What is it?
Transient quadriplegia (TQ), also called cervical cord neurapraxia (CCN), is a rare but dangerous cervical spine (neck) injury. TQ is usually caused by cervical spinal cord trauma, which can occur after a neck hyperextension or hyperflexion injury with possible axial loading (pressure applied to the top of the head). The incidence is approximately 0.2-2 per 100,000 athletes. The rate of spinal cord injuries is noted to be decreasing, primarily due to improved teaching of tackling techniques in football.

Symptoms/Risks
Symptoms of transient quadriplegia (TQ or CCN) include burning and tingling pain, loss of strength, or loss of sensation in both arms and/or legs. A key factor is that the symptoms occur in either both arms, both legs, or both arms and legs. Weakness can range from mild to complete paralysis. The symptoms of transient quadriplegia are, by definition, transient, and usually last less than 15 minutes but may last up to 48 hours. If symptoms last longer, it cannot be TQ and another diagnosis should be considered.

Sports Medicine Evaluation & Treatment
The physical findings for patients with TQ may be quite dramatic and are usually distressing to everyone in attendance. If the athlete is paralyzed, unconscious, or has severe weakness, then spinal precautions should be instituted. This means the patient’s head and neck should be immobilized, he or she should be placed on a stretcher, and the athlete should promptly be taken by ambulance to the nearest emergency room.

Although the symptoms will resolve if the diagnosis is transient quadriplegia, it is not always known in the early time period if the neurologic dysfunction will resolve. Even athletes with a rapid return of all neurologic function should be carefully observed and should not be allowed to return to play until a complete evaluation by a spine specialist is performed.

X-rays and magnetic resonance imaging (MRI) of the cervical spine are performed to evaluate patients with transient quadriplegia. X-rays are done to evaluate for a vertebral fracture (vertebrae are the bones of the spine) or other bony abnormalities of the spine. The MRI is required to rule out a herniated disc (a condition where the disc between the vertebrae abnormally protrudes into the spinal canal), spinal stenosis (narrowing of the spinal canal), or a spinal cord contusion (direct damage to the spinal cord). It is sometimes difficult to see a non-displaced or minimally displaced fracture of the spine on both x-ray and MRI, so a computed tomography (CT) scan may also be ordered. If no fracture is identified, but a patient has significant neck pain, cervical flexion/extension x-rays can be obtained to verify that there is no evidence of ligamentous instability. This is done by doing x-rays with the neck flexed and then extended to see if the vertebrae slide forward or backward, which would be proof of ligamentous instability.

If an athlete has a persistent neurologic deficit, such as arm and/or leg weakness or numbness, an electromyography and nerve conduction velocity (EMG/NCV) test may be ordered. EMG/NCV tests are useful to determine which nerve is affected, and how severely it is damaged or irritated.

The treatment of transient quadriplegia is focused on regaining and improving the strength of the affected extremities, as well as the neck and core muscles. Patients who have a fracture, spinal stenosis, a herniated disc, abnormal vertebral anatomy, or a spinal cord contusion should be carefully evaluated by a spine specialist. Rarely surgery may be recommended to facilitate resolution of the stenosis, improve symptoms, and prevent recurrence.
**AMSSM SPORTS MEDICINE TOPICS**

**TRANSIENT QUADRIPLEGIA**

**Injury Prevention**
To prevent this type of injury in football, it is important for coaches and trainers to stress the importance of proper tackling technique, with the head kept up. Referees and all observers should show zero tolerance for spearing, which is the lowering of the head to make a tackle.

**Return to Play**
General return-to-play guidelines are controversial and each individual athlete must be carefully evaluated by a qualified physician after an injury is sustained. The decision to allow an athlete to return or not return to sport must be individualized and is ultimately made by the treating and/or team physician. Fundamental requirements for returning to play should include normal strength and sensation, normal cervical range of motion, a stable vertebral column, and being pain-free.

Reasons to absolutely prevent an athlete from returning to play are ligamentous instability, a single injury with evidence of spinal cord damage, more than one event of TQ, and/or symptoms lasting longer than 48 hours. These activities cause additional strain on the aorta putting it at risk to rupture. Regular aerobic activities will improve bone, heart and psychological health and are recommended in most individuals with Marfan syndrome.

**References**


**AMSSM Member Authors:** Tony Truong, MD and Tara Shaw, MD

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AMSSM is a multi-disciplinary organization of sports medicine physicians dedicated to education, research, advocacy and the care of athletes of all ages. The majority of AMSSM members are primary care physicians with fellowship training in sports medicine who combine their practice of sports medicine with their primary specialty. AMSSM includes members who specialize solely in non-surgical sports medicine and serve as team physicians at the youth level, NCAA, NFL, MLB, NBA, WNBA, MLS and NHL, as well as with Olympic teams. By nature of their training and experience, sports medicine physicians are ideally suited to provide comprehensive medical care for athletes, sports teams or active individuals who are simply looking to maintain a healthy lifestyle. Find a sports medicine physician in your area at www.amssm.org.