

Head in the Game: Concussions in Female Athletes

Risks, Recovery, and Prevention

Concussions are one of the most common injuries in high school and youth sports. And while they are most common in contact sports such as football and ice hockey, they occur across the full spectrum of sport, as well as during daily activity. As such, concussion remains a hot topic in sports medicine and an area of significant concern for young athletes and their families.

With research continuing to evolve in this area, there is also growing recognition that females appear to be at greater risk for concussion, while also experiencing lengthier recovery times than their male peers. Dr. Michele LaBotz, a [TrueSport Expert](#) and sports medicine specialist, reports that this research is consistent with her clinical experience: “Although we typically see larger numbers of concussions in sports like football and soccer, some of the most challenging concussions I have managed have been in females in sports like cheerleading and volleyball.”

In this article, Dr. LaBotz explains why researchers believe female athletes are at higher risk for concussion and for negative long-term side effects, and how coaches and caregivers can ensure that these athletes have the support they need.

Concussion Risk

We know that concussions are a common injury in youth sport, but what makes young female athletes potentially more concussion-prone than their male counterparts? It’s a combination of biomechanical, physiological, and social differences, says LaBotz.

“When you look at data across the board, more males are going to have a concussion than females, but that is primarily driven by football,” says LaBotz. “If you look at high school sports that have similar rules for boys and girls, like [soccer, basketball, or softball and baseball](#), girls are at about two times higher risk of concussion relative to males.”

Risk Factors

Female concussion risk is an area of active research, but based on the current data, the elevated risk likely results from a combination of factors that are both intrinsic and extrinsic to the individual athlete.

Some of these risk factors include:

Neck strength: “When there's an impact to the head, stronger neck muscles will help disperse the force of the impact throughout the body. If the neck muscles aren't functioning efficiently, this force is going to be concentrated in the brain. Females often have less neck mass, and typically aren't training neck strength, which may contribute to their increased risk of concussion.”

Body awareness: LaBotz notes that lower kinesthetic awareness—the ability to sense the body's position, movement, and orientation in space—in females may also be a concussion risk factor. It's unclear whether that's due to biology or conditioning, since

female athletes often enter sport later than their male counterparts and receive less coaching and training.

Skill matching: “Depending upon the sport and the community, there are often more boys than girls trying out for sport. In these cases, many times the boys will be separated out into skill levels because of this. But for many female teams, all girls play on the same team regardless of level, so you can have this big disparity in terms of abilities within a single team, which leads to increased injury risk.”

Coaching and facilities: LaBotz adds that, unfortunately, coaches for female sports are often not as experienced as coaches for male teams, and in many cases, the [quality and availability of training facilities and other resources](#) are lower for female athletes than for their male peers.

Concussion Symptom Disparities

“The biggest predictor of recovery length after concussion is the number and severity of symptoms that you have right after injury,” says LaBotz. “Once they are concussed, females seem to suffer a bit more from concussions than males, and are [more likely to require a longer recovery](#).”

After concussion, females tend to report a greater number of symptoms and a higher symptom severity than their male counterparts. The reasons for this are not clear. One possibility is that females are known to have more “interoceptive awareness” —meaning that they’re more attuned to how their bodies are feeling—compared to males, so they may simply be more aware of a concussive injury and of the associated symptoms.

Post-traumatic changes in hormone levels in females may also be playing a role in these differences. The hormone progesterone helps to protect the nervous system, and progesterone levels have been shown to decrease in females after concussion, which may contribute to increased symptom severity. LaBotz adds, “Females on oral birth control pills appear to have lower symptom scores after concussion, which may be due to the stabilization of hormone levels that occurs while on this medication.”

The [Concussion Recognition Tool](#) describes common symptoms in sport-related concussion. Of these, symptom sets with the largest differences between males and females include:

Headaches: “Another thing that is predictive of post-concussion symptomatology is migraine history, whether it’s a family or individual history of migraines,” she says. Females tend to be at higher risk for migraines than males, which LaBotz notes may contribute to the greater difficulty with headaches that is often seen in females.

Impacts on mental well-being: “There is a bi-directional relationship between mental health and concussion,” explains LaBotz. “Given that rates of anxiety and depression are higher in females, this seems to be placing them at higher risk for both sustaining a concussion and for mental health-related issues after a concussion.”

Care and Treatment

Outdated concussion protocols dictated that the athlete should stay in a quiet, dark room with no screens and no stimulation. “However, [concussion recovery guidelines](#) around physical and social activity have changed, and the importance of early activity for both physical and psychological recovery after concussion should be a point of emphasis,” says LaBotz. “Maintaining [healthy social connections with friends](#)—even if that involves some screen time, is a key component to minimizing the social isolation and development of prolonged symptoms that are common after concussion. This may be particularly important in females who had some pre-injury anxiety or depression.”

“We now know that [it wasn’t helpful to completely shut down physical activity](#) after a concussion,” says LaBotz. Currently, athletes are encouraged to do gentle movement, like walking or yoga, as soon as they feel able to. “Within the first day or two after injury, any movement that doesn’t aggravate the symptoms is okay,” she adds. “Walking with friends, socializing—that’s fine. But if symptoms start to increase, the athlete should slow down and certainly stay away from activity that might cause another head injury.”

“After a couple of days, an athlete can start to do things that let their concussion symptoms go up a little bit,” she says. “If the athlete has a headache that they’d rate as a 3 out of 10 when they start their workout, it’s okay if it goes up by 1-2 points. But if it goes up more than that, such as going from a 3 to a 7, that’s too much and the athlete needs to back off.” This is similar to current recommendations for getting back to schoolwork and other cognitive activity, where athletes should back off any mental activity that increases symptoms by more than 2 points on a 10-point scale.

Return to Sport

Returning to sports or activities that place the athlete at risk for another head injury requires the following:

1. No concussion-related symptoms at rest
2. Concussion-related symptoms do not emerge during or after high intensity activity
3. Return to pre-injury academic performance and cognitive function

“If you have concussion symptoms, you do not return to competition the same day,” says LaBotz. “Each state has legislation determining the process for athlete’s return to classroom learning and athletic competition after a concussion. This often includes clearance from the athlete’s doctor, a gradual progression back into training and team activity, and potentially a sign-off [from an athletic trainer](#). But in general, if there are ongoing symptoms consistent with the concussion, then the athlete can’t return to competition.”

Finally, she notes that it’s important to pay attention to the athlete’s psychological readiness to return to play after a concussion. It is very common for athletes to experience some stress and anxiety around returning to play after sustaining a head injury, and the process of a gradual progression back to sport can be very helpful for athletes to build their confidence for a

successful return to sport. Athletes who return while “playing scared” are at higher risk for additional injury and do not perform as well during training and competition.

Takeaway

Female athletes appear to be at higher risk for concussion than their male counterparts in many sports, and they may also struggle more with long-term impacts from those concussions. Because of this, it’s important that female athletes are made [aware of the early warning signs of a concussion](#), and that [parents and coaches are paying attention to potential concussions](#) in their young female athletes. When dealing with the aftermath of a concussion, ensure that the athlete is following the recommended return to play protocols, and watch for signs that they’re struggling with their recovery, both mentally and physically.



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