

Concussion in Children and Adolescents

Molly Faulkner, PhD, APRN, LCSW
Nurse Practitioner, Clinical Social Worker
University Of New Mexico, Department Of Psychiatry,
Division Of Community Behavioral Health

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Objectives

1. Participant will **define concussion** and **post concussive syndromes** in in children and adolescents
2. Participant will **identify 3 behaviors** that can be **attributed to post concussive syndrome** in children and adolescents
3. Participant will **list 3 interventions** to **assist in the classroom with maladaptive behavior** resulting from a concussion

Mild head injury/**concussion**

- Mild head injury is a **quiet disorder**. It is **common, typically bloodless** and without call for significant medical intervention. It seems even more quiet because **the noise it does not make (its symptoms)** is often attributed to **other causes**. Nevertheless the **disruption in coping capacity** and attendant **breakdown in usual behavioral patterns** causes **more psychosocial and academic economic hardship** than have begun to be appreciated. (Boll 1983, p. 74).

Head Injuries or traumatic brain injury (TBI)

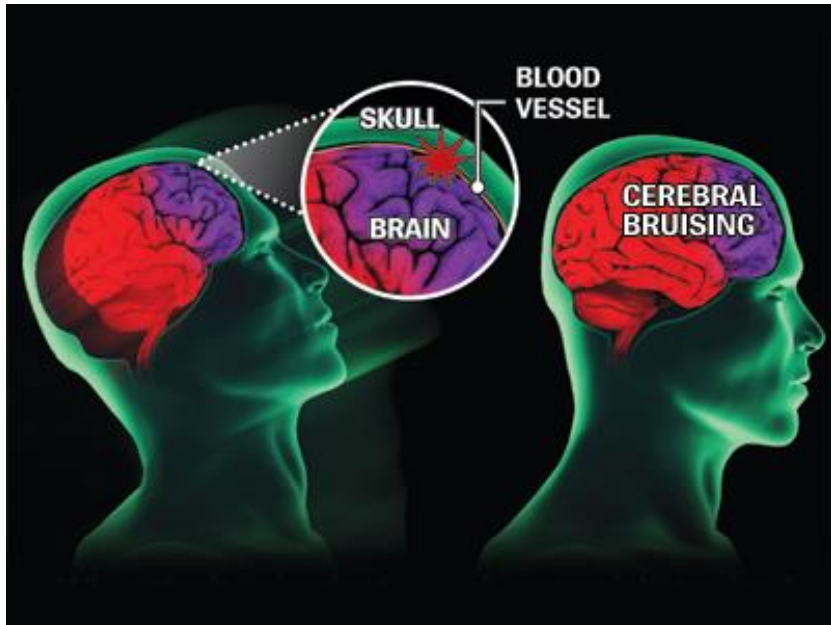
Closed Head Injury (CHI)

- No skull fracture
- Brain jostled and bruised internally
- Coup, contra coup injuries

Open Head injury

- More severe head injury
- Skull fracture with compression of brain or projectile in the brain

Terms used to refer to mild CHI



- Minor closed-head injury*
- Mild closed-head injury
- mid traumatic brain injury
- **concussion**

Different terminology

American Academy of Pediatrics

‘Minor Closed Head Injury’

Inclusion criteria:

- Normal mental status on initial examination
- No abnormal or focal neurological findings
- No physical evidence of skull fracture
- Loss of consciousness <1 minute
- May have had a seizure immediately after injury
- May have vomited after injury
- May exhibit other signs and symptoms (e.g. headache, lethargy)

Exclusion criteria:

- Multiple trauma
 - Unobserved loss of consciousness
 - Known or suspected cervical spine injury
 - Suspected intentional head trauma
-

American Congress of Rehabilitation Medicine

‘Mild Closed Head Injury’

Inclusion criteria (at least one must be present):

- Any loss of consciousness
- Any loss of memory for events immediately before or after the accident
- Any alteration in mental state at the time of the accident
- Focal neurological deficits that may be transient

Exclusion criteria:

- Loss of consciousness >30 minutes
 - Glasgow Coma Scale score <13 after 30 minutes
 - Post-traumatic amnesia >24 hours
-

Transient impairment of function as a result of a blow to the brain

Symptoms Mild TBI/concussion

- Nausea
- Vomiting
- Fatigue
- Feeling light-headed or dizzy
- A feeling of “having your bell rung”
- Trouble getting things organized
- Blurred vision or eyes that get tired easily
- Headaches or ringing in the ears
- Other common symptoms of concussion, or mild TBI, include:
 - Feeling sad or anxious
 - Being easily irritated or angry
 - Feeling tired all the time
 - Having trouble with memory, attention, or concentration
 - Being bothered by sounds, lights or distractions
 - Having trouble making decisions or solving problems
 - Having trouble with self-control
 - Thinking, moving, speaking or reading slower than normal
 - Feeling easily confused or overwhelmed
 - Having changes in sleep, including much more or much less
 - Having changes in sexual interest or behavior

Epidemiology TBI in the United States

Est 1.7 million people sustain a TBI annually

- 52,000 die
- 275,000 are hospitalized

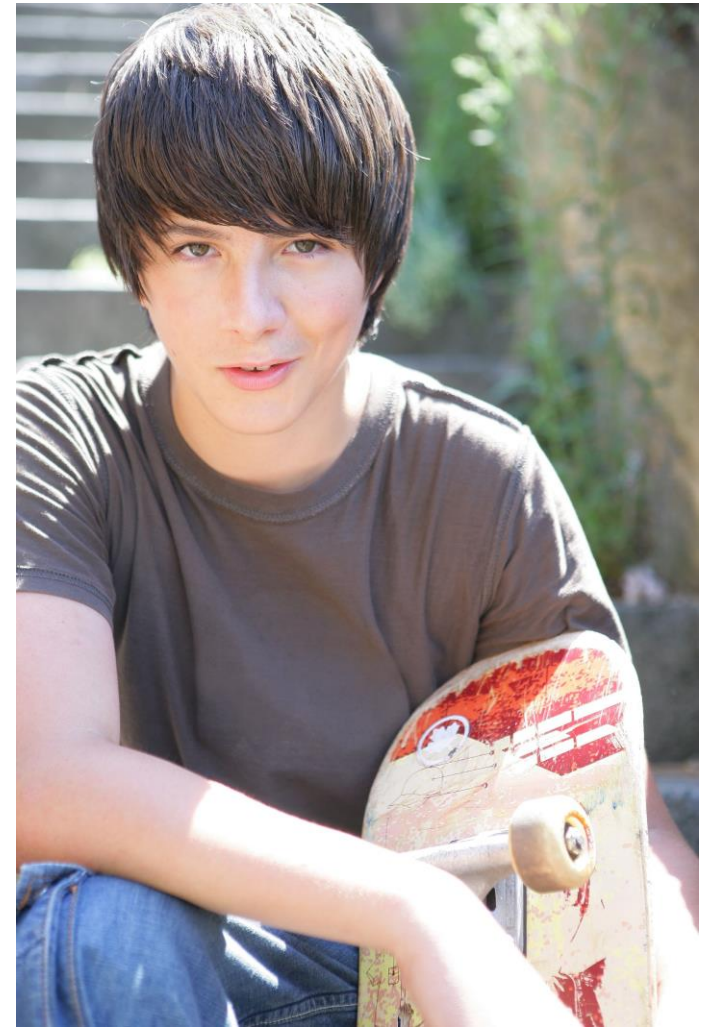
Children

- 1,000,000 closed head injuries in US annually
- 1 in 5 children **prior to age 16**
- Almost half a million (473,947) ed visits for TBI annually by **children aged 0 to 14 years.**
- 80-90% classified as mild

- 1.365 million, **nearly 80%, are treated and released** from an emergency department.
- TBI contributing **factor to a third (30.5%) of all injury-related deaths**
- About **75% of TBIs** each year **are concussions** or other forms of **mild traumatic brain injury (mtbi)**
- Direct medical costs & indirect costs such as lost productivity, totaled an est. \$60 billion

Joaquin

- 15 year old Hispanic/Anglo male who was a gregarious A & B student, had lots of friends and loved to skateboard. Parents divorced and get along well, he has good relationships with both his mom and his dad. He and his 13 year old brother had normal sibling rivalry and he has a great connection with his 20 year old sister who had a 3 year old daughter that he adored. Recently began his first 'real' relationship with a 14 yr old girlfriend, he smoked pot 'a couple of times', but didn't like to drink. Wanted to go to trade school and be an electrician, like his dad, when he graduated from high school.



Causes of TBI 2006–2010

#1 Falls leading cause of TBI

Disproportionately affect **youngest & oldest age groups:**

55% of TBIs in children **0 to 14 years** by falls.

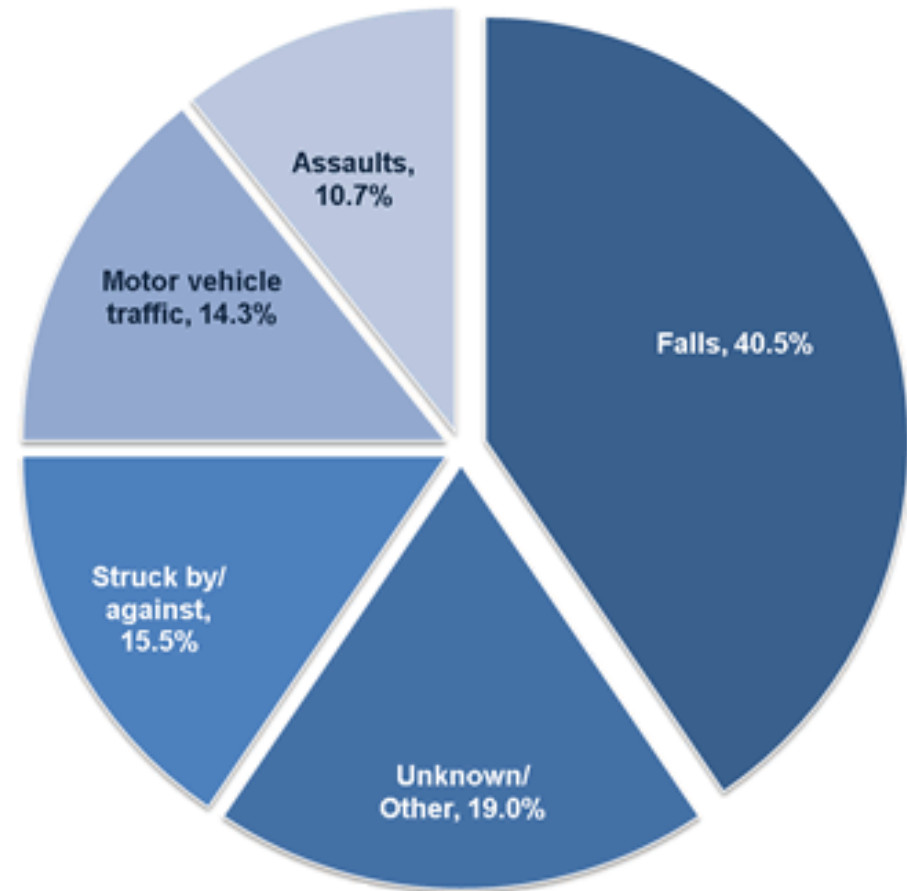
81% of TBIs in adults **aged 65 and older** by falls.

#2 Unintentional blunt trauma 15.5%

#3 Motor vehicle crashes all age groups 14.3%

#4 Assaults 10%

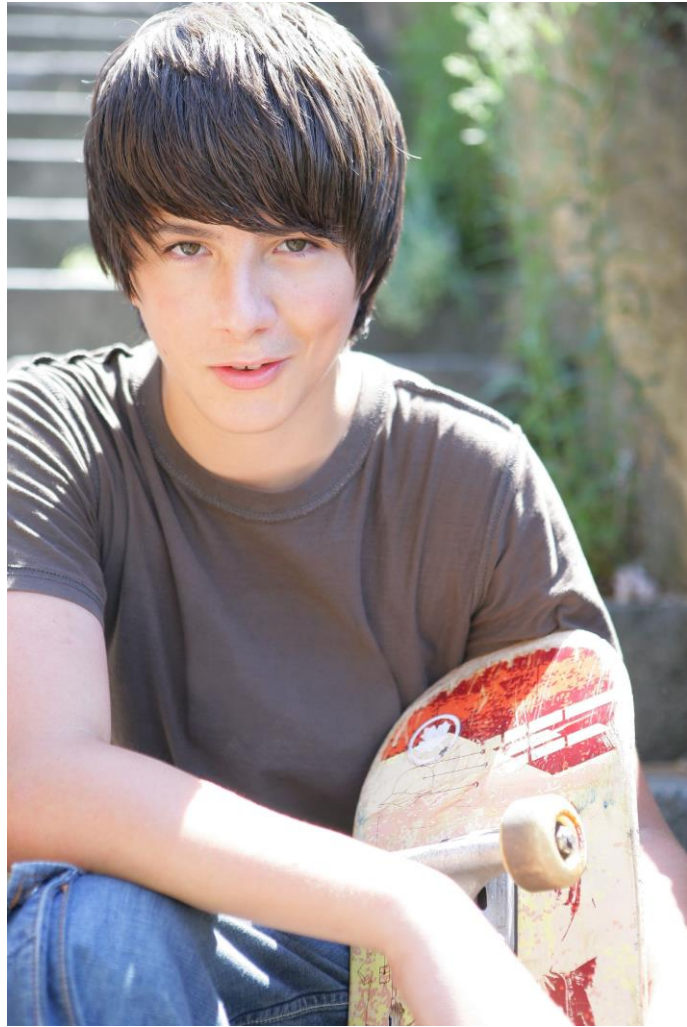
Leading Causes of TBI



Risk Factors for TBI

- Gender
 - Males 1.4 to 1.6 x more likely to have TBI and 20-5-% more likely to have severe/fatal injury
- Age
 - Highest among 0-4, 15-19, 75 & above
- Ethnicity
 - African American
 - Caucasian
 - American Indian/Alaskan Native/Asian-Pacific
- Alcohol
 - 56-75% have +blood alcohol levels
 - 21% of MVA w/TBI had BAL, 12% over legal limit
- Prior TBI
 - 1 prior=3x more likely
 - 2 prior= 809 x more likely
- Rural: 2 x more likely
- Military: 80% in non-deployed
- Incarcerated: 60? Have TBI²

Joaquin



- Joaquin presented for psychiatric evaluation after being hit, **five months ago**, by a drunk driver at dusk while skateboarding along a side road near his home. Broke his pelvis and right arm and **luckily only suffered a mild concussion.**

Neurobehavioral Outcomes mild CHI

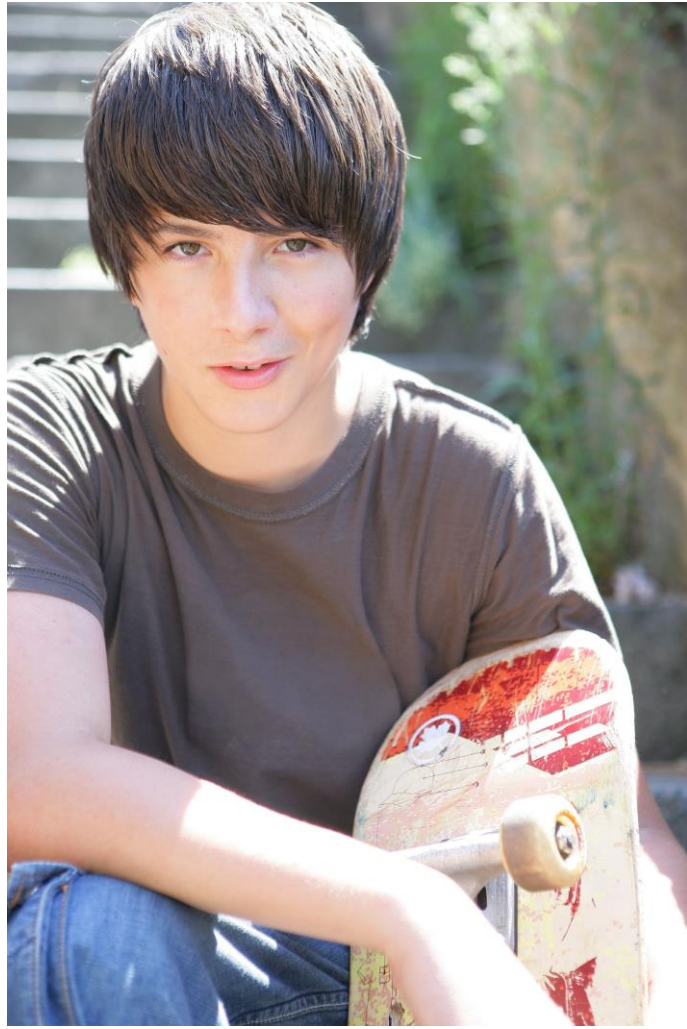
Post-concussive Symptoms

- Cognitive
 - Somatic
 - Emotional
 - behavioral
- Symptoms persist over time
 - Lasting months, Even years
 - Despite resolutions of deficits on standardized cognitive testing
 - May be associated with significant functional morbidity

Post-concussive Symptoms

- COGNITIVE-inattention, forgetfulness
- SOMATIC- headaches, dizziness, fatigue
- Emotional- irritability, depression
- Behavioral-impulsivity, poor social judgement

Joaquin



- Pelvis and arm were healing well but his **grades had slipped to D's and F's** as he couldn't seem to **pay attention** and he was **so tired all the time**. He now **smoked pot daily** and **stayed in his room all the time**, and hadn't skateboarded since the accident.

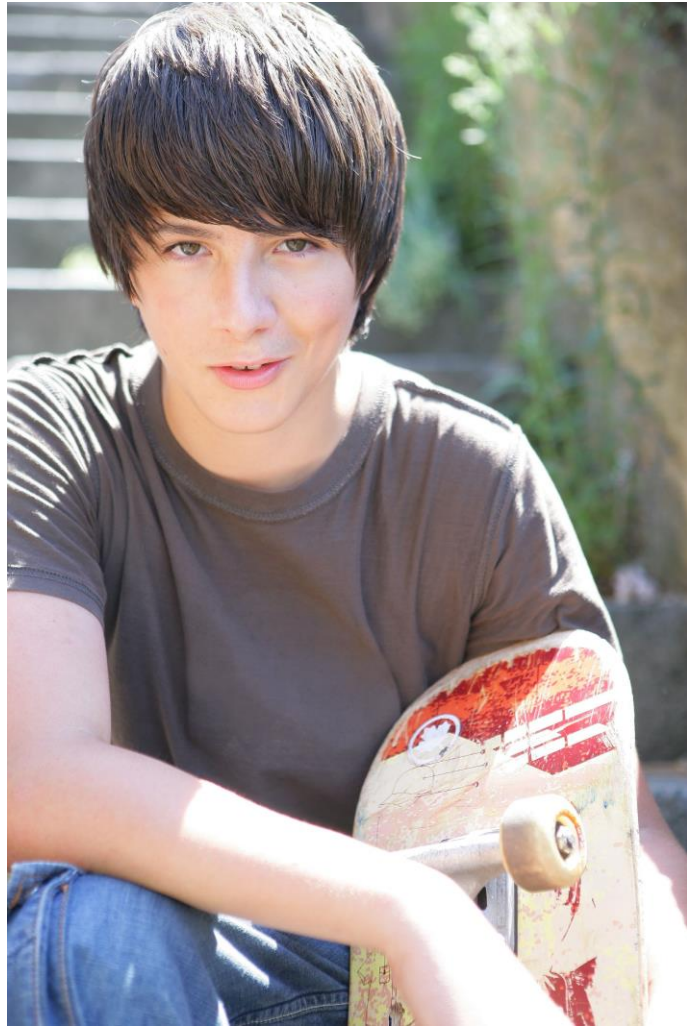
Ongoing Problems after Concussion

- The chances of having **ongoing problems** is the same whether a patient is **only dazed** or **actually loses consciousness** for less than 30 minutes after the traumatic event.
- After **one brain injury**, the **risk of a second injury is 3x greater**
- After the **second injury**, the **risk for a third brain injury is 8x greater than average**.
- **More brain injuries that a person suffers, the greater the chance of having long-term problems.**

DSM-IV Diagnostic Criteria for Post-Concussion Syndrome

- Hx of head trauma causing **significant cerebral concussion** (e.g. Loss of consciousness, post-traumatic amnesia or seizures)
- Neuropsychological **evidence of difficulty in attention or memory**
- 3 or more symptoms lasting at least 3 months
- Onset shortly after head trauma:
 - Fatigue
 - Disordered sleep
 - Headache
 - Dizziness
 - Irritability or aggression with little or no provocation
 - Anxiety, depression or affect lability
 - Changes in personality
 - Apathy or lack of spontaneity

Joaquin



- Parents were fighting as they were **really worried** about Joaquin but couldn't agree how to best help him. His normal sibling rivalry had **deepened into serious physical fights** over small conflicts, **he hardly ever saw his older sister** and **had broken up with his girlfriend**, and he when his parents brought up his future as an electrician, **he told them he didn't want to talk about it!**

Contributing Factors to Recovery

- Age at time of injury
 - risk: younger children & older adults
- Pre injury function
 - Protective: higher ed
 - Risk: learning disorders, prior psyche diagnosis
- Social strengths
 - Protective: Higher SES, caregivers dedicated
 - Risk: lack or limited social support, inadequate insurance
- Psychological
 - Protective: resilience
 - PTSD/Depression
 - Cognitive biases

Features seen in classroom of post concussive syndrome

Emotional-Behavioral-Cognitive-Somatic Change in previous level of functioning or worsening

- Increased missed days of school
- Seeing health provider more outside of school
- Reduction in activity levels
- Going to nurse's office with headaches, stomach aches
- Increase in anxiety, irritability, touchy, fighting more
- School performance
 - Does assignment but may not do correctly
 - Does not turn in on time
 - More disorganized than usual
 - Inattentive, disinterested
 - Dazed
 - Tired

Interventions in the classroom

- Team approach to planning for child/adolescents return to classroom or planning for education
- Include the student “in the loop” with regard to plan
- Be mindful of developmental age of child/adolescent and typical challenges they are facing
- Collaborate with parents, counselors, doctors
- Reduce complexity of homework (if at all possible), break down into chunks for child/adolescent
- Abide by guidelines provided by health care provider and/or parents
- Neuropsychological evaluation
- Reduce stimuli if at all possible
- Rest
- Reminders/stickers

Strategies for addressing concussion symptoms at school

Cognitive

- Concentrate first on general cognitive skills, such as flexible thinking and organization, rather than academic content.
- Focus on what the student does well and expand the curriculum to more challenging content as concussion symptoms subside.
- Adjust the student's schedule as needed to avoid fatigue
- Adjust the learning environment to reduce identified distractions or protect the student from irritations such as too-bright light or loud noises.
- Allow extra time for test/in-class assignment completion.
- Help the student create a list of tasks and/or daily organizer.
- Assign a peer to take notes for the student.
- Allow the student to record classes.
- Increase repetition in assignments to reinforce learning.
- Break assignments down into smaller chunks and offer recognition cues.
- Provide alternate methods for the student to demonstrate mastery, such as multiple-choice or allowing for spoken responses to questions rather than long essay responses.

Strategies for addressing concussion symptoms at school

Behavioral/Social/Emotional

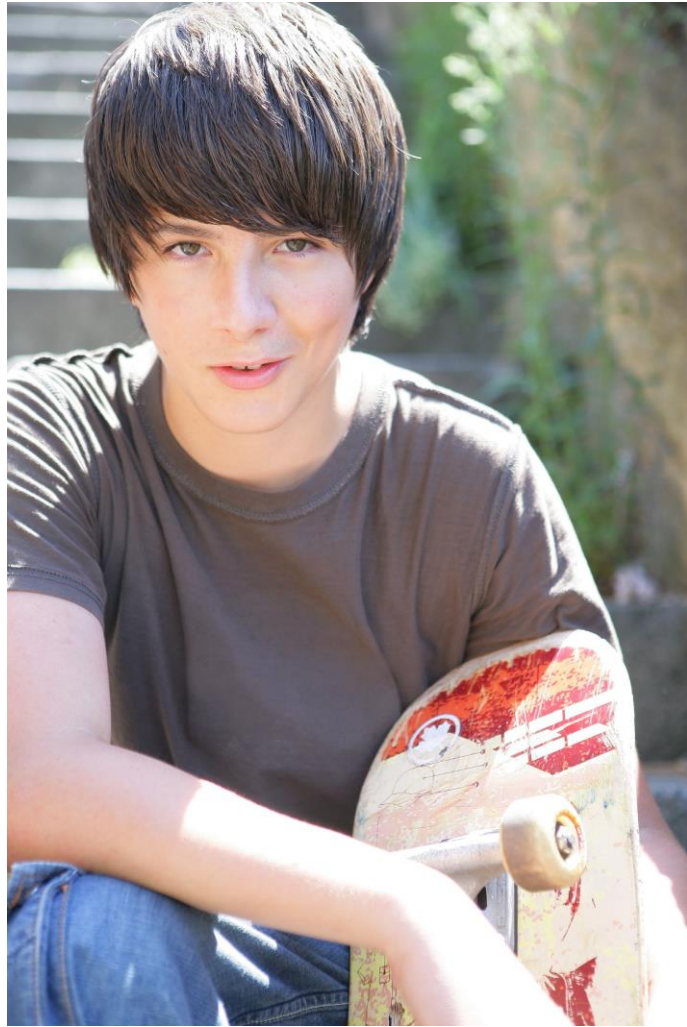
- If the student is frustrated with failure in one area, redirect him/her to other areas associated with success.
- Provide reinforcement for positive behavior as well as for academic achievements.
- Acknowledge and empathize with the student's sense of frustration, anger or emotional outburst: "I know it must be hard dealing with some things right now."
- Provide structure and consistency; make sure all teachers are using the same strategies.
- Remove a student from a problem situation, but avoid characterizing it as a punishment and keep it as brief as possible.
- Establish a cooperative relationship with the student, engaging him/her in any decisions regarding schedule changes or task priority setting.
- Involve the family in any behavior management plan.
- Set reasonable expectations.

Interventions in the school


- Team approach includes:
 - Child/teen
 - Parents
 - Healthcare providers
 - Teachers interacting with student
 - School Nurse
 - Counselor
 - School administrator



Joaquin



- After coaching parents on how to collaborate with the school, psychologist, myself and other healthcare providers, they were able to get an educational plan that facilitated Joaquin's recovery from concussion. Plan included shorter days at school, lighter classroom load, family therapy to help parents and sibs learn how to be more supportive and low dose stimulant to help with his inattention and focus. He graduated 6 months after his peers and is now in trade school to become an electrician.



Questions?

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