Periacetabular Osteotomies Lead to Improved Long-term Patient-Reported Outcomes: A Systematic Review

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INTRODUCTION: Periacetabular osteotomy (PAO) has been accepted as a joint-preserving surgery to treat hip dysplasia. Periacetabular osteotomy can preserve the original hip joint and thus delay or possibly prevent the need for a total hip arthroplasty (THA). However, it remains to be seen if PAO can lead to long-term improvements in patient-reported outcomes. The purpose of this project was to perform a systematic review for long-term outcomes of PAO.

METHODS: A systematic review of the literature was conducted with the following keywords: (periacetabular osteotomy) AND (patient-reported) AND (outcomes) in PubMed, Cochrane, and Scopus in August 2023 using the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) criteria. Only studies evaluating long-term PROs of 10 or more years of follow-up after periacetabular osteotomy or rotational osteotomy were included. Background article information was recorded, including article title, author, study design, level of evidence, patient demographics, radiographic information, intraoperative data, PROs, psychometric thresholds, and secondary surgeries.

RESULTS: Thirteen studies, including eleven studies covering 2,662 periacetabular osteotomies and two studies covering 275 rotational osteotomies were included in this systematic review. Seven studies were level III evidence and five were level IV. Study periods ranged from 1987 to 2017. Average follow-up periods ranged from 106.0-348.0 months for periacetabular osteotomies and 134.4-236.4 months for rotational osteotomies. The average age for the reconstruction and repair groups varied between 22.0-37.4 years, respectively.

Average modified Harris Hip Scores (mHHS) for the periacetabular osteotomy groups ranged from 61.9-83.0 preoperatively compared to 80.0-91.9 postoperatively. One study reported mHHS scores for rotational acetabular osteotomy (preoperative mHHS: 70.0, postoperative mHHS: 87.6 +/- 12.8). Average Merle d'Aubigne-Postel scores for the periacetabular osteotomy groups ranged from 14.0-15.0 preoperatively and 16.0-18.0 postoperatively. One study reported Postel scores for rotational acetabular osteotomy (preoperative mHHS: 15.0+/-0.8, postoperative mHHS: 18.0 +/- 1.1). All studies found a significant improvement between preoperative and postoperative patient-reported outcomes. Overall secondary surgery rates ranged from 11.5-57.3% in the labral reconstruction cohort, compared to 6.2-13.1% in the rotational acetabular osteotomy cohort.

Significant risk factors for failure for PAO included age >40 (six studies), preoperative arthritis (Tonnis Grade >1, three studies), and poor preoperative patient-reported scores (Postel score <15, two studies). Significant risk factors for failure for RAO included age >40 (two studies) and preoperative arthritis (Tonnis Grade >1, one study).

DISCUSSION: Patients undergoing periacetabular osteotomy demonstrated significant improvement in postoperative outcomes. Risk factors for failure included advancing age, Tonnis Grade >1, and poor patient-reported scores, informing expectations and at-risk patients. Overall, periacetabular osteotomy appears to be an effective treatment in clinically indicated patients with durable long term outcomes.

SIGNIFICANCE/CLINICAL RELEVANCE: (1-2 sentences): This project is the first systematic review to examine long-term patient-reported outcomes after periacetabular osteotomy, allowing for a longitudinal scope of how patients are faring after PAO at long term follow-up. The study also analyzes risk factors for failure.