The Athlete's Knee: Cartilage Injury—Chondropenia to Osteoarthritis

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The soccer athlete's knee is exposed to various degrees of sporting activity, injury, and chronological aging effects, which frequently result in a spectrum of meniscal, ligament, and articular cartilage disorders. Participation in recreational and competitive soccer may result in a higher incidence of acute and chronic injury, chronic overuse syndromes, and osteoarthritis. One of the goals of this chapter is to introduce a new concept, *chondropenia,* the earliest degenerative cartilage lesion, and highlight the pathogenesis that ultimately leads to the end stage articular cartilage lesion, osteoarthritis. Another major objective is to present a treatment algorithm for knee articular cartilage injury management. The emphasis of this algorithm is placed on long-term joint function preservation. In the soccer athlete, articular cartilage injuries will invariably lead to a reduction in performance levels and chronically to future knee articular cartilage degeneration. We now know that an acute knee injury in the soccer athlete, such as an anterior cruciate ligament (ACL) rupture or a meniscus tear, is likely to have long-term chronological effects resonating beyond the index injury and leading to degenerative joint disease. The degenerative process arises from an insidious biochemical response that begins with the intraarticular release of interleukins and degradative cytokines after the acute injury. Current therapeutic approaches do not significantly curtail the biochemical destructive process.

Another important variable relevant to soccer athletes is high-rate repetitive loading of the joint, which adds to the degenerative risk. It is for this reason that articular cartilage injuries remain a challenge for the physician, the scientist, and the physical therapist, despite recent positive strides. The impact of articular cartilage injuries is costly and, as such, greater emphasis is being placed on knee injury-prevention strategies. These injury-prevention programs include multicomponent physical training regimens, as well as athlete-trainer counseling approaches to curb pathological repetitive joint loading. The ultimate goal is to influence the trend toward degenerative arthritis by eliminating the index knee lesion through prevention and education.

Caring for the soccer athlete requires a multi-level approach that includes injury prevention, acute injury management, and the long-term need to preserve joint function and athletic performance. As a consequence, the sports medicine orthopaedic surgeon can no longer be reactive toward acute knee injuries but