

High-Volume Posteromedial Knee Capsular Injections Provide Safe Infiltration to the Entire Posterior Knee Capsule

Landon Polakof¹, Ran Atzmon², Adam Wang³, Robert Robert Bennett³, Seth Sherman⁴, Nicholas John Giori⁵

¹Stanford University, ²Stanford Medicine, ³Department of Radiology, ⁴Stanford Medicine Outpatient Center, ⁵VA Palo Alto Health Care System

INTRODUCTION: Pericapsular injections provide early postoperative analgesia following total knee arthroplasty. Given the anatomic course of the popliteal vessels and peroneal nerve, needle insertion in the center or posterolateral knee capsule risks damage to these structures. This study seeks to compare the dispersion of a large-volume, isolated injection in the posteromedial area of the capsule with a combination of injections in both the posteromedial and posterolateral regions.

METHODS:

Cadaveric knee specimens were opened via standard medial parapatellar arthrotomy. To simulate the anesthetic used in pericapsular injections, we injected a diluted solution of Iohexol contrast medium mixed with normal saline at a ratio of 1:4. Specimens in the study group were given a single high-volume injection (50mL) of the contrast solution through the posteromedial knee capsule. For the control group, we followed a previously published protocol for posterior capsule injections as described by Pinsornsak et al. in 2017. In the control group, two injections of 12.5mL each were given through the posterior capsule, targeting the posteromedial and posterolateral regions. Following the injection, the knees were ranged 20 times, and a CT scan was performed to evaluate the distribution of the injected contrast fluid.

RESULTS:

The CT scans revealed that a single 50mL posteromedial pericapsular injection resulted in wide spread of the contrast fluid such that there was direct contact of the injected fluid with the posterior capsule both medially and laterally. This was similar in appearance to the spread of the contrast fluid in the control group receiving multiple injections.

DISCUSSION AND CONCLUSION: It is not necessary to inject multiple locations across the posterior capsule to achieve complete medial-to-lateral distribution of injected anesthetic posterior to the knee. A single 50mL injection to the posteromedial knee capsule provides equivalent coverage as multiple posterior knee injections without risking injury to neurovascular structures. This has become our preferred technique for distributing analgesic medication posterior to the knee when performing pericapsular injections.