

LUMBAR LOAD IN ADOLESCENT FAST BOWLERS: A PROSPECTIVE INJURY STUDY

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What is the problem and what is known about it so far?

Multiple factors contribute to the development of lower back injuries in adolescent fast bowlers. These include risk factors that predispose the bowler to an injury, and the large impact forces and spinal loads that are experienced during the delivery stride.

Why did the researchers do this particular study?

The researchers set out to investigate whether certain aspects of physical preparation may be related to lower back injury risk.

Secondly, bowling technique and the forces at the lumbar spine were assessed in order to determine which types of loads are more likely to cause lower back injury.

Who was studied?

Twenty-five male fast bowlers between the ages of 14 and 18 years, who had not suffered any lower back pain in the preceding three months, participated in this study.

How was the study done?

Before the start of the cricket season, each bowler underwent a magnetic resonance imaging (MRI) scan to make sure that they were free of bone stress injuries in their lower back. They then completed a battery of strength and flexibility tests for the lower body and trunk, based on typical pre-season cricket testing protocols.

Each bowler then underwent a 3-dimensional biomechanical assessment, using a 12-camera motion analysis system and reflective markers placed on their skin to capture the positions of each body segment during bowling and a force plate to capture the forces against the ground after front foot contact. The researchers used this data to calculate joint angles, forces and moments (torque) at the ankles, knees, hips, and lower back.

The bowlers were then followed throughout a single cricket season, and all lower back injuries were documented and treated by a sports physician. At the end of the season, bowlers were categorised into two groups – those who suffered a lower back injury and those who didn't – and differences in their pre-season testing and bowling biomechanics were examined.

What did the researchers find?

Twelve of the twenty-five bowlers suffered a lower back injury during the cricket season.

During the pre-season testing, bowlers who went on to get injured performed worse on the back extensor muscle endurance test (injured group: 103 ± 33 seconds, vs. non-injured group: 132 ± 33 seconds), and had poor mechanics during the single leg squat test (knee collapsed inwards). Injured bowlers had greater lateral flexion (side bending) of the trunk (injured group: 50 ± 6 degrees, vs. non-injured group: 40 ± 8 degrees at ball release), and experienced larger forwards and side bending torque during bowling.

There was also a relationship between the knee shifting inwards during a single leg squat and increased lateral flexion of the trunk during bowling, suggesting that good lower body strength and control may be needed in order to maintain a better posture during bowling.

What are the implications of the study?

This study highlighted the role of trunk lateral flexion during bowling and the forces on the spine associated with this motion in the development of back injuries in adolescent fast bowlers. Coaches should aim to reduce the amount of lateral flexion during the delivery stride, bearing in mind that good lower body strength and control under lower loads may be required before any improvements will be seen during bowling.

The single leg squat and back extensor muscle endurance tests may be used as screening tests for lower back injury risk in adolescent fast bowlers, and training to improve performance on these tests is recommended.



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