

## Abstract

Legg-Calvé-Perthes (LCP) disease is associated with non-vascular necrosis of proximal epiphysis of the femur resulting in resorption of necrotic bone and subsequent remodelling of femoral head. The risk factors of the disease and factors affecting the treatment outcomes following conservative or surgical therapy are not completely understood.

The first part of the thesis outlines the clinical and research problems pertaining to conservative and surgical treatment of LCP disease. The second, clinical part retrospectively analysed the predictors of treatment outcomes in patients treated conservatively or surgically, with emphasis on children younger than 6 years of age. The experimental part of the thesis analysed 3D kinematic data of the gait and hip range-of-motion data in patients treated conservatively or surgically.

Age of the patient at the time of diagnosis and the shape of the lateral pillar of femur were significant predictors of treatment outcomes, and treatment outcomes after surgical treatment were comparable in children below and above the age of 6. Gait analysis showed a larger displacement of the pelvis in sagittal plane during the initial 25% of the standardised gait cycle and a larger extent of knee flexion during initial 13% of the gait in patients treated surgically compared to patients treated conservatively. Patients treated surgically also showed reduction in internal rotation and adduction of the hip in children treated surgically.

Results confirmed previous findings on significant predictors of treatment outcomes, and newly point to the possibility of surgical treatment of LCP disease even in children younger than 6 years. Results of the experimental study point to the importance of continuing rehabilitation and follow-up tests of hip functions in patients treated surgically.

**Key words:** avascular necrosis, Herring classification, hip arthritis, Legg – Calvé – Perthes disease, Stulberg classification, transient ischemia, 3D kinematic gait analysis