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How to Improve Your Pre-participation Sports Physical Exam -- Part II

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In the first part of this article, we looked at the general goals and format for sports preparticipation examinations (PPEs). It is in the general medical evaluation that any life threatening abnormalities are meant to be discovered. However, the true "meat" of the examination -- that area in which we are most likely to discover abnormalities and positive information significant to actual sports participation -- is the sports-specific examination. Now many of you are probably asking how the musculoskeletal and other screening that we normally do in the general PPE can possibly yield any sports-specific information. The truth is that, in its original form, it probably cannot. However, there are ways in which one can design this examination so that it yields a sports-specific profile of fitness or readiness of the athlete's body to respond to the stresses of the sport attempted.

Let it be said from the outset that modifying what may be the same exam that has been done for the last 20 years cannot always be done all at once, and will require not only a little extra effort, but also convincing providers of the exam and facilities of the value of change. However, once coaches, athletes, and authorities of schools and programs come to understand the value of the information gleaned from this portion of the exam in preparing for the upcoming season, they will be the ones demanding that these changes be made. The background for the construction of sports-specific evaluation is based upon the premise that different sports exert different demands on different parts and systems of the body. For example, long distance running places microtrauma stresses on the lower extremity over relatively long periods of time. It also stresses aerobic endurance. On the other hand, football place mainly macrotrauma stresses on several parts of the body over a relatively short period of time, and taxes anaerobic endurance. A sports-specific exam addresses these differences, and can yield consistent physical findings which correlate with performance in a particular sport.

W. Ben Kibler, in his landmark reference on sports PPEs has outlined a simple but elegant way to help construct a sports-specific exam. He begins by development of a profile for each sport based upon the unalterable demands of that sport on the body. An unalterable demand is defined as one which cannot be altered by changing equipment or practice environments. His particular protocol focuses upon the muscular system, and defines five parameters basic to all athletic activity: flexibility, strength, power, anaerobic endurance, and aerobic endurance. He then rates each parameter on the basis of its importance to a particular sport, ranking it from 1 (minimally needed) to 4 (maximally required). This then develops a sports specific profile. For your own reference, compare the profiles of football and long distance running listed below:

Football: 3, 4, 4, 3, 2

LD Running: 3, 2, 2, 2, 4

To construct the sports-specific examination, it now becomes necessary to outline different ways of testing each parameter. Flexibility can be measured not only by a sit-and-reach exam of the lower back, but also by goniometric examinations of those joints most likely to be stressed by a sport. Strength can be measured by general "whole body" screens such as pushups and sit-ups, as well as by dynamometer testing and Cybex peak torque protocols. Power testing can include Cybex exam time to peak torque, vertical jump tests, and medicine ball throws. Anaerobic tests include tests such as number of jumping jacks or sit-ups performed in one minute, shuttle runs, hexagon drills, and short yardage dashes, while aerobic endurance can be tested by step testing, timed mile runs, or submaximal bicycle, or treadmill testing.

The final step in the process is to translate the profile and knowledge of how to test each parameter into a specific exam sequence for each sport. For example in football, a known power sport, areas at risk include the neck and shoulders, back, knees, legs, and ankles. Ligamentous sprains comprise a large percent of the injuries seen. Kibler's recommendations for testing for football, based upon the profile listed above, as follows:

Flexibility: sit-and-reach, knee flexion/extension, iliotibial band, gastrocnemius (this author adds shoulder ROM as well)

Strength: all tests

Power: all tests

Anaerobic endurance: 40 yard dash, sit-ups in one minute

Aerobic endurance: timed mile run

Compare this to the exam for long distance running, in which areas of greatest risk include the feet, ankles, lower legs, and knees. Overload injuries to the lower extremities are the most common with some sources listing ankle sprains as the most common single trauma injury.

Flexibility: sit-and-reach-goniometric exam of hip flexion/extension, knee flexion/extension, iliotibial band, and gastrocnemius/soleus

Strength: Cybex exam of knees, sit-ups, hand-grip strength

Power: Cybex exam to peak torque

Anaerobic endurance: sit-ups in one minute, jumping jacks in one minute

Aerobic endurance: step test or submaximal treadmill stress test

It is readily apparent that this system can be used to create a test which assesses those areas of the body most stressed and most likely to be injured in a sport. It is also important to test these body areas in ways which approximate the type of stress experienced during the athletic activity: hence the need for the parameter testing. While there are bound to be differences of opinion about the importance of the parameters to each activity, their relative weight compared to the other parameters can help us make wise choices about which things need to be tested the most thoroughly. I highly recommended the Kibler text as a well-thought-out guideline for the constructions of sports-specific examinations, especially since the technique for specific tests is outlined in the text along with age-referenced normals for many of the tests.

However, I believe that anyone who takes the time to think through the sport for which they are performing PPEs and uses the parameter system outlined above can construct an examination which is at least somewhat more specific than the general medical screening exam. This can only help us better prepare the athletes we serve for their respective activities.

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