Brain concussion and DAI in Athletes

Concussions

mild traumatic brain injury(mTBI)
is defined as a complex pathophysiological process affecting the brain induced by traumatic biomechanical forces resulting in the rapid onset of short-lived impairment of neurological function that resolves spontaneously

Concussions

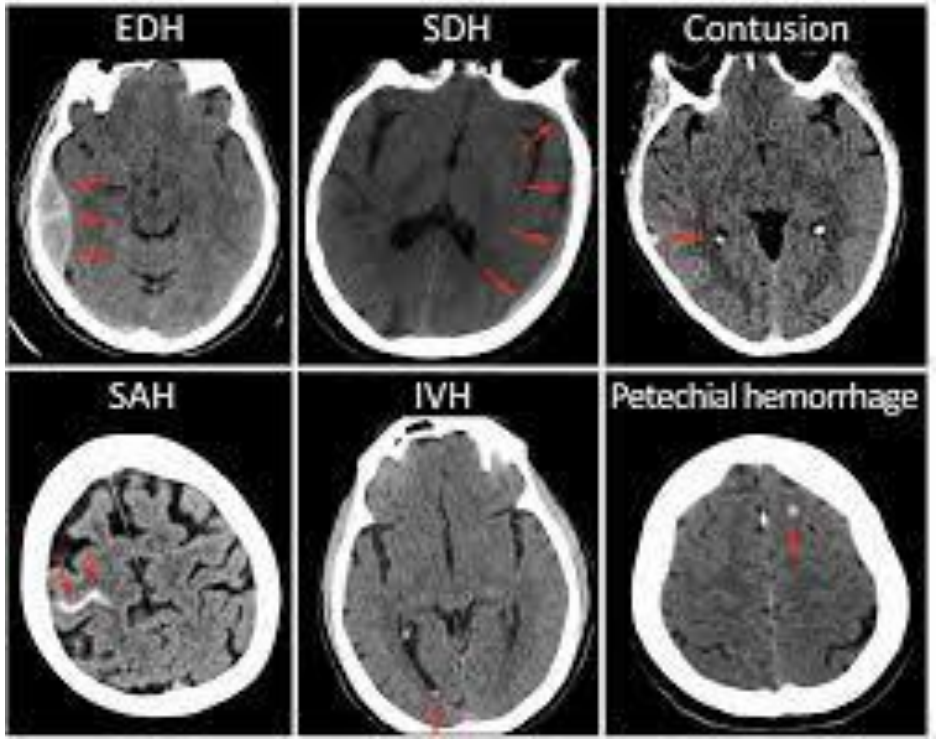
- there is physiological changes in the brain after some kind of trauma to the head.
- These changes will increase initially and begin to subdue in a general period of 7-10 days for adults
- or in about 14 days for children

When a concussion occurs

- there is increased blood flow to the brain.
- increased intercranial swelling
- Pressure increases inside the skull.

▣ Most of the damage in a concussion is

- superficial and functional in nature so many current imaging techniques do not accurately detect them.



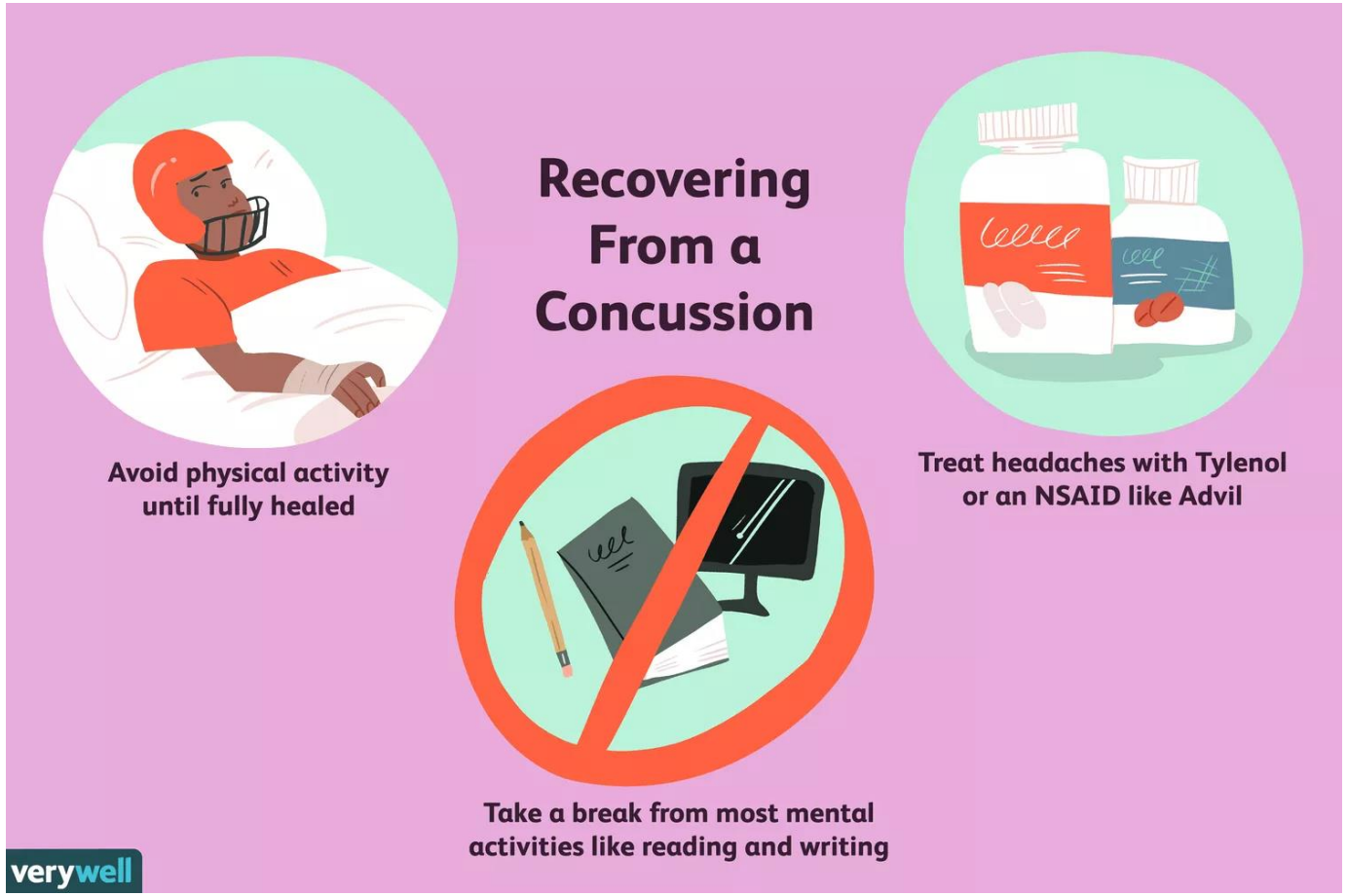
Some stats about concussions

- ▣ Approximately 1.6-3.8 million people in the
- united states alone will suffer from some kind
- of traumatic brain injury.
- ▣ Approximately 20% of that will occur during
- sport
- ▣ It has been reported that as high as 20% of
- concussions can lead to post concussive
- syndrome which include persistent symptoms
- three months pos injury.

Signs and Symptoms

- ▣ Headache, nausia, dizziness,
- “feel like your in a fog” slow, sluggish
- ▣ Physical signs – amnesia or loss of consciousness
- ▣ Behavioural changes – irritability
- ▣ Cognitive impairment – slow reaction time
- ▣ Sleep disturbance

Post concussion care



What Can Concussions Lead To

- ▣ Chronic traumatic encephalopathy (CTE)
- ▣ Second impact syndrome (SIS)
- ▣ Post concusive syndrome (PCS)

Chronic Traumatic Encephalopothy

- ▣ Is a progressive degenerative disease (gets
- worse as you age)
- ▣ Occurs from sustaining repetitive head injuries or concussions
- ▣ Often show symptoms of dementia, memory loss, aggression, confusion and depression
- ▣ Can be very debilitating and can lead to premature death.

Second Impact Syndrome

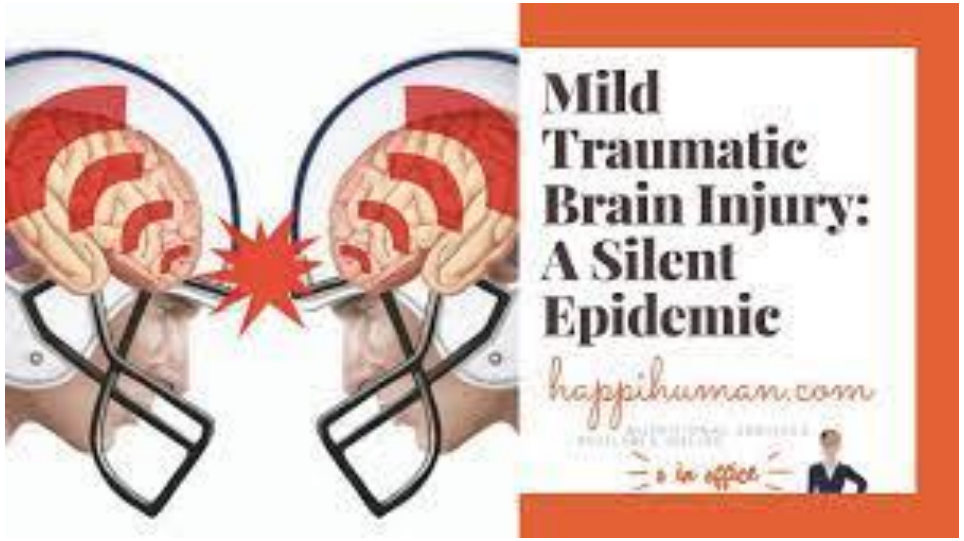
- ▣ Any impact to the head prior to full healing of a first traumatic event – can result post
- concussive syndrome and/or in permanent, lifelong brain damage.
- ▣ Critical 7-10 days of full rest and recovery

Post Concussive Syndrome

- ▣ PCS is defined as a constellation of physical, cognitive and emotional symptoms that persist in a small percentage of patients who suffer from a concussion
- ▣ Impairments in memory, attention, dizziness,
- headaches, alteration of mental status,
- irritability.
- ▣ *Is a result of functional rather then structural damage*

The Silent Injury

- ▣ Concussion is often referred to as the silent injury because there is often no or little visible trauma although there could be high amounts of brain and nerve damage



The Warrior Code

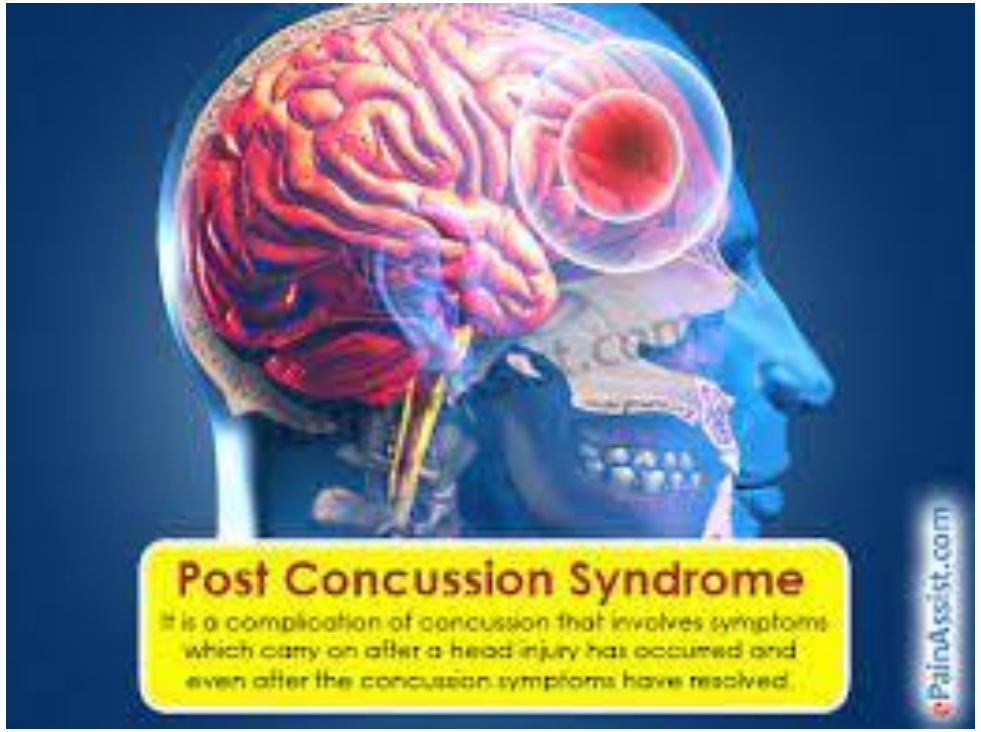
- The mentality that you must sacrifice your body for the better of the team – you must play through any injuries and are expected to compete at your top level.
- This Can lead to early return to play which can put the athlete at a greater chance of injuring themselves and possibly sustaining life long damage.

Levels of Sports-Related Head Injuries

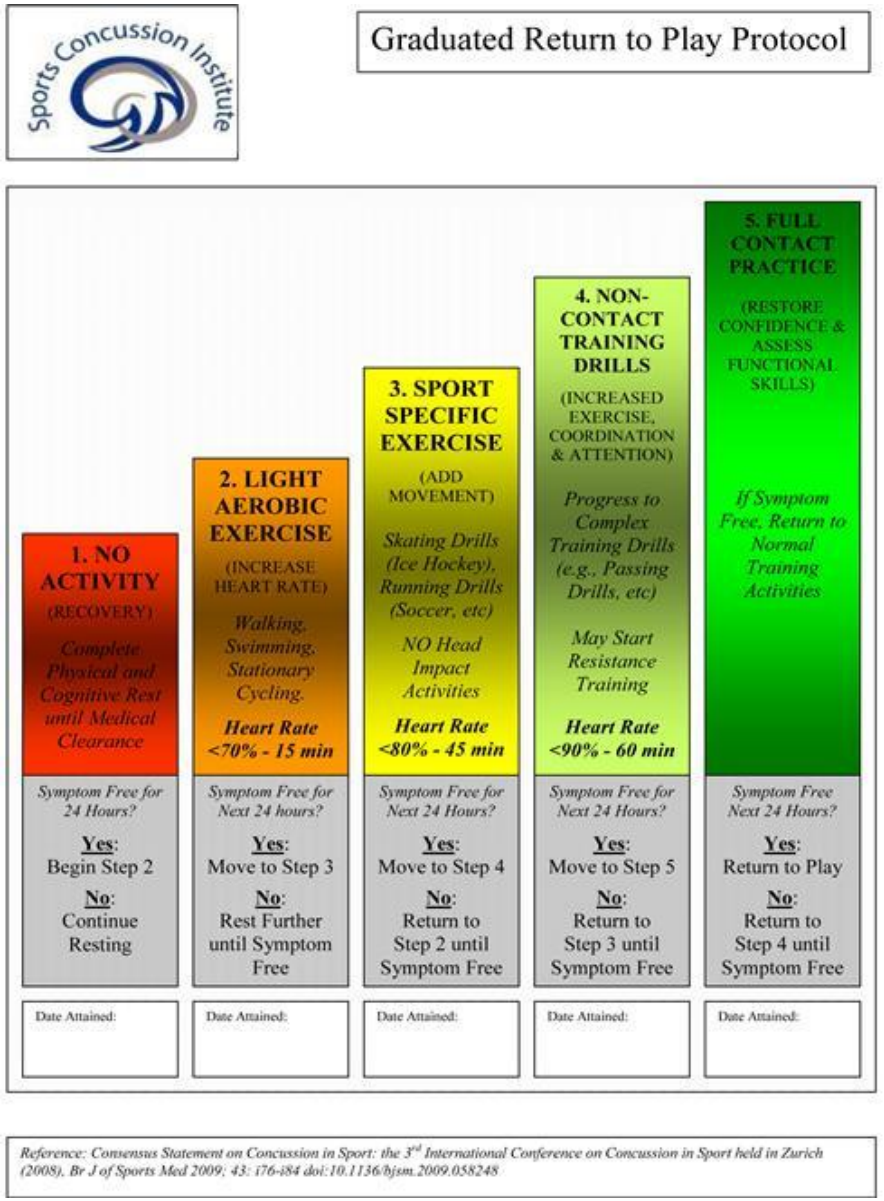
- Grade 1 – Mild physical trauma to the head such as a bump, contusion, or laceration.
- Grade 2 – Characterized by headaches that are often migraine-like in character, with associated symptoms.
- Grade 3 – Mild traumatic brain injury (TBI), characterized by a sudden change in mental status or loss of consciousness for less than 1 minute, or amnesia for less than 30 minutes.
- Grade 4 – TBI characterized by loss of consciousness for more than 1 minute and less than 5 minutes, or amnesia for more than 30 minutes, but less than 24 hours.
- Grade 5 – Severe TBI, which can be life threatening physical injuries to the brain, bleeding within the brain, and increased intracranial pressure.

Grade 5 category

- athletes who have lost consciousness for more than five minutes or experienced amnesia for more than 24 hours in the



Return-to-Play Guidelines



Return-to-Play Guidelines

- **Grade 1 – Athletes can return to play as soon as the physical injury has healed.**
- **Grade 2 – Athletes can return to play once they are asymptomatic and have completed a return-to-play protocol, which is a five-stage gradual increase in activity. We also recommend that athletes with Grade 2 injuries or higher undergo neurocognitive testing after injury. Once post-injury neurocognitive test results are favorable in comparison to the baseline and the symptoms have resolved, then the athlete can resume play.**
- **Grade 3 – We recommend that athletes wait at least 10 days before they participate in any activity that can result in head trauma.**
  - **They also must be asymptomatic and successfully complete the five-day return-to-play activity protocol.**
  - **Returning to play after four such injuries should be considered only after receiving clearance from a neurologist or neurosurgeon.**

Return-to-Play Guidelines
Grade 4

- ***30-day*** break with a first injury,
- ***90-day*** break with a second injury,
- ***180-day*** break after a third injury
- They may then return to play if they are asymptomatic and neurocognitive testing is favorable as compared to the baseline.
- We recommend that athletes ***not return to play after three Grade 4 injuries***.

Return-to-Play Guidelines
Grade 5

•Athletes may be able to return to play after six months if an MRI indicates that there was no evidence of structural damage inside the brain.

This would include athletes who were unconscious for more than five minutes or had amnesia for more than one day and have a normal neurologic exam.

They must be cleared by a neurologist or neurosurgeon.

If an MRI shows evidence of an abnormality, such as brain contusion or increased intracranial pressure, or if the neurologic exam remains abnormal, then we recommend that those athletes ***never return to play***