

Post Total Knee Arthroplasty Analgesia Controversies

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Predicting dissatisfaction following total knee replacement

A PROSPECTIVE STUDY OF 1217 PATIENTS

C. E. H. Scott, C. R. Howie, D. MacDonald and L. C. Biant

J Bone Joint Surg Br September 2010 vol. 92-B no. 9 1253-1258

Patient expectations were highly correlated with satisfaction. Satisfaction following TKR is multifactorial. Managing the expectations and mental health of the patients may reduce

dissatisfaction. However, **the most significant predictor of dissatisfaction is a painful total knee replacement.**

Zero controversy: systemic opioids vs regional techniques

Controversy no. 1:

Epidural analgesia - Gold standard?

Central Neuraxial Block

- Epidural
 - ?? gold standard for pain relief

Reg Anesth Pain Med 2012;37: 310–317

SPECIAL ARTICLE

Epidural Technique for Postoperative Pain

Gold Standard No More?

Narinder Rawal, MD, PhD

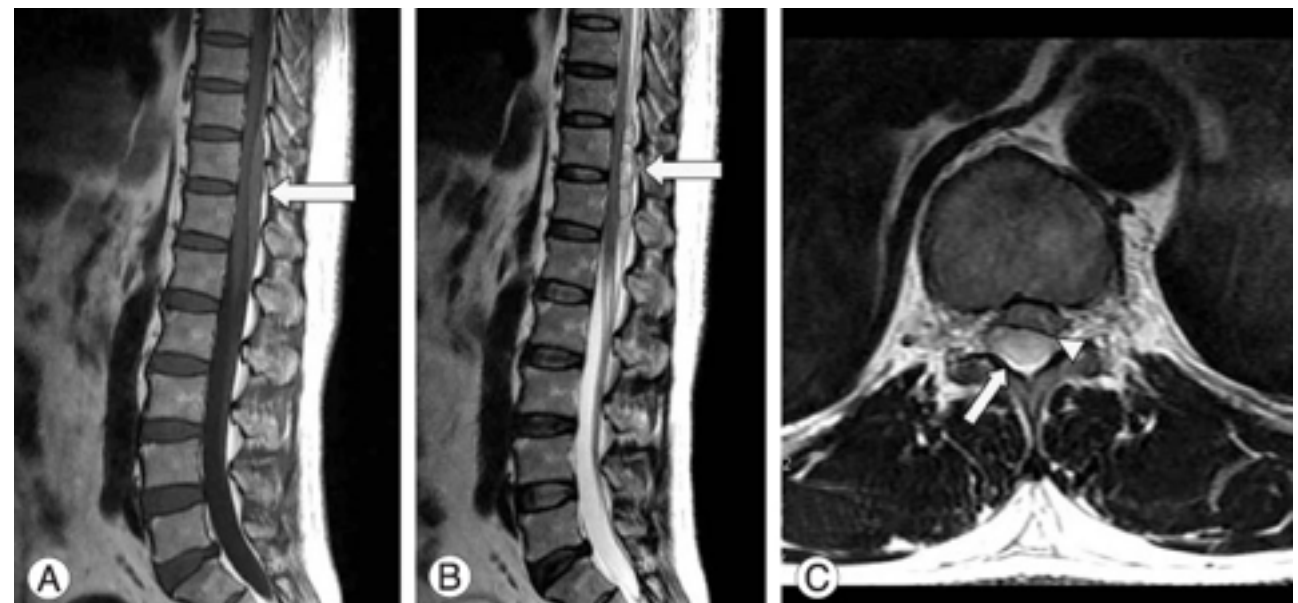
The number of indications for the use of epidural analgesia seems to be decreasing for a variety of reasons. The decision about whether to continue using epidural techniques should be guided by regular institutional audits and careful risk-benefit assessment rather than by tradition.

For routine postoperative analgesia, epidural analgesia may no longer be considered the gold standard.

Why move away from Epidural analgesia?

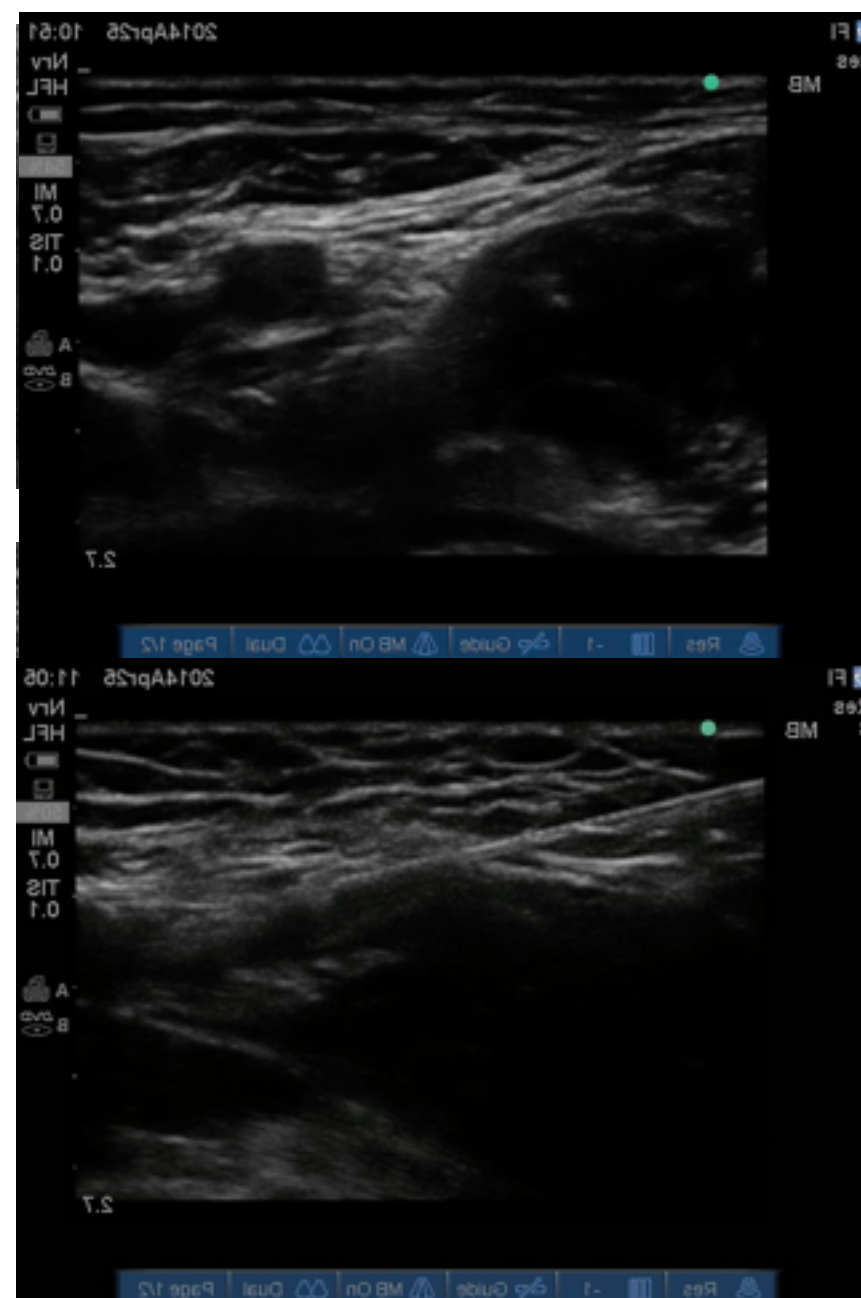
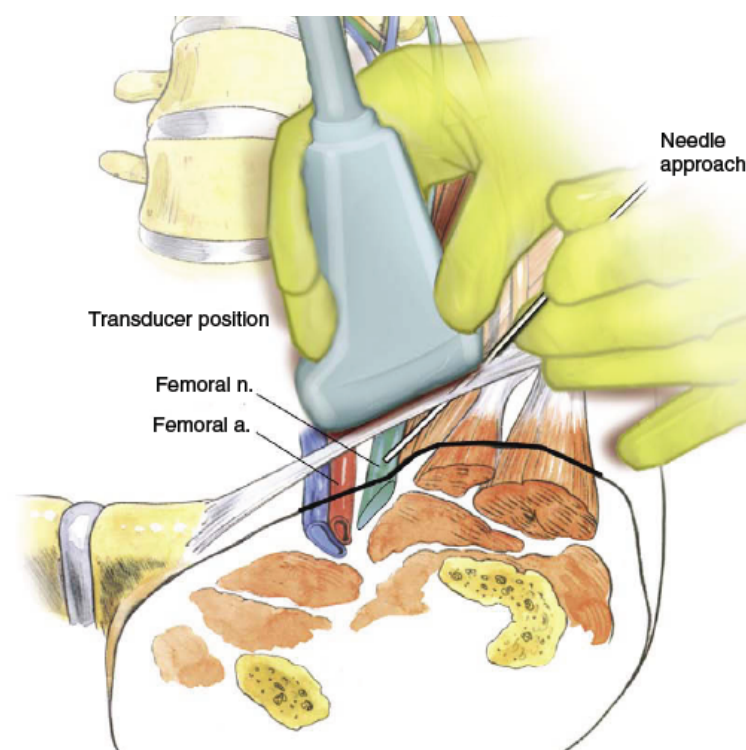
- Enhanced recovery after surgery (ERAS)
- Side effects of Epidural -
 - hypotension
 - urinary retention
 - opioid related -
 - PONV
 - pruritus

- non-operated limb numbness
- epidural hematoma



One step away from neuraxis

- Femoral nerve block



REVIEW ARTICLES

Epidural analgesia compared with peripheral nerve blockade after major knee surgery: a systematic review and meta-analysis of randomized trials

S. J. Fowler¹, J. Symons¹, S. Sabato¹ and P. S. Myles^{1, 2*}

- PNB with a FNB provides postoperative analgesia, which is comparable to epidural technique but with an improved side-effect profile and is less likely to cause a severe neuraxial complication.

Controversy no. 2:

Peripheral NB & early mobilisation

Enhanced Recovery post TKR:

Analgesia

Least systemic side effects

nausea, vomiting, itching, urine retention,
sedation

Motor sparing = early mobilisation



[J Orthop Surg \(Hong Kong\). 2008 Dec;16\(3\):381-4.](#)

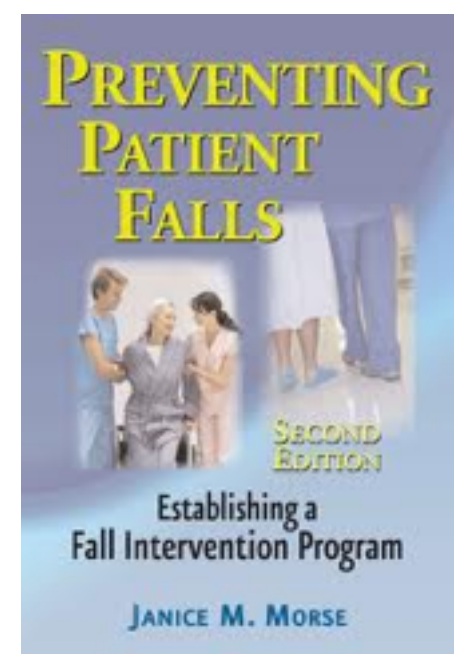
Postoperative fall after the use of the 3-in-1 femoral nerve block for knee surgery: a report of four cases.

Atkinson HD, [Hamid I](#), [Gupte CM](#), [Russell RC](#), [Handy JM](#).

[American Journal of Medical Quality January 15, 2013](#)

Reducing Costly Falls of Total Knee Replacement Patients

[Quanjun Cui](#), [Laura H. Schapiro](#), [Matthew C. Kinney](#), [Peter Simon](#), [Andrew Poole](#), [Wendy M. Novicoff](#)



Quadriceps femoris

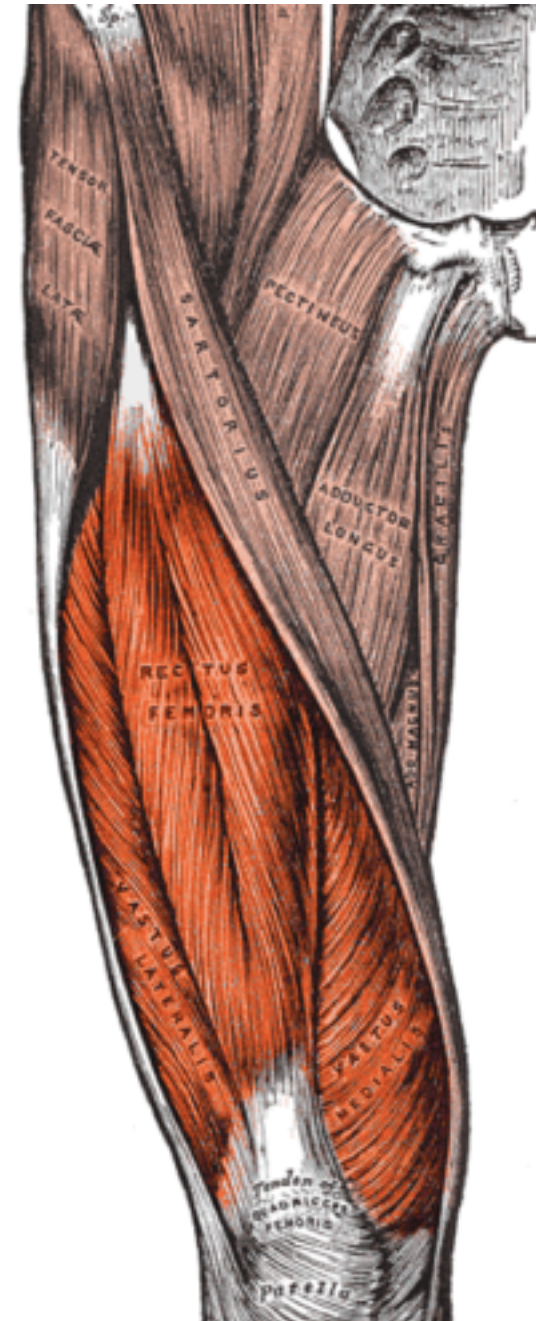
Rectus femoris

Vastus intermedius

Vastus lateralis

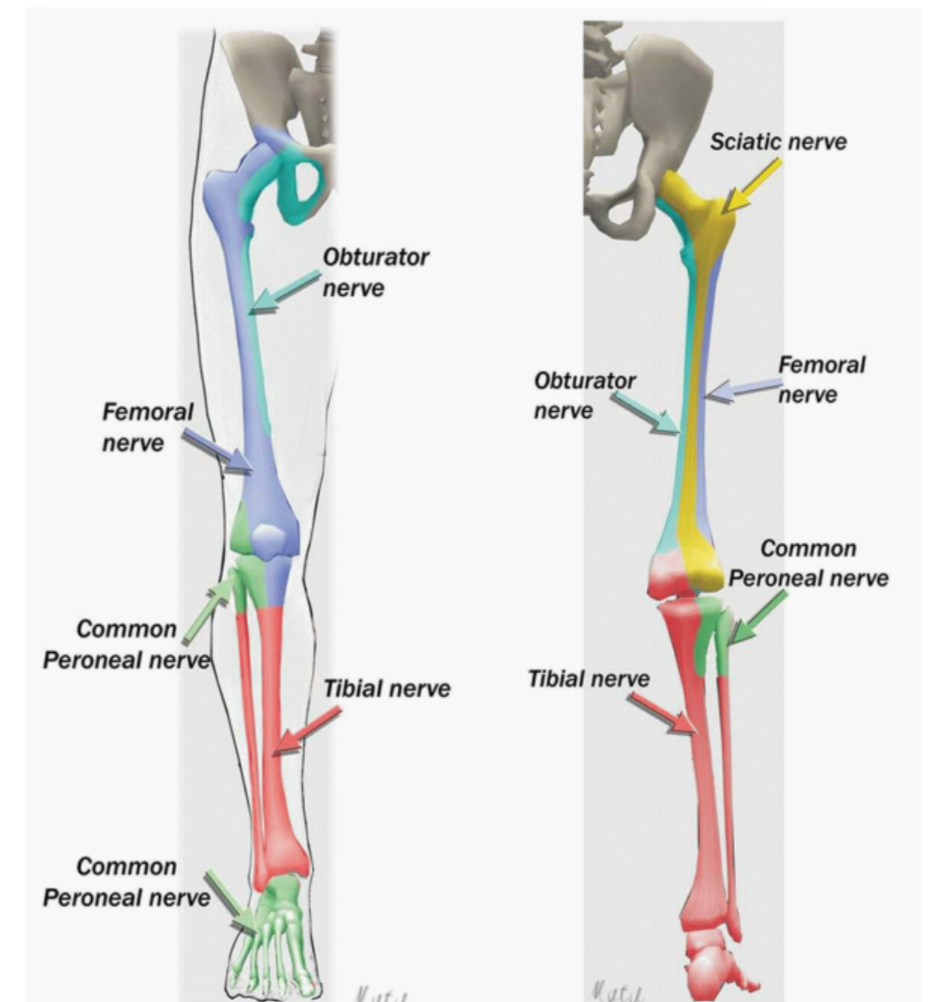
Vastus medialis

N supply - Femoral N



Nerve supply to knee

- Saphenous
- Obturator - posterior div
- N to V medialis
- Tibial
- Common peroneal
- N to V lateralis
- N to V intermedius

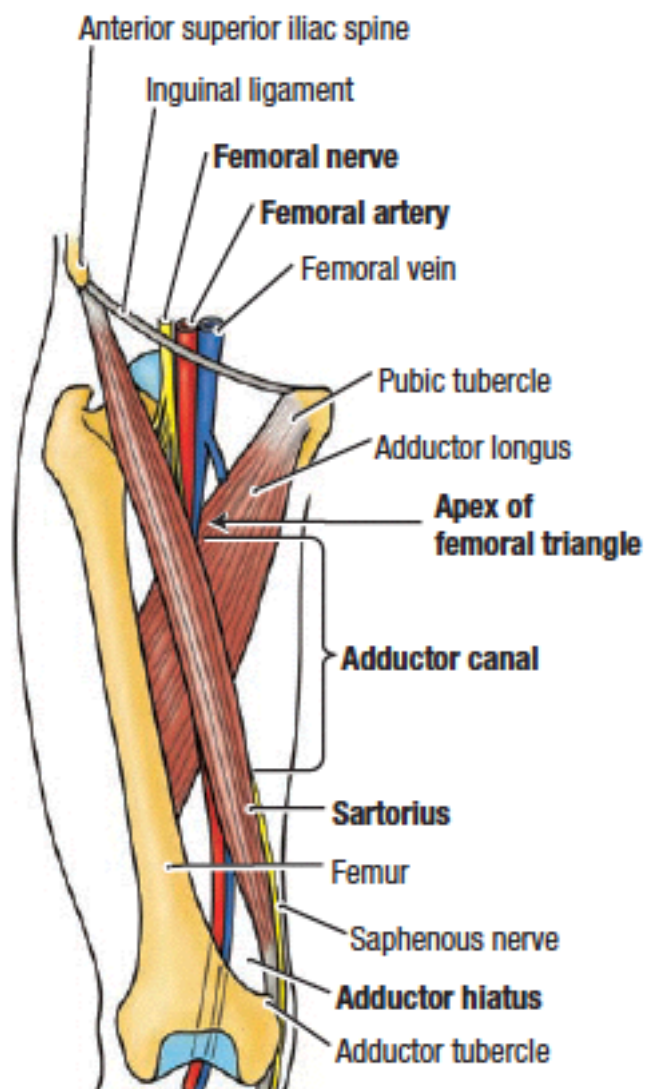


Adductor canal

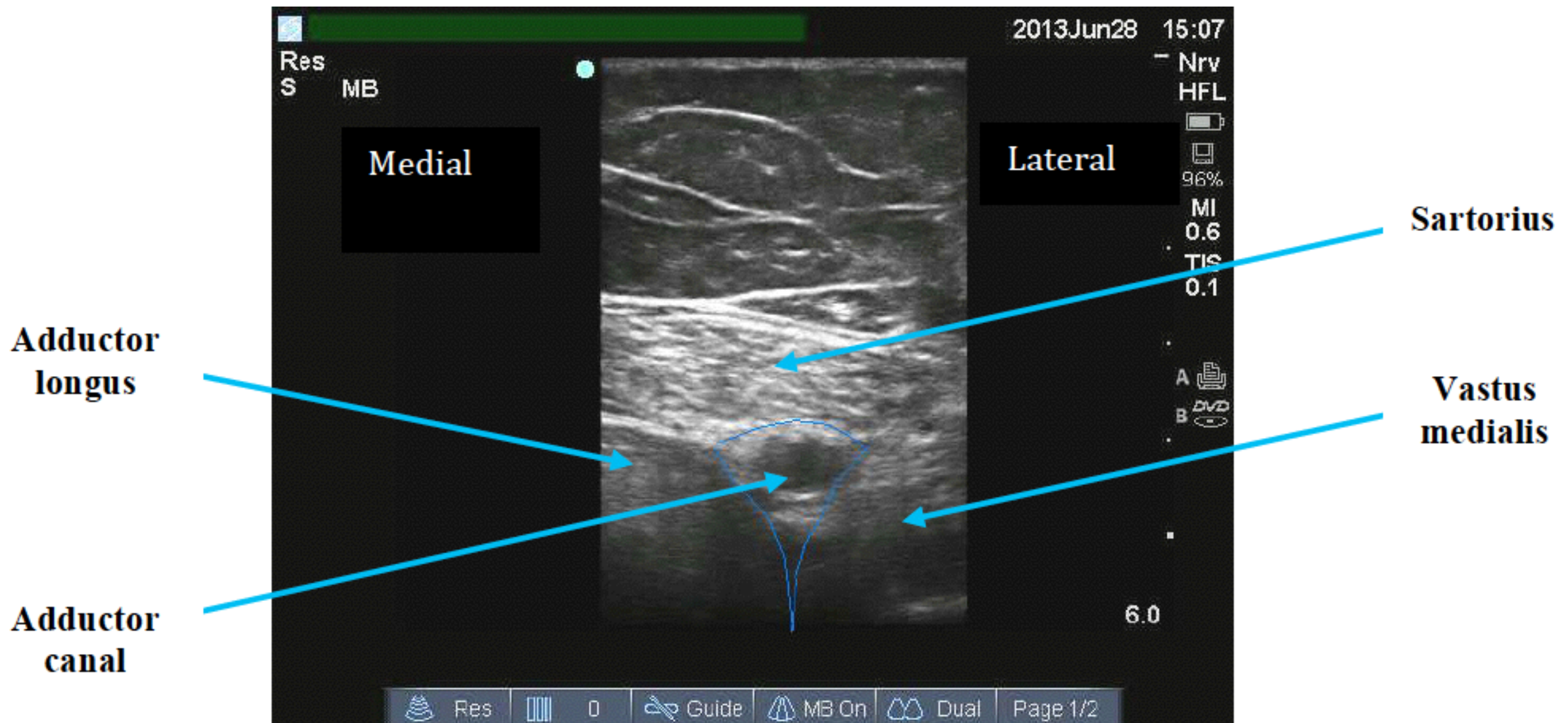
middle third of thigh

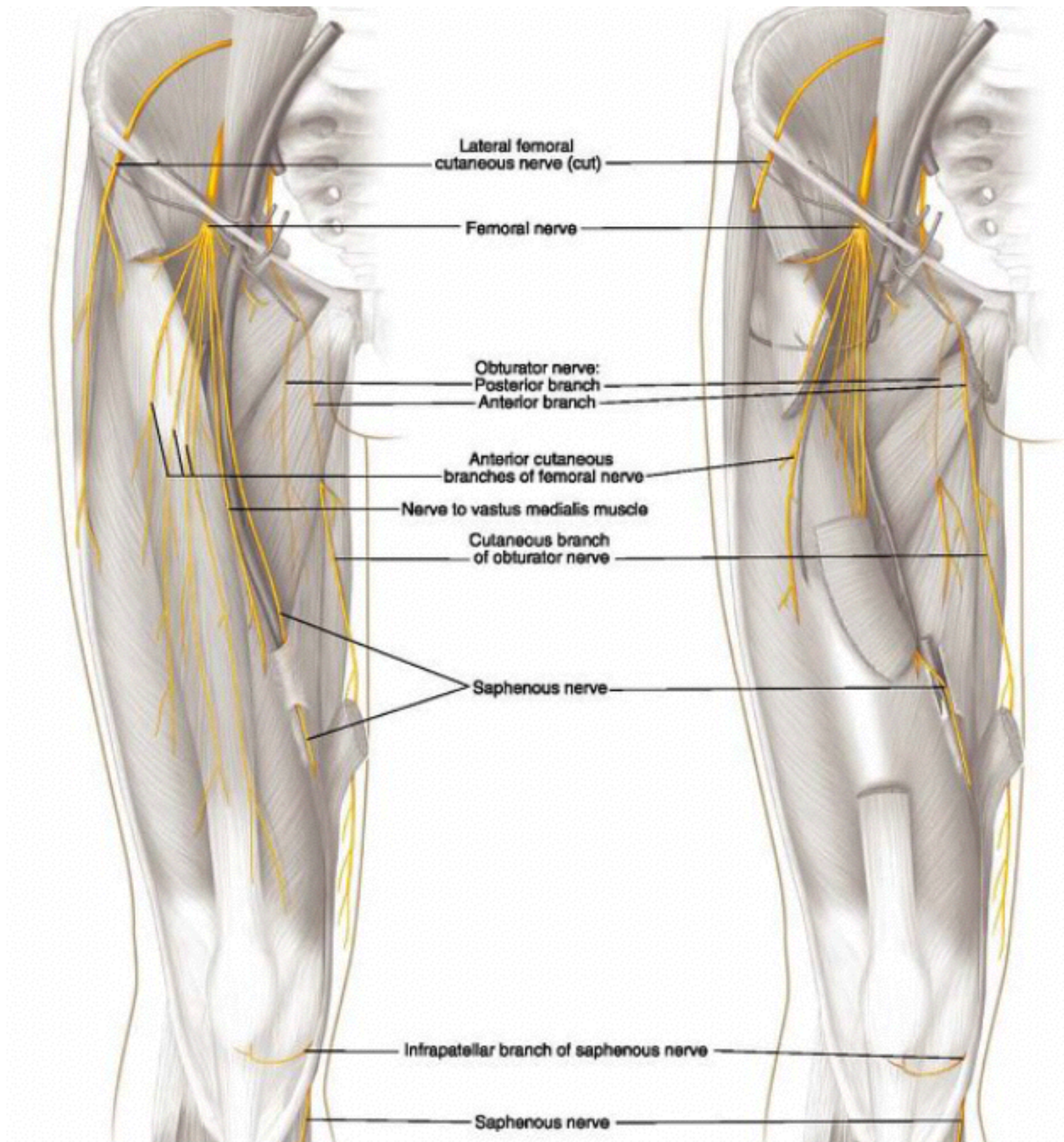
roof - sartorius
lateral - v medialis
medial - add longus

contents -
N to V medialis
Saphenous N
Post div of Obturator
Superf femoral A & V



Sono-anatomy





Evidence:

The Effects of Ultrasound-Guided Adductor Canal Block Versus Femoral Nerve Block on Quadriceps Strength and Fall Risk

A Blinded, Randomized Trial of Volunteers

M. Kwesi Kwofie, MD, FRCPC, Uma D. Shastri, MD, FRCPC,†
Jeff C. Gadsden, MD, FRCPC, FANZCA,‡ Sanjay K. Sinha, MBBS,§ Jonathan H. Abrams, MD,§
Daquan Xu, MB, MPH,‡ and Emine A. Salviz, MD‡*

Reg Anesth Pain Med 2013;38: 321–325

Results: Quadriceps strength and balance scores were similar to baseline following ACB. Following FNB, there was a **significant reduction in quadriceps strength ($95.1\% \pm 17.1\%$ vs $11.1\% \pm 14.0\%$; $P < 0.0001$) and balance scores (56 ± 0 vs 37 ± 17.2 ; $P = 0.02$)** compared with baseline. There was no difference in hip adductor strength ($97.0\% \pm 10.8\%$ vs $91.8\% \pm 9.6\%$; $P = 0.17$).

Conclusions: Compared with FNB, ACB results in significant quadriceps motor sparing and significantly preserved balance.

Evidence:

Clin Orthop Relat Res
DOI 10.1007/s11999-013-3197-y

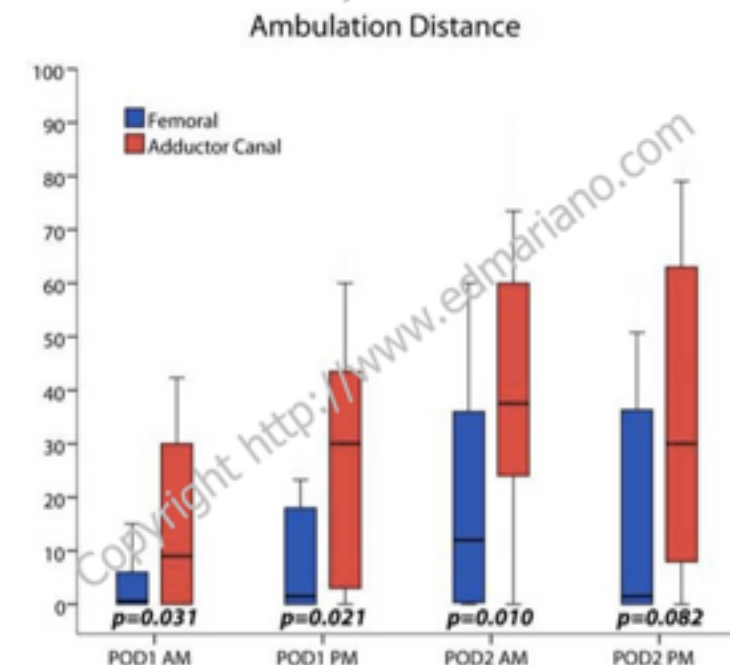
Clinical Orthopaedics
and Related Research®
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SYMPOSIUM: PERIOPERATIVE PAIN MANAGEMENT IN ORTHOPAEDIC SURGERY

Continuous Adductor Canal Blocks Are Superior to Continuous Femoral Nerve Blocks in Promoting Early Ambulation After TKA

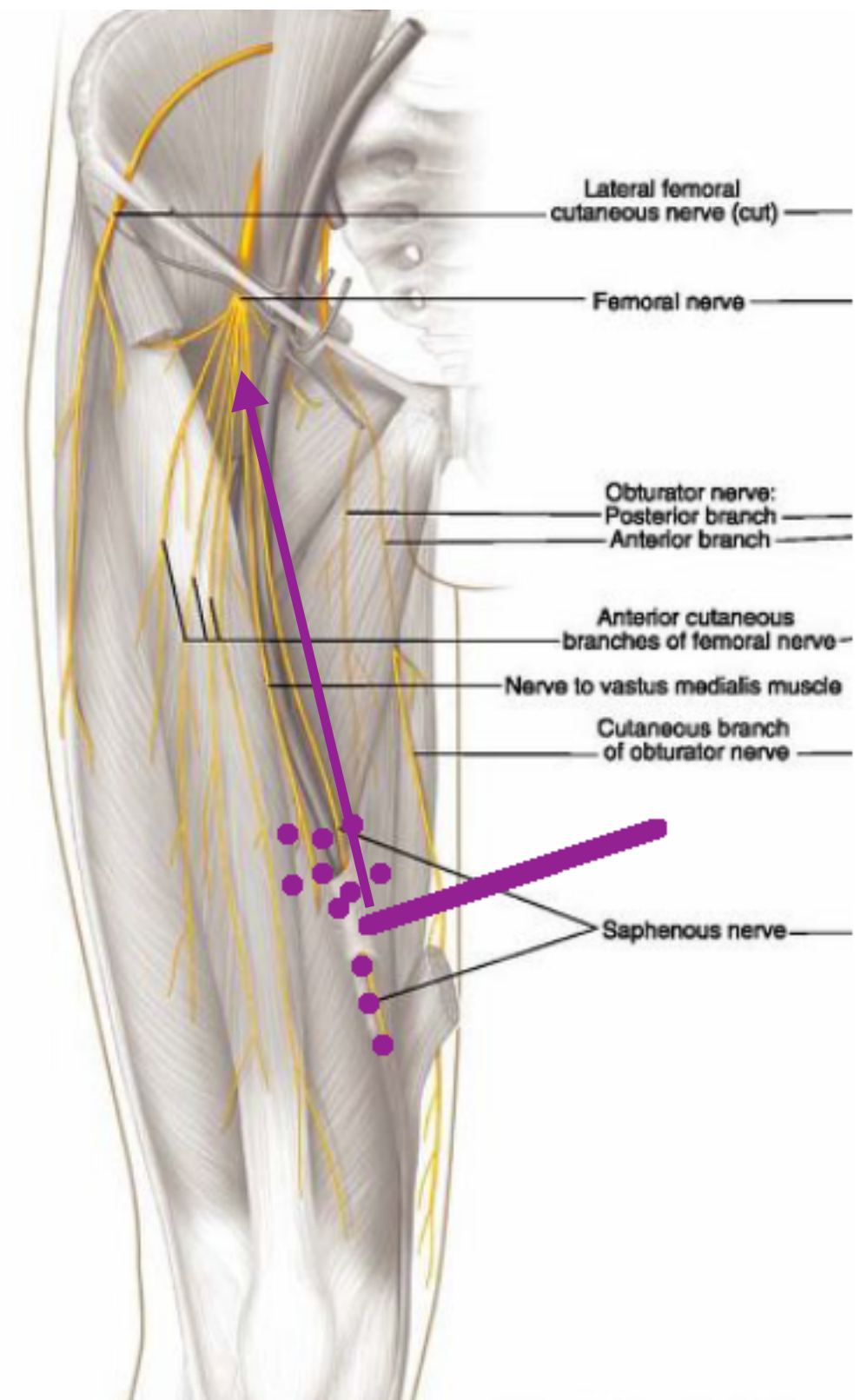
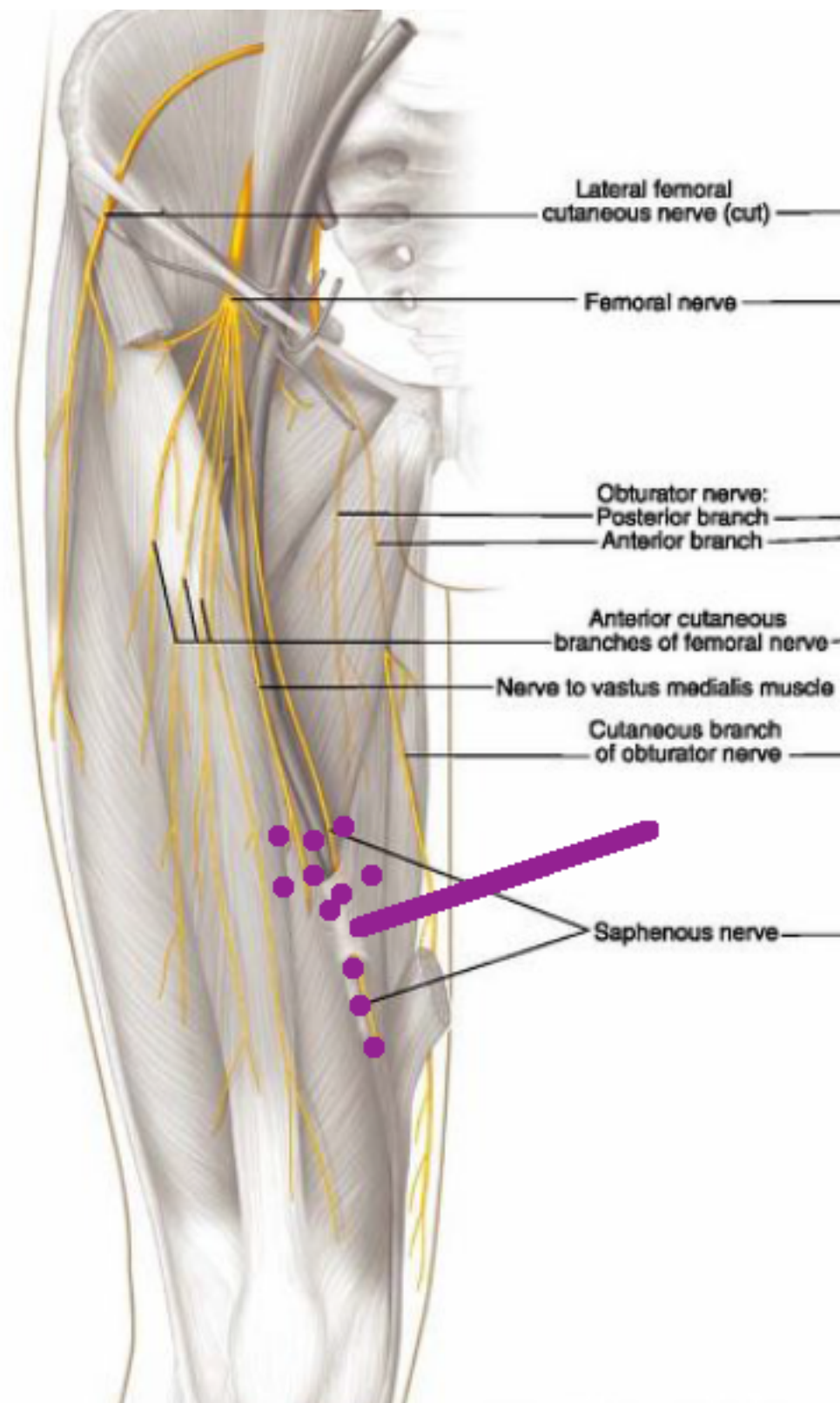
Seshadri C. Mudumbai MD, MS, T. Edward Kim MD, Steven K. Howard MD,
J. Justin Workman MD, Nicholas Giori MD, Steven Woolson MD,
Toni Ganaway BA, Robert King BS, Edward R. Mariano MD, MAS (Clinical Research)

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Controversy no. 3:

Is saphenous nerve block an indirect approach to femoral nerve block?



Controversy no. 4:

sciatic nerve block
vs
tibial nerve block

Anesth Analg 2012;115:202–6

Femoral Nerve Block With Selective Tibial Nerve Block Provides Effective Analgesia Without Foot Drop After Total Knee Arthroplasty: A Prospective, Randomized, Observer-Blinded Study

Sanjay K. Sinha, MB, BS,* Jonathan H. Abrams, MD,* Sivasenthil Arumugam, MB, BS,* John D'Alessio, MD,* David G. Freitas, MD,* John T. Barnett, MD,* and Robert S. Weller, MD†

CONCLUSIONS: Tibial nerve block performed in the popliteal fossa in close proximity to the popliteal crease

1. avoided complete peroneal motor block and
2. provided similar postoperative analgesia compared to sciatic nerve block when combined with femoral nerve block for patients undergoing total knee arthroplasty.



Controversy no. 4:

Role of LIA?

HVLIA

- a systematic infiltration of a mixture of ropivacaine, ketorolac and adrenaline into the tissues around the surgical field
- simple?
- safe?
- effective?

Simple?

- Simple:
 - Anybody can do it -
 - ◆ even the orthopaedic surgeons!

Safe?

Continuous intra-articular infusion of ropivacaine after unilateral total knee arthroplasty

M Reeves, MW Skinner

Anaesthesia and Intensive care, 2009, Volume 37, Issue 6

Intra-articular infusion of local anaesthetic after joint arthroplasty is attractive in that it is simple and will not cause motor block.

66 patients for U/L TKR under GA with Femoral + Sciatic blocks

All patients had an intra-articular Painbuster™ device sited at the end of the procedure. The catheters were infused continuously for 48 hours and then removed.

There were **two cases of infection, both in the treatment groups.**

No positive benefit of intra-articular infusion of local anaesthetic after total knee arthroplasty could be identified. On the contrary there may be negative effects in terms of expense, pain and possibly infection risks.

A Prospective, Randomized, Blinded Study of Continuous Ropivacaine Infusion in the Median Sternotomy Incision Following Cardiac Surgery

Agarwal, Shvetank; Nuttall, Gregory A.; Johnson, Michael E.

Regional Anesthesia and Pain medicine March/April 2013 - Volume 38 - Issue 2

The data safety monitoring board stopped the study after enrolling 85 patients because of excessive sternal wound infections (9%, n = 44) in the ropivacaine group

Effective?

High-volume infiltration analgesia in total knee arthroplasty: a randomized, double-blind, placebo-controlled trial.

Andersen LØ, Husted H, Otte KS, Kristensen BB, Kehlet H.
Acta Anaesthesiol Scand 2008; 52: 1331–5.

Effective for 6 - 12 h

High volume local infiltration analgesia compared to peripheral nerve block for hip and knee arthroplasty—what is the evidence?

SJ Fowler, N Christelis

Anaesthesia and Intensive Care, Volume 41, Issue 4 July 2013, p 458-462

Summary:

- 1. Despite the popularity of HVLIA, supporting evidence for its use is currently limited.*
- 2. HVLIA certainly provides postoperative analgesia, but it is not clear whether it is equivalent to contemporary peripheral nerve block techniques in terms of either analgesia or early or later functional outcome*
- 3. Nor is it possible to state whether HVLIA provides benefits in terms of persistent postsurgical pain or cost and process efficiency.*

Better alternative:

Continuous Saphenous Nerve Block as Supplement to Single-Dose Local Infiltration Analgesia for Postoperative Pain Management After Total Knee Arthroplasty

Henning Lykke Andersen, Jens Gyrn, Lars Møller, Bodil Christensen and Dusanka Zaric
Reg Anesth Pain Med 2013;38: 106-111

40 subjects for TKR

SAB and intraoperative single dose LIA

Adductor canal catheter with 15ml 0.75% Ropivacaine or Saline q12H

Pain at rest and during movement

Ability to ambulate on day 1

Quality of sleep on first night

Breakthrough pain

Conclusions: The combination of a saphenous nerve block with single dose LIA offered better pain relief on the day of surgery than LIA alone.

Controversy no. 5:

Liposomal Bupivacaine - where does it fit?

Bupivacaine encapsulated in multivesicular liposomes - slow release preparation

FDA approved for local infiltration only

Extended duration - more than 2X

Concerns:

- toxicity

- prolonged motor block

- inadvertent sensory block (popliteal instead of tibial)

- can't top-up in case of inadequate block

Controversy no. 6:

Role of pre-operative education?

Does pre-operative education improve post TKR outcome with respect to pain, etc.?

Factors:

method - consent / info booklet / interactive AV

depressed / anxious patients

patients with unrealistic expectation