Essentials of Sports Injury Prevention & Rehabilitation

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Lecture – 1

Sports Injuries and Prevention

Ladies and gentlemen, good morning and welcome to Fundamentals of Sports Injury Prevention and Rehabilitation. It is our proud privilege along with my co-faculty to present this course to you, and we hope you have an enjoyable few weeks ahead. So, what will you learn in the next few weeks?

In week one, you will learn something about introduction to sports injuries and rehabilitation. You will learn something about the anatomy and biomechanics of the major joints.

In week two, you will learn about pre-participation physical evaluation. You will also learn how to do warm-up, how to do the conditioning phase of the exercise, and how to do the cooling down.

In week three, you will learn about lower limb injuries and prevention strategies, upper limb injuries and prevention strategies.

Week four will cover head, neck and spine injuries and a very important topic, called sports concussion. It will not all be lectures. You will also be graded via online assignments at the end of every week.

Week five will cover prehabilitation, rehabilitation and the concepts of periodization and how the concept of periodization is established, or used with rehabilitation.

Week six will cover sport specific rehabilitation, the principles, and the techniques. Week six will also cover management of common sports injuries.

Week seven will cover injury prevention in special population; that is, adolescent athletes and women athletes.

Week eight will cover psychological aspects of injury and rehabilitation, return to sport and long-term injury prevention.

So, this is a short summary of what you will be doing over the next few weeks.

Your faculty, so I am Colonel Dr. Anup Krishnan. I am a retired army officer. I am a sports physician and a sports medicine doctor. My co-faculty is Dr. Atul Sharma who is also a sports physician.

So, without much further ado, let's now come to the first lecture of week number one, that is sports injuries and prevention. I will be covering this lecture under the following outline.

We will try and define sports injuries.
We will talk about types of sports injuries.

We will talk about the magnitude of the problem.

We will talk about injuries by sport, and injuries by body part.

We will discuss something called the injury causation model.

We will talk about the role of injury prevention programs.

We will talk about general management principles of sports injuries and we will conclude by having a short take home message.

So, what is an injury? Injury is any damage to your body. It can be due to accidents, falls, hits, weapons and many more. Millions of people injure themselves every year, and these injuries may be minor or they may be life threatening. It can happen at work, play, indoors, outdoors, while walking, while driving a car. Basically, it can happen while doing any activity.

Now that we have seen what is an injury, let us define a sports injury. It is basically any physical complaint sustained by a player due to a match or due to training, irrespective of the need of medical attention or loss of time from physical activities. That means, if a player has got any physical ailment due to training or due to a match, whether he reports to a doctor, whether he takes time off due to the injury, irrespective it will be called a sports injury.

The International Olympic Commission manual of sports injuries defines it a bit differently. They say; any damage to the tissues of the body that occurs as a result of sports or exercise is to be classified as an injury. There are different types of sports injuries. If it is a single traumatic event within the last five to six days, it is called an acute injury. Fractures, sprains, dislocations, muscle strains, these are all examples of acute injury. If it is subtle, if it occurs over time and it is difficult to diagnose and treat, it is called an overuse injury or a repetitive stress injury.

For example, swimmer's shoulder, runner's or jumper's knee, Achilles tendonitis, shin splints, these are all examples of a repetitive stress injury or an overuse injury. If the injury has lasted three months or more, we classify it as a chronic injury. So, what is the magnitude of the problem? The magnitude is 20% of school children and 28% of working adults miss at least one day in a year due to sports injuries. Be aware, we are talking about sports injuries, not normal injuries. Between the ages of 5 to 24, sports injuries account for one out of every

five episodes.

30 to 50% of these are overuse injuries. 41% of injuries due to running are overuse injuries. 26 injury episodes per 1000 persons per year is the injury rate and please note this rate exceeds the rate for transportation related injuries or injuries due to automobile accidents. So, which are the sports which are injury prone? From this study, it is very clear that the sport of basketball is the most injury prone with approximately 512, 213 cases and the sport of wrestling is the least injury prone. However, there are some sports such as bicycling, baseball, trampolines, horseback riding which also have a significant number of injury cases.

If we look at the injuries per body part, the ankle is the most injured body part with approximately 15,000 injuries per year. Out of which 66% are male and 34% are females. If you look at the statistics for the ankle and the foot combined, this complex reports similar statistics and the male-female distribution is also similar. The next common body part which is injured is the head, and head injuries will be a separate topic, which will be discussed in detail. Now, let us come to the injury causation model.

We talk about something called injury risk factors which are risk factors for injury. Now, if we say age, gender, body composition, previous health conditions, physical fitness, body anatomy and skill level, these are all intrinsic factors which are present in the athlete and these are all intrinsic risk factors. So, if you have any of these intrinsic risk factors, you become what is called a predisposed athlete. When you are exposed to any of the extrinsic risk factors such as your teammates, your opponents, the referee, the helmet, the shin guards, sports equipment and the environment such as weather, snow and ice conditions, floor and turf type, poor maintenance of the turf, any of these conditions are if you get exposed to them, they are called extrinsic risk factors. When you get exposed to an extrinsic risk factor, you become a susceptible athlete.

So, if you have an intrinsic risk factor, you are a predisposed athlete. If you are exposed to an extrinsic risk factor, you become a susceptible athlete. Now if there is an inciting event that is a playing situation, player or opponent behaviour, or any biomechanical characteristics related to equipment turf etcetera, this becomes an inciting event. So, if a susceptible athlete is exposed to an inciting event, he or she gets an injury. So, this is the model of injury causation which is mainly for acute injuries.

When we talk about predisposing factors to overuse injuries, again there are extrinsic factors and intrinsic factors. Extrinsic factors are outside the body, intrinsic factors are within the body, simply put. So, what are the extrinsic factors? If you have any training errors, excessive volume, excessive intensity, a rapid increase in volume or intensity, sudden change in type of exercise or sudden change in type of training. If there is excessive fatigue, if your recovery is not proper, if you have a faulty technique, if the surfaces are hard, soft or cambered, if your shoes are inappropriate or they are worn out shoes, if your equipment being used is inappropriate, if the environmental conditions are hot, cold, humid, you will get an injury. If there are psychological factors involved, if there is inadequate nutrition involved, these are all extrinsic factors for overuse injury.

If you talk about intrinsic factors, any factor or anatomical factor affecting the body, it may be an anatomical deformity, anatomical imbalance, a muscle imbalance, muscle deformity, a lack of muscle strength, a lack of flexibility or a weakness or a tightness or it may be any

other factor which is intrinsic to the human body. These become intrinsic factors to overuse injury. To sum up, sports injury causes are training program, trauma, overuse, biomechanical abnormalities, technique faults, physical conditioning, weather, misuse of facilities and equipment, lack of protective gear, lack of fitness, medical illness, age, disregard for rules. So, once we have seen all these factors, let us now talk about what we can do to prevent these injuries. Most sporting federations, clubs and different organizations, they use something called injury prevention program (IPP).

Now, injury prevention programs are structured, multifaceted interventions that contain warmup, stretching, neuromuscular training, agility, strength and conditioning and or proprioceptive training activity with the sole aim of reducing injury. When are they implemented? They are partially or completely implemented on the playing field during training, and during competitive matches across the regular season. IPPs should have consistent and regular contact with participants, and at least 15 minutes of treatment exposure per contact session. Ideally, an injury prevention program should be done every training session, and before every competition.

What is the outcome which have been noticed?

Structured injury prevention programs reduce injury rates, and thereby help to reduce the individual economic and social costs associated with immobility, treatment and rehabilitation after any sports injury.

Now, we have discussed how to prevent them. Let us talk about the management of these injuries. Management always starts from pre-event. We should always be prepared. We should always have a medical team, and we should always have a team of physical conditioners and coaches assisting the medical team.

The best part is, incidence of critical injuries is low. Incidence of critical injuries is low, and we should always be prepared for the worst. Be aware that there will definitely be mass confusion if there is an injury, or if there is an injury or mass casualty on feet. The plan for evacuation should be written, documented, rehearsed and practiced, and disseminated to all possible stakeholders at the stadium and at the event. The manpower should be specially detailed, and trained for this particular purpose.

All the medical supplies should be checked, and they should be accessible. If the medical supplies are kept under lock and key in a particular area, they should be removed from there and moved to the medical room, so that they are easily available. Make sure your medical team and people who are going on field should have the proper accreditation, and they should be able to access all the electronic gates with their accreditation. During the event, make sure the medical team is watching the game. If you are not able to watch the game directly, make sure you are watching it on video; because, it gives you a lot of information about the mechanism of injury if you are watching the event.

Ideally, you should wait for the umpire or the referee call before you enter the sports arena. However, if there is a life-threatening event, the medical team is authorized to act immediately. Whenever you enter the field of play, you should be aware of the game stoppage rules and ideally, if you are going to exceed the game stoppage time, make sure you

move the athlete away from the field of play and into your medical team, into your medical room so that the game can go on. And please note that the sports person's health is paramount. There are certain conditions, which will cause you to remove the athlete from the playing field.

First and foremost, any injury to the brain and the spinal cord, that is a central nervous system injury. Any injury with a loss of consciousness of the patient, of the sportsman will entail him to be removed from the field. Active bleeding, you will have to remove the sportsman from the field. Any joint, bone and ligament damage, you will have to splint and move the patient away from the field. The patient is unable to bear weight, you will have to remove him from the playing field.

If there are any muscle tears, you will have to remove him from the playing field. If there is any cardiovascular system trauma, if the heart has gone into any sort of irregular heart rhythm called arrhythmias, please remove the athlete from the playing field. And any injuries to the head, face and neck, the athlete should be removed from the playing field. So, what is the take home message for all of us from this inaugural lecture? Sports injuries are common, they are preventable, and they are inevitable. Whenever people are going to play sports, they are going to get injured.

Please note, if the injury is reported or if the injury is not reported, whether the injury causes the athlete to take time off, or does not cause him to take time off, it will still be classified as sports injury. Before you start any training, any sports, please ensure a pre-participation medical examination by a qualified sports physician. This will help you to prevent a lot of problems in future. This will help you to pick up, if there are any abnormalities in the athlete, and you are able to correct them very, very early. In continuation, once you have picked up your abnormalities with the pre-participation medical examination, make sure you have early biomechanics correction.

Any biomechanical abnormalities which have been picked up should be corrected at the earliest, before the athlete is put on the field. Warm up session should not be cut short. There should be a proper warm up session before any training, or before every event. And, make sure that after training, after the event, the cooling down sessions are also conducted properly, and the athlete has had adequate time to recover from the training session, or the competition. Make sure, that the athlete is taking a proper diet for the exercise or training he is undergoing, and make sure his hydration status is proper.

Simple questions you can ask is, what is the colour of your urine? If the colour of your urine is anything other than colourless, you are dehydrated, and you should consume more water and fluids, and bring your hydration status back to normal. Make sure whenever you are playing a sport or training, you have a proper technique, and you have the proper equipment which is well managed, well maintained and in a playable condition, and you should not be getting any injuries because of improper or poorly maintained equipment. Make sure that your physical conditioning is appropriate for the level of sport you are going to play. If you are a recreational athlete, you will have a different level of physical conditioning. If you are an amateur athlete, you will have a slightly higher level of physical conditioning.

If you are a professional or an elite athlete, you will have a much different, and a higher level of physical conditioning. Whatever level of sport you are playing, make sure that your training programs are scientific, and well designed. The facilities where you are conducting your training, or you are going to have competitions, make sure they are well managed, they are well maintained and they have protocols in place for cleaning, maintenance of equipment and sterilization etcetera. Make sure you play only with balanced opponents, that is a state level player should not be put up against an international player. There will be trauma, there will be damage, and there will be injuries more often in the state level player, but it may also occur in the elite player, due to some abnormal actions, or activities done by the state level.

So, make sure the opponents you are putting in the ring or in any training arena are balanced. Make sure that you follow all the rules of the sport, and please ensure that they are enforced at every training session and competition. And last but not least, please use common sense. If something seems off, please do not undertake that activity, you probably will not get injured.

So, these are the references. Ladies and gentlemen, I would strongly recommend you to go through the references, and after you have gone through the lecture. I thank you, for your time and your patience. Ladies and gentlemen, thank you for listening and do let us know, if you have any queries or comments regarding the lecture.

Thank you and Jai Hind.