinking skills & balance back to “normal.”
- After **REST** period and gradual activity progression (exertion)
- **MUST BE CLEARED BY MEDICAL PROFESSIONAL.**
 - Can be MD, PT, ATC but most likely MD after cleared by PT / ATC and referred back for release to return to sport from referring physician

Summary

- We know a lot more about injuries to the brain
- We have systems that can be put in place to
 - Safeguard the student-athletes
 - Facilitate speedy but safe return to play
 - Reduce risk/ liability to the athletic system
 - Improve overall athletic system performance
- **YOU, the parent, coach, teacher, athletic trainer, rehab professional, physician are critical to proper care**
- Proper care starts with DIAGNOSIS

Summary

- Relying on symptom assessment alone is relying on limited and possibly faulty information
- **Balance testing & provocative exercise** are sensitive and valid tools to help augment clinical evaluation and guide concussion management
- Student-athlete should not return to play until symptom free & post-injury test results are normal at rest and after exertion.
- The Mary Rutan concussion program is here to help you safeguard our student athletes

Heads Up: Concussion in High School Sports

- Parent Fact Sheet
- Athlete Fact Sheet
- Guide for Coaches

www.cdc.gov/ncipc/tbi/coaches_tool_kit.htm

**“If in doubt,
sit them
out”**