Arthroscopic Lysis of Adhesions Improves Knee Range of Motion after Fixation of Intra-articular Knee Fractures

Introduction

Intra-articular fractures about the knee often necessitate surgical reduction and stabilization. Arthrofibrosis requiring surgical intervention after intra-articular trauma involving the knee has been reported to be as high as 14.5%, and patients with prolonged application of external fixation are at the highest risk for developing arthrofibrosis.1-10

The average knee range of motion (ROM) motion has been reported to be 107 degrees after intra-articular distal femoral fractures and 105 degrees after proximal tibial fractures, while the arc of motion of a normal knee is 0 to 135 degrees.8,12,13 In general, flexion from 0 to 125 degrees is sufficient for daily activities, including sitting and stair climbing.13 Small impairments of ROM of the knee can cause gait disturbances and significantly increase the energy expenditure required for daily activity.14

Traditional treatments for arthrofibrosis after intra-articular fractures about the knee include manipulation under anesthesia (MUA), open quadricepsplasty, and surgical arthroscopic lysis of adhesions (SALKA). Although SALK has been described to treat posttraumatic knee arthrofibrosis, to date there are no studies describing this procedure’s efficacy.

The purpose of this study was to examine the immediate and sustainable range of motion (ROM) changes after surgical arthroscopic lysis of knee adhesions for post-traumatic knee stiffness after open reduction internal fixation.

Materials & Methods

This study is an IRB approved retrospective review of a consecutive series of patients at a single institution with arthrofibrosis after internal fixation about the knee (tibial plateau, patella, distal femur) who underwent SALK from 2009-2014. 13 qualifying patients were identified (mean of 35 years, range 22-67 years) that underwent SALK for posttraumatic knee stiffness. The primary outcome variable was change in knee ROM following SALK for posttraumatic knee stiffness. The primary outcome variable was change in knee ROM following SALK for posttraumatic knee stiffness. The primary outcome variable was change in knee ROM following SALK for posttraumatic knee stiffness. The primary outcome variable was change in knee ROM following SALK for posttraumatic knee stiffness. The primary outcome variable was change in knee ROM following SALK for posttraumatic knee stiffness.
Discussion

Traditional treatments for arthrofibrosis after intra-articular fractures about the knee include MUA, open quadricepsplasty, and SALKA. While there are previous series on the efficacy of MUA and open quadricepsplasty for treatment of posttraumatic knee arthrofibrosis, to our knowledge, there are no reports regarding the efficacy of SALKA.\textsuperscript{15-16}

This study is limited as a retrospective chart review with a small sample size (n = 13). Despite an \textit{a priori} power analysis showing that this study was adequately powered, our study was powered only to detect large effect sizes. As a surgical procedure, SALKA can be quite variable with patients having a variety of demographics, co-morbidities, and types of previous internal fixation procedures. These factors limited our ability to make specific conclusions regarding the true impact of patient risk factors on ROM before and after SALKA. Nevertheless, given that each patient were measured against themselves, the efficacy of SALKA can be assessed.

SALKA improved ROM intra-operatively from an average of 72 degrees immediately before surgery to 128 degrees directly after surgery or a 56 degree (78\%) improvement in total ROM. All patients in this cohort showed improvement of ROM immediately after surgery. At latest follow up visit, mean ROM was 101 degrees or 26 degrees (35\%) of sustained improvement in total ROM from the preoperative visit. At latest follow up, patients lost an average of 27 degrees of ROM from immediately after SALKA. This decrease in ROM from immediately after SALKA to latest follow up visit is biased by the fact that the immediate post-operative measurement was obtained intra-operatively while the patient was still anesthetized.

Our results are comparable to MUA and open quadricepsplasty for posttraumatic knee arthrofibrosis where an average improvement of 64 degrees and 76.3 was seen immediately after these respective procedures. MUA and open quadricepsplasty lost 13 degrees and 25 degrees respectively from immediately postoperatively to latest follow up.\textsuperscript{15-16} Although there are no reports for SALKA for posttraumatic arthrofibrosis after ORIF, our results are comparable to SALKA for arthrofibrosis after total knee arthroplasty (TKA). A systematic review reports that that SALKA increases average ROM ranging from 16.5 - 60 degrees for treatment of the stiff TKA.\textsuperscript{17}

Conclusions

SALKA for arthrofibrosis of the knee after articular fracture fixation increases range of motion. This improvement in ROM is similar to results found in MUA and open quadricepsplasty. While an improvement from pre-operative ROM is obtained, the ROM gains in all 3 procedures diminish over time. SALKA offers an advantage over MUA in that arthroscopy allows the surgeon to examine and treat soft tissue impingement, loose bodies, or adhesions under direct visualization. SALKA is also less morbid than open quadricepsplasty. Although SALKA shows promising results, this technique may be technically challenging as it may require a surgeon to use posterior,
trans-septal, and suprapatellar portals. Indications for MUA, quadricepsplasty versus SALKA for treatment of posttraumatic arthrofibrosis are unclear. Future research may directly compare these three procedures and develop a protocol for their specific indications in treatment for posttraumatic knee arthrofibrosis after ORIF.

References