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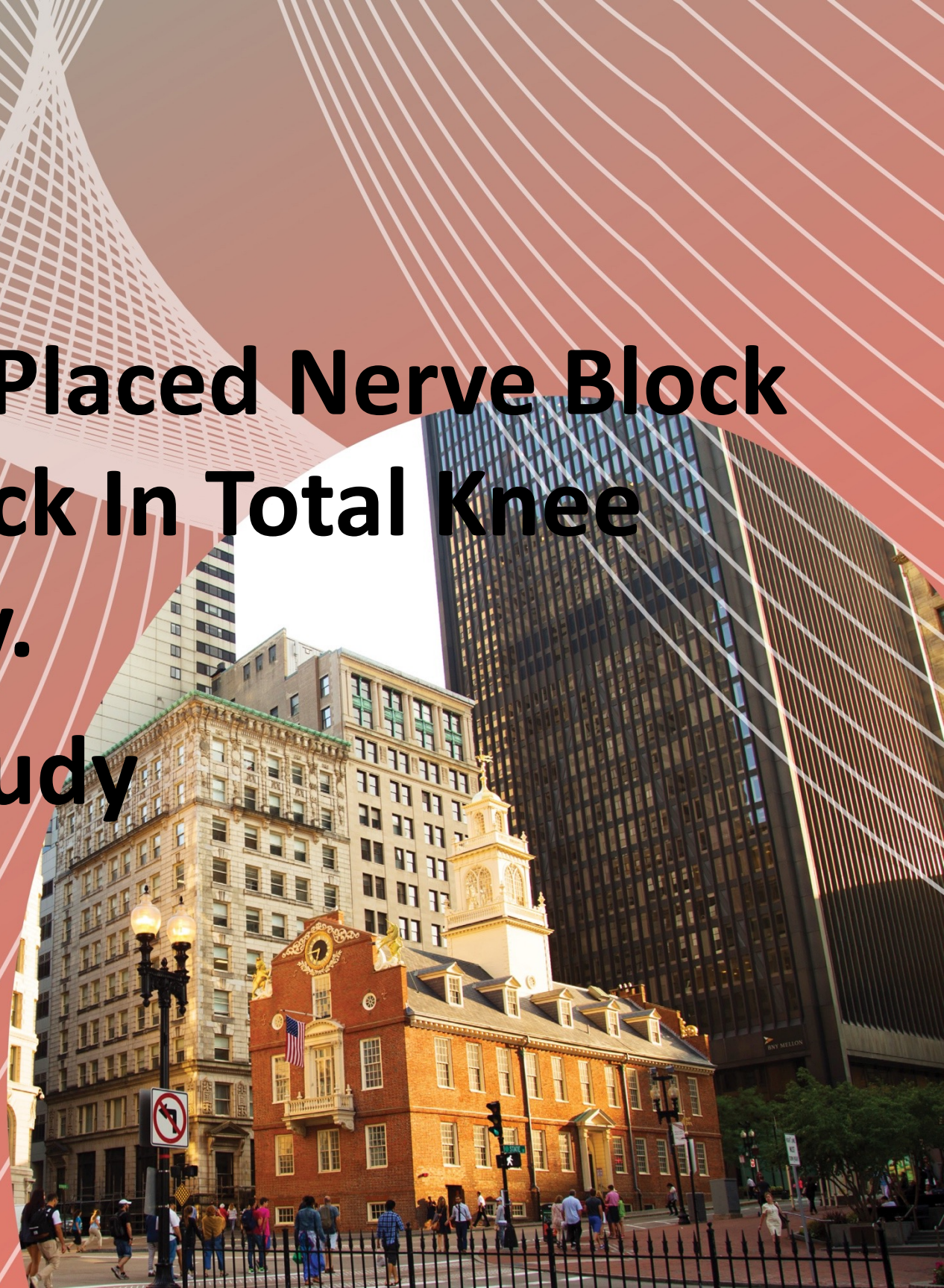
Boston
Massachusetts
June 18–June 21

Novel Technique For Surgeon-Placed Nerve Block And Continuous Nerve Block In Total Knee Arthroplasty. A Cadaveric Study

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Disclosures:

Cadaver/Lab supported by :

Syracuse University New York, SUNY

Syracuse New York, USA.

Avanos, Alpharetta, Georgia, USA

Author:

DEM is a paid consultant and receives research support from Avanos,
Alpharetta, Ga, USA , Mitek, a Johnson & Johnson Company, USA

Smith and Nephew, USA.



Introduction:

- **Total knee arthroplasty (TKA) is considered to be one of the more painful medical procedures routinely performed today. Pain management in TKA patients is challenged by a postoperative requirement for early ambulation along with a concurrent goal to reduce opioid consumption while reducing the hospital stay. Peripheral nerve blocks (PNB) address these concerns to some degree, with femoral nerve block, and adductor canal block(ACB) being the most commonly used regional nerve blocks for surgeries performed around the knee joint.**



Purpose:

The purpose of this study was to investigate the novel placement of an indwelling catheter placed by the Surgeon during a standard para-patella surgical approach in TKA. This block and catheter are placed between the muscles that make up the borders of the adductor canal. This is commonly known as an Adductor Canal Block (ACB). This intra-operatively placed catheter was compared to a standard anesthesia placement performed under ultrasound guidance.

Methods:

Using different colored dyes as a surrogate for the anesthetic agent the effectiveness of this novel ACB, placed intraoperatively by the surgeon, was compared to a standard pre-operative ACB using standard ultrasound guided anesthesia techniques.

The study was conducted in 12 fresh-frozen human cadaveric lower limbs



8 nerves mediate post-TKA pain from the anterior and posterior nerve groups

Nerves that host pain post-TKA³

Anterior nerves:

- Saphenous nerve
- Saphenous nerve Infrapatellar branch
 - Intermediate femoral cutaneous nerve
- Femoral cutaneous medial nerve
- Vastus nerve w/ medial retinacular branch
- Anterior obturator nerve

Posterior nerves:

- Tibial nerve posterior articular branch
- Obturator nerve posterior

Saphenous Nerve responsible for vast majority of pain after TKA



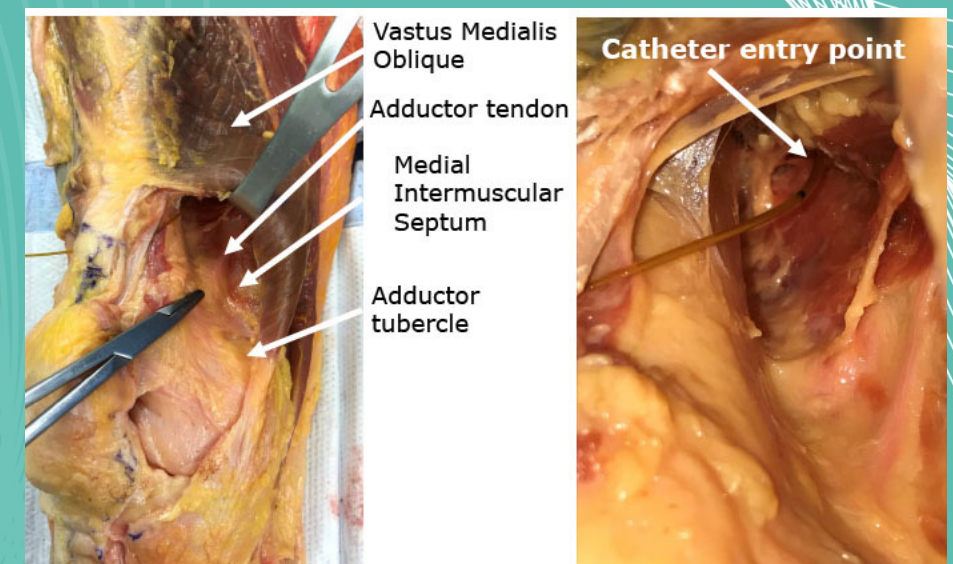
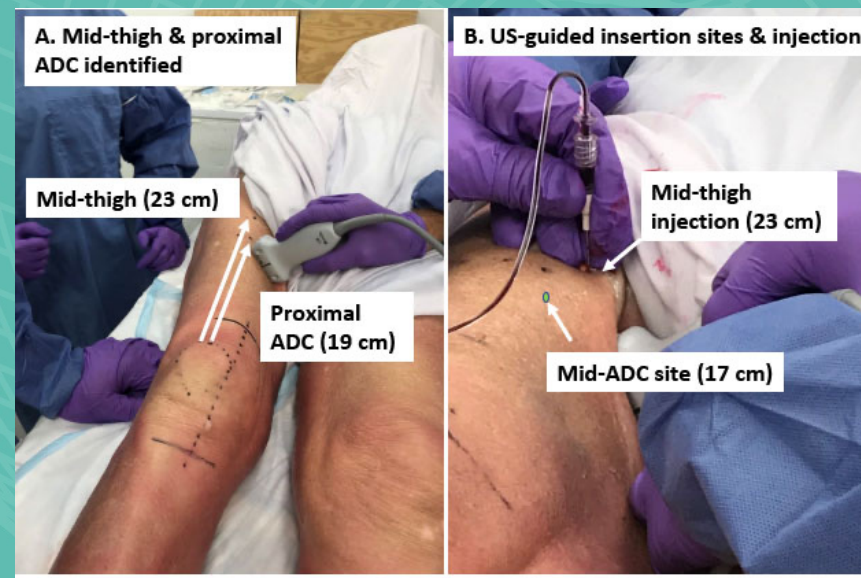
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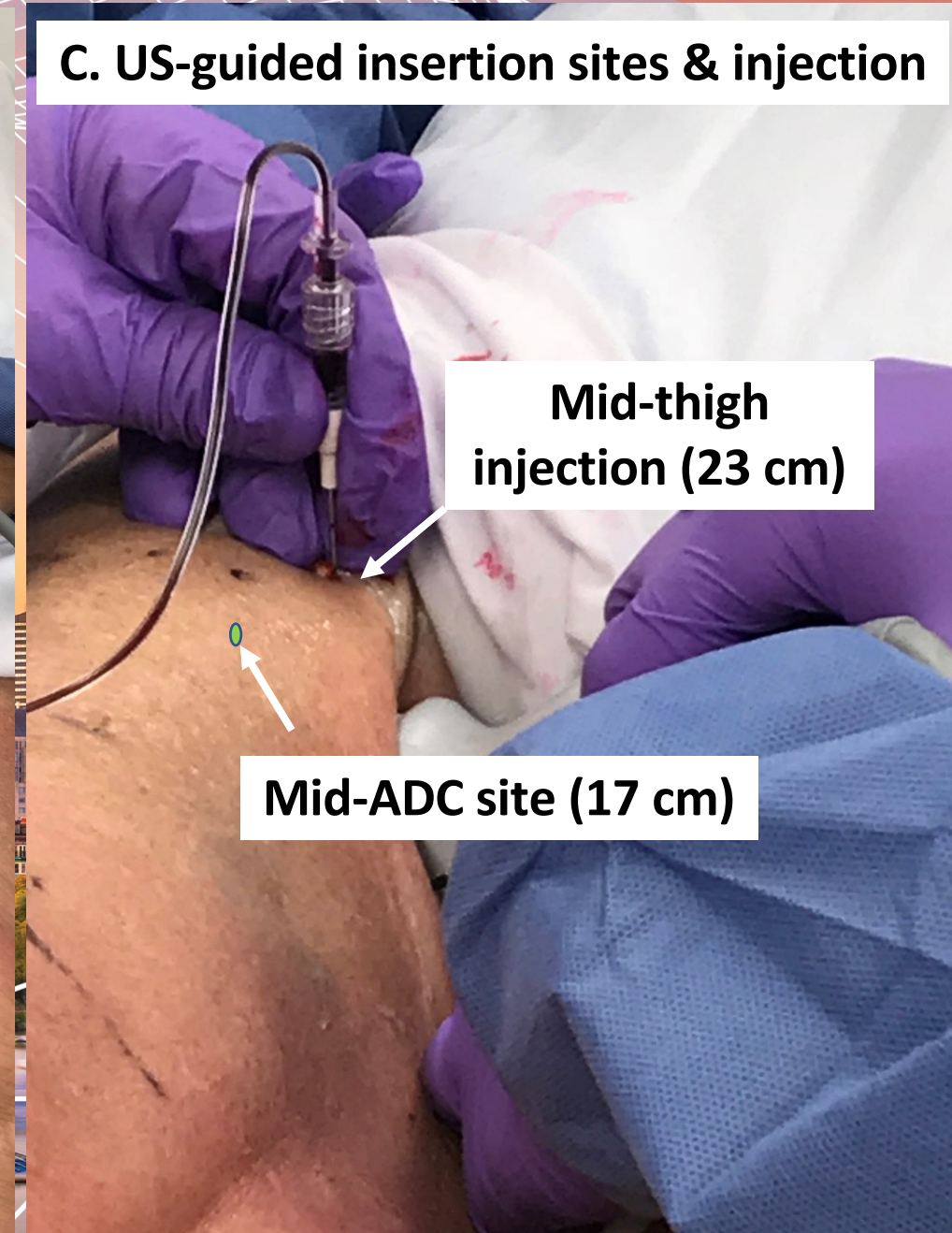
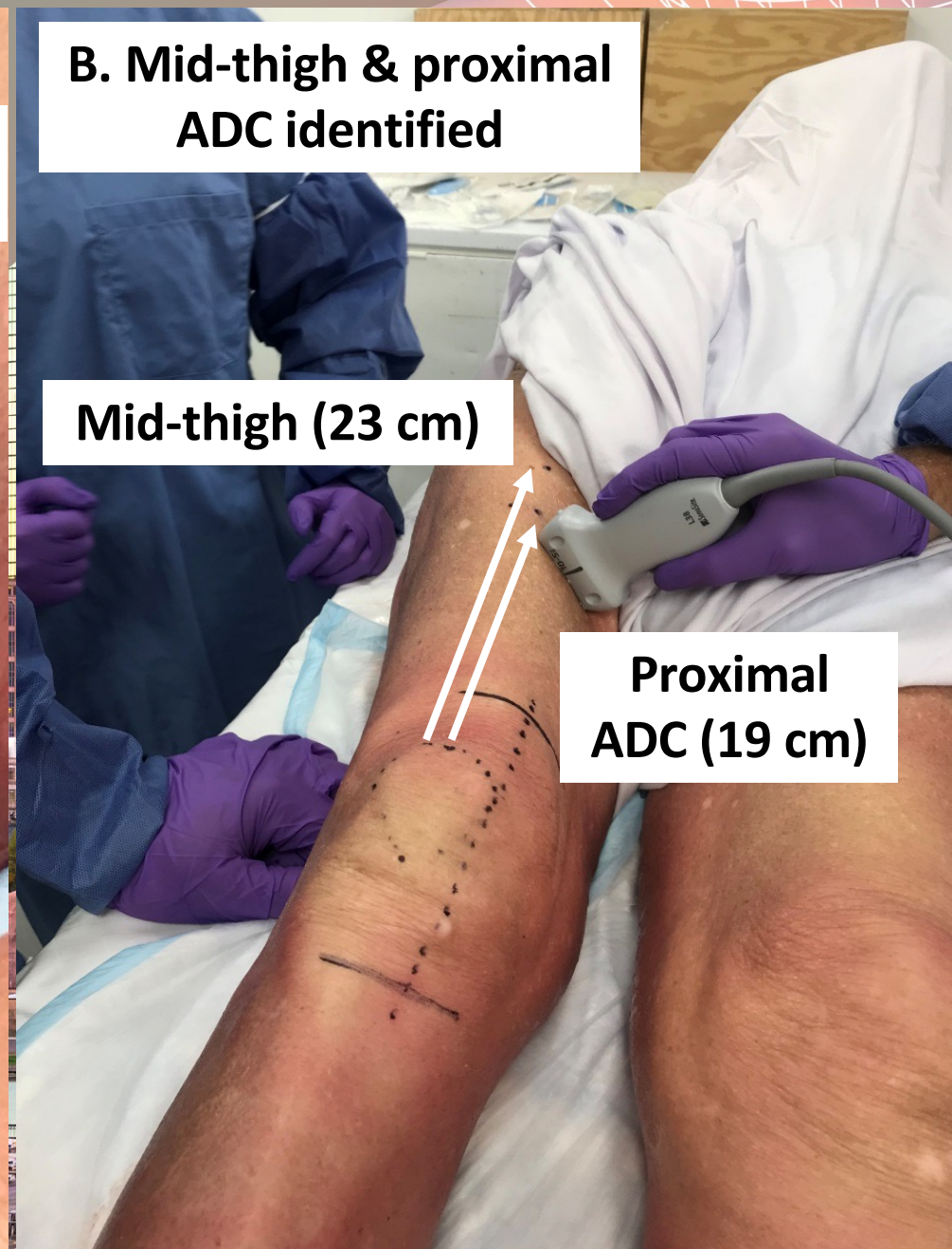
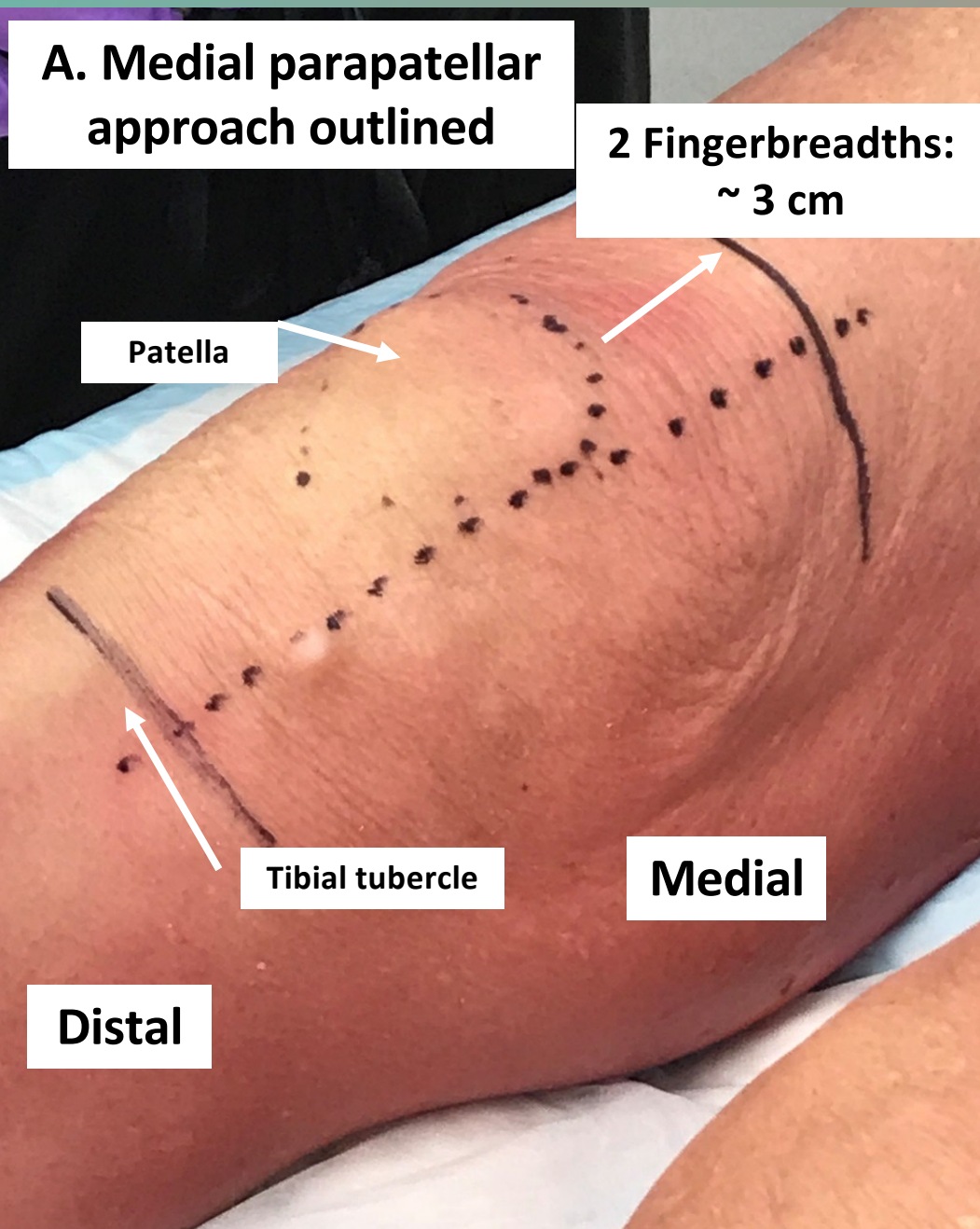
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Preoperative and Intraoperative Adductor Canal Nerve Block Placement

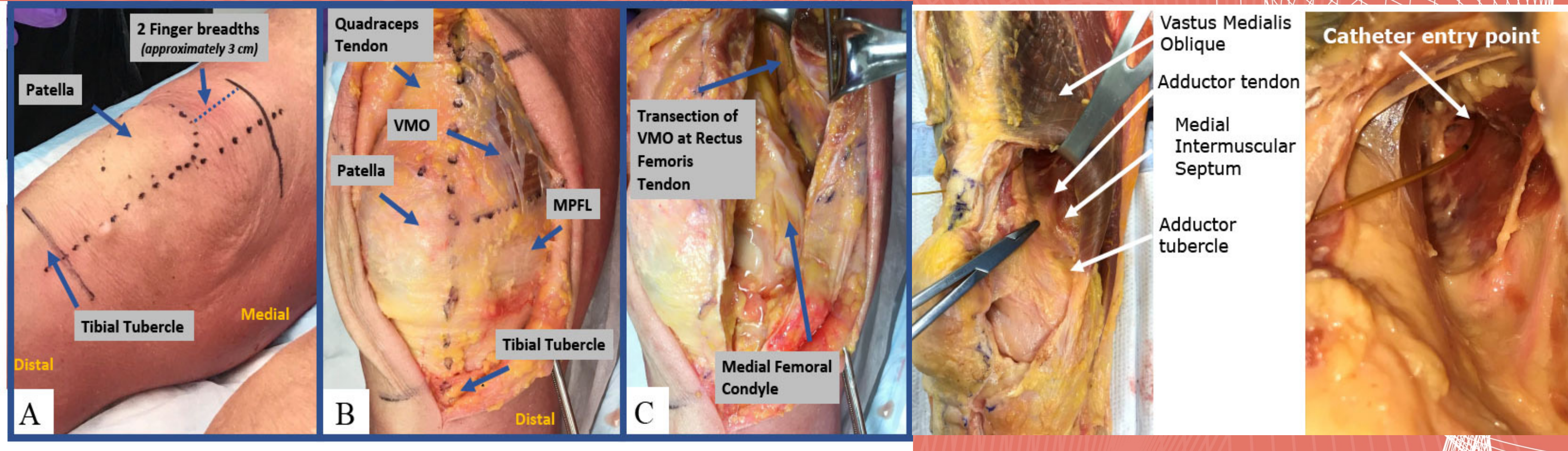
This comparison was performed using saline solutions of different colors as surrogates for the nerve block agent. Using the same human cadaveric limb, the traditional preoperative block was performed initially using the standard ultrasound technique. This was followed by the novel intraoperative surgeon placement technique performed through a standard para patellar approach to the knee. The resultant location of tissues stained with the colored saline following both ACB techniques served to indicate whether use of the novel ACB technique would be able to serve as an appropriate ACB.



ACB Through US-guidance



ACB Through Surgical Approach



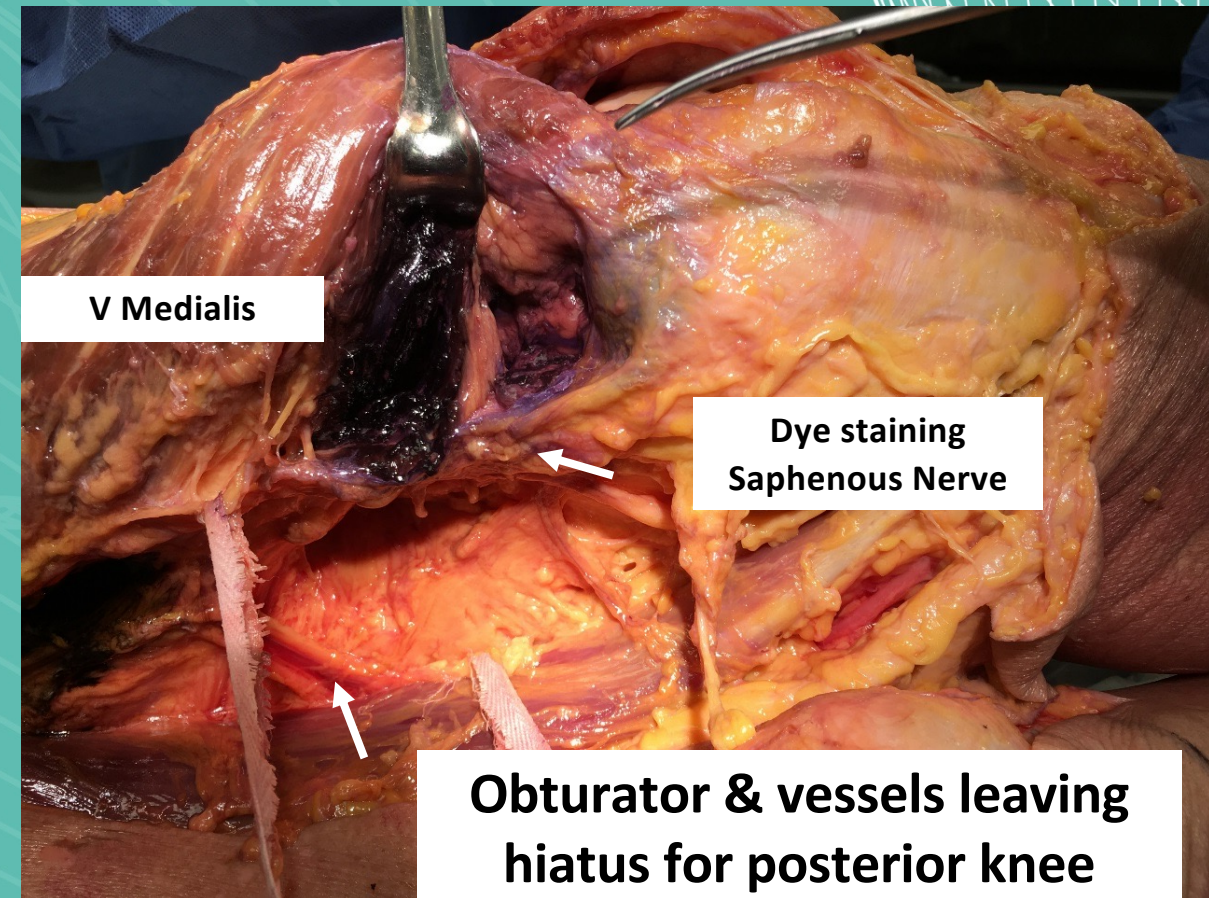
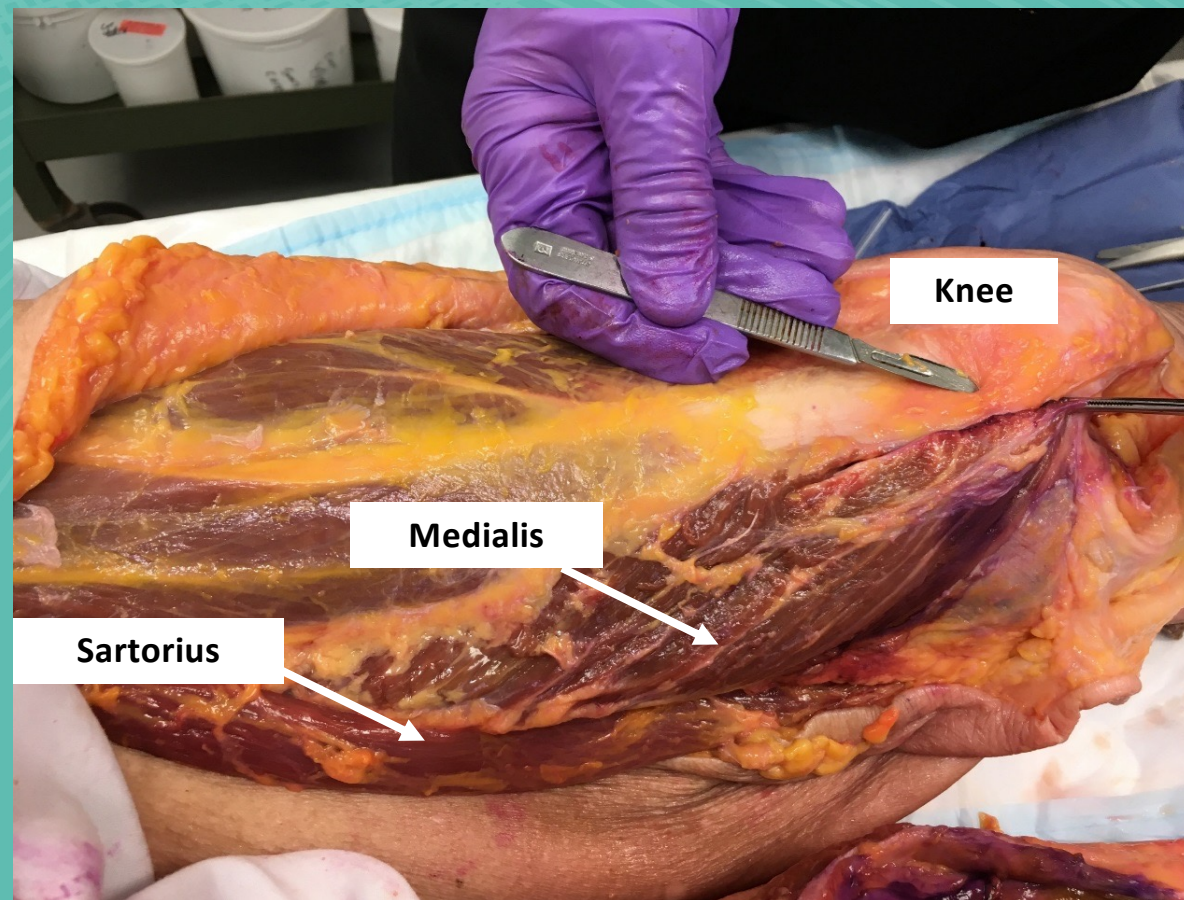
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Ultrasound Guided ACB

Dye Injected into the Canal, stayed in the Canal, Dying the Saphenous Nerve and the Infra-patellar Branch as it traveled through the Sub-sartorial Space



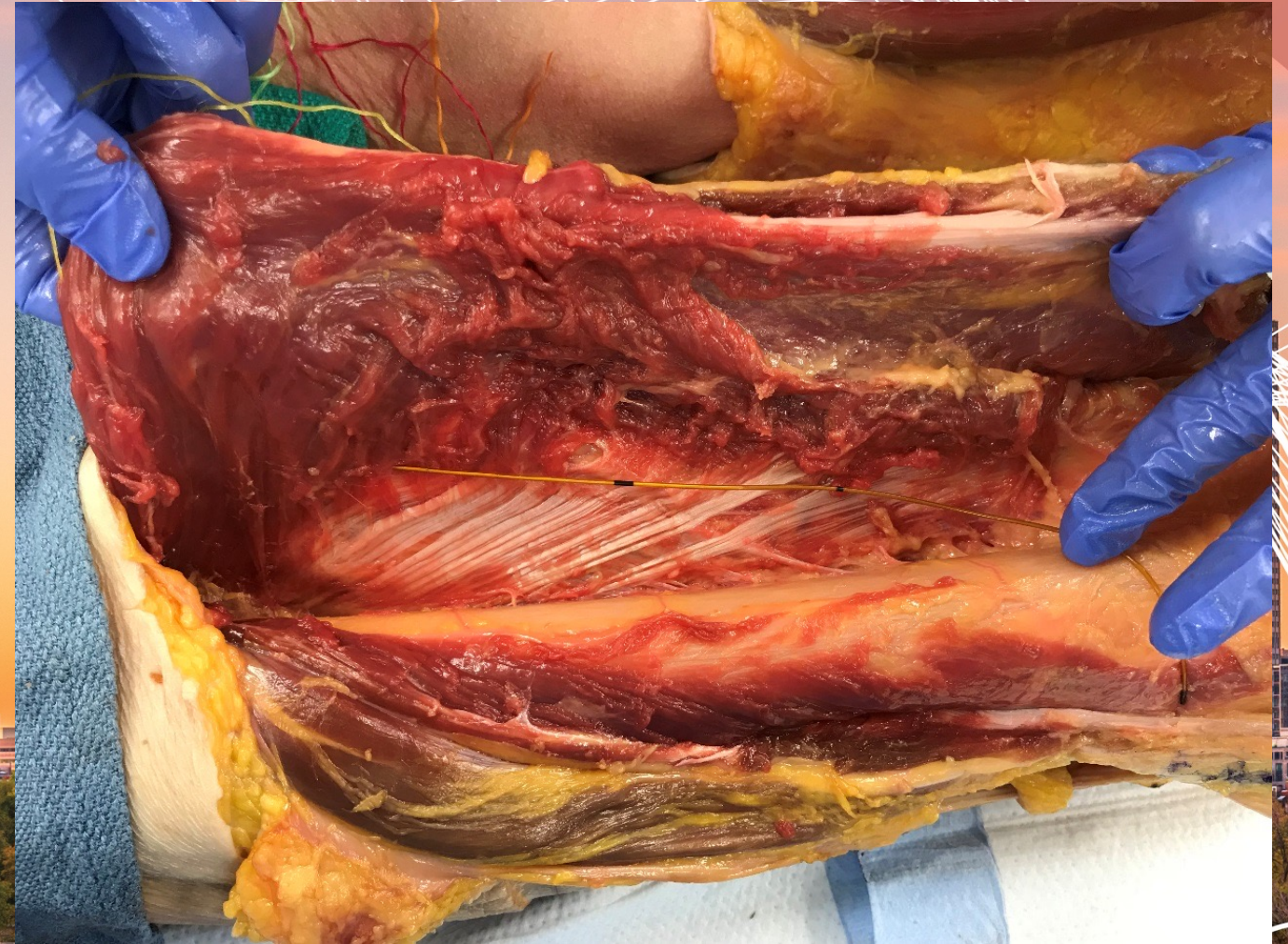
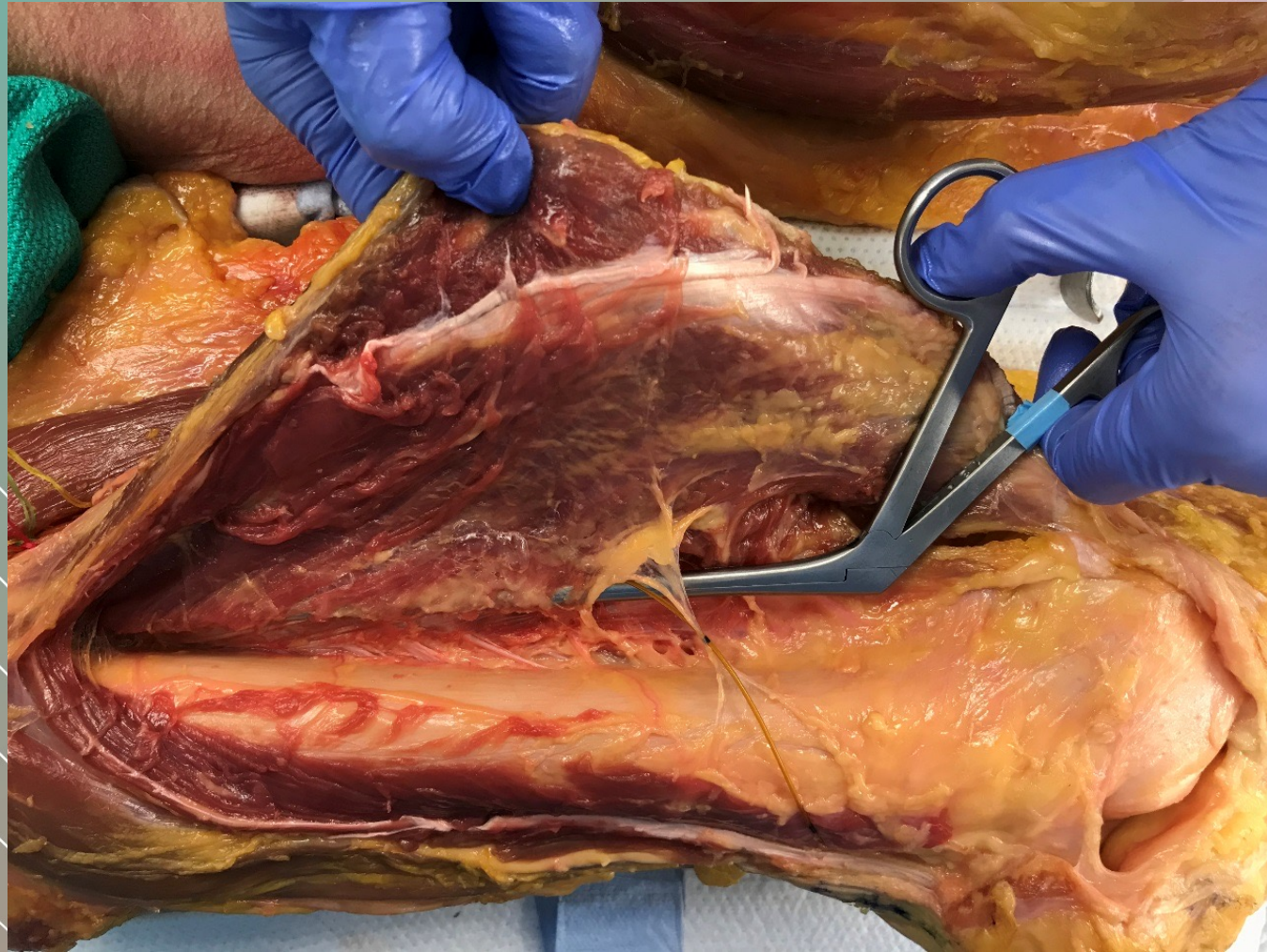
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Surgeon place catheter

Medial Intermuscular Septum (layers of fascia) Separates the Catheter in the Adductor Canal

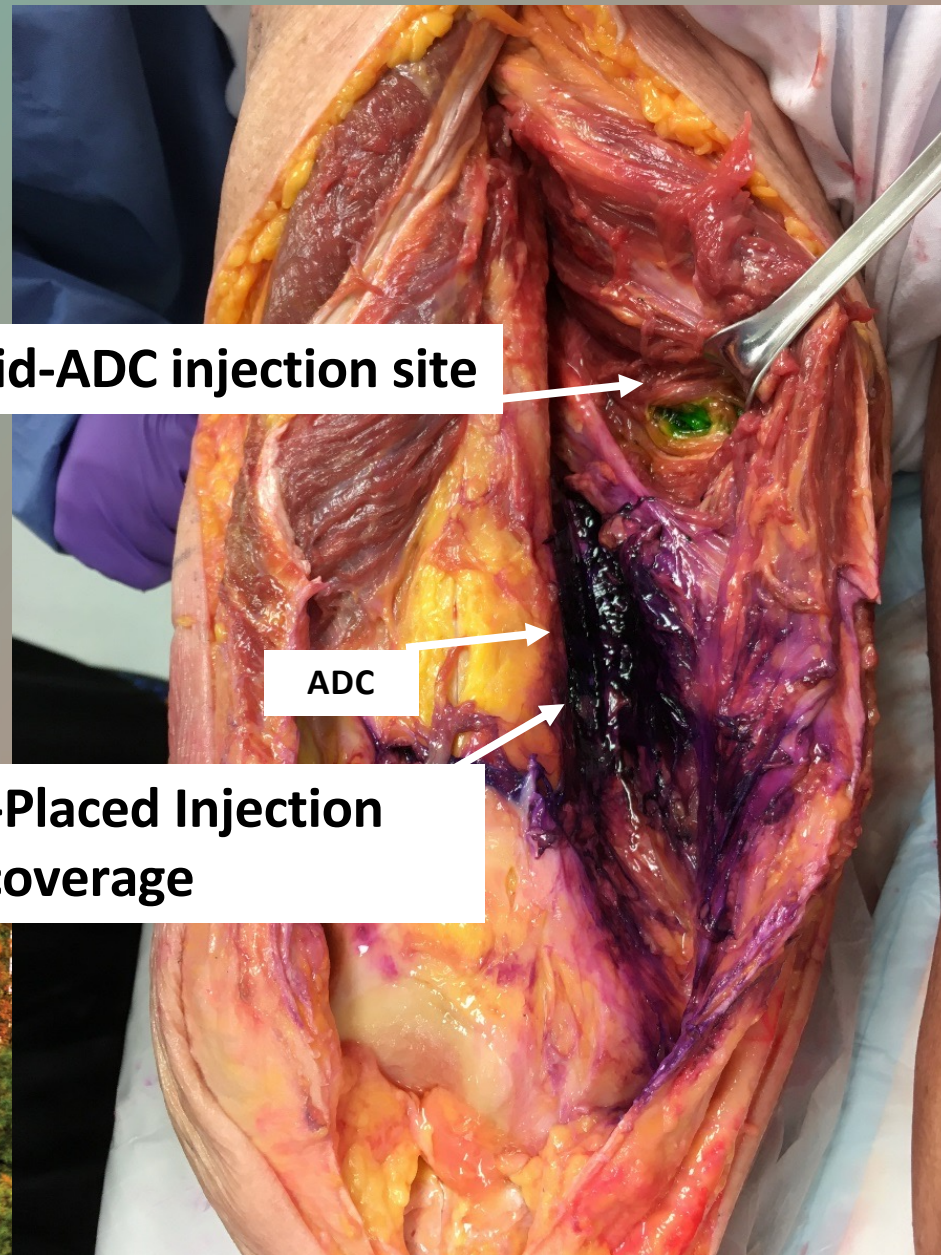


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Surgeon-placed Catheter

Infused Middle-to-Distal Half of Adductor Canal, where the Saphenous and Posterior Obturator nerves are located



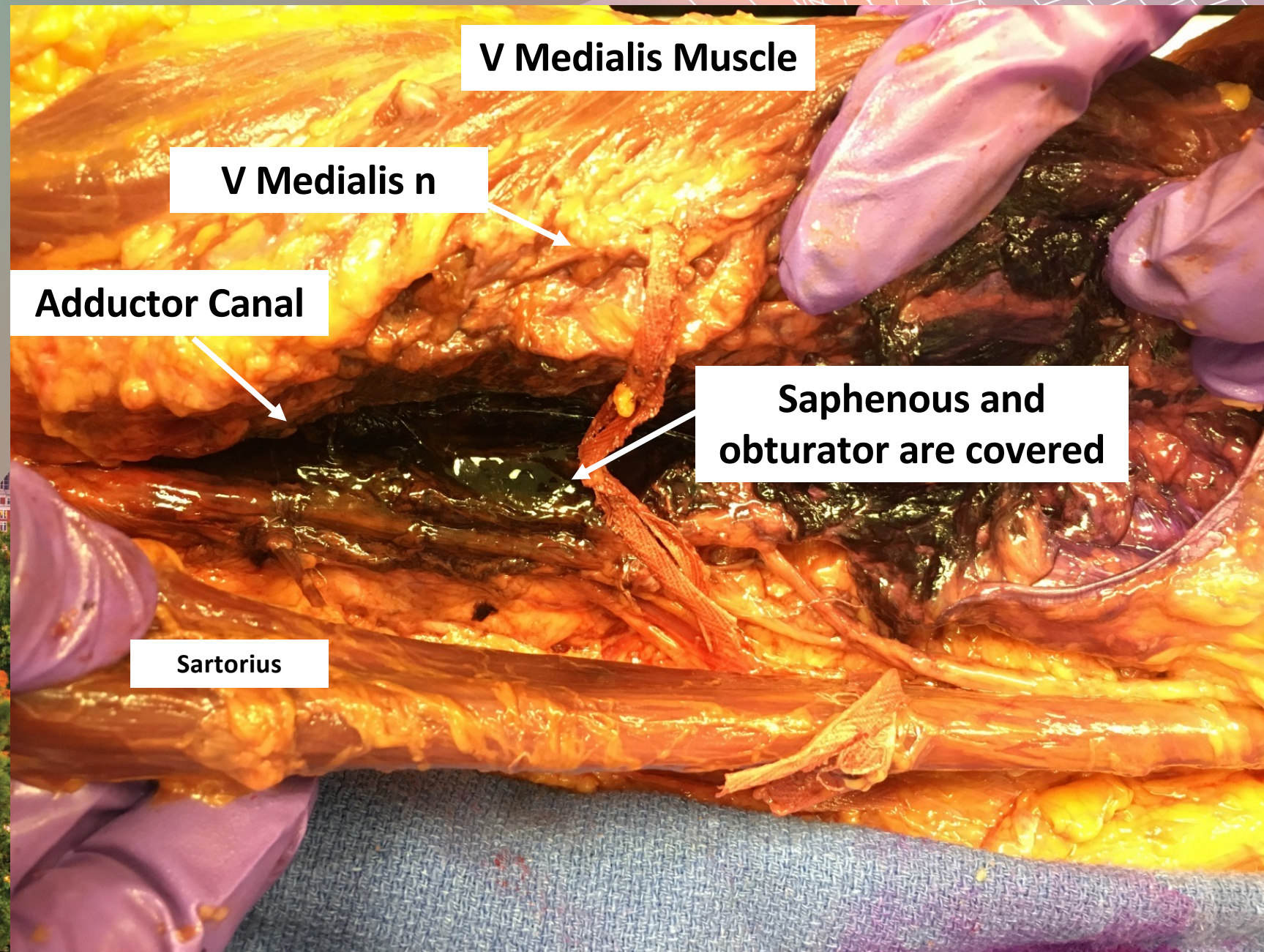
Surgeon-Placed Injection coverage

US-guided injection coverage



**Dye Injected into the Canal (US ACB & Surgeon-Placed ACB) both Overlapped,
Coverage of the Saphenous Nerve**

The Surgeon placed injection also covered the Posterior Obturator Nerves



Summary of Placement Techniques

While both techniques covered the Saphenous Nerve

The Surgeon- placed catheter uniquely dyed the anterior & posterior obturator nerves in addition to the saphenous nerve : suggesting a basis for better outcomes

| Nerve | Saphenous | Infrapatellar branch of saphenous | Intermediate femoral cutaneous | Medial femoral cutaneous | Medial vastus or Retinacular branch | Posterior articular (tibial) | Anterior obturator | Posterior obturator |
|----------------|-----------|-----------------------------------|--------------------------------|--------------------------|-------------------------------------|------------------------------|--------------------|---------------------|
| Mid-thigh | ✓ | ✓ | unlikely | X | ✓ | X | unlikely | X |
| Distal AC | ✓ | ✓ | unlikely | X | X | X | unlikely | X |
| Surgeon-Placed | ✓ | ✓ | ✓ | X | ✓ | X | ✓ | ✓ |