

Reoperative Realms: Exploring Reoperations following Femoral Osteotomy in Patients with Cerebral Palsy

Sam Philip Wimmer, Natalie Lacey Zusman¹, Tishya Wren, Rachel Y Goldstein², Robert Michael Kay³
¹Children's Hospital Los Angeles, ²Children's Hospital Los Angeles, ³Pediatric Ortho/Children's Hosp

INTRODUCTION:

Hip displacement occurs commonly in children with cerebral palsy (CP), with reported rates of 30-35%. Displacement risk is directly related to Gross Motor Function Classification System (GMFCS) level. At-Risk, subluxated, or dislocated hips are indicated for surgical intervention to minimize the risk of pain later in life. Existing literature focuses on the survival of a native hip in patients with CP. We undertook this study to define the survival of hips after undergoing an index procedure.

METHODS:

We conducted a retrospective cohort study of patients ≤ 18 years old with CP who underwent proximal femoral varus derotational osteotomy (VDRO) surgery at a tertiary referral center from 2004 to 2022. A total of 313 patients (119 female; mean age: 8.4 years, SD: 3.3, range: 1.5-17.7; 27 GMFCS II, 32 GMFCS III, 112 GMFCS IV, 122 GMFCS V, 20 unavailable) met inclusion criteria. Patients were excluded from analysis if they had < 2 years of follow up and did not require reoperation. Demographic, index surgery, and reoperation surgery data were collected. Reoperation surgery was defined as any return to the operating room for same-surgical-site procedures, including hardware complications, peri-implant fracture, infection, pain, soft tissue contracture, and further hip subluxation. Revision-free survival (RFS) was the interval (in years) between index procedure and reoperation. Analyses were carried out using logistic regression models in STATA. Reoperation surgery rates and odds ratios were calculated.

RESULTS:

In total, 589 hips (216 bilateral) were included for analysis (44 GMFCS II, 62 GMFCS III, 227 GMFCS IV, 223 GMFCS V, 33 unavailable), with a median follow up of 5.2 years (IQR: 4.7, range: 6 months-15.5) years). Patients with unavailable GMFCS level information were excluded from GMFCS analyses. We report a 30.0% rate of reoperation surgery (177 reoperations). Increasing age at initial surgery was protective against need for reoperation (adjusted OR=0.85, 95% CI [0.79-0.90], $p < 0.01$). Among hips with available GMFCS information, reoperation rates were greatest in GMFCS V hips (32.7% GMFCS V, 29.1% GMFCS IV, 27.4% GMFCS II/III). Hips in patients operated on at age ≥ 8 years old were significantly less likely to require a reoperation surgery than in those operated on at < 8 years old (20.5% vs. 38.9%, OR 0.40, 95% CI [0.27-0.58], $p < 0.01$).

DISCUSSION AND CONCLUSION:

The results of this investigation are currently the largest series of VDRO reoperations in children with cerebral palsy with operative hip displacement. Age at index surgery was the only significant variable in this analysis with a stepwise decrease in GMFCS level that did not reach statistical significance. We advocate for using this knowledge and associated Kaplan-Meier RFS curves as a tool in the shared decision making with the patients and their families prior to index hip reconstructive procedure in children with cerebral palsy.

