

1 **Concussion Management and Update**

Ricardo Guirola MD M Ed
Pediatric Rheumatology
Primary Care Sports Medicine

2 **Objectives**

- Review definition, signs and symptoms
- Discuss the initial evaluation of a patient with concussion
- Understand current recommendations regarding school and physical activity following concussion
- Understand current laws regarding concussions
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4 **Recent Developments on Concussions**

- Healthy Kids and Safe Sports Concussion Summit held at Whitehouse May 2014
 - Development of novel ways for parents, trainers, coaches, and physicians to not only prevent, but spot concussions earlier and react with more effective treatments
 - Department of Defense and NCAA
 - Study concussions in youth
 - NFL to donate 25 million dollars for research over next 3 years
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5 **Recent Developments on Concussions**

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7 **Definition**

- Concussion is a brain injury and is defined as a complex pathophysiological process affecting the brain, induced by biomechanical forces

8 **When parents and patients ask me??**

- A concussion is a brain injury that disrupts normal brain function

9 **Definition**

- ² • Causes
 - Direct blow to the head, face or neck
 - Elsewhere on the body with an “impulsive” force transmitted to the head

10 **Definition**

- Results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously
- Some cases, symptoms and signs may evolve over a number of minutes to hours.

11 **Definition**

- ¹ • May result in neuropathological changes
- The acute clinical symptoms largely reflect a functional disturbance rather than a structural injury

- No abnormality is seen on standard structural neuroimaging studies.

12 **Questions on Definition of Concussion?**

- Do we need to have loss of consciousness(LOC)?
 - Most patients do not suffer LOC
- Amnesia?
 - Most patients do not have amnesia
- Imaging studies?
 - Conventional studies normal
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13 **Who gets concussions?**

- ¹
- Concussion risk is greatest in certain sports:
 - Males (football, rugby, hockey and soccer)
 - In females (for soccer and basketball)
 - After prior concussions/mTBI
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14 **Concussion Modifiers**

- Symptoms > 10 days
- Signs
 - LOC >1 min
 - Amnesia
- Sequelae
 - Convulsions
- Temporal
 - Multiple concussions
 - Cloe together
 - Recent
- Threshold
 - Less impact
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15 **Concussion Modifiers**

- ²
- Age
 - Less than 18
 - Comorbidities
 - Migraines
 - Mental health disorders
 - ADHD
 - Learning disabilities
 - Sleep disorders
 - Associated Medications
 - Dangerous play
 - High Risk sport and position

16 **Recognition of Concussions?**

17  **Concussion Symptoms**18  **Concussion Signs**

- ² • Poor coordination
 - unsteady gait
 - Slow to answer questions or follow commands
 - Poor concentration
 - Behavior or personality changes
 - Inappropriate play
 - Diminished ability

19  **Patient Red Flags**

- ¹ • Repeated emesis
 - Severe headache or worsening symptoms
 - Very drowsy or lethargic
 - Prolonged LOC > 1 min
 - Focal neurologic deficit
 - Seizures
 - Slurred speech
 - Weakness
 - Abnormal behavior, combative, or irritable

20  **Initial Management**

- ¹ • ABC's
 - History and Physical
 - Remember Neck!!
 - Distracting injury
 - Complete Neurologic Evaluation
 - Sideline Assessment Tools
 - SCAT 3 or Childhood SCAT

21  **SCAT 3**

- Tools have been developed in consensus conferences (Zurich 2012)
- No reliable data yet of true validity
- 13 yrs and older
- As of now most adequate sideline tool

22  **SCAT 3**

- GCS score
 - If less than 15
 - Recommendation for Emergency management
- Maddocks Score

23  **SCAT 3**

- Symptomatology Score
- Cognitive Assessment
 - Orientation
 - Immediate Memory

- Concentration
- Delayed Recall
- Neck Examination
- BESS Score
- Coordination Score
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24 **BESS Score**

- ² • 3 stances
 - Double leg
 - Single leg (non dominant)
 - Tandem stance
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- 20 seconds
- Eyes closed
- Foam and hard surfaces

25 **Childhood SCAT**

- Less Data
- 5-12 yrs
- Changes in Symptom Score questionnaire
- Parent questionnaire
- Modified BESS
 - No single leg
- Modified Maddock
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26 **Neuroimaging**

- ¹ • Usually normal not necessary for diagnosis
- CT scan most common
 - Emergency Situations
 - Exclude severe injuries
- MRI
 - Cerebral contusion
 - White matter injury
- Functional MR and PET scan
 - Research promising
 - Not easily available

27 **Neuropsychological Exams**

28 **ImPACT testing**

- 30 minute test
 - Attention span
 - Working Memory
 - Sustained and selective attention time
 - Response variability

- Non Verbal problem solving
- Reaction time

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29 **ImPACT**

- 1 • Additional tool
- Baseline testing
- Not clinically necessary but very helpful
- Widely used and growing data
- Does not substitute full neuropsychological testing

30 **Caution with ImPACT**

- 1 • Baseline testing
 - Performed in mass
 - Unsure of reliability
- If patient symptomatic
 - Scores not reliable
- Should be performed once patient asymptomatic

31 **Neuropsychology**

- 2 • Referral
 - Complex concussion
 - Learning disabilities
 - Repeated concussions
 - Psychiatric disorders
 - ADHD
 - Children?
 - Data still limited

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32 **Return to Play**

- No athlete with signs or symptoms of concussion either at rest or with exertion should be allowed RTP.
- Individualized
 - Graduated
- Prolonged
 - Younger patients
 - Risk Factor/modifiers
- Guidance
- Education
- Reassurance

33 **Return to Play Factors**

- Second Impact Syndrome

- High mortality/morbidity
- Reported in youth
- State Laws
- Risk of other concussions
- Neurocognitive impairment
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34 **Graduated Return to Play Protocols**

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- Time

35 **Treatment/Management of Concussions**

- Brain rest(cognitive)
 - 48-72 hrs
- Physical rest
- Sleep
- Hydration
- Nutrition
- Must be Individualized
 - Younger patients
- Academic accommodation
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36 **Brain Rest**

- ¹ • No television
- No extensive reading
- Video games
- Texting
- Electronic Gadgets
 - I pads, I pod
- No caffeine or stimulants
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37 **School Accommodations**

- Individualized
- Neurocognitive testing helpful
- Stay at home
 - Usually first days
- If symptoms persistent
 - Exclude tests

- Half days
- Reduce work overload
- Modify classes

38 **Pharmacological**

- Headaches
 - Acetaminophen
 - NSAID's
- Nausea
 - Zofran
- Prolonged symptoms
 - Sleep
 - Melatonin
 - Amitriptyline
 - Amantadine

39 **Texas Law**

- HB 2038
- Effective June 2011
- "Natasha's Law"

40 **Natasha's Law**

- Creation of a concussion oversight team by each school district
 - Must include a physician
 - ATC, NP, PA, neuropsychologist
 - Outline concussion management and return to play policies
- All students and their parent/guardian must review concussion information and sign form acknowledging this prior to participation each year

41 **Natasha's Law**

- 1 • Training course every 2 years for coaches and members of concussion oversight team
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 - Immediate removal from play for any athlete believed to have a concussion
 - Coach
 - Parent
 - Health professional

42 **Natasha's Law**

- Progressive return-to-play once completely asymptomatic following guidelines
- Signed clearance by physician for RTP
 - Requires MD/DO signature
 - Prevents other individuals from faster return
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43 **Prevention**

- 1 • Education
- Violent behavior increases risk
 - Immediate elimination
 - Sanctions

- Modification of Sports
 - Sparring
- Fair Play

44 Concussions and Head Gear?

- NO evidence that these alter concussion risk
 - Soccer headgear
 - Position
 - Particular helmet
 - Mouth guards
- Decreased risk
 - Fractures
 - Intracranial injuries
 - Oral injuries
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45 Summary

- Definition includes impairment in brain function
- All athletes at risk for concussion
- Concussion Modifiers
 - Young age
 - Previous disorders
- Testing helpful for complete clinical assessment
- Treatment is multidisciplinary
- RTP graduated after treatment
- Natasha's Law
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