What are the most common causes of spinal cord contusion?

Most spinal cord contusion injuries are the result of high-impact motor vehicle accidents. However, athletes can sustain this injury as a result of contact while playing. Fortunately, the number of serious incidents involving spinal cord injury is low. That being said, more orthopedists are beginning to function as the team physician during athletic events. Therefore, it is important for physicians to be able to recognize the symptoms of cord contusion and differentiate them from brain concussion and peripheral nerve stingers.

What is the difference between a stinger and a spinal cord contusion?

A stinger injury involves a stretch or compression of the nerve roots or brachial plexus after these nerves exit the spinal canal, whereas a spinal cord contusion is generally a more serious injury involving the spinal cord itself within the tunnel inside the vertebrae of the neck. A nerve injury has a much better chance of recovery as opposed to a contusion of the spinal cord itself. Both cord contusion and stingers usually originate from a neck injury, which is why there is a higher prevalence of those injuries in contact sports such as football and hockey.

What are the neurological symptoms differentiating brain concussion, cord contusions, and stingers?

In instances of brain concussion, the most severe symptom is unconsciousness. In these cases, brain concussion is the immediate assumption and further evaluation is needed—necessitating immediate removal from play, emergency head and spine precautions, and imaging—to determine the extent of the injury. If consciousness is maintained but the athlete experiences numbness, tingling, or weakness in the extremities, the top differential diagnoses are stingers or spinal cord contusion.

The first step to determining which injury you are potentially dealing with is determining what area of the body is being affected. The neurological symptoms of stingers commonly affect...
only 1 side of the body and only the upper extremities, whereas those involving cord contusions, particularly if it is a central cord injury, can affect the upper extremities bilaterally and also sometimes involve the lower extremities.

**What type of imaging is used for diagnosing a spinal cord concussion?**

Radiographs are performed to evaluate whether any fractures or dislocations have occurred that might impact the cord. Then, a magnetic resonance imaging (MRI) scan is the best test to diagnose a spinal cord contusion. An MRI can determine whether there is swelling in the cord or, in worse case scenarios, bleeding.

**What are the current return-to-play guidelines for spinal cord contusions vs stingers?**

If there is any suspicion of spinal cord contusion, the player should be removed from play and imaging should be performed to investigate the injury. Players who have experienced a stinger can generally return to play faster, possibly even later in the game in which they were injured. However, in cases of more severe stingers with persistent symptoms, it may be the next game or longer. Conversely, players who have experienced spinal cord contusions may have to wait weeks or months before they can return to play. In both injuries, a player must be symptom free, be neurologically intact, demonstrate sport-specific activity, and be cleared medically before returning to play.

**Is there anything that can prevent these types of injuries?**

To some extent, these types of injuries will occur because of the nature of the sports these athletes play. However, measures are being taken by governing bodies to try to institute penalties and fines for unsafe plays, such as penalties for helmet-to-helmet contact in football. Changes in the equipment athletes wear can help prevent injuries. Football linemen often wear “horse collar” pads that are designed to prevent hyperextension of the neck. Players can do strengthening and conditioning exercises for the core muscles of the neck. Also, educating both players and coaches on the proper football tackling techniques is an important factor.

**Is there a high incidence of recurrence of spinal cord contusions?**

Potentially, in the initial period when the brain or spinal cord is an inflammatory state, the athlete is more susceptible to reinjury, which is why athletes must be symptom free and neurologically intact before they return to play. Furthermore, if initial imaging studies found swelling or bleeding, those studies should be repeated to confirm that all internal injuries have been resolved.

**Is there a risk of paralysis?**

Yes. Depending on the location of the contusion and the extent of bleeding, swelling, and cell damage, one could experience paralysis of the arms and possibly legs, but that is the worst case scenario. Chronic weakness or numbness in the extremities is a more common concern.

**What does future research hold for the treatment of spinal cord contusions?**

In the cases of paralysis, cell damage in the cord is a concern, so stem cell research is an important factor in future treatment. The Craig Hospital in Denver is working with a group in Israel researching stem cell treatments. Another area of current research is lowering a player’s body temperature as an early potential treatment for cord injuries.