

Low Back Pain in Adolescent Athletes: Diagnosis, Rehabilitation, and Prevention

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Adolescent athletes with low back pain or dysfunction are the most difficult patients for sports-medicine clinicians to treat. General orthopedic surgeons have little training in spine care; those with sports-medicine fellowships have dedicated training in the extremities, especially the shoulder and knee, with

less emphasis placed on the spine. An orthopedic spine surgeon with fellowship training would be an asset for any sports team. Many are not involved in sports medicine but can provide excellent care as consultants if they are available.

The spine is clearly the area that athletic trainers, family practitioners, and other physicians specializing in sports medicine are the most uncomfortable with. Even though physical therapists and

physiatrists are the most comfortable when treating lower back dysfunction in athletes, many still are not prepared to evaluate and treat the spine in a timely manner, allowing athletes the best chance to return as quickly and safely as possible to their sport.

Athletes most at risk for developing symptoms in the low back include those participating in football, hockey, soccer, golf, rowing, gymnastics, swimming, tennis,

bowling, volleyball, basketball, and track and field.

Adolescents With Low Back Pain

A significant increase in the occurrence of low back pain occurs at age 12 and older. Several studies have found that in all age groups above 11 years, more than 50% have experienced lower back pain at some time in their lives—58.1% of females and 43.2% of males.^{1,2}

In adolescents who watched television 1–2 hr/day, 59.3% had low back pain; of those watching television more than 2 hr/day, 68.8% had low back pain.^{1,2} Other possible risk factors for developing lower back pain include increased height, decreased lumbar extension and straight-leg raising, increased lumbar flexion, and decreased muscle endurance of the abdominal and back muscles.^{3–5} Specific muscle imbalances such as hip-flexor tightness have also been found to be associated with lower back pain.

After reviewing 100 athletes and 38 nonathletes, Kujala et al.¹ found that the prevalence of low back pain correlated with hip-flexor tightness. Olsen et al.² evaluated 1,242 individuals, of whom one third had restricted activities because of low back pain and 7.3% sought medical attention for it. In a study of 1,503 schoolchildren, age 14 years, Salminen and colleagues³ found that low back pain was the third most common form of pain interfering with schoolwork and sports. In this study, 65% were better in 1 month, but 35% reported disability from

KEY POINTS

▶ Adolescent athletes who present with pain on lumbar extension might have a greater chance of disk herniation or annular tears than pars interarticularis defects.

▶ A history and physical examination, along with a functional evaluation, will help to ensure the development of a complete and accurate differential diagnosis.

▶ After rehabilitation of an injury, prevention techniques prepare the athlete to reduce the frequency and severity of recurrent episodes.

▶ Key Words: functional evaluation, algorithm, imaging, disk herniation

chronic low back pain, with recurrent or continued episodes of pain. There was a direct relationship between history of lower back pain and decreased straight-leg raise in adolescent males in a study by Miereau et al. on 402 children 10–18 years old.⁴ Ohlen et al.⁵ found that female gymnasts with low back pain had a significantly larger lumbar lordosis (41°) than did those with no low back pain history, who had a 35° lumbar lordotic curve. There was positive correlation between low back pain, age, female sex, time spent watching television, smoking, and competitive sports when Balague et al.⁶ evaluated 1,715 schoolchildren of both sexes.

We know that low back pain affects 80% of the population, and its prevalence in children is somewhere between 7% and 51%, depending on the study. Back pain in children is a major public health issue. The prognosis is that 90% are better in a few weeks to months, but 25% are still disabled at 1-year follow-up.⁷⁻¹¹

Evaluation

A complete and comprehensive medical history, including a detailed musculoskeletal history, is essential in establishing the differential diagnoses. Some of the more important points that should be included in the history are discussed here and outlined in the sidebar.

History

1. How the injury occurred or how symptoms began.
2. Previous injury to the spine, hip, knee, foot, and ankle and whether those were fully evaluated and treated (the kinetic chain).
3. The years and positions played in that sport and level of competition.
4. Other sports played, if any.
5. Previous treatment for current condition.
6. Diagnostic studies to date.
7. Ability to play in games and practices since the injury (essential).
8. Training errors.
 - a. Using poor spinal mechanics for lifting.
 - b. Seated weight machines often isolate individual muscles at the risk of the spine (sitting position increases disk pressure).

We have developed a comprehensive history form that patients fill out before being evaluated, which helps to ensure that we obtain the entire medical history. This form can then be reviewed with the athlete and any family members present and allows more time for the evaluation. To fully evaluate an adolescent athlete with lower back pain or dysfunction, a history of previous injuries to the spine and other parts of the functional kinetic chain, especially the lower extremity joints, is absolutely essential. Oftentimes these previous injuries have not been fully evaluated or treated. An area that is not questioned enough is how much time has been spent by the athlete on seated weight machines, which can increase disk pressure. This, along with poor spinal mechanics for lifting, is one of the more common precipitating factors in increasing the risk of adolescent athletes developing lower back pain or dysfunction.

Physical Examination

The traditional physical examination of the spine is inadequate, and the following points should help in forming a complete and accurate diagnosis. At a minimum, there should be a functional screening exam of the lower extremities and spine, looking at the “big picture” first. This can be accomplished by using the six basic functional tests outlined in the sidebar on the next page. These tests should identify functional biomechanical deficits in the kinetic chain of the lower extremity and spine, as well as the pelvis and shoulder girdle. As an example, an adolescent right-handed golfer with lower back pain who has restricted subtalar-joint motion in the left foot might not be able to pronate (load) the whole left lower extremity. This, in turn, reduces knee internal rotation and hip external rotation, thereby causing excessive lumbar rotation to the right on the backswing. This makes up for restrictions in the hip range of motion in the transverse plane originally caused by decreased subtalar-joint pronation.

A cervical- and thoracic-spine screen and sacroiliac-joint motion tests should also be performed. Observation of a shift in the lumbar spine that is worse with extension or flexion is important, because shifts that are worse with extension generally have a poor prognosis and might take months to improve, rather than several weeks when the shift is worse with flexion and better with extension. A flexible shift might be present, in which the athlete is observed to have a shift to the left; simply touching the left shoulder will cause