Unless you've been living under a rock, you know that the most talked about injury in sports is concussions.

We've seen everything imaginable labeled in association with concussions - from books, to movies, to equipment and every imaginable medical scenario.

What we've ended up with is increased awareness; a lot of information - good/bad and ugly; and a process that still has a long way to go.

The Michigan High School Athletic Association has been engaged in a variety of progressive programs to help schools make those critical decisions about identifying potential concussions, withholding student-athletes from play, properly returning them to play, and supporting families with the first-of-its kind nationally gap insurance.

So in this past decade - what have we learned?

From two years of data collection from member schools, we know that concussions are of concern beyond football and boys. While football – the highest participation sport – has had the most concussions, the sports that follow are girls basketball (second) and girls soccer (third).

We've also learned that girls report two to three times as many concussions as boys in basketball and soccer, as well as in softball compared to baseball.

Which leads to the next lesson learned - Whether girls actually experience more concussions than boys or are more forthcoming than boys in reporting suspected concussions, coaches need to coach and communicate with females differently than males; and coach educators must prepare coaches to interact differently with boys and girls.

Next, we've learned that more than 80 percent of concussions caused the athlete to be withheld from activity for six days or longer; and again, there was a tendency to withhold girls longer than boys. In any event, the data suggests that people are taking concussions seriously and not rushing students back into practices or contests.

Finally, the data reveals that more than two-thirds of reported concussions arise from competition, and less than one-third occur during the many longer hours of practice. This is a reversal of the data we were provided a decade ago based on smaller samplings from other states; and this suggests that coaches are finding ways to teach skills and conduct drills without requiring as much player-to-player contact as in the past.

There's a lot more to learn about concussions to help make our games even safer than they are now, and a team effort of coaches, athletes and parents continues to be a top priority to train and play in ways that minimizes risk, to identify potential concussions, and to act responsibility in reporting and returning to activity from such injuries.

Let's review what we know about concussions:

- They are caused by anything that causes the head and brain to move rapidly back and forth.
- The sudden movement literally bounces or twists the brain inside the skull.
- Signs and symptoms of a concussion may not appear for minutes, hours, or days.
• No piece of equipment, training technique or food supplement can prevent concussions.
• It's possible to get a concussion without head contact.
• A concussion is a disruption in the flow of communication within the brain - not a bruise in the brain.
• Most concussions don't involve being knocked out.

Concussions - according to our data - occur in all sports - where high school athlete's brains are still developing, and they tend to take longer to recover.

Some students are more prone to sustaining concussions than others. **Risk factors include:**

• A history on concussions
• A genetic predisposition to concussions
• A history of migraine headaches
• A lack of sleep
• Dehydration
• Illness
• Taking medication
• Fatigue
• A mood disorder
• A existing learning disability

While most concussions start with a hit, collision or fall - you might not see it happen. So here are things to look for - and remember that **ANY of these could mean a concussion:**

• Headache or feeling pressure in the head
• Nausea or vomiting
• Dizziness
• Vision Problems
• Sensitivity to light or noise
• Feeling Sluggish or Groggy
• Appears Confused or Clumsy
• Answers questions slowly
• Extreme changes in personality/emotions
• Loss of consciousness happens in only 1 of 10 occurrences

Remember that no two people - or concussions - are the same; and I hope we've changed the culture we're all past the point of believing that if you just got your bell rung or got a "dinger", you'll be OK. Getting your bell rung or a "dinger" is a concussion. I also hope we can change the culture make progress with kids realizing that - no matter how much they want to stay in the game - they're placing themselves in danger trying to play through any injury - let alone possible concussions.

And sometimes a head injury is more than a concussion. When that happens, act fast. You don't know right away if it's a concussion or something bigger - you could be ignoring something that needs immediate medical attention.

Here's what to look for: If any of these symptoms worsen, that's a red flag. (Other warning signs include increasing sleepiness, seizures, vomiting, slurred speech, trouble recognizing people or places, neck pain and weakness or numbness in arms and legs.) All of these are signs of a potential brain or spinal cord injury.

The signs and symptoms of a concussion may not appear immediately. It may take minutes-hours-even days. They may not occur until the student is challenged mentally or physically.

That's why everyone affiliated with your program - coaches, trainers, parents and athlete need to team up to recognize concussions.
Coaches, players and others should watch for any kind of event which causes a rapid movement of the head; and then for any of the signs and symptoms described previously. Coaches should always have a reference on hand listing the signs and symptoms.

Keep in mind that young people take longer to recover from a concussion than adults. With that in mind, MHSAA regulations state that an athlete may not return to practice or play without an unconditional medical release.

While the athlete is progressing through a return to activity protocol, they need physical rest - which includes restrictions on physical activities; mental rest - a break from studying, video games, texting and so on; staying hydrated, eating well and getting plenty of sleep.

Again, concussions are not preventable, but the risk can be reduced through education, coaching kids to follow the playing rules and officials enforcing them the playing rules; and using available technology that works to keep them safe.

**EDUCATION** - Teaching players about proper technique, and everyone to recognize the signs and symptoms of a concussion. It also includes providing an environment of good sportsmanship and positive coaching where athletes are praised for reporting concussion symptoms, and athletes feel comfortable reporting an injury. There should never be an acknowledgement of bravery to any player for playing with a concussion - or any injury. It's important that concussion education takes place throughout the season.

**ENFORCEMENT** - Coaches must have zero tolerance for unsafe play, officials must enforce the rules, and schools must self-enforce all MHSAA concussion protocols.

Since 2009, game playing rules and MHSAA rules have been in place addressing how to handle an apparently concussed athlete. The protocols in detail can be downloaded from the MHSAA Website. Here's a quick review of the highlights of those protocols:

First, officials have no role in determining whether an athlete stays or must be removed from the game. The official’s role is to advise the coach of the possible concussion.

The school, which has the primary responsibility for the well-being of the athlete, makes the determination to remove the youngster from the game, and after its designated staff person evaluates the situation, makes the determination to return or withhold the player from the competition. If not immediately transported for medical attention, be sure that the player is supervised for one to two hours after being removed from the game.

Once the determination is made to withhold the player from further play, the athlete may not return to competition that day and may not return on a subsequent day of activity (practice or game) without the unconditional written authorization of an MD, DO, Nurse Practitioner, or Physician's Assistant. The word "unconditional" was added to the protocol 2015-16. New in 2016-17 was a requirement that there must be a signed Post-Concussion Return to activity Consent Form on file. Schools which play athletes who have not been properly cleared to return are subject to MHSAA Handbook penalties.

The Return to Activity and Post-Concussion Consent Form can be found on the Health & Safety Page of the MHSAA Website. Again, we stress that the release by medical personnel be unconditional, and the new portion of the form be signed off by the parent and/or student-athlete as appropriate. The completed form must be submitted to the MHSAA before the student can return to activity and retained in the school files for seven years following the student's graduation from high school.

Schools are required to report all head injuries sustained at all levels of all sports - in games and in practice settings. The report can be filed online through the MHSAA Website. In the first two years of this requirement, 99 percent of schools filed reports. We thank you for your cooperation, and remind you that all initial reports require a follow-up within two weeks; and even if no concussions take place at your school during a season, that we still need to have that information reported.

The MHSAA became the first state association nationally in 2015-16 to provide concussion insurance coverage, at no charge to schools and families, at all levels of all sports in which postseason tournaments are conducted. Please make
sure that your students and parents are aware of this benefit. Additional information can be found on the MHSAA Website.

It takes a team to keep concussions on the sidelines and kids in the game. We encourage everyone to become more aware about the signs and symptoms of concussions, and we have a number of resources on the Health & Safety page of MHSAA.com you can share with your coaches, players and parents. New laws in the state of Michigan require that coaches of non-MHSAA tournament sports take a free online course, among other requirements. Get more information at Michigan.gov/SportsConcussion.