

Background

Hip arthroscopy is a minimally invasive orthopedic procedure used to address problems inside the hip joint. Capsule closure, the reapproximation of the tissue surrounding the hip joint after the procedure, is shown to improve joint stability and patient outcomes. However, only **81%** of surgeons report closing the capsule.

This gap in closure stems from the procedure being:

Time-Intensive

Technically Demanding

Prone to Errors

These challenges contribute to preventable complications and longer operative times. Addressing these root causes has the potential to **improve capsule closure rates and overall surgical success.**

Orthopedic surgeons performing hip arthroscopy in the U.S. need a way to control capsular flaps in the surgical field to ensure precise manipulation and reapproximation of native capsule during capsule closure to consistently restore joint stability and mobility.

The Capsule

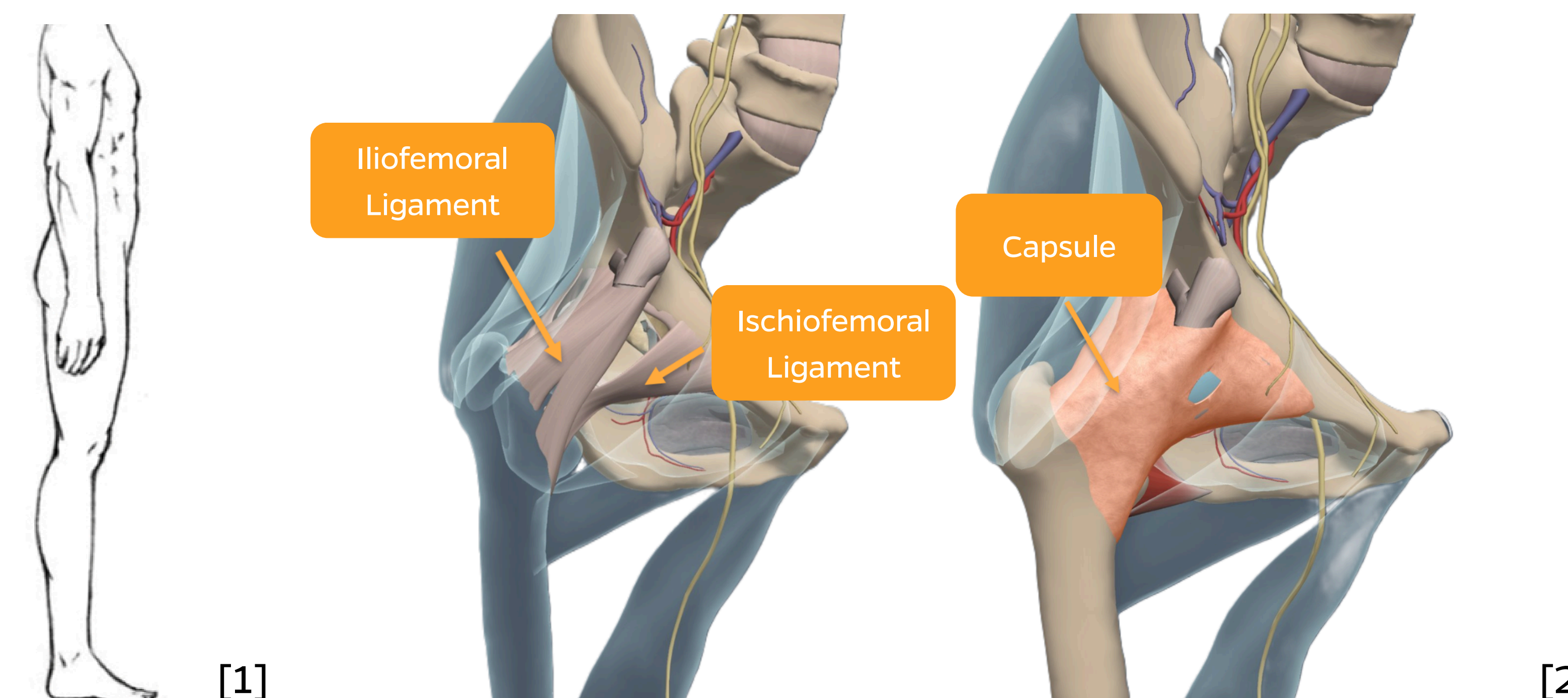


Fig A: The hip capsule is a strong fibrous tissue surrounding the iliofemoral and ischiofemoral ligaments that surrounds the hip joint, stabilizing the acetabulum and femoral head.

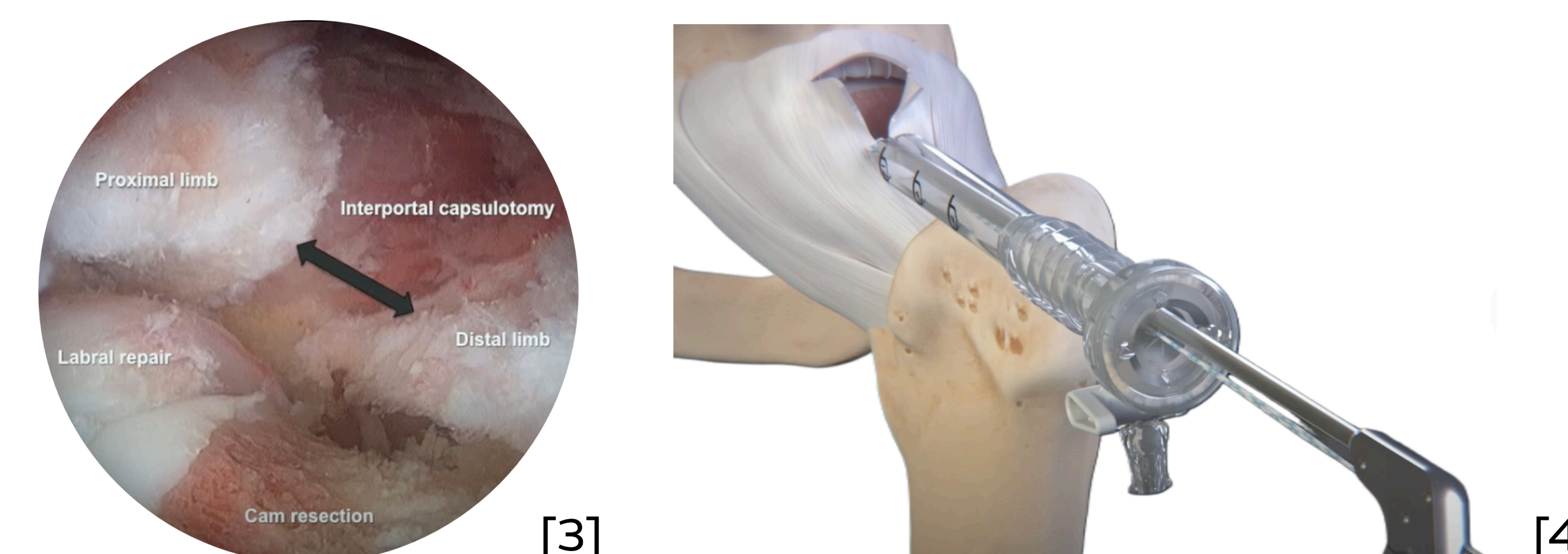


Fig B: A cannula is used to allow insertion of arthroscopic tools without causing damage to surrounding tissue.

Capsule Closure

Competitive Landscape

Current solutions include **surgeon-driven devices** that require manual force and precise wrist motion to penetrate the thick capsule, increasing technical difficulty; **Device-driven systems** automate suture passage but often limit approach angles and may not support self-retrieval or self-loading, increasing steps and reducing efficiency.



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What does CapSeal do?

Our solution presents **a novel closure system** that simplifies the capsule closure workflow designed with the following features:

Ergonomic Handle

Self-Loading

Self-Retrieving

Benefits:

- Reduced complexity
- Improved efficiency
- Readily adoptable



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[1] "Male Body Side View Drawing" Pinterest. <https://www.pinterest.com/pin/544865254889223401>

[2] "Hip joint anatomy." AnatomyTV. Elsevier. <https://www.anatomytv.com>

[3] "Capsular Management in Hip Arthroscopy: Interportal and T-Capsulotomy, Suspension, and Closure." ScienceDirect. <https://www.sciencedirect.com/science/article/pii/S2212628723003547>

[4] "Hip Capsular Closure Using LoopLoc™ Knotless Suture." Arthrex, YouTube. <https://www.youtube.com/watch?v=Xnl06YhIOVE>

[5] "CAP-FIX Capsulotomy Blade." Smith+Nephew. <https://www.smith-nephew.com/en-us/health-care-professionals/products/sports-medicine/cap-fix-blade>

[6] "Hip Labral Repair." Smith+Nephew. <https://smith-nephew.stylelabs.cloud/api/public/content/8dcd1180e694468d9d57c3b94db59e02?v=0ae09bcf&download=true>

[7] S. Ekhtiari et al., "Hip arthroscopic capsulotomy techniques and capsular management strategies: a systematic review," *Knee Surgery, Sports Traumatology, Arthroscopy*, vol. 25, pp. 9–23, Jan. 2017, doi: 10.1007/s00167-016-4411-8.