

INDICATIONS FOR TOTAL KNEE ARTHROPLASTY

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Osteoarthritis in the United States has an estimated annual cost of 65 billion dollars¹ in terms of both medical expenses and lost days from work. In the United States, the incidence and prevalence of osteoarthritis are increasing for reasons that have yet to be fully identified. An estimated 27 million adults in the United States have clinical osteoarthritis,² and the prevalence of osteoarthritis in the United States is anticipated to rise to 59 million people (18% of the population) by 2020.^{3,4} Osteoarthritis of the knee has an incidence reported to range from 164 to 240 per 100,000 person-years.^{3,5} The demographic of individuals over the age of 65 is increasing, and both the incidence and prevalence of osteoarthritis correlate with population age.^{1,6} As a population, the average body mass index (BMI) is increasing, and weight has been demonstrated to correlate with the development of knee osteoarthritis.^{7,8} Medical advances in magnetic resonance imaging (MRI)⁹ as well as increased patient awareness may also contribute to earlier presentation and diagnosis. The combination of an increasing elderly demographic, increasing BMI, and increased awareness and diagnostic sensitivity suggests that osteoarthritis will become an even larger problem in the coming decades.¹⁰

The diagnosis of osteoarthritis likely encompasses what is increasingly suspected to be many different disease processes with a common endpoint of articular cartilage loss and joint destruction. The etiology is multifactorial and suspected to include a genetic component,^{3,11-13} anatomic predisposition to disease progression due to limb alignment,^{3,8,14-16} occupation and lifestyle,¹ medical comorbidities,¹⁷ and age.⁶

Most cases of osteoarthritis are currently classified as idiopathic; other commonly reported causes are inflammatory arthritis, anatomic deformity, traumatic injury, hemophilia, avascular necrosis, and Paget's disease. Deformity of the knee may be either congenital or acquired; irrespective of etiology, the altered anatomic axis results in medial or lateral shift of the mechanical axis, with resultant disproportionate loading and shear forces in the respective compartment.¹⁸ Cross-sectional studies have demonstrated a correlation between joint injury and the subsequent development of osteoarthritis.^{3,19} Trauma to the joint may result in subsequent arthritis due to direct cartilage injury, ligamentous or muscular injury altering joint stability and biomechanics, or fracture deformity altering the natural joint alignment.

Although the etiology is multifactorial, the clinical course of osteoarthritis is well described. Injury or degeneration of the collagen matrix decreases its efficacy in constraining the proteoglycans; unconstrained, the hydroscopic proteoglycans swell, while at the same time lose their stiffness to compressibility.²⁰ This decreased stiffness to compressibility decreases the ability of the solid matrix to dissipate the energy of compressive loads through the frictional drag of water molecules through the matrix.²¹⁻²⁶ Consequently, a higher proportion of the load is transmitted to the solid matrix, resulting in increased solid matrix destruction. The end result is loss of cartilage and subsequent collapse of the joint space.