Evaluation of the Injured Runner

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• Pronation • Supination • Flexibility • Patella

EXAMINATION OF THE RUNNER

Two guiding principles assist in identifying risk factors for the injured runner.[1–4] Leadbetter's principle of transition seeks to identify extrinsic risk factors[5] and states that injury is most likely to occur when the athlete experiences a change in mode or use of the involved part. Most running injuries occur when the athlete has a specific change in training, such as a change in running volume, intensity, or equipment. Accordingly, the history carefully searches to identify the change or transition.

Macintyre's principle of "victim and culprits" underscores the importance of the biomechanical and functional examination.[6] The presenting injury represents the "victim," which has occurred as a result of an inability to compensate for a primary dysfunction at another site, the "culprit." The entire kinetic chain must be examined to rule out asymptomatic injury or dysfunction. For example, the "malicious malalignment syndrome" (femoral anteversion, knee valgus with increased Q angle, external tibia torsion, heel valgus, and pronation) can, with faulty training techniques, contribute to injury.[7]

History

In addition to the standard medical history, a detailed analysis must be made of premorbid and current running history. Useful information includes weekly mileage, length of long run, pace, the number of pairs and types of running shoes worn, frequency of hill work and interval training, running surfaces, and review of flexibility, strength, warm-up exercises, and amount of cross-training activities.

Because overuse injuries are often asymptomatic in their origin, the history well before the symptoms first appeared must be inquired after. Were there antecedent changes in training routines, running shoes, or surfaces? When during running does the pain occur? Does the pain only occur with up or down hill, after a certain distance, or only when running on a particular surface? Does the pain occur during and after

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running? Is there any initial improvement with a period of warm-up? Self-treatments, prior medical treatments, and previous diagnostic tests should be reviewed. Finally, the health care provider should always ask the runner what he or she believes the problem to be.

Examination

Examination of the injured runner includes a sequential biomechanical screening, site-specific examination, functional screening, gait analysis, shoe wear assessment, and appropriate ancillary tests.[4,7–9]

Biomechanical Assessment

Standing

The examination of the runner begins in the standing position on an uncarpeted surface. The athlete should be in running shorts, without shirt, shoes, or socks on. The female athlete should be in an appropriate sports bra or gown. The examiner should have adequate space to step back to assess the athlete's posture. Posture is assessed by having the athlete face the examiner, face sideways, and stand with the back to the examiner. The physician should start by observing the general contour of the spine, noting abnormal curvature, shoulder or pelvic tilt, flank creases, or prominent scapula, which may suggest scoliosis. The athlete is observed bending forward and sideways, and any spinal deformities or segmental dysfunction noted. Having the athlete bend forward also allows the examiner the opportunity to assess lumbopelvic rhythm. The normal lumbar lordosis should reverse with forward flexion.

The examiner then screens the athlete for leg length discrepancies. The examiner palpates the iliac crests and anterior and posterior superior iliac spines, and notes any asymmetries. Asymmetries can represent functional or anatomic leg length discrepancies. Functional leg length discrepancies imply that the actual leg lengths are equal. Functional differences may be related to varying degrees of foot pronation or sacroiliac (SI), pelvic, or hip dysfunction. Anatomic leg length discrepancies imply that one leg is actually shorter than the other.

Sacroiliac joint function is assessed by the SI fixation and flexion tests.[10] With the SI fixation test the inferior slope of the posterior superior iliac spine and the medial spinous process of S2 are identified with the thumbs bilaterally. The patient is then asked to flex the hip. With the SI flexion test, the patient bends forward with the examiner's thumbs on the posterior superior iliac spines bilaterally. Normally the examiner's thumb swings downward and lateral. A positive test (indicating SI dysfunction) occurs when the examiner's thumb swings upward or does not move relative to the other side.

Alignment of the lower leg is assessed by sequentially observing the knees, lower legs, and feet. The knees are observed for genu valgum, varum, or recurvatum. Genu varum is not uncommon in men, with 5° representing the upper limit of normal. Genu valgum is not uncommon in women, with 5° again representing the upper limit of normal. Patellar position is noted. Normally in the standing position the patella faces directly forward; ''squinting'' or excessively laterally displaced patella may predispose to patellofemoral syndrome.

In the standing position, most feet can be identified as cavus, neutral, or pronated. The cavus foot is highly arched and rigid, with calcaneal inversion. The pronated foot is flexible with little to no arch being present.

The lower extremity is then examined in the subtalar neutral position. In the standing position, the foot is placed in neutral position by placing the talonavicular joint in a position of congruency. Talonavicular congruency is obtained by having the examiner place the thumb just distal to the medial malleolus at the talonavicular joint, with the