

Essentials of Sports Injury Prevention & Rehabilitation

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Lecture – 5

The Back In Sports

Good morning ladies and gentlemen, and welcome back to lecture 5 of week 1 of the course on Sports Injuries and Rehabilitation. Today, we will be discussing a very important topic. It is, the back in sports. Without the back, there is no sports. It is as simple as that. We have discussed the upper limb.

We have discussed the lower limb, and now we have to discuss about the organ system which brings all this together, and helps us to move. I will be covering this topic under the following outline. Functional anatomy, some amount of functional biomechanics. We will talk about back pain in athletes.

We will talk about assessment and management of back pain in athletes, and we will talk about the conclusion. Let us talk about the anatomy. The human spine is a complex structure, and it is designed to protect the spinal cord, and at the same time transfer loads from the head and trunk to the pelvis. While simultaneously allowing movements, and providing stability to the trunk. So, it is supposed to protect the spinal cord, transfer load from the head and trunk to the pelvis, allow movement and make sure the trunk is stable.

When we realize that it has got such a vast variety of functions, the design of the spine has to be very very meticulous. So, it has got 33 vertebrae which articulates with the neighboring ones to permit motion in three planes. The vertebrae are connected to each other by the ligaments, which provide intrinsic stability along with something called the intervertebral discs. Now, these are small discs which are present in between the vertebrae, and they have a very important role in shock absorption and transmission of forces. The intervertebral discs and the ligaments, they provide intrinsic stability, and the muscles around the back and the muscles around the spine provide extensive stability.

The functional unit of the spine is what is called a motion segment, and it is nothing but two adjacent vertebrae and their soft tissues, that is the intervertebral disc and the ligaments. Motion between the two vertebrae is very very small, and it does not occur independently. That means, if you say lumbar 1 and lumbar 2 they cannot move independently too much. If you say cervical 7

and thoracic 1 they cannot move independently too much, but when the small small movements are added on it provides more motion of the spine. Thus, the functional motion of the spine is always a combined action of several motion segments.

When we talk about the load on the spine; please remember body position affects the load on the lumbar spine. The least load on the lumbar spine is when it is in an upright relaxed standing position, and any deviation from this upright relaxed standing position will cause more load on the spine. Forward flexion and twisting of the spine produces high stresses on the lumbar spine, and also on the intervertebral disc. If you apply an external load on the spine, such as lifting objects or carrying objects, you are subjecting the lumbar spine to very high loads. If you want to minimize these loads on the spine, make sure you reduce the distance between the trunk and the object lifted.

If the distance is larger, the load on the spine is larger, if this distance is smaller the load on the spine is less. If you have caused the muscles around the trunk to be fatigued, there is increased loss of motor control, and there will be increased stress on the ligaments, the discs and the joints; and in this case you will increase the vulnerability of the spine to injury. So, fatigue is not a good state for the trunk muscles to be in. Walking is an excellent exercise, which poses a low load on the lumbar spine. Let us talk about back pain in athletes.

Spine pain or back pain can be one of the most debilitating musculoskeletal problems for athletes, because there is a loss in training time, performance is reduced and in severe cases even the athlete's career may come to a premature end. Low back pain occurs for the majority of spinal pain. Low back pain commonly begins during adolescence, with symptoms often persisting beyond 12 months. So, it is that bad a problem, and it has to be addressed as soon as possible. However, low back pain risk is associated with both extremes of exercise, too much of exercise, and too little of exercise.

If you exercise too much you are at a higher risk of low back pain, and if you do not exercise you are again at a higher risk of low back pain. The specific demands differ among sports with injury patterns linked with different spinal demands. Each sport has got different movement patterns, and each sport has got different injury patterns. Sports commonly associated with high back pain prevalence tend to involve high levels of cyclic spinal loading, that means repeated cyclic spinal loading along with side bending or rotation. These sports are football, cricket, gymnastics, rowing, hockey and tennis.

Now, let us talk about the assessment and management of low back pain. We all know, it is a complex multifactorial problem that requires skilled and targeted intervention which is individualized based upon the individual presentation. The problem is, current management of spinal pain in general and in sporting populations are often not contemporary, and rarely are best practice guidelines being followed. Now, a suggested framework has been developed for athletes

with spinal pain. This will help to guide the assessment, and the management of spinal pain within the sporting environment.

First, you talk about or you look at the injury mechanism. Is it a traumatic injury? Is it a non-traumatic injury? Was it insidious in origin, or was it because of some overuse? So, your first step is to classify the injury as traumatic, non-traumatic, insidious or overuse. Step 2: try and reach a precise anatomical diagnosis. There are several low back pain disorders which have a precise anatomical diagnosis, such as a Pars stress fracture, spondylolisthesis, disc herniation with radiculopathy, fractures and ligament tears. Basically, if an anatomical structure is damaged, you say there is an anatomical cause.

However, if there is no anatomical structure damage which can be demonstrated, we say it is a non-specific low back pain, because there is no pathology which can be demonstrated. So, either it is a specific low back pain with an anatomical cause, or it is a non-specific low back pain without an anatomical cause. Step 3: look at the nature of pain. We say the pain is mechanical, if it has a clear and consistent anatomical focus, if it has a response that is proportional to the stimulus, and it can be provoked and relieved by specific activities and postures. That means, if the doctor or the therapist can demonstrate or recreate the pain with specific activities and postures, and if the pain goes away if those specific activities and postures are removed, then the pain is classified as a mechanical pain.

If the pain does not have a clear anatomical focus, if the response is disproportionate to the stimulus, and there is no clear pattern of being provoked or being eased by specific activities and postures, then the pain is classified as non-mechanical. Let us talk about the extrinsic factors. They are factors which are extrinsic to the individual or external to the individual, such as training related, environmental, any additional demands being placed on the athlete, other potential factors such as teammates and if there are any unique demands of a specific sport, such as running, throwing, jumping or lifting. So, if there are any of these extrinsic factors, you classify them accordingly. You also look at intrinsic factors, which are factors within the individual which influence the development or maintenance of an injury; such as non-modifiable factors, motor control, biomechanics, conditioning of the patient, flexibility, any motor response to pain, physiological, psychological and other factors.

So, you have to look for these factors, and classify them if they are present as intrinsic factors. Now, we have taken the history, we have classified the pain, we have done the assessment. Now, how do we do the management of a case of acute spinal pain in athletes? Number one, exclude any serious pathology. They are called red flag signs in back pain, and they have to be excluded first. Then, you identify the athlete's injury mechanism.

Reassure the athlete regarding the benign nature of the non-specific spinal pain. Give him a short period of rest, not more than 3 days. In rare cases you give him 5 days, in any case it should not be more than 5 days of rest. You should use appropriate medication. First choice is always paracetamol, second choice is non-steroidal anti-inflammatory drugs and, please do not give him any narcotic pain relieving agents or steroids.

In the initial phase, if you want to unload the spinal tissues, you may give him taping. Make sure you have a clear management plan for the athletes upcoming training and competition. You should have very clear communication with the relevant support groups, that is the coach, the family, the team, the manager etc. And, please advise the athlete to stay active where appropriate. Rest is very very short periods of rest.

There is a new approach, which is called cognitive functional therapy. Now, this approach provides specific targeted interventions directed at the cognitive and the functional factors which contribute to spinal pain. And a lot of research has supported its efficacy for non-specific spinal pain in athletic as well as non-athletic populations. What is the component? So, the cognitive component has an emphasis on the therapeutic alliance that means, the athlete, the coach, the doctor, the sports psychologist all work in tandem. You have to educate the athlete regarding the factors which are contributing to the ongoing symptoms.

You have to tell him what is causing his pain, why is the pain there, how long will it last? All these things have to be told to him and taught to him. You have to manage the lifestyle issues, you have to manage the cognitive issues and the affective issues, if any are present. You have to do goal setting for the athlete. Basically, it means that a sports psychologist has to be working with the athlete in close synchronization with the medical team. You have to train the athlete for motor control, and you have to train him for enhanced body awareness.

You may use mirrors, you may use videos, you may use movement training. You have to teach the athlete to confront maladaptive behaviors. That means, you have to tell him: this behavior is wrong, this pattern movement pattern is wrong, and in this moment you are loading the spine in an abnormal manner. So, once you train him accordingly, you have to retrain him to not perform these maladaptive behaviors. After you look at the cognitive component, you have to look at the functional component. You have to specifically train him for specific movement patterns, and once you have trained him for specific movement patterns, you have to integrate those movement patterns into his training program so that it becomes a functional integration.

Any areas of his body which are weak, which are tight, which are flaccid, you are supposed to target and, you are supposed to do a targeted conditioning program for all these areas which are weak. You have to specifically focus and ensure that the rate of progression through the stages are

as per the individual's presentation. That means, one size fits all will not work for all athletes. The program has to be tailor made and individualized.

Return to play: please do not allow your athlete to return to play while there are ongoing symptoms, because this will result in delayed recovery. Because there is spinal pain, it will impact the motor responses of both: the trunk and the limbs and the athlete may develop movement patterns which are compensatory, if he continues to train or compete with pain. So, please ensure that there are no compensatory motor patterns, and there is no pain before the athlete is returned to play.

So, let us talk about the take home messages from this very important lecture on back pain. Spinal pain is a complex multifactorial problem that requires skilled, individualized and targeted interventions. In the sporting environment, a broader multifactorial approach towards spinal pain management is required. We cannot have people working in individual silos, and managing back pain in athletes because the management is always going to be suboptimal in such cases.

A framework for athletes with spinal pain has been developed to guide the assessment process, and to help to manage the spinal pain. Consideration of all aspects of this framework along with a cohesive team environment will help guide optimal management. That means, you have to consider all the aspects of the assessment and management framework which has been given and you have to have a proper team: sports physicians, sports physios, sports psychologists, nutritionist, strength and conditioning coaches, technical coaches, etcetera working with the athlete. This is the only management strategy which is going to help guide management, and bring your athlete back from an episode of spinal and back pain. These are the references which have been there and I recommend you to go through these references. I thank you for your attention and your patience and this brings us to the end of week one of sports injuries and rehabilitation.

There will be an assessment test which will be given to you and you will be required to submit the assessment within the prescribed time. The modalities will be intimated to you shortly and I hope you had a pleasant time during the last week and I hope you had an enhanced learning experience. Please let us know if we can improve upon this week's lectures in any manner and as always, we look forward to your comments and your questions. Thank you and Jai Hind.

References:

Basic Biomechanics of the Musculoskeletal System by Margareta Nordin, Victor H. Frankel; Dawn Leger - 4th ed.

Sports Injury Prevention and Rehabilitation: Integrating Medicine and Science for Performance Solutions by David Opar, Kevin Cross, and Julie Hides, 2016.