Essentials of Sports Injury Prevention & Rehabilitation

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Lecture – 20

Risk Factor in Injury

Good morning ladies and gentlemen, and welcome to week 5 of the course on sports injuries prevention and rehabilitation. Today's lecture we will be discussing risk factors in injury. This is where we are as compared to the week, and we are at week 5 and in this week we will be covering some important topics such as prehabilitation, rehabilitation, periodization, periodization of rehab, etc. And as is the norm, we will also have an assignment at the end of the week which you will have to submit online. So, I will be covering this course in the following outline. I will be covering this lecture as per the following outline: definition, salient features, we will discuss something called the injury causation model, risk factors, factors in acute and overuse injuries and conclusion.

Let us define what is a sports injury. A sports injury is defined as any physical complaint sustained by a player that results from a match or training irrespective of the need of medical attention or time loss from physical activities. The IOC manual of sports injuries defines sports injury as any damage to the tissues of a body which occurs as a result of sports or exercise. To the casual observer athletic injuries appear to be random accidents or because of serendipity.

However, there are many factors which play a role before the actual injury event occurs. There is a model of injury causation which examines the correlation of various factors to injury etiology and explores their interrelationship. This is the model of injury causation which has been suggested. If you look at the model, we will see that there are some risk factors for injury which are distant from the outcome and there are injury mechanisms which are proximal to the outcome. You may have some intrinsic risk factors, that means they are present within you such as age, gender, body composition, health, physical fitness, anatomy, skill level, etc.

Now these are all risk factors, which are present within you and which cannot be changed. If you have any of these risk factors, it makes you what is called a pre-disposed athlete. Ok. Now from intrinsic to extrinsic, if you have any extrinsic risk factors such as those which are outside your body: human factors, protective equipment, sports equipment, environment, stadium,

weather, opponents, etc. Now, if these are present or if you are exposed to any of these extrinsic risk factors, a pre-disposed athlete becomes a susceptible athlete.

If you are a susceptible athlete and you have been exposed to a playing situation, opponent behavior, any biomechanical characteristics from external forces, anything which comes from outside and causes you to get an injury, this is called an inciting event. If you are a susceptible athlete, and you get exposed to an inciting event, you will get what is called an injury. This in a nutshell is the injury causation model which has been suggested by several authors. If you have an overuse injury, the intrinsic factors may be training errors, any excessive volume, excessive intensity, sudden increase in volume or intensity, sudden change in type, fatigue, inadequate recovery and faulty technique. The surfaces may be hard, soft or cambered surfaces.

The shoes may be inappropriate or worn out. The equipment may be inappropriate. The weather conditions in which you are playing may be hot, cold or humid. There may be psychological factors at play and your nutrition may be inadequate. In overuse injuries, these are the extrinsic factors which contribute to overuse injuries.

However, there are certain intrinsic factors which contribute to overuse injury. Any anatomical defect or any defect in body composition of the body like malalignment, pes planus, pes cavus, rearfoot varus, tibia vera, genu valgum, genu varum, etcetera, these are all anatomical defects or biomechanical defects which exist in your body or because of wearing of certain equipment, it may come into play. If these are present, they are called intrinsic factors and they also contribute to overuse injury. Now, when we talk about risk factors, they are classified as either internal or intrinsic or external and extrinsic. Internal factors, risk factors are internal to the athlete and they may include factors such as biomechanics, conditioning of the athlete, how mature is the athlete and somatotype.

Extrinsic risk factors are those factors that have an impact on the athlete from outside, from without and include factors such as weather, field conditions, rules and equipment. There are several intrinsic risk factors which may predispose an individual to injuries. These are those that prepare, sensitize, condition or otherwise create a situation so that the host tends to react in a specific fashion to a disease agent, personal interaction, environmental stimulus or specific incentive. They basically cause the host to react in a particular manner to an external stimulus. That is what is an intrinsic risk factor.

Although predisposing factors may be necessary, they are rarely sufficient to cause injury. Once the athlete is predisposed, extrinsic risk factors may act on them from outside. Such factors are the enabling factors that facilitate the manifestation of disease such as equipment, weather conditions and playing surfaces. The presence of intrinsic and extrinsic risk factors may

render the athlete susceptible to injury but again is not usually sufficient for injury to occur. You need something called an inciting event for that.

These factors sum or interact effectively to make the athlete an accident waiting for a place to happen. That means if you have an intrinsic risk factor or an extrinsic risk factor, you are an accident waiting to happen. It's only the place which has to be decided. This state is also referred to as nearly sufficient constellation of causal factors. The final link in the chain or web of causation is an inciting event which is definitely related to the injury.

These precipitating factors are associated with the definitive onset of the injury, and are almost always regarded as necessary causes. That means, intrinsic risk factors, extrinsic risk factors are not causes for the injury. They are contributors to the injury, whereas the inciting event is a cause to the injury. There are two broad categories of athletic injuries which differ markedly in their etiology. That means there is a big difference in how they occur.

Acute injuries are those associated with a macro-traumatic inciting event. That means, there is a trauma from outside of sufficient magnitude. Examples of such injuries are fractures and ligament sprains. The inciting event is readily identified by the application of some external force which disrupts tissue like tackles, throws, collisions, etc. That means there has to be an external force which will damage the tissue for acute injuries to occur.

The other type of overuse injuries are the result of repetitive microtrauma. These include stress fractures and tendonitis. In overuse injuries the inciting event is often less apparent and the result of tissue damage is because of overstress rather than due to acute disruption. Some injuries however like muscle strains can have a component of both acute injury and overuse injuries.

Let us talk about the contributing factors to overuse injuries. The relative contribution of intrinsic and extrinsic factors differs from these two classes of injury. In overuse injury there is likely a greater contribution from intrinsic risk factors. In running related injuries the age and the biomechanical alignment of individuals may predispose them to injury. The use of worn out shoes and running on rough terrain are intrinsic risk factors which make them susceptible to injury. Lastly, the inciting event may be excessive running, excessive distance which leads to an Achilles tendonitis which is the injury.

The inciting event, that is the excessive mileage may not have been sufficient enough to cause the injury but it may have been the last straw which broke the camel's back. Because it is the most apparent, much of the cause may be attributed to the inciting event. However we must be careful that in case of overuse injuries, we must try and identify the intrinsic and the extrinsic risk factors as well as the inciting event which has contributed to this; so that we may be able to treat them appropriately and prevent their reoccurrence.

Contributing factors for acute injuries. With acute injuries the relative contribution of factors is often less clear but may be less complex also. The athlete may have been predisposed by a previous injury which is an intrinsic risk factor but may have been tackled because he lost footing on a wet playing surface which is an extrinsic risk factor. The only factor beside the inciting event needed to attain this sufficient cause may have been exposure to playing the sport itself. That means, playing the game itself is the inciting event in this case. Depending on the type of injuries there may be different weightage given to various components of the sufficient cause. Acute injuries may have more weight placed on the inciting event that is a large dose analogy such that the risk factors only contribute in a small quantum of manner.

On the other hand, overuse injuries may have a larger constellation of causal risk factors all of which contribute individually to a lesser extent. That means it is a small dose analogy. Most of the factors which cause overuse injuries contribute in a small manner to the overall injury. However in an acute injury because it is a large dose analogy most of the cause or most of the causative factor is placed upon the inciting event.

So, what do we learn from this lecture? We have learned that sports injuries are common. The cause of most injuries is multifactorial. There may be intrinsic risk factors, there may be extrinsic risk factors each of which is a lecture in itself. There may be an inciting event, there may be a predisposed athlete. There is an injury causation model which has been proposed to take care of this idea that most injuries are multifactorial. We have definitely identified several intrinsic and extrinsic risk factors.

Please note that the contributing factors and the contributing event are often the last straw in an injury or probably it is the last straw which has broken the camel's back. Acute injuries and overuse injuries are different. They are different in terms of whether intrinsic factors or extrinsic factors are more important. They are different in terms of whether the inciting event has a role to play, major role to play or a minor role to play. They are different in terms of which factor has got one single major role to play or whether all the contributing factors have got small, small, multiple roles to play.

We have to understand the risk and the causative factors. It is very important for us to understand this because only when we know what are the risk factors, what are the causative factors, we can formulate prevention strategies. We can target these risk and causative factors in a precise and definitive manner and we can help to prevent these injuries. These are the references which I strongly urge you to go through in detail in case you want to know more about this topic. I thank you for your time and patience.

Ladies and gentlemen, do let us know in case there are any queries or any comments. We will be greatly, we will be glad to get back to you as I reply to your comments and your emails. Thank you, ladies and gentlemen, for listening and Jai Hind.