

# **Essentials of Sports Injury Prevention & Rehabilitation**

**Col (Dr.) Anup Krishnan**

**School of Sports, Exercise & Nutrition Sciences**

**D Y Patil University, Navi Mumbai**

## **Lecture – 15**

### **Head, Face and Neck Injuries**

Good morning ladies and gentlemen and welcome to week 4 of the module on sports injury prevention and rehabilitation. In week 4, we will be dealing with head, neck and spine injuries and sports concussion. Both are very important topics when we deal with sports injury prevention and rehabilitation. And of course, at the end of the week, there will be an assessment. I will be covering this topic under the following outline. Definition of the problem. Head injuries. Types of traumatic brain injuries, facial injuries, neck injuries, management of the same, and conclusion.

Head injuries. They are common in all contact sports, but fortunately, the vast majority are minor. These sports include football, boxing, gymnastics, horse riding and martial arts. However, they may be seen in any sport where there is movement, where there is equipment, and where there may be contact with other opponents. The incidence ranges from 0.25 to 4 per 1000 player hours of exposure in professional team sports. The problem though is head injuries at all levels are a medical emergency because they can prove fatal.

The most common head injury in sport is a concussion, and 90% or more of concussions do not involve a loss of consciousness. The clinician's role in the management of acute head injuries, is to recognize the problem first, ensure immediate resuscitation and transfer the injured sports person to the appropriate facility in a proper non-injurious manner. There are different types of traumatic brain injuries, and if you look at the pathophysiology, it is concussion, contusion and laceration. However, for the purpose of simplicity, they have been divided into several different terminologies. So we will start with each of them.

Mild concussion: loss of consciousness for less than 30 minutes with confusion for about one day. Moderate traumatic brain injury: loss of consciousness for over 30 minutes but less than one day, and the confusion can last up to one week. Severe traumatic brain injury: loss of consciousness for over 24 hours, and these injuries are typically associated with changes on head CT or brain MRI scans. Uncomplicated traumatic brain injury: head CT and brain MRI are

normal regardless of whether the injury is mild, moderate or severe. Complicated traumatic brain injury: head CT or brain MRI show changes such as bleeding, clot, space occupying lesion, infarcts, etc.

Closed traumatic brain injury: closed traumatic brain injury means there is an outside force which has caused a blow or a jolt to the head, but did not penetrate the skull. This sort of injury injures the brain causing it to swell and increase something called intracranial pressure. Open or penetrating traumatic brain injury: this injury occurs when there is a bullet or a knife or any sharp object penetrates the skull. If the object goes into the brain, it damages brain tissue. There is another entity called non-traumatic brain injury, or hypoxic/anoxic brain injury.

There are some conditions which may cause a traumatic brain injury even though they are not traumatic. Strokes, seizures, choking, drowning, etc. anywhere where the brain is deprived of oxygen. This is a hypoxic/anoxic brain injury.

After the head, let's come down slightly, let us come to the face. The face is one of the most vulnerable and important parts of the human body. The common mechanisms of facial injuries are motor vehicle accidents, domestic accidents, work related accidents, violence and sports. The causes may vary due to age, sex, race, socio economic status and geographical location. Sport related facial injuries account for 8% of all facial injuries; and 11 to 40% of all sports injuries involve the face. Most facial injuries are due to direct hits with a ball, or due to player to player contact.

The most common types of sports related facial trauma are; soft tissue injuries, nose fractures, zygomatic arch fractures, mandibular fractures or trauma to the teeth and the alveoli. Depending on the extent and the type of this trauma, some injuries can be managed at the sporting site with the athlete resuming play immediately. For example, in boxing if the athlete suffers a cut injury, he can be managed on site by the doctor and the boxer can return back to the ring. Facial injuries are frequently associated with profuse bleeding. You have to control the bleeding and then fully assess the underlying structures, because the profuse bleeding may mask damage to the underlying structures.

All head and neck injuries should be considered as closed head injuries till they reach the hospital. Cervical spine precautions should be taken if the patient is unconscious, has any neurological deficits or any tenderness of the cervical spine. Please note that the airway is particularly vulnerable to obstruction. Teeth may fall in, implants may fall in, dental appliances may fall in, fractured bones may fall in. Any of these structures if they lodge in the airway, it causes an airway obstruction.

This is a chart showing some types of facial injuries. We must be very aware of those injuries which are not to be missed, especially fractured petrous temporal bone, torn auditory nerve, corneal lacerations, retinal detachments, lens dislocation, blowout fractures of the orbit, optic nerve injury and injury to the lacrimal system. However, there may be some less common injuries which we should be aware of and this chart gives you all of them. There are some conditions which require an urgent referral to an eye doctor or an ophthalmologist. These symptoms are: severe eye pain, if the athlete complains of persistent blurred or double vision.

If the athlete complains of persistent photophobia, that means he cannot look at light without him complaining of pain. If you are suspecting a penetrating injury of the eye, if you are seeing blood in the anterior chamber of the eye, if you see an embedded foreign body in the eye, if you cannot see the fundus, that means there is a suspected vitreous hemorrhage or a retinal detachment. If the vision equity is less than 6/12, or if any part of the visual field cannot be seen by the athlete, then these athletes should be immediately referred for ophthalmology opinion. Assessment of these facial injuries. First, ascertain the mechanism of injury and locate the source of the patient's pain. Check for blurred vision, diplopia, concussion or cerebrospinal fluid leakage. Inspect the nasal septum for hematomas and nasal obstruction. Inspect the external ear for any hematomas. Hematomas are nothing but blood collection under the skin. Observe the face for any asymmetry or any structural depressions.

Look at the globe and look for a sunken eye globe. If the globe is sunken inside, it suggests a blowout fracture of the orbit. Observe lacerations, or any deep lacerations which are overlying suspected fractures. Palpate the facial bones, the orbital rims, the nasal bones, the temporomandibular joints for tenderness, crepitus, numbness or contour irregularities. Make the patient do eye movements, and if he is able to do the eye movements properly, it means cranial nerves 3, 4 and 6 are normal. Check the mouth opening, and check the bite of the patient. If he is unable to open the mouth or if the bite is abnormal, it is a sign of mandibular fractures.

After the face, let us come down to the neck. The cervical spine is exposed to an immense amount of stress in many sports. High translation forces, compression forces and shear forces are imparted by collisions in rugby, ice hockey and any sport where there is body to body contact. However, even low magnitude forces if they accumulate over a period of time, they can be equally threatening to the cervical spine. High gravitational forces, or high G-forces and vibrations in motor racing and ice sliding sports are examples of cumulative exposure. These forces can lead to overload and injury in the neck that is not strong enough to tolerate them. So, that is why, in any of these sports involving high Gs, you always focus on cervical spine and neck strengthening. The resulting injuries may be serious vertebral fractures causing spinal instability, paralysis, concussions and soft tissue injuries.

Sports accounts for almost 10 percent of all cervical spine injuries in the US, and the general population nearly half will suffer neck pain at some point. There are some sports which show a high prevalence of neck injuries. They are American football, rugby, diving, anything involving horses, skiing, snowboarding and motor racing. Nearly a third of high school and freshman American football players have been reported to have radiological evidence of a previous neck injury with rising prevalence. That means these people come in for some evaluation of the spine or some x-ray of the spine, and these injuries are picked up, but the athletes are playing and they have not yet reported these sort of injuries. The causes of these are better reporting and monitoring of injuries, increase in the physical demands of the sport and very often neck strengthening is neglected.

There are certain mechanisms of cervical spine injuries which we should be aware of. Injuries as a result of high force exposure compression. Basically, if there is compressive loading of the cervical spine when the cervical spine is flexed more than 30 degrees, this causes the neck to reduce its energy attenuation capability and if there is an injury, if there is a force, a compressive force put on the neck at this position, there will be a cervical spine injury. This can also happen if the neck is in any abnormal position extension friction and there is an axial compression applied.

Injuries as a result of high force exposure: acceleration, deceleration. You are traveling in a car, you are moving at a particular speed, the body is moving at a particular speed, there is an accident, the neck goes forward and then suddenly slaps back or whips back. This is called a whiplash injury. This may be caused by a trauma to the neck or a trauma to the trunk. Either will cause the neck to whip forward and backward like this and cause a whiplash injury.

It is more commonly seen in motor racing and collision sports. It is also seen in martial arts. Injuries as a result of high force exposure: traction or compression. Basically, if anything pulls the arm or if there is any compression force applied to the shoulder, this will cause a traction of something called the brachial plexus which goes from the neck and into the shoulder. If there is either a traction, a pull on the brachial plexus or if there is a compressive force applied on the shoulder which pushes the brachial plexus down, there will be something called brachial plexopathy, and these are very more commonly called stingers or burners.

Injuries as a result of high force exposure traction compression: Either of these mechanisms can injure or irritate the brachial plexus or nerve roots. If you get a stinger or a burner, or if there is a traction or a compressive injury to the brachial plexus, either of these mechanisms can injure or irritate the brachial plexus or the nerve roots, commonly C5, C6 and C7. The symptoms are a burning or a dead feeling down the arm, and temporarily the athlete may not be able to produce full muscle power. These effects are often temporary but you must look for long term neurological deficits or altered movement patterns.

Injuries as a risk of chronic force exposure-static postures. In sports such as archery, shooting, it causes the athlete to remain in one position with the cervical range at end range for a long period of time, and these may cause the forces to exceed the tolerance of the cervical spine and you may get injuries because of that. Injuries as a result of chronic G-forces. Any chronic exposure to vibration or high G-forces can lead to neck injuries. They are seen in sports like motor and aircraft racing, high speed sliding sports or ice sports and contact sports. High defects of high g-force exposure include dizziness, disorientation, visual disturbances, reduced coordination, delayed reactions and neck pain.

How do you manage these injuries? At the site of the accident, please remember an acute pain in the neck following an injury is to be considered a spinal injury unless proven otherwise. I repeat; pain in the neck following an injury is to be considered a spinal injury, unless proven otherwise. All suspected spinal injuries are to be considered unstable injuries, unless their stability is confirmed by investigation. We will be discussing unstable and stable spinal injuries, so it will be a bit more clearer later.

However, as a thumb rule, any pain in the neck following an injury, to be considered a spinal injury. Any spinal injury, to be considered an unstable injury. Avoid any movement of the injured segment; and any suspected spine injury patient you should always put on a rigid cervical collar as soon as possible. When you move a patient with a suspected cervical spine injury, make sure that one person is holding the neck in traction by pulling the head. The rest of the body is supported at the shoulder, pelvis and the legs by three other people.

The whole body is to be moved as one piece so that there is no movement which occurs at the spine. This activity is called a log roll, and we will be discussing this in detail in a subsequent lecture.

So what is the take home message for all of us out of this lecture? Head injuries are common, but the majority are minor. Head injuries are a medical emergency. Most common head injury is a concussion, and 90% of the concussions do not involve a loss of consciousness.

Recognize the problem, ensure immediate resuscitation and transfer the patient in a safe manner to the nearest medical facility. Facial injuries are common, and they can occur anywhere. Facial injuries bleed profusely. However once you stop the bleeding, you must always check for deeper tissue damage.

Vital organ damage requires immediate referral. Please note there are several vital organs which are present in the face and damage to any of these eye, ear, nose, etc. should be immediately referred to the specialist. All neck trauma is to be treated as a spine injury, and the

patient should only be moved with spine precautions. I repeat; all neck trauma to be treated as a suspected spine injury and these patients should be moved only with the proper spine precautions taken. All head, face, neck injuries should be considered as closed head injury.

That means these patients will require evaluation at the nearest hospital, a CT or an MRI and a period of observation after the injury will become mandatory for these patients of closed head injury. Generally, we observe them for 48 hours before we discharge them. These are the references. Ladies and gentlemen, I strongly urge you to go through these references and read about these topics in further detail.

I thank you for your time and your patience. Ladies and gentlemen, thank you for listening and, Jai Hind.