Report of Break-out Session: Management of Sequelae of Legg-Calvé-Perthes Disease

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Where Are We Now?

Sequelae of Legg-Calvé-Perthes disease (LCPD) are an important cause of hip pain in the young adult population and are associated with the development of premature osteoarthritis in approximately 50% of those affected [5, 11]. The extent of epiphyseal involvement, age at disease onset, and modes of childhood treatment affect the shape of the hip at skeletal maturity [12]. The resultant deformity varies substantially and is impossible to characterize uniformly. The spectrum of hip deformity includes a high trochanter, short femoral neck, misshapen femoral head, hypertrophied labrum, femoral and acetabular chondral lesions, torsional deformity of the femur and acetabulum, and secondary acetabular deformity [6, 9]. These anatomic abnormalities can lead to varying coexisting combinations of intra- and extraarticular femoro-acetabular impingement, joint incongruity, hip instability, articular and labral damage, and secondary osteoarthritis. As

such, assessment of pathoanatomy and mechanical dysfunction in symptomatic patients is individualized.

Increased understanding of joint mechanics and modern surgical approaches to the hip designed to improve congruency, stability, mobility, and chondral damage offer the opportunity to alter joint mechanics. Although there is no consensus on the ideal surgical candidate, asymptomatic patients are usually not considered for treatment. Because nihilistic treatment of symptomatic adolescents and young adults is not optimal, evaluation by a hip specialist experienced in joint-preserving surgery is recommended [8]. The complexity of evaluating skeletally mature patients with LCPD requires thorough radiographic analysis and, often, advanced imaging. The anatomic consequence of joint-preserving surgery and its effect on future hip arthroplasty is an important clinical consideration [4, 7].

Impingement, instability, mechanical symptoms, and dysfunction, either alone or in combination, may be addressed surgically using the gamut of advanced femoral and acetabular procedures including periacetabular osteotomy; surgical hip dislocation combined with neck lengthening, head reshaping, head reduction plasty, intertrochanteric osteotomy, and chondral reconstruction; and to a restricted amount arthroscopy [10]. The current choice of reconstructive procedure is dependent on the clinical impression of pathologic mechanics responsible for the patient's symptoms. Three series suggest intermediate-term improvement in pain and function suggesting the natural course of the disease may be improved with appropriate surgical intervention [1–3].

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Where Do We Need to Go?

The direction of research on the sequelae of LCPD should focus on four areas. First, research to improve our understanding of

the complex mechanics in post-Perthes hips and the mechanism of femoral head and acetabular articular cartilage and labral damage is important because it is considered, at this time, the etiology of joint damage. Second, research is necessary to correlate healed patterns of Perthes with specific mechanical causes of premature joint damage to identify hips most at risk for degeneration. Third, research directed toward improved radiologic techniques that can accurately characterize articular cartilage damage patterns will facilitate surgical indications. Fourth, clinical followup on patients currently undergoing reconstruction is necessary to assess the magnitude of pain relief, improvements in functional capacity, and alteration in the natural history of healed LCPD.

How Do We Get There?

In our opinion, developing an improved understanding of the sequelae of healed LCPD will require multicenter collaboration. First, consistent imaging studies that include the pelvis and upper femur and that account for femoral torsion will facilitate mechanical analysis. The development of in vitro post-Perthes computer-generated mechanical models and using emerging techniques such as in vivo motion capture analysis will further our mechanical understanding of the complex deformity. Continued improvements in imaging technology will enable identification of cartilage damage patterns that can be correlated with mechanical data. Last, prospective multicenter evaluation of the natural history of healed LCPD and the effect of currently used procedures will define the clinical effect of treatment.

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