

Restoration of Normal Insall-Salvati Ratio Is Critical When Fixing Patella Fractures

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Purpose: The purpose of this study was to compare clinical outcomes of patients based on the immediate Insall- Salvati ratio (ISR) obtained following open reduction and internal fixation (ORIF).

Methods: Patients who were surgically treated for displaced patella fractures from 2012 to 2024 at a single multi-site urban academic institution were analyzed. All patients underwent repair with hardware or sutures. Final intraoperative fluoroscopic radiographs were measured for ISR. Patients were categorized into two groups based on intraoperative ISR measurements: normal ISR (NR), defined as between 0.8 and 1.2 and abnormal ISR (AR), outside of the 0.8 to 1.2 range. Demographic data, fracture classification (OTA classification), knee range of motion (ROM), postoperative complications, and fracture union were collected. Comparisons of statistics were performed using Pearson χ^2 tests and independent t-tests. Statistical testing was performed using SPSS, version 29 (Armonk, NY).

Results: The analysis included 191 patients (163 NR and 28 AR). Of the 28 in the AR group, there were 23 tension band constructs, three plates, and two suture repairs. Demographically, the AR and NR groups were identical, and there was no difference in proportion of fracture type or fixation construct between groups ($p = 0.611$ and $p = 0.563$). Notably, the AR group exhibited higher complication rates (14.3% vs 4.3%, $p = 0.037$). The complications experienced by both groups included hardware failure (screw cut-out and inferior fragment distraction), fracture-related infections, and venous thromboembolism events. Of note, the AR group experienced a higher rate of hardware failure than the NR group (10.7% vs 1.2%, $p = 0.004$). Furthermore, knee ROM at 3 months was significantly greater in the NR group (117.22 ± 13.75 vs 105.13 ± 21.38 , $p < 0.001$) and at 6 months (127.37 ± 13.27 vs 119.25 ± 14.26 , $p = 0.020$). No significant differences were found in the nonunion rates ($p = 0.732$).

Conclusion: Abnormal intraoperative ISRs following patella fracture repair are associated with poorer knee ROM and increased incidence of complications, specifically hardware failure following ORIF of the patella. This finding highlights the importance of the restoration of soft-tissue parameters along with anatomic fracture fixation in the setting of patella fractures.