



Novinky v blokádach dolnej končatiny

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Anaesthesiology **ESA**



- Landeskrankenhaus Wien Neustadt
- 19 oddelení, 4 inštitúty
- 826 lôžok
- 16 000 anestézií p.a.





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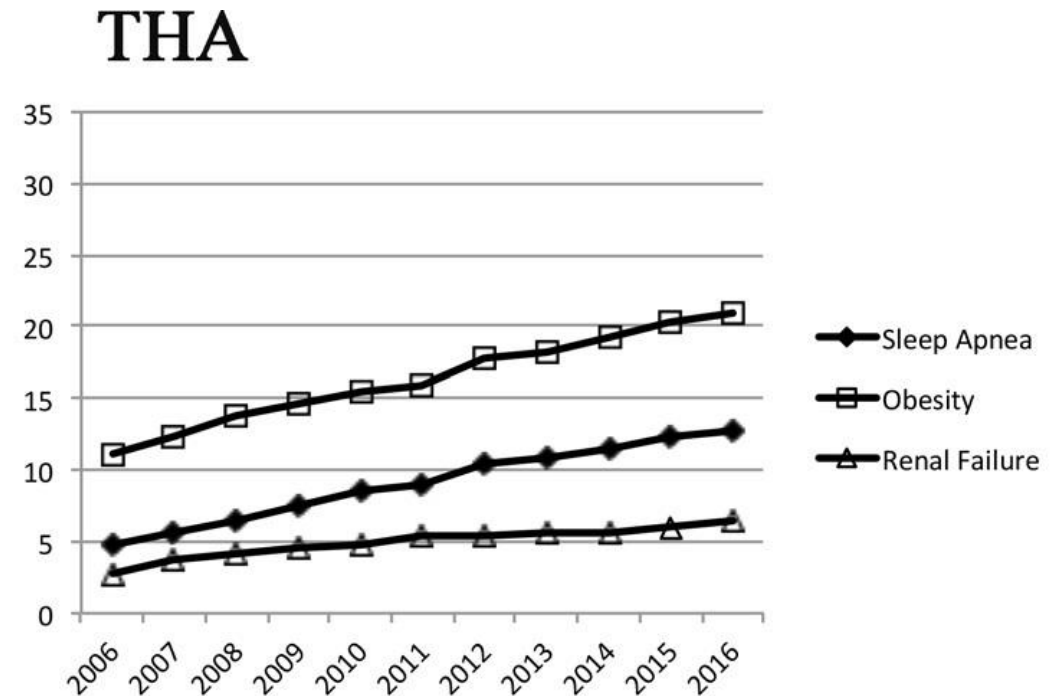
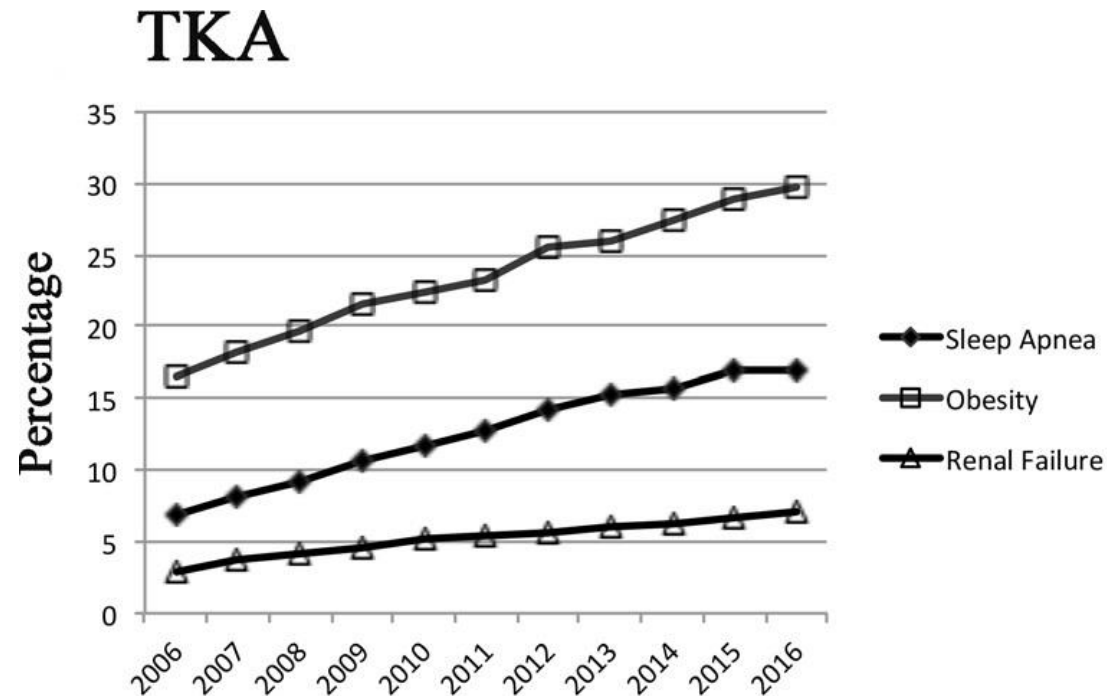
- 826 lôžok
- 16 000 anestézií p.a.

In relation to this presentation the author has no conflict of interest that need to be disclosed.

Trendy v používaní regionálnej anestézie, komorbidity a perioperačné komplikácie

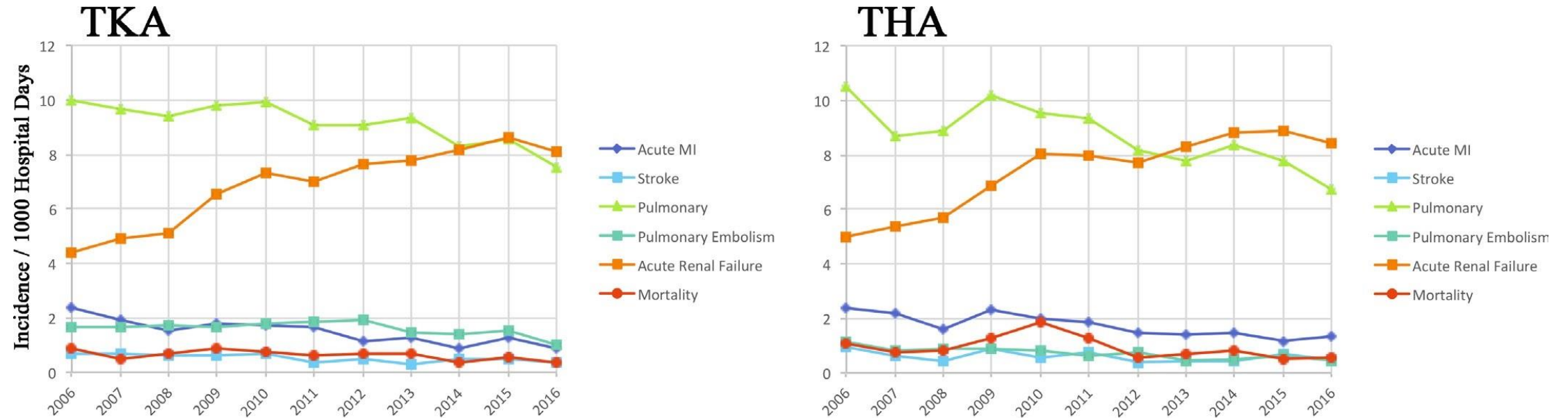


Komorbidity a perioperačné komplikácie



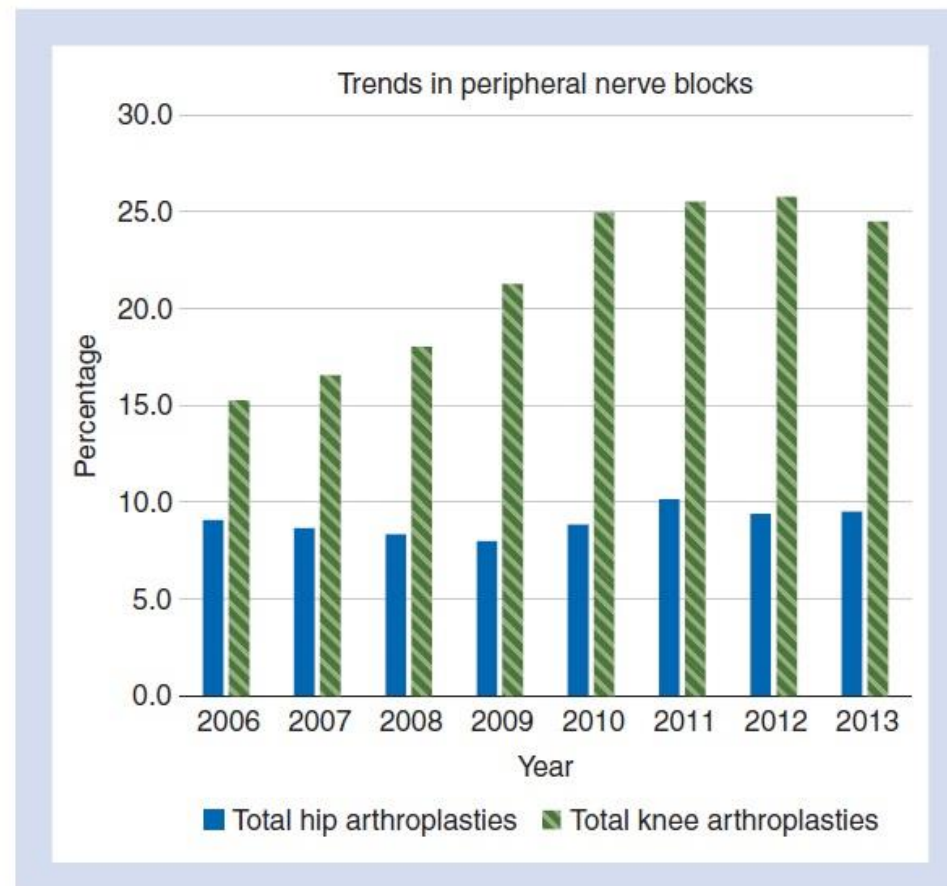
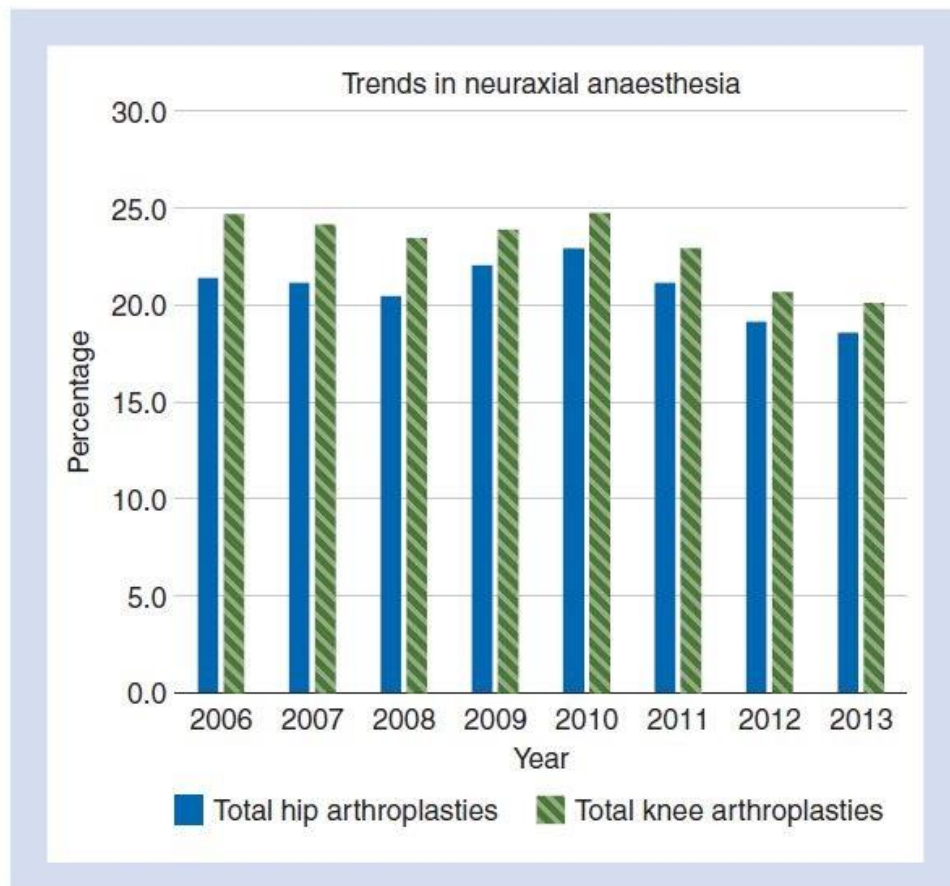
Liu, Jiabin, et al. "Trends in total knee and hip arthroplasty recipients: a retrospective cohort study." *Regional Anesthesia & Pain Medicine* 44.9 (2019): 854-859.

Komorbidity a perioperačné komplikácie



Liu, Jiabin, et al. "Trends in total knee and hip arthroplasty recipients: a retrospective cohort study." *Regional Anesthesia & Pain Medicine* 44.9 (2019): 854-859.

Trendy v používání neurax. anestézie a PNB



Cozowicz, C., J. Poeran, and S. G. Memtsoudis. "Epidemiology, trends, and disparities in regional anaesthesia for orthopaedic surgery." *BJA: British Journal of Anaesthesia* 115.suppl_2 (2015)

Zlomeniny v oblasti bedrového kĺbu

USA: - 27-29% RA u pacientov nad 50 rokov
- 34,2% RA u pacientov nad 60 rokov

UK: - 49% Neuraxiálna anestézia
- 19% PNB



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Library

Cochrane Database of Systematic Reviews

Peripheral nerve blocks for hip fractures (Review)

Guay J, Parker MJ, Griffiths R, Kopp S

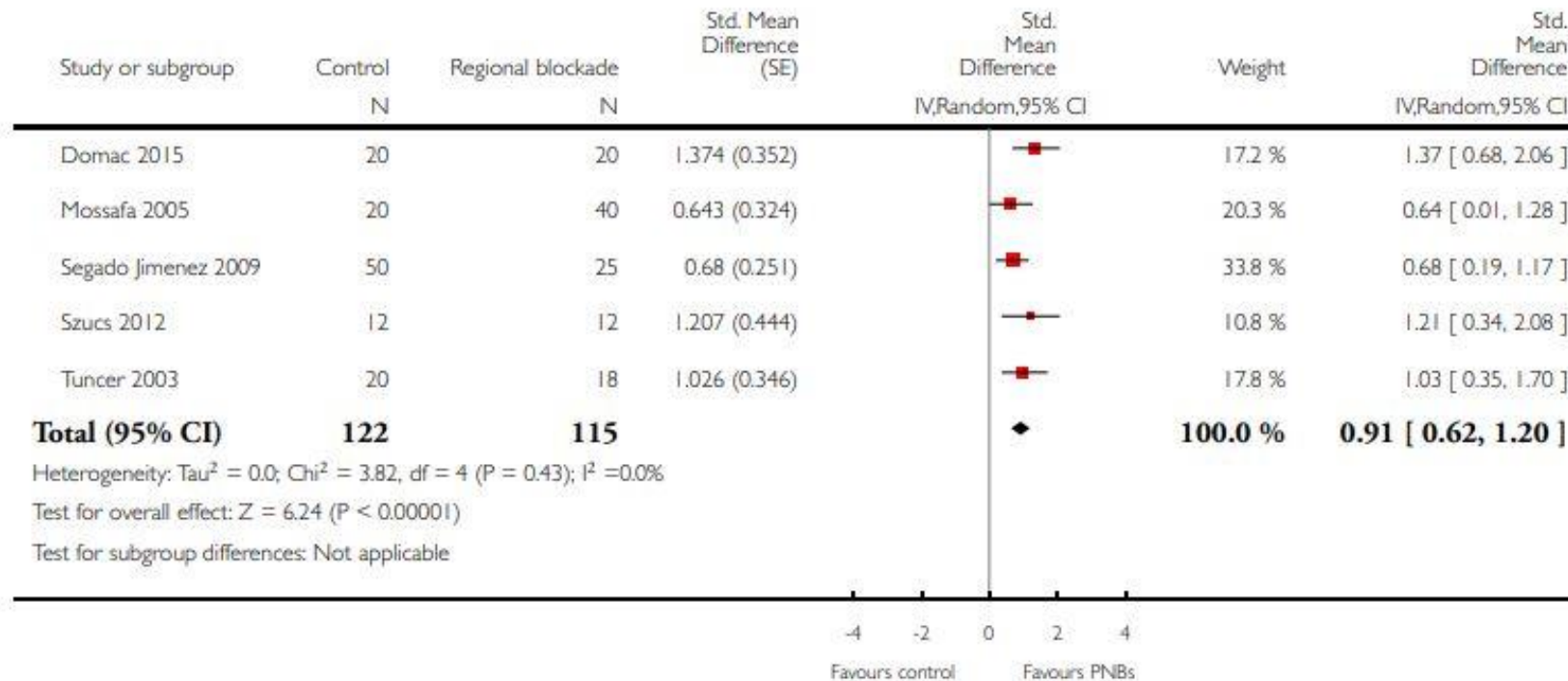
Quality of evidence: We rated the quality of evidence as high for reduction of pain on movement within 30 minutes, and as moderate for pneumonia, time to first mobilization and costs of analgesic drugs. We would need more information before we could draw final conclusions on effects of peripheral nerve blocks on the risk of acute confusional state, myocardial ischaemia and mortality.

Analysis 1.16. Comparison 1 Nerve block versus other modes of analgesia, Outcome 16 Participant satisfaction.

Review: Peripheral nerve blocks for hip fractures

Comparison: 1 Nerve block versus other modes of analgesia

Outcome: 16 Participant satisfaction



The effect of anesthetic technique on mortality and major morbidity after hip fracture surgery: a retrospective, propensity-score matched-pairs cohort study

Laith Malhas,¹ Anahi Perlas,¹ Sarah Tierney,¹ Vincent W S Chan,¹ Scott Beattie²

Malhas, Laith, et al. "The effect of anesthetic technique on Mortality and major morbidity after hip fracture surgery: a retrospective, propensity-score matched-pairs cohort study." *Regional Anesthesia & Pain Medicine* 44.9 (2019): 847-853.

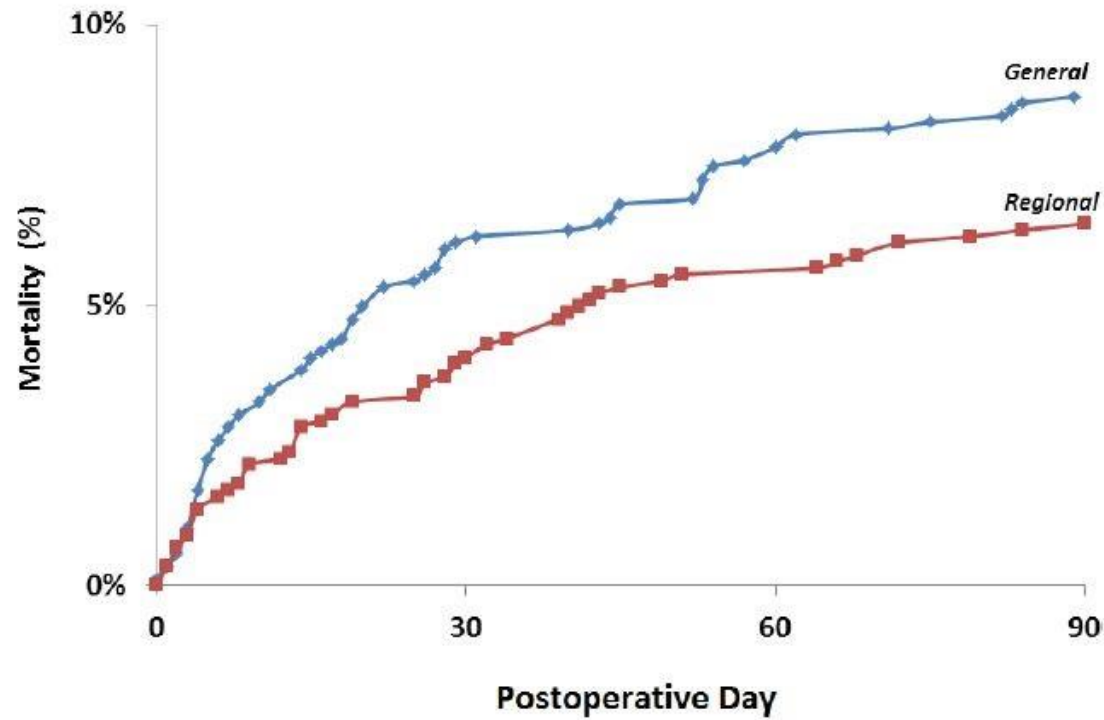


Figure 1 Cumulative postoperative mortality over time. The Y axis represents mortality expressed as a percentage of all cases. The X axis represents the number of postoperative days. the blue curve corresponds to patients who underwent general anesthesia, while the red curve corresponds to those who underwent regional (spinal) anesthesia.

Table 4 Causes of death

System	GA (n=78)		SA (n=57)	
	n	%	n	%
Cardiac	23	30.3	11	19.7
Respiratory	20	26.3	18	32.1
Sepsis	4	5.3	8	14.3
Renal failure	2	2.6	1	1.8
Liver failure	3	3.9	1	1.8
Neurological	2	2.6	1	1.8
Gastrointestinal	5	6.6	4	7.2
Hematological	1	1.3	0	0
Undetermined	18	21	13	21

Regarding the secondary outcomes, patients in the SA group were less likely to experience PE (0.5% vs 1.3% in the SA vs the GA groups, respectively; RR 0.36, 99% CI 0.08 to 0.64, $p < 0.001$) and major blood loss (4.8% vs 7.7%, RR 0.62, 99% CI 0.38 to 0.94, $p < 0.001$) and had a shorter hospital length of stay of about 2 days (10.0 vs 11.9 days; $p = 0.024$). There was no significant difference on the incidence of MACE. (table 3).

GA, general anesthesia; MACE, major adverse cardiac event; PE, pulmonary embolism; RR, risk ratio; SA, spinal anesthesia.

Malhas, Laith, et al. "The effect of anesthetic technique on Mortality and major morbidity after hip fracture surgery: a retrospective, propensity-score matched-pairs cohort study." *Regional Anesthesia & Pain Medicine* 44.9 (2019): 847-853.

Use of Regional Anesthesia for Outpatient Surgery Within the United States: A Prevalence Study Using a Nationwide Database

Rodney A. Gabriel, MD,*† and Brian M. Ilfeld, MD, MS (Clinical Investigation)*

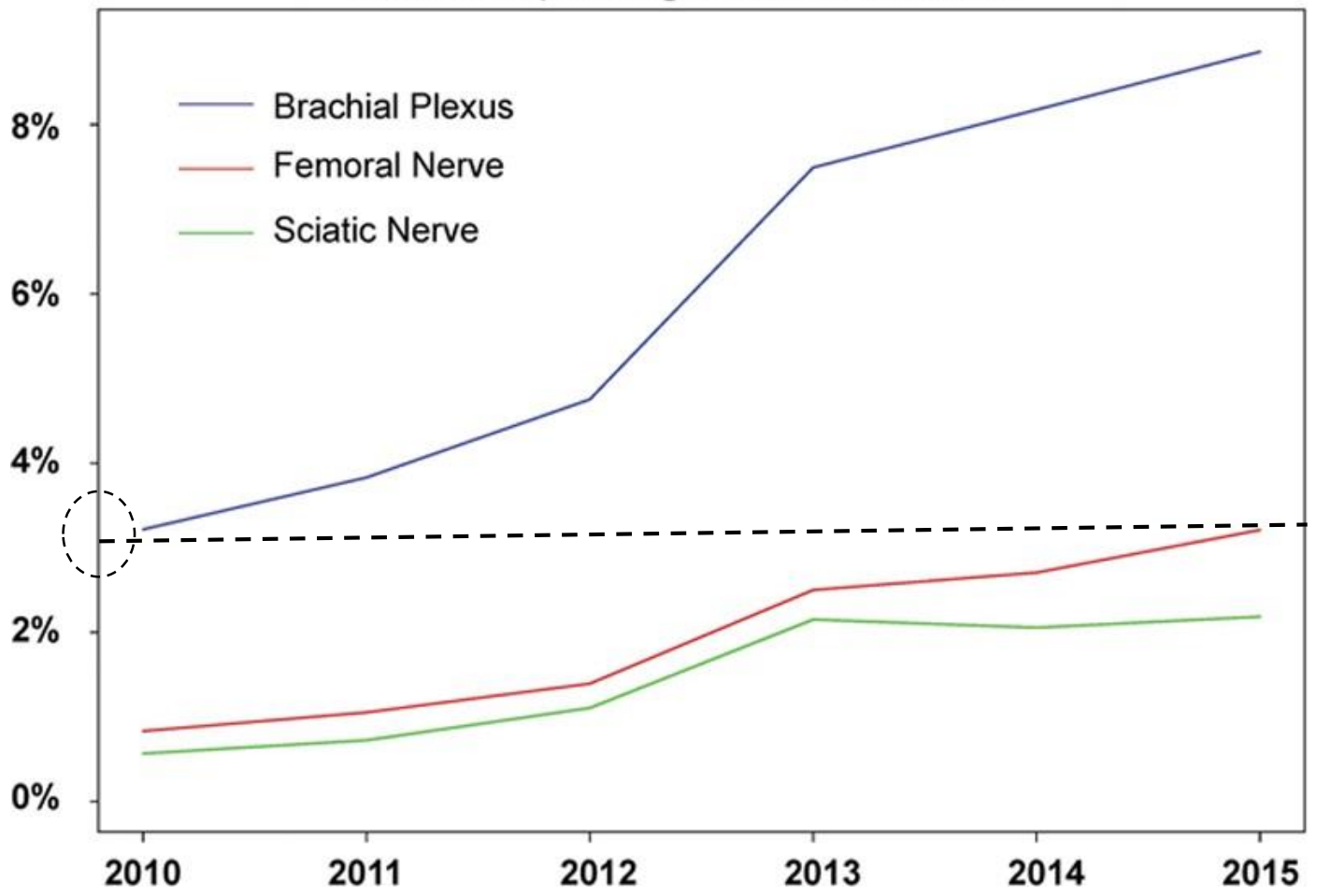
BACKGROUND: Regional anesthesia is of benefit for outpatient surgery given its demonstrated improvement in analgesia and decrease in complications, resulting in shorter average recovery room times and lower hospital readmission rates. Unfortunately, there are few epidemiological studies outlining the overall utilization of peripheral nerve blocks (PNBs) in this setting. Therefore, the primary objective of this study was to report the overall utilization of several types of PNBs among all candidate cases in the outpatient setting within the United States.

METHODS: We identified all cases from the National Anesthesia Clinical Outcomes Registry that were performed as an outpatient surgery. We reported the frequency of various types of PNBs among all candidate cases, defined as cases that potentially could have received a PNB. Changes in prevalence of PNB utilization from 2010 to 2015 were analyzed by using logistic regression.

RESULTS: Of the 12,911,056 outpatient surgeries in the National Anesthesia Clinical Outcomes Registry, 3,297,372 (25.5%) were amenable to a PNB. However, the overall PNB frequency was only 3.3% of the possible cases. The overall utilization for PNB of the brachial plexus, sciatic nerve, and femoral nerve were 6.1%, 1.5%, and 1.9%, respectively. The surgical procedures generating the highest volume of PNBs were shoulder arthroscopies and anterior cruciate ligament reconstruction, in which 41% and 32% received a PNB, respectively. During this time period, there was a significant increase in overall PNB utilization for both single-injection and continuous PNB ($P < .0001$). However, the proportion of continuous PNB to single-injection PNB did not increase significantly.

CONCLUSIONS: While the overall frequency of PNB is relatively low, there was a significant increase in its prevalence during the study period. Regional anesthesia offers significant positive impact for perioperative outcomes and hospital efficiency metrics; however, it is not clear what is limiting its widespread use. Future studies are necessary to identify barriers and disparities in care to implement methods to increase regional anesthesia volume nationwide where beneficial and appropriate. (Anesth Analg 2017;XXX:00–00)

Percentage of Cases Receiving a Nerve Block (Single Injection or Continuous) Among All Amenable Cases



Gabriel, Rodney A., and Brian M. Ilfeld. "Use of regional anesthesia for outpatient surgery within the United States: a prevalence study using a nationwide database." *Anesthesia & Analgesia* 126.6 (2018): 2078-2084.

Používanie zavedených a vznik nových techník

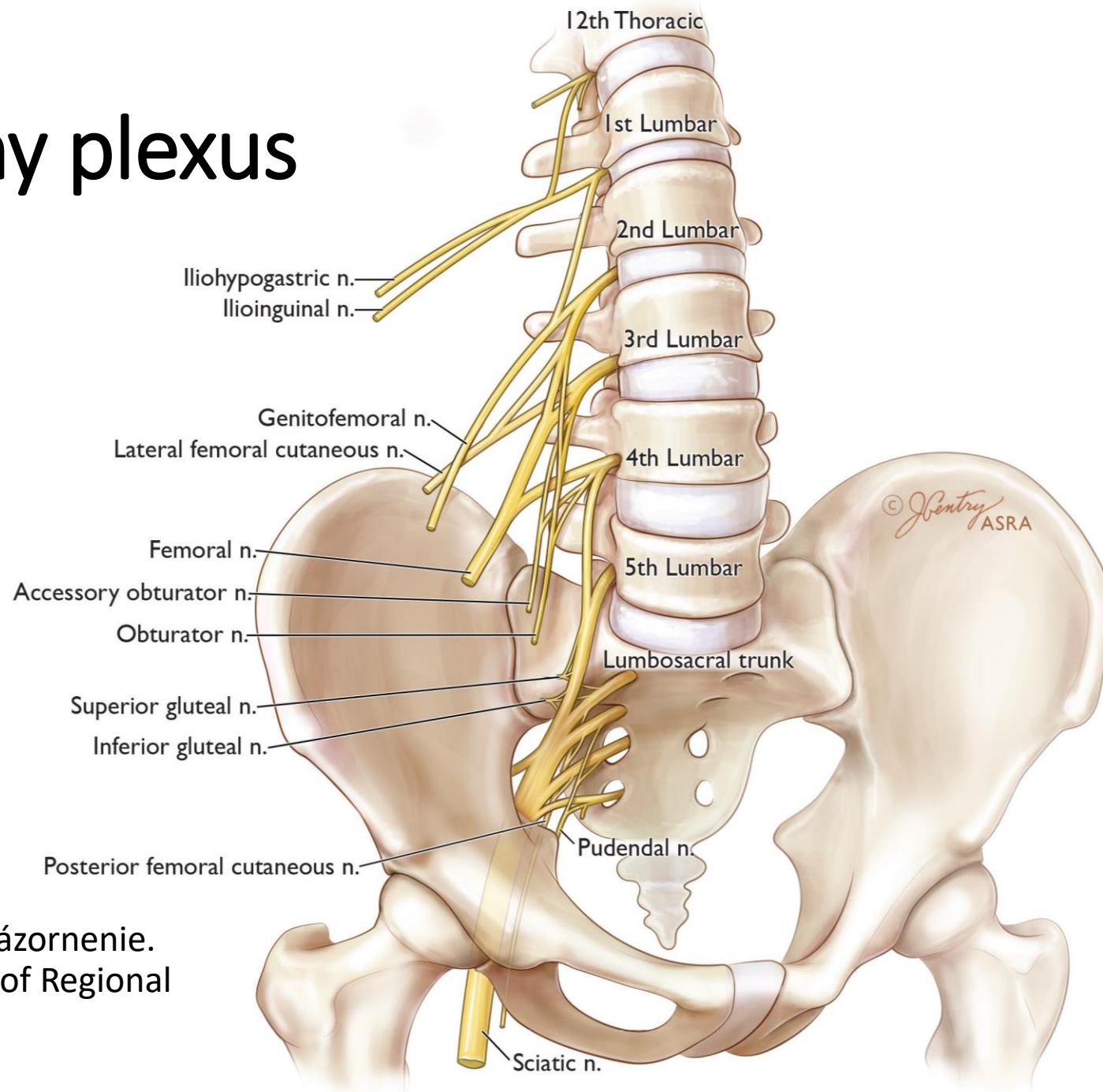


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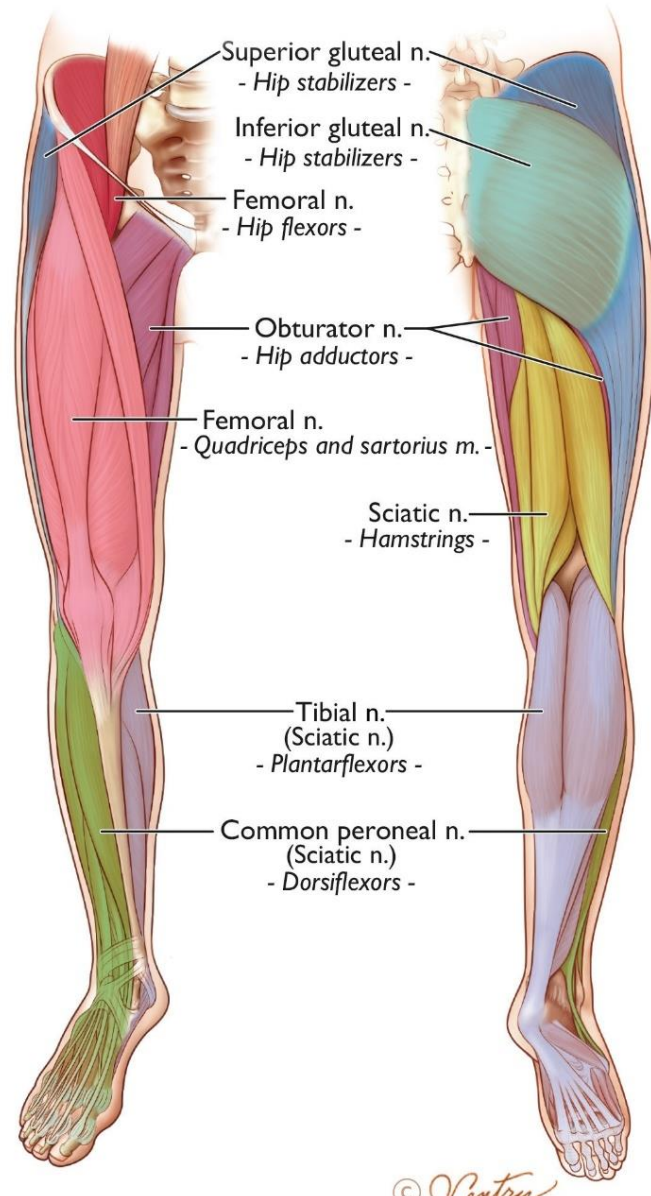
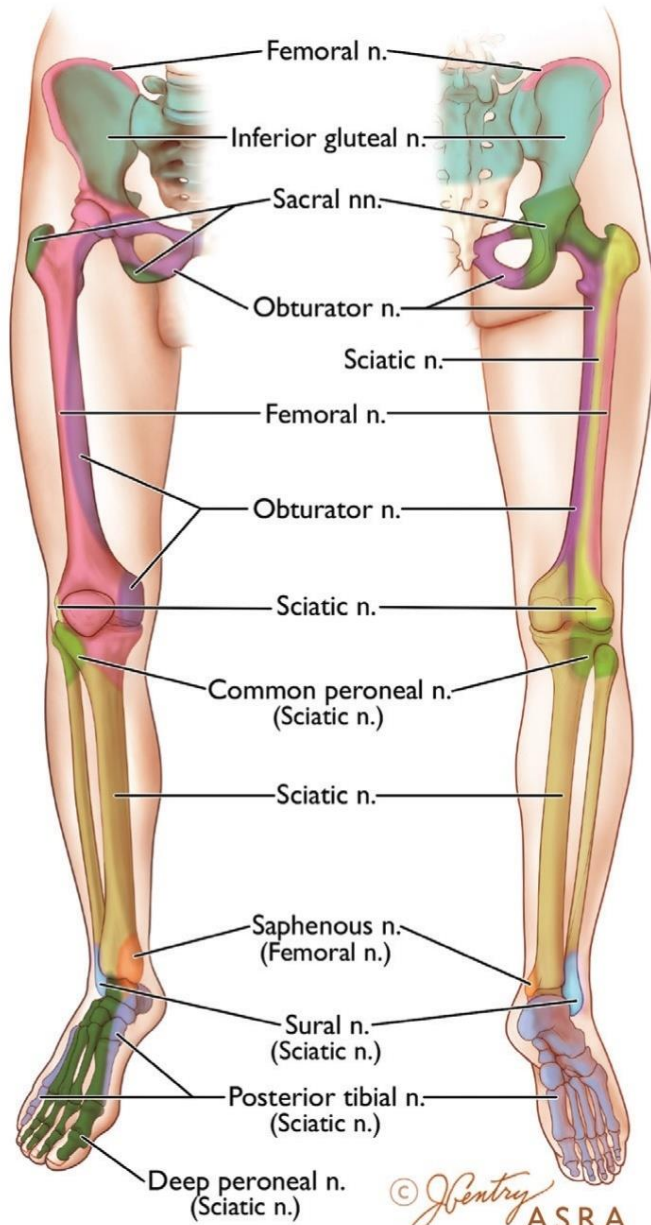
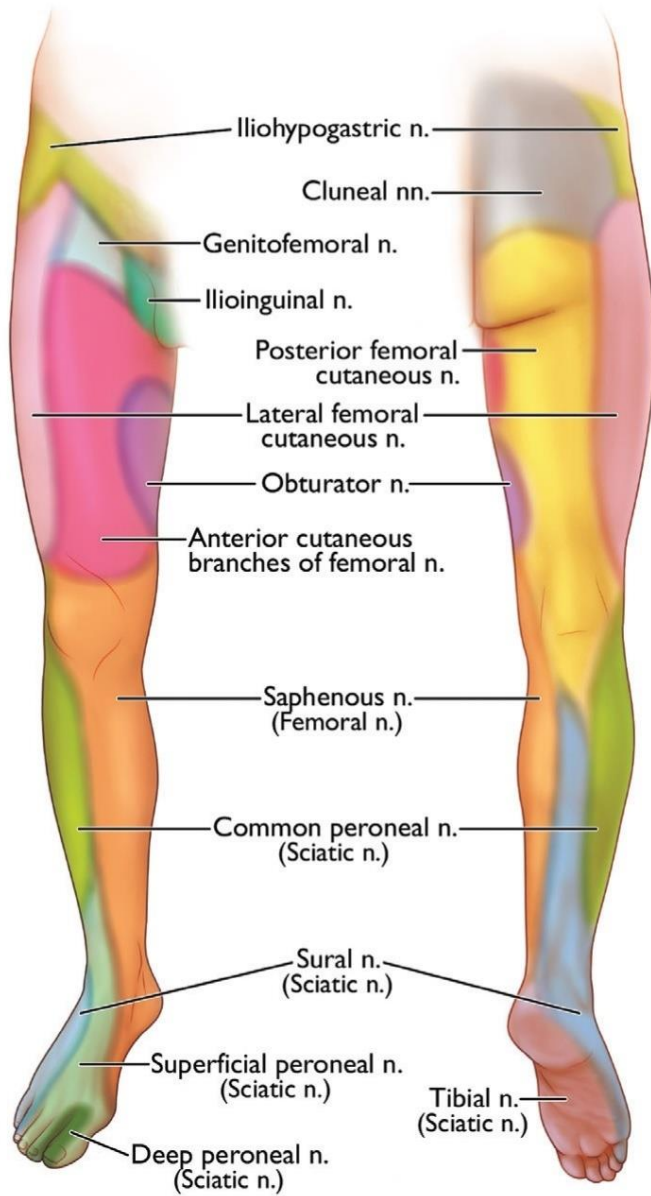
- Plexov
- Cielene jednotlivých nervov
- Interfaciálne
- Periartikulárne

- „Landmarks“ techniky
- Nervový stimulátor
- USG
 - Ich kombinácie
 - Katétre

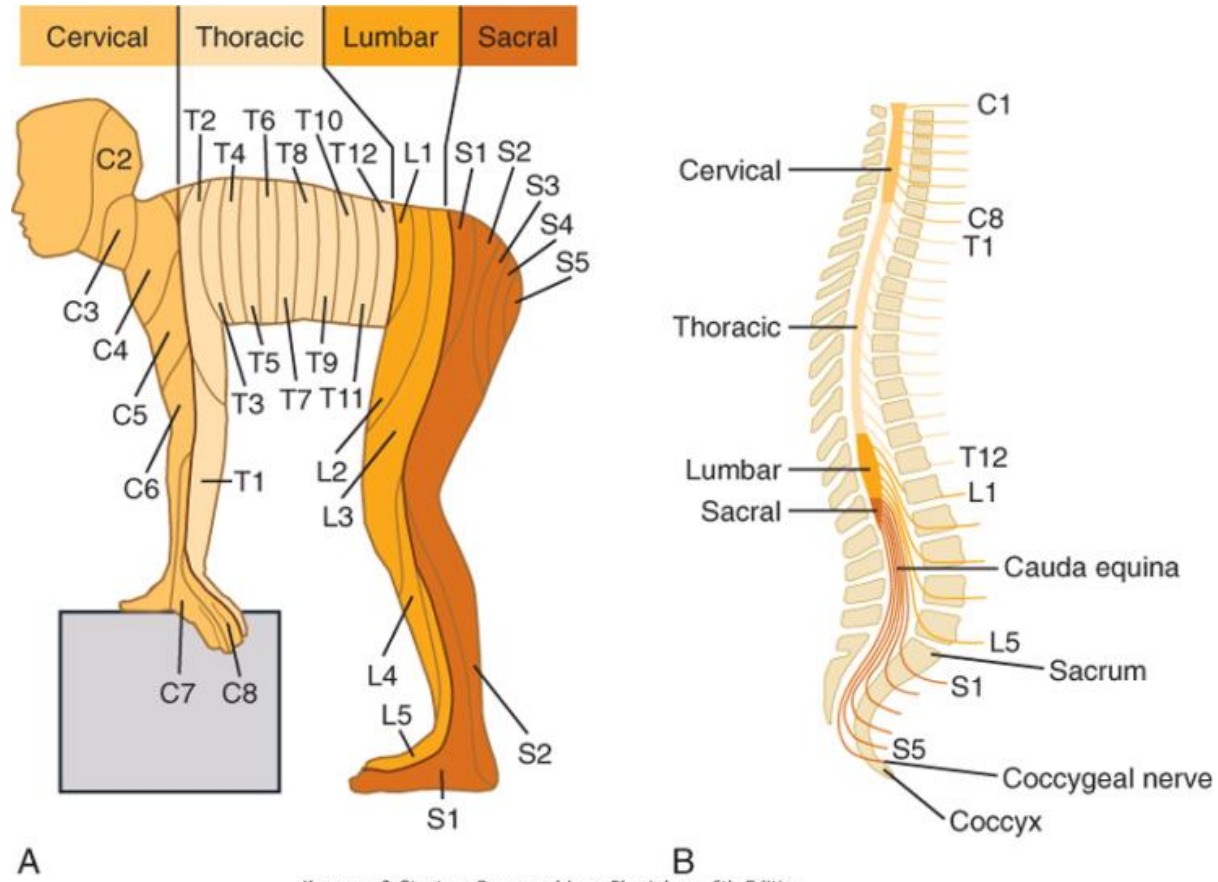
Lumbárny a sakrálny plexus



Lumbárny a sakrálny plexus – schématické znázornenie.
(Copyright Jennifer Gentry, American Society of Regional
Anesthesia and Pain Medicine)



Lumbárny a sakrálny plexus

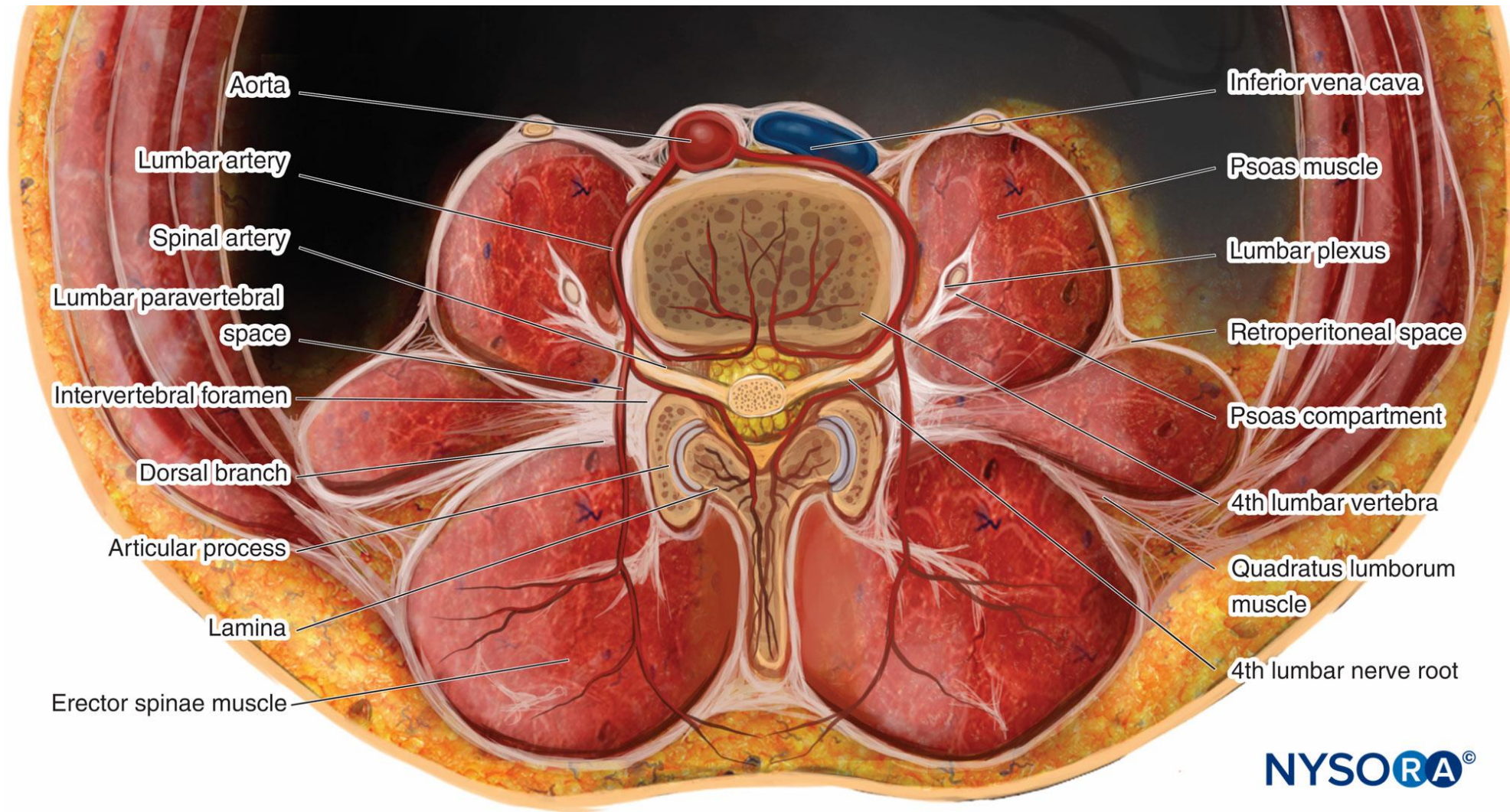


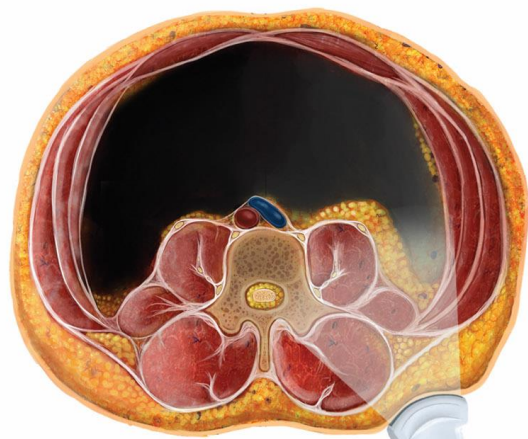
Blokády lumbálního plexu

anestézia resp. pooperačná analgézia všetkých troch nervov

n. femoralis, n. cutaneus femoris lateralis a n. obturatorius

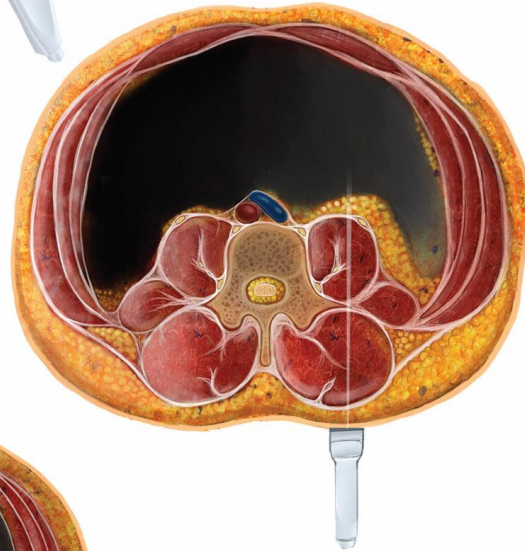
- Psoas kompartment blok
- Trident
- Shamrock
- 3 v 1 blok



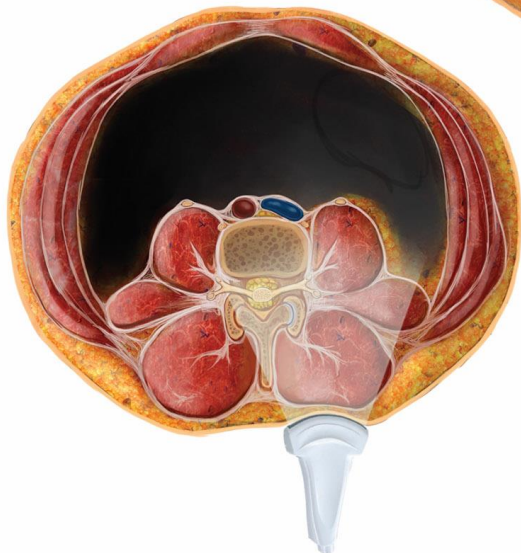


A. PMSS - TP level

B. PMTOS - TP level



C. PMTOS - AP level



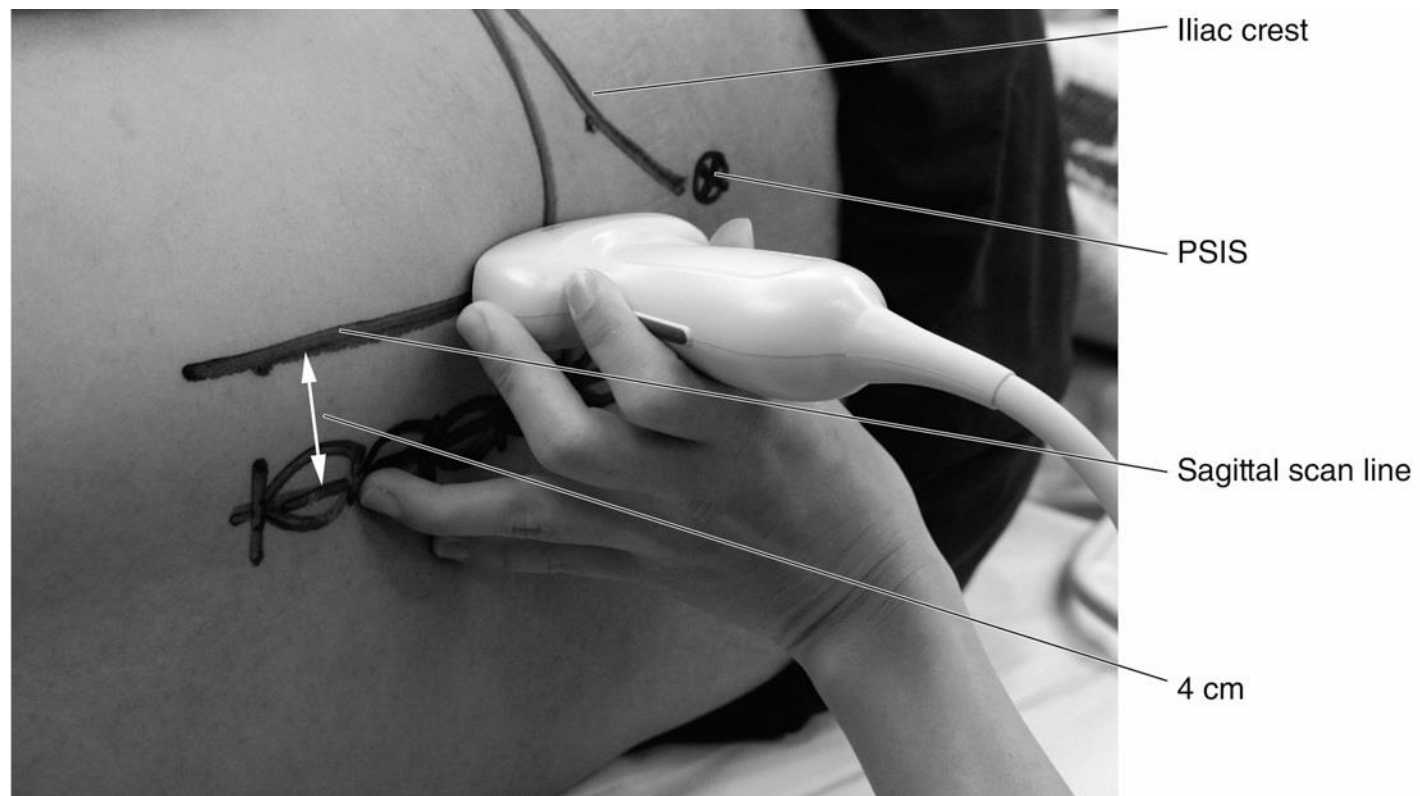
(A) paramedian sagittal scan at the level of the transverse process (PMSS-TP);

(B) paramedian transverse oblique scan at the level of the transverse process (PMTOS-TP);

(C) paramedian transverse oblique scan at the level of the articular process (PMTOS-AP).

Trident (trojzubec)

paramedian sagittal scan at the level of the transverse process



Erector spinae muscle

Transverse process
vertebra lumbarum 2

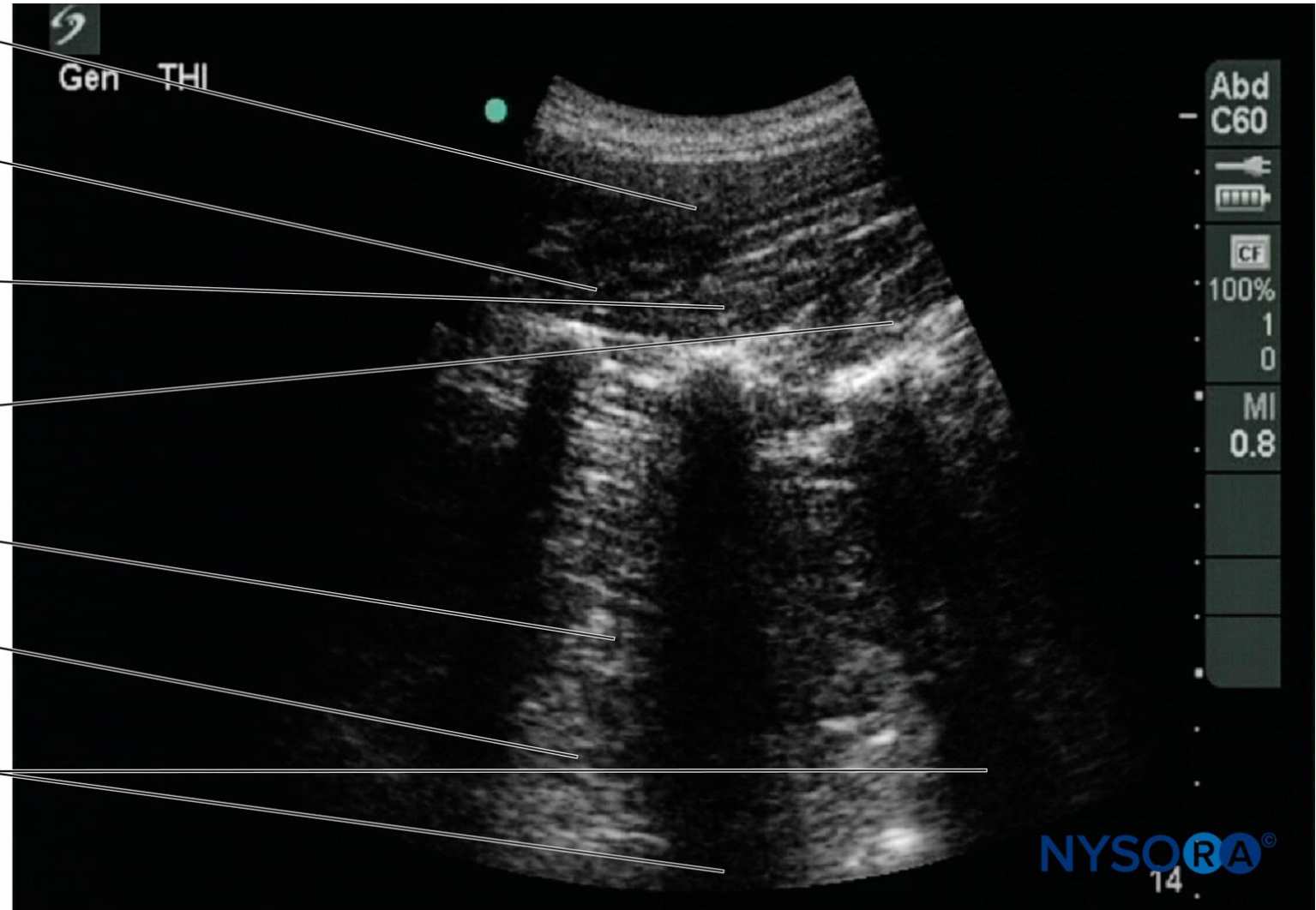
Transverse process
vertebra lumbarum 3

Transverse process
vertebra lumbarum 4

The lumbar
ultrasound trident

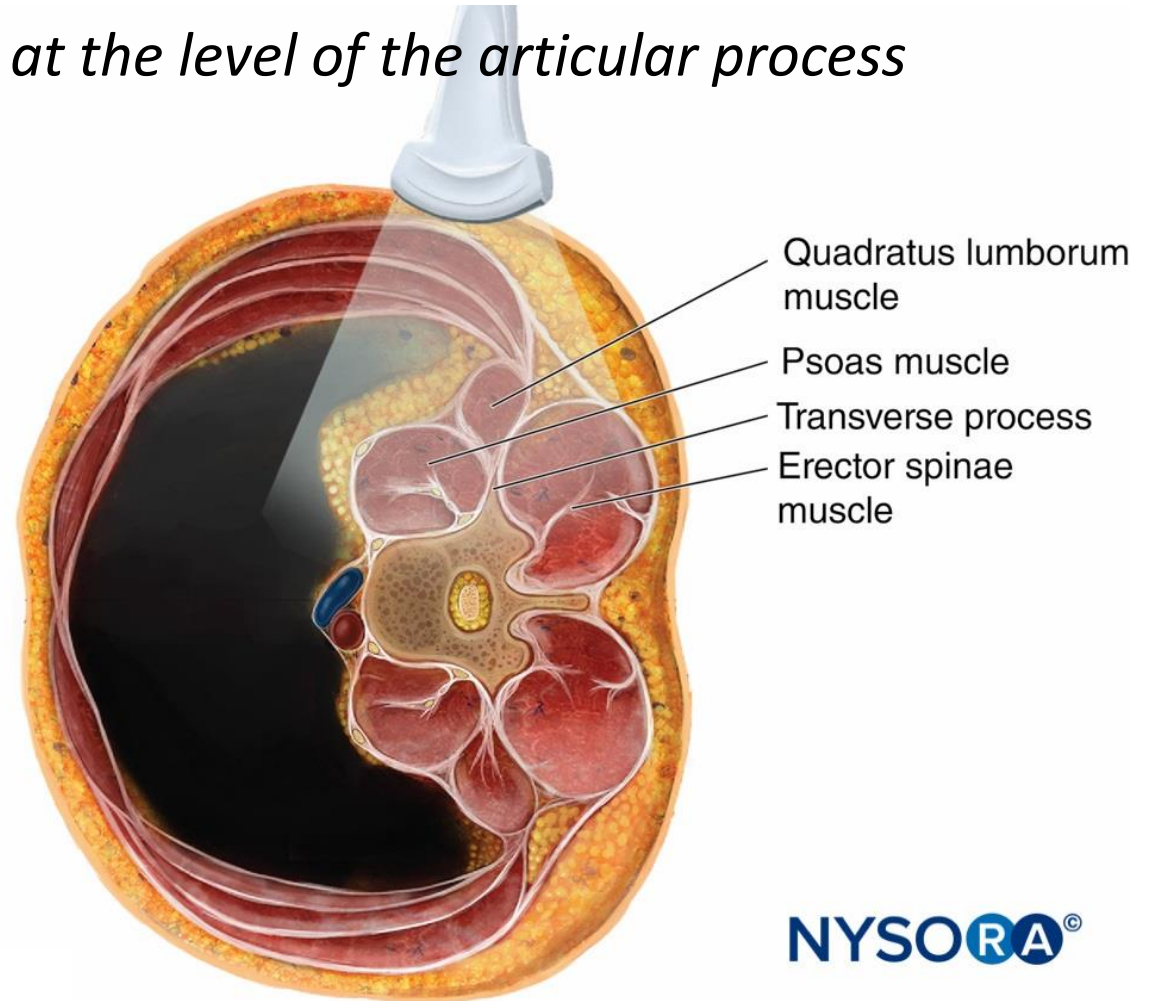
Acoustic window

Acoustic shadow
due to
transverse process



Shamrock (trojlístok)

paramedian transverse oblique scan at the level of the articular process



- Transverse abdominal muscle
- Quadratus lumborum muscle
- Lumbar plexus
- Lumbar nerve root
- Psoas muscle
- Retroperitoneal space
- Lumbar paravertebral space
- Intrathecal space
- Inferior vena cava
- Vertebral body
- Dura
- Aorta



Posterior

Medial

Shamrock > Trident

- rýchlejšie prevedenie blokády
- menší počet reinzercií a repozícií ihly
- menšia procedurálna bolesť u pacientov

Účinok - obe metódy sa javia totožné.

Súbežné použitie nervového stimulátora a ultrazvuku pre tieto metódy sa nelíši v rýchlosti prevedenia ani účinku, významný rozdiel je však v nástupe účinku.

Supraingvinálny facsia iliaca kompartment blok

n. femoralis, n. cutaneus femoris lateralis a n. obturatorius

→ v ingvinálnej oblasti pri kraniálnom smerovaní ihly

vyšší objem LA (40ml), vedie ku konzistentnému šíreniu kraniálne

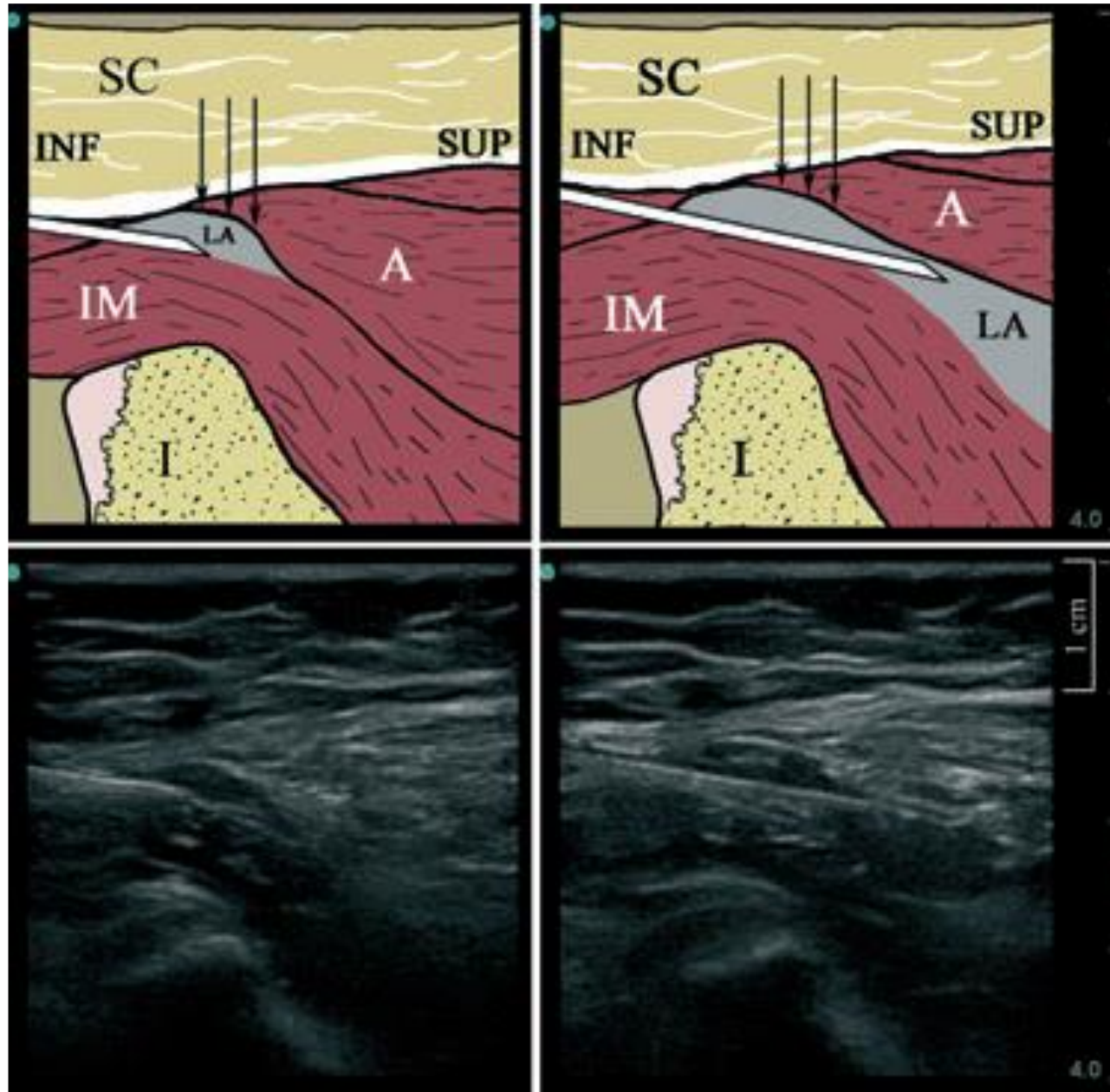
→ *n.obturatorius* v porovnaní s infraingv. prístupom.

pooperačná analgézia (bedrovový kĺb), predoperačná analgézia pri zlomeninách bedrového kĺbu

→ polohovanie pacienta k OP, k zavedeniu neuraxiálnej blokády

Supraingvinálny facsia iliaca kompartment blok

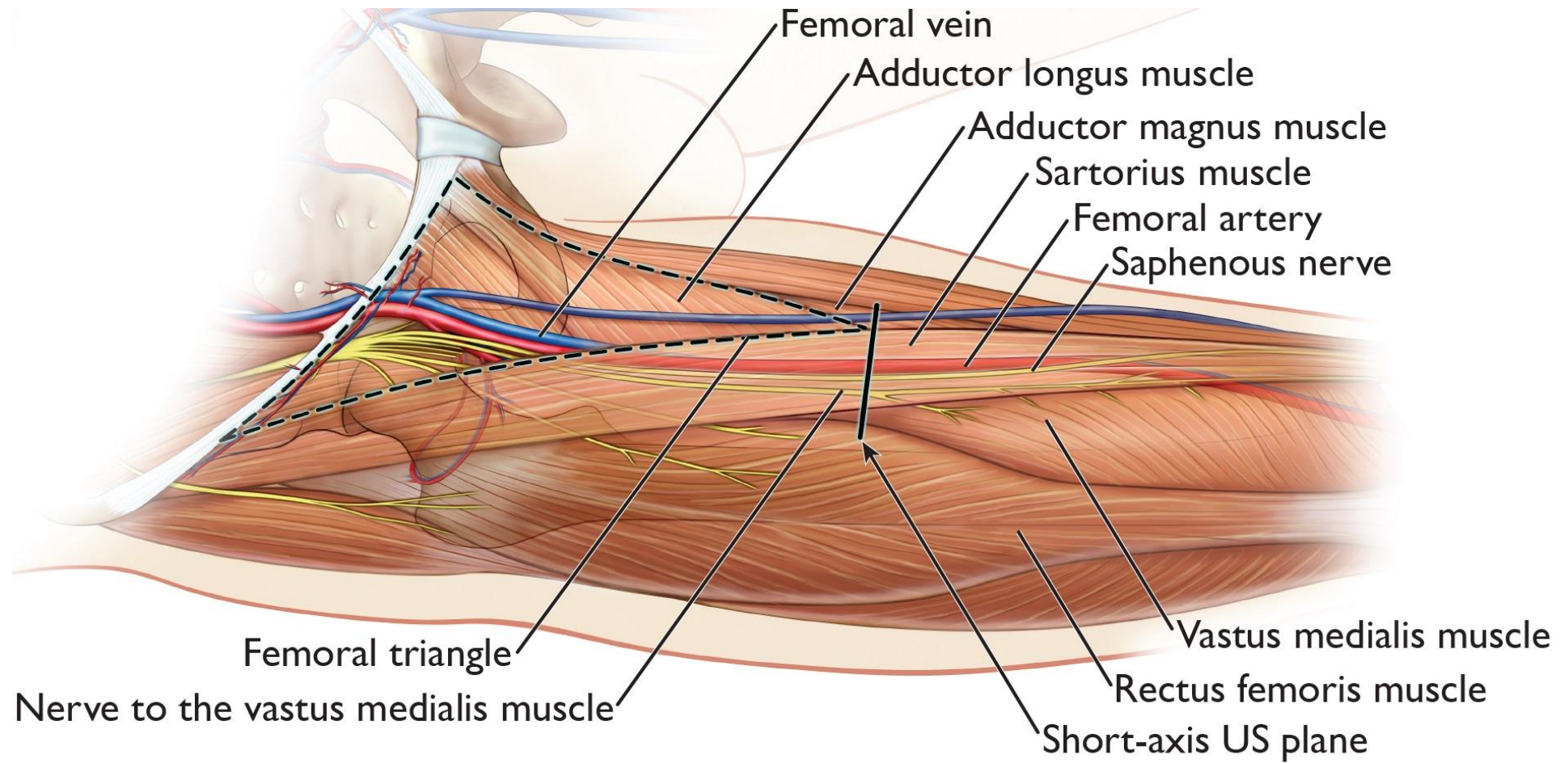




Blokáda *n.femoralis* – je vždy potrebná?

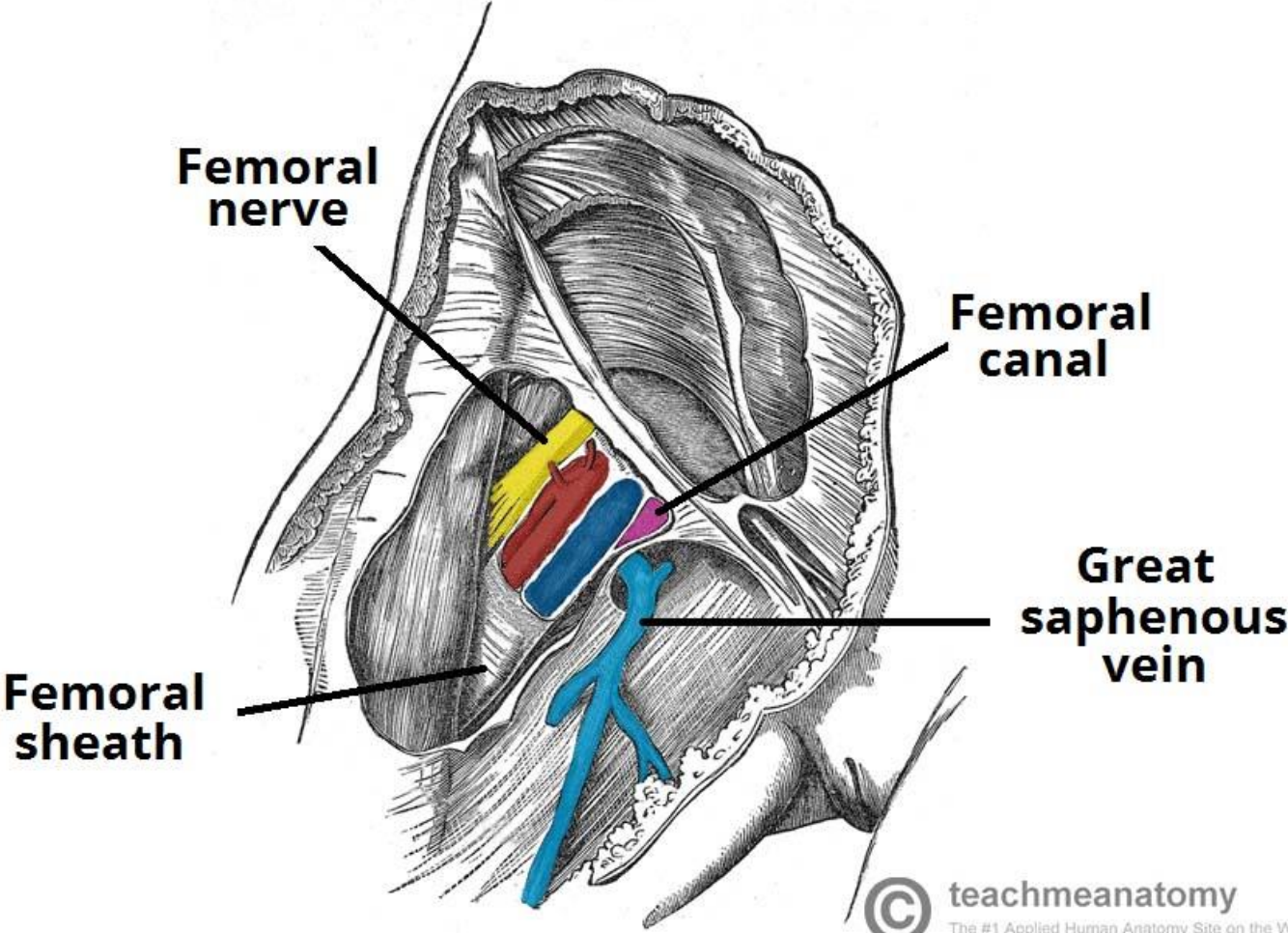
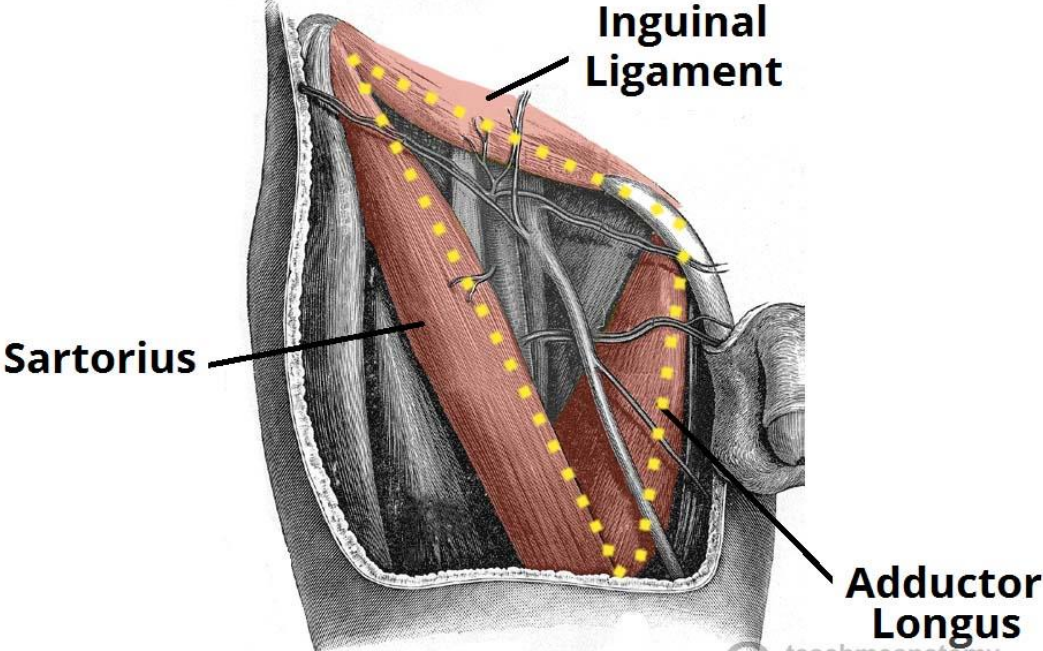
- skorá rehabilitácia pri ortopedických výkonoch na kolene?
- čisto senzorická blokáda so zachovanou motorickou funkciou?
 - trigonum femorale blok → *n. saphenus* a nerv inervujúci *m. vastus medialis*
 - adductor canal blok → *n. saphenus*

Trigonum femorale a Canalis adductorius

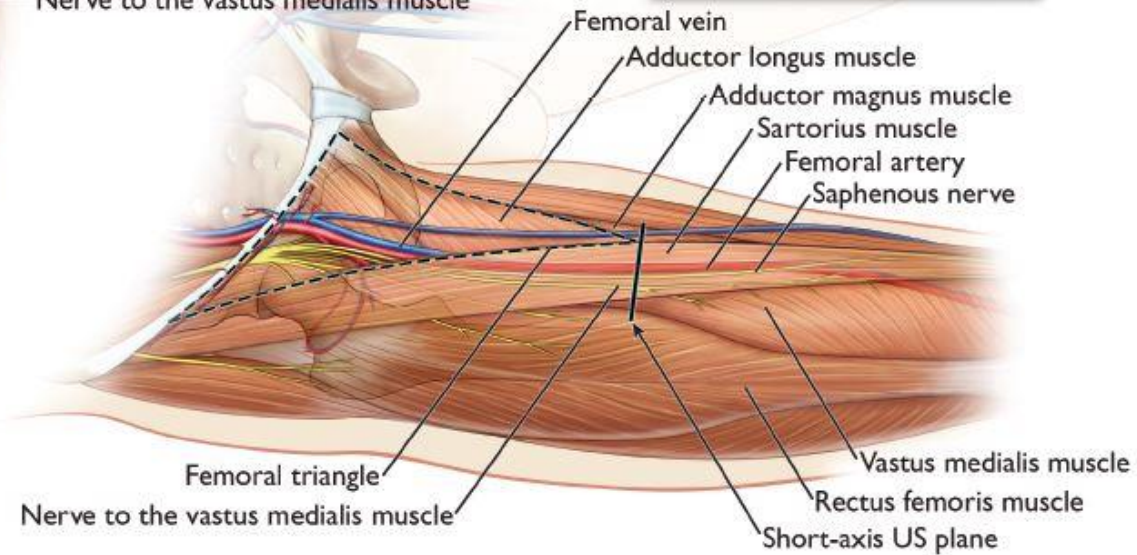
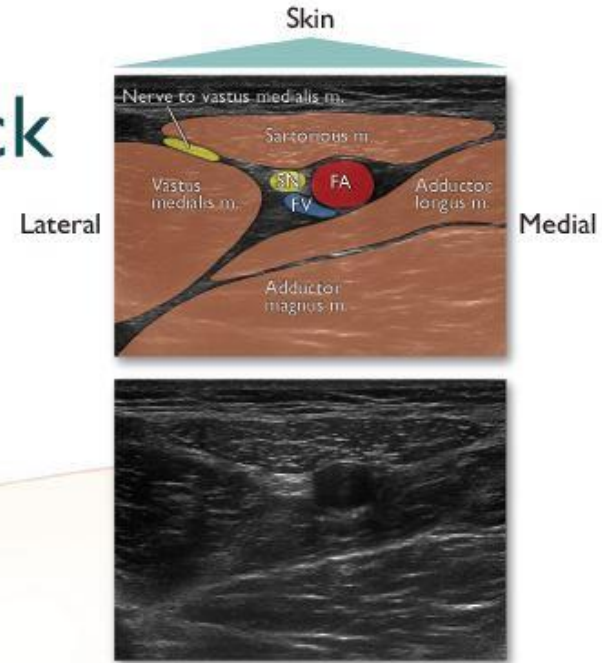
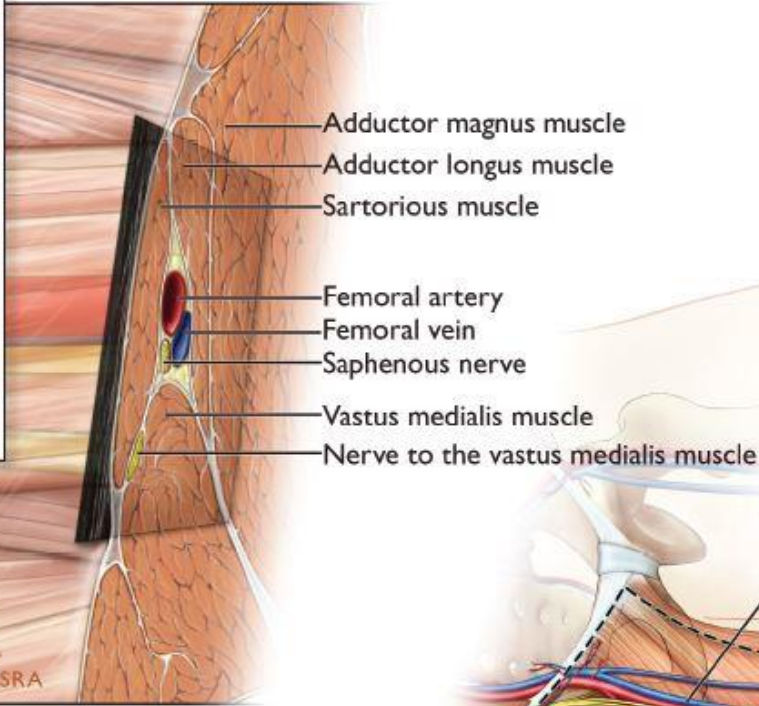
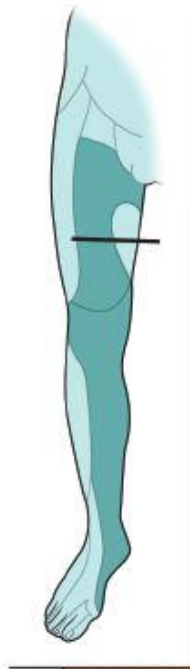


Trigonum femorale a Canalis adductorius – schématické znázornenie. (Copyright Jennifer Gentry, American Society of Regional Anesthesia and Pain Medicine)

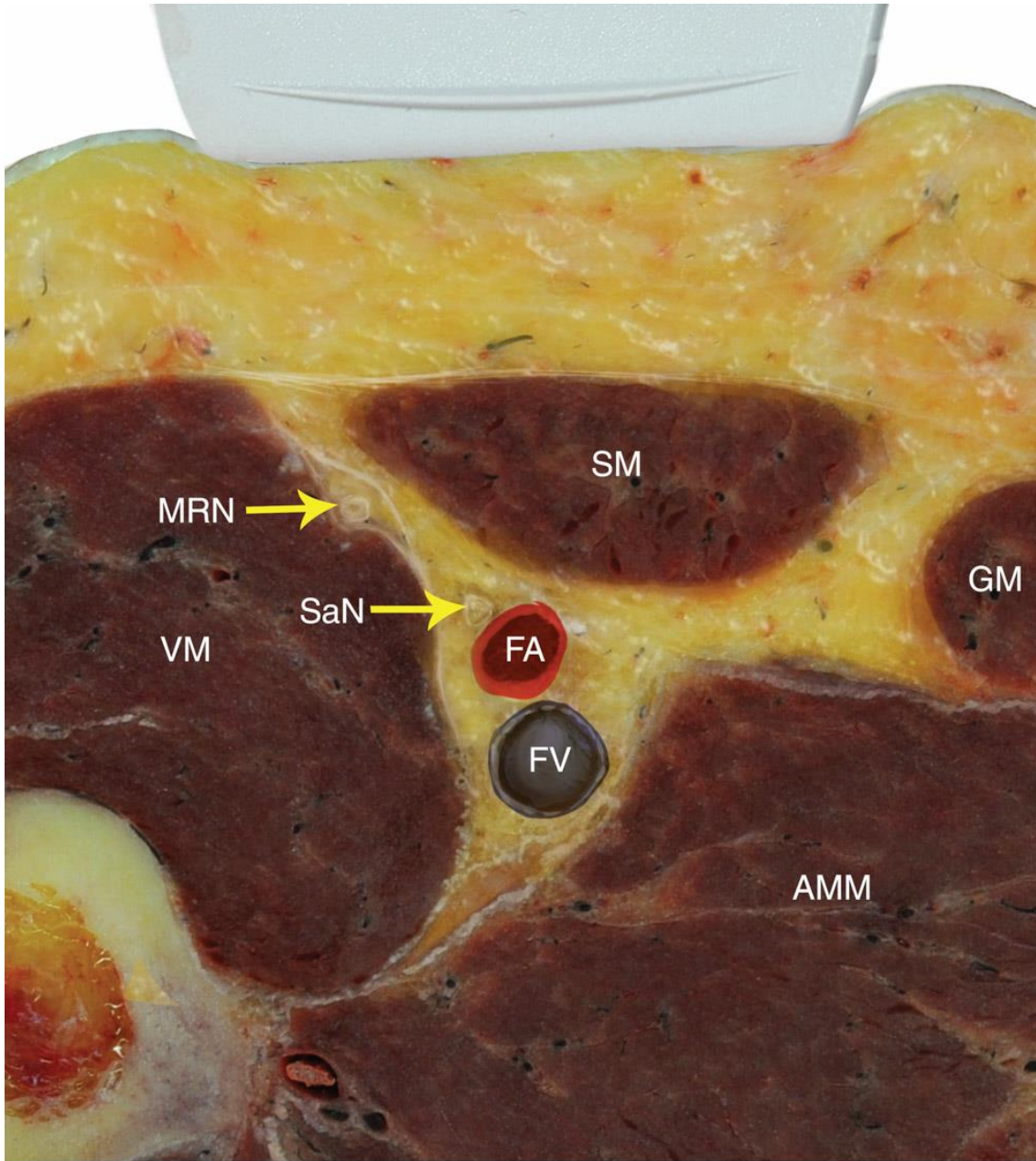
Trigonum femorale blok



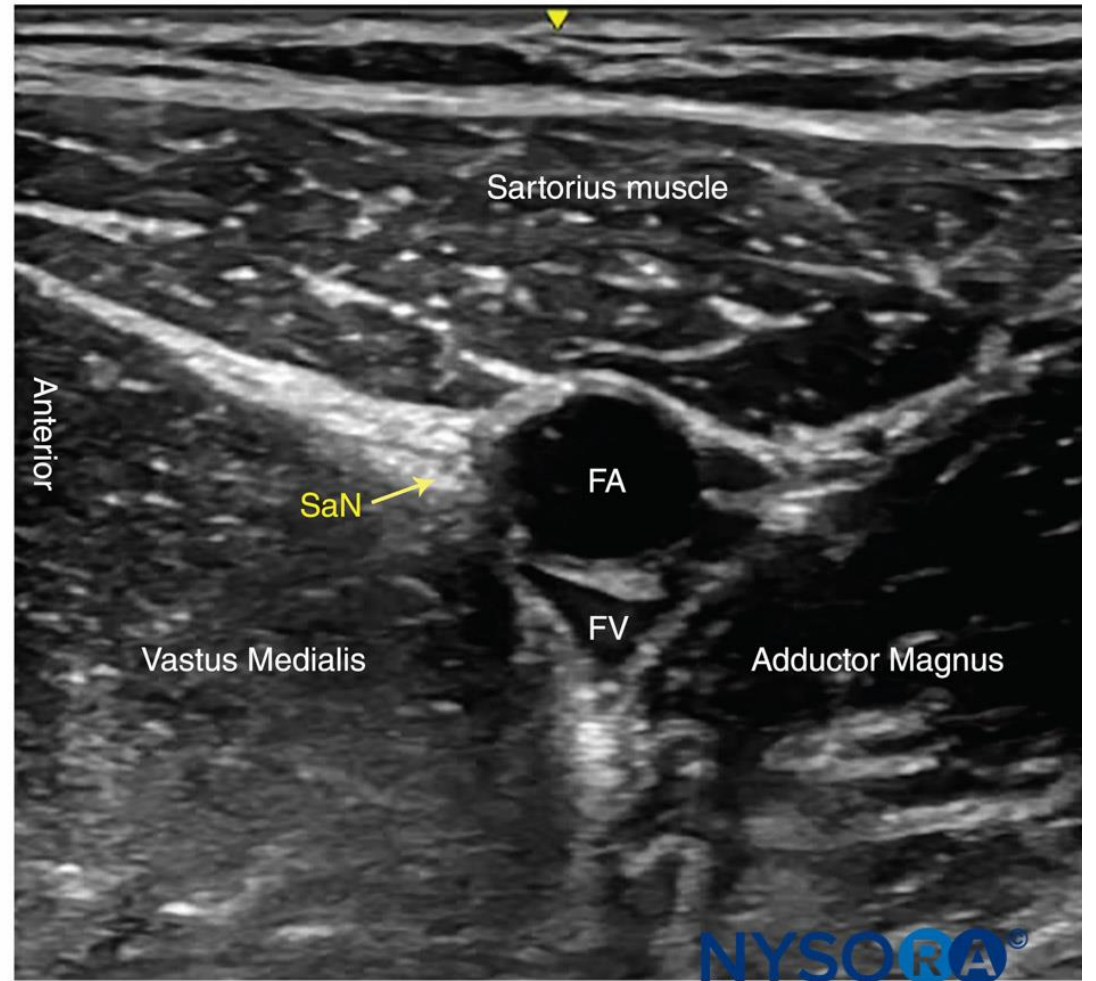
Adductor Canal Block



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A



B

Trigonum femorale blok, Adductor canal blok

- Oba bloky znižujú
 - bolestivosť po operáciách totálnej náhrady kolenného kĺbu
 - potrebu opiátov
 - v porovnaní s blokom *n. femoralis* zachovávajú motoriku *m. quadriceps femoris*, umožňujú skoršiu a intenzívnejšiu rehabilitáciu

Adductor canal blok dosahuje v prípade potreby blokovania *n. saphenus* pre výkony distálne od kolena lepšiu účinnosť v porovnaní s ostatnými prístupmi nad a pod kolenným kĺbom.

Perikapsulárne bloky

Blokáda atrikulárnych vetvičiek v oblasti kapsúl veľkých kĺbov

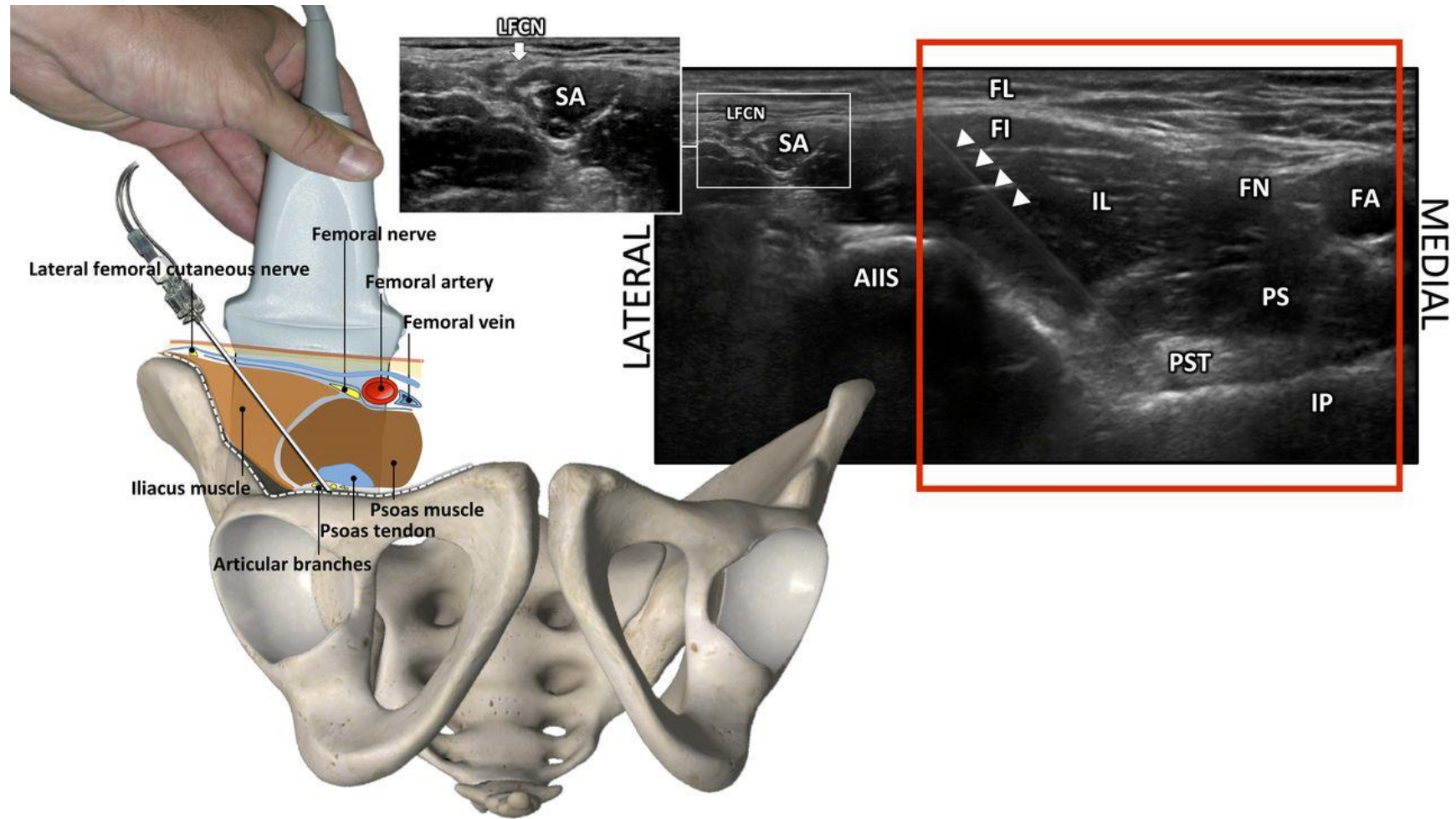
- **PENG blok** - PEricapsular Nerve Group (bedrový kĺb)
- **iPACK** - infiltration between popliteal artery and capsule of the knee.

PENG blok

- pri operáciach zlomeniny bedrového kĺbu
- najviac inervovaná časť bedrového kĺbu je predná časť jeho kapsuly
- signifikantné zníženie intenzity bolesti pri zachovanej motorickej aktivite *m. quadriceps femoris*
- in-plane technikou podá 20 ml lokálneho anestetika medzi šľachou *m.psoas a ramus ossis pubis*

Girón-Arango, L., Peng, P. W., Chin, K. J., Brull, R., & Perlas, A. (2018). Pericapsular nerve group (PENG) block for hip fracture. *Reg Anesth Pain Med*, 43(8), 859-863.

PENG blok



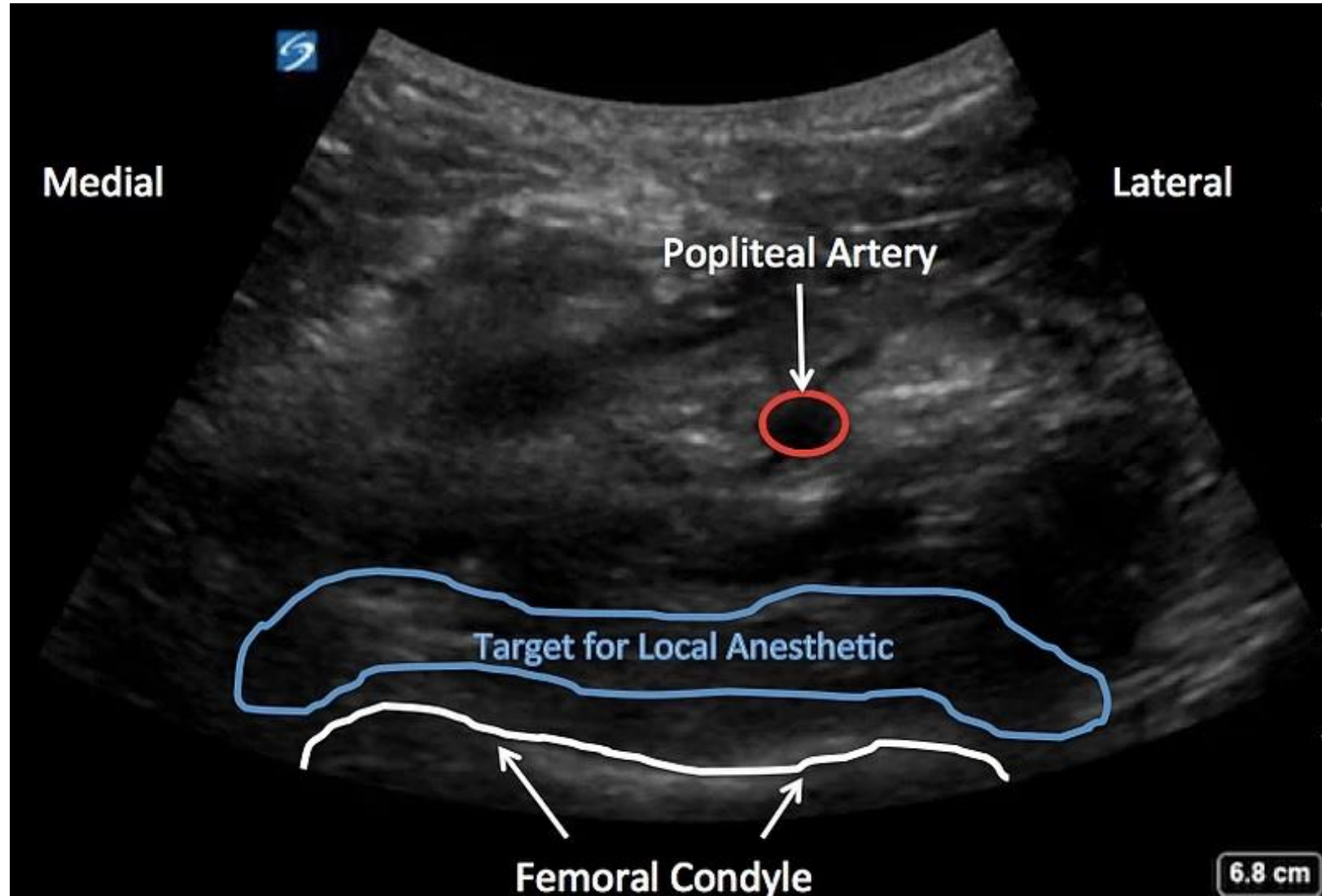
Girón-Arango, Laura, Vicente Roqués, and Philip Peng. "Reply To Dr Roy et al: Total postoperative analgesia for hip surgeries: PENG block with LFCN block." *Regional Anesthesia & Pain Medicine* (2019): rapm-2019.

iPACK blok

- blokujú artikulárne vetvičky z dorzálnej strany kĺbového puzdra
- in-plane metódou podať 10-15ml LA medzi femur a *arteria poplitea* bez zasiahnutia *n. ischiadicus*
- ekvivalent k použitiu LIA podanej chirurgom počas operačného výkonu
- presné cielené podanie LA → v kombinácii s adductor canal blok sa javí ako dobrá pooperačná analgézia k totálnej výmene kolenného kĺbu

Reddy, D. A. V. G., et al. "To compare effect of combined block of adductor canal block (ACB) with IPACK (Interspace between the popliteal artery and the capsule of the posterior knee) and adductor canal block (ACB) alone on total knee replacement in immediate postoperative rehabilitation." *International Journal of Orthopaedics Sciences* 3.2 (2017): 141-145.

iPACK blok



Bolkády *n. ischiadicus* - čo je nové za posledných 97 rokov...?

L'ANESTHÉSIE RÉGIONALE

PAR

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ET

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TROISIÈME ÉDITION REFOUNDUE

Avec 308 figures dans le texte.

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23676

Regional Anesthesia

Its Technic and Clinical Application

By

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With a Foreword by

William J. Mayo, M. D.

With 315

Original Illustrations

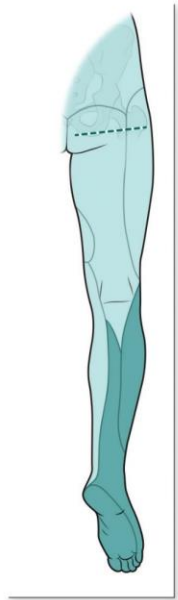
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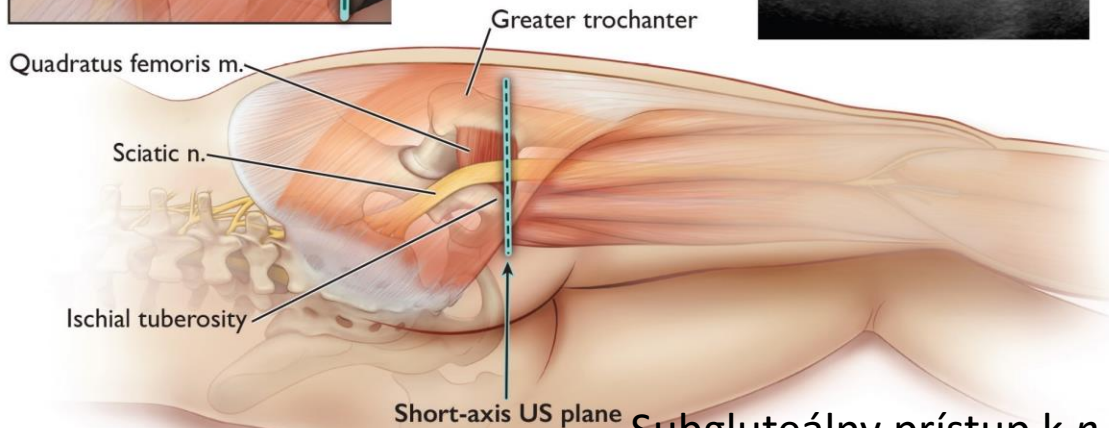
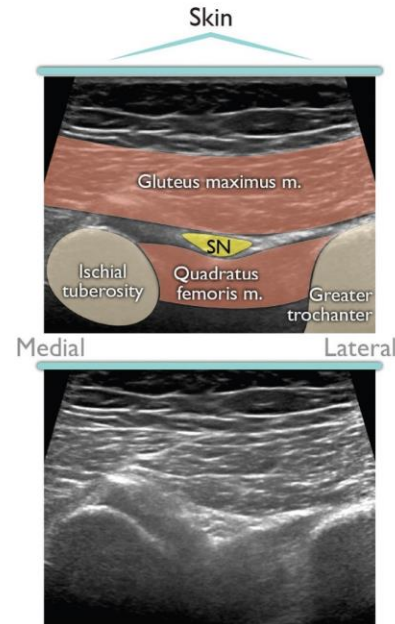
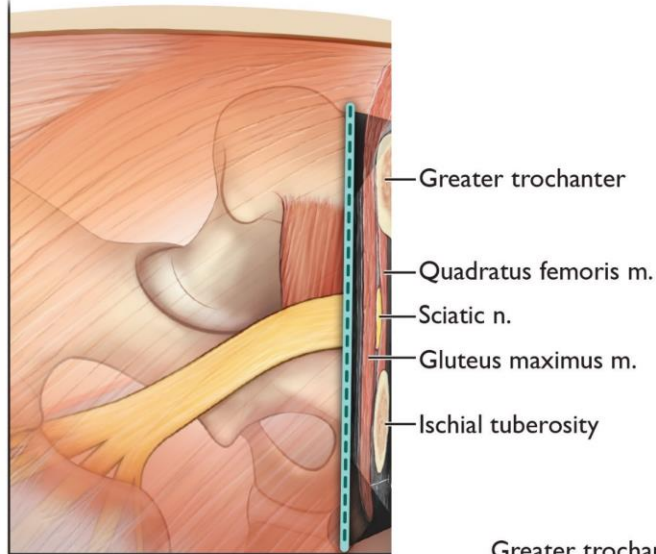
1922

Subgluteálny prístup k *n. ischiadicus*

Proximal Sciatic Block



© Jennifer Gentry ASRA



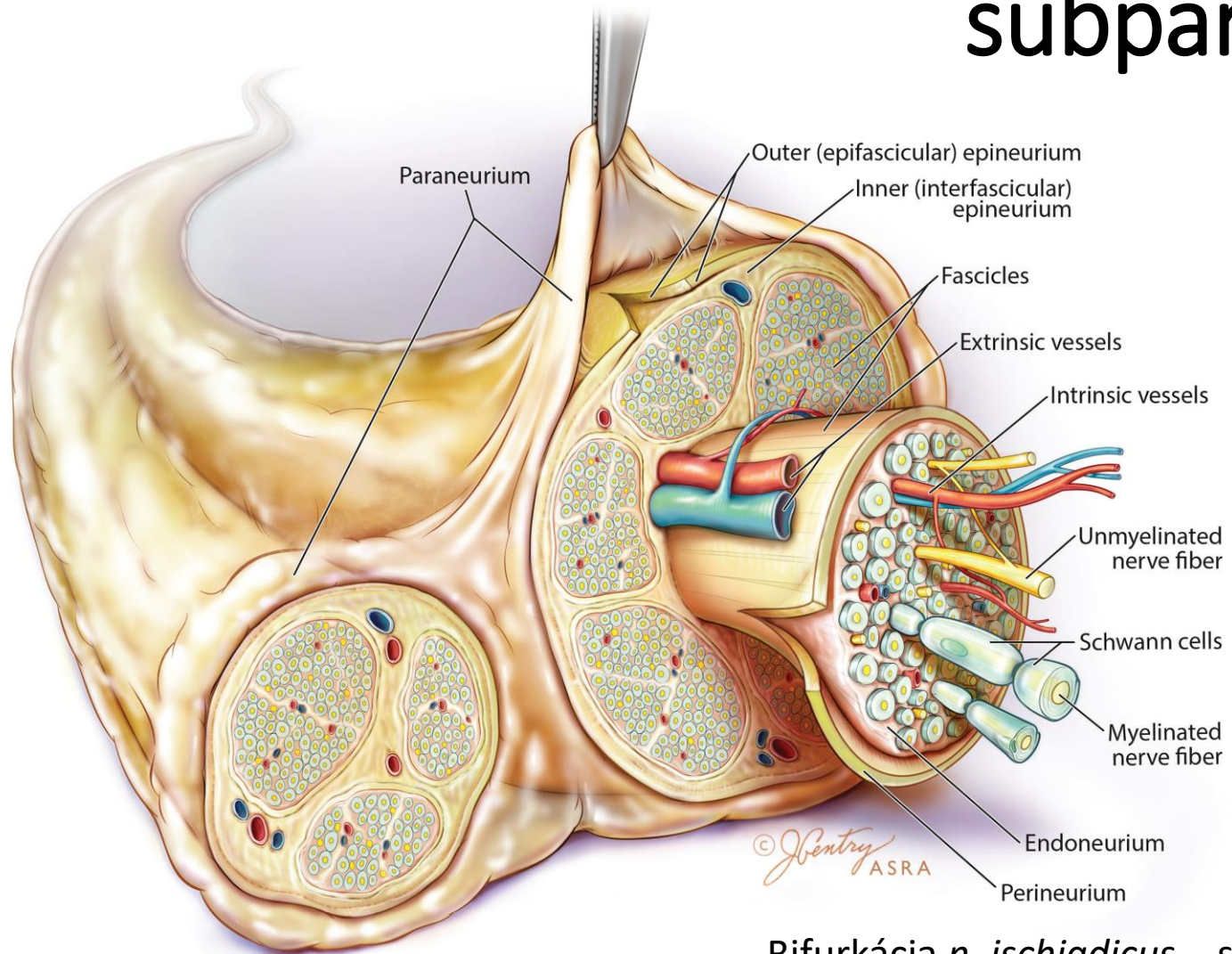
Subgluteálny prístup k *n. ischiadicus* – schématické znázornenie. (Copyright Jennifer Gentry, American Society of Regional Anesthesia and Pain Medicine)

Subgluteálny prístup k *n. ischiadicus*

- v porovnaní s transgluteálnym šetrí čas a vykazuje nižšiu procedurálnu bolesť u pacientov
- použitie nervového stimulátora → vyššia účinnosť bloku pri motorickej odpovedi v oblasti *n. tibialis* (plantárna flexia) v porovnaní s *n. peroneus communis* (dorzálna flexia)
- použitia ultrazvuku umožňuje redukciu množstva LA, jeho lepšie umiestnenie dookola nervu → rýchlejší a konzistentnejší

Tran, De Q., et al. "Lower extremity regional anesthesia: essentials of our current understanding." (2019): 143-180.

Distálny prístup k *n. ischiadicus* - subparaneurálna technika



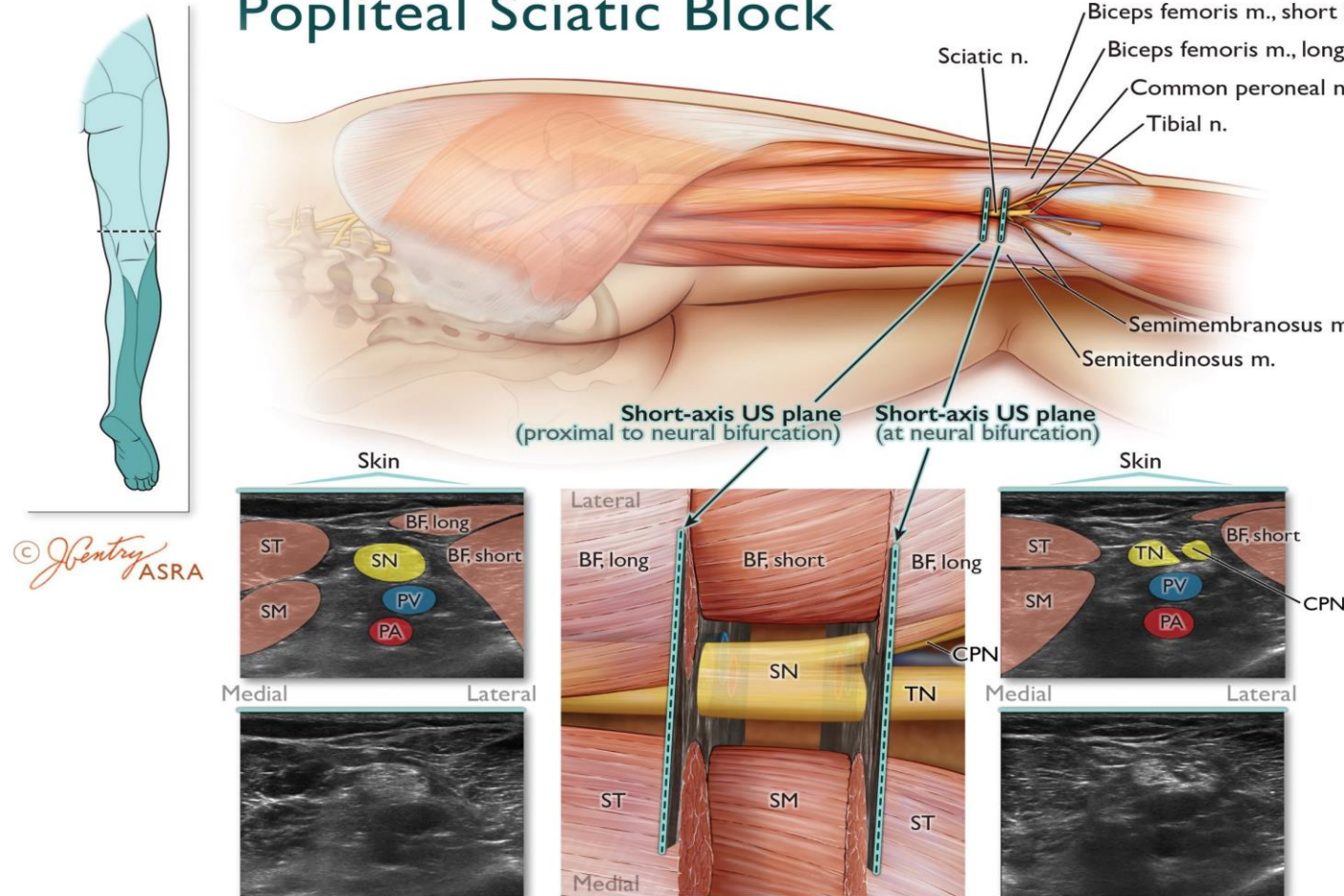
Bifurkácia *n. ischiadicus* – schématické znázornenie. (Copyright Jennifer Gentry, American Society of Regional Anesthesia and Pain Medicine)

Distálny prístup k *n. ischiadicus* - subparaneurálna technika

- vo *fossa poplitea* sa *n. ischiadicus* delí na *n. tibialis* a *n. peroneus com.*
- USG prístroj s vysokým rozlíšením umožňuje:
 - podať LA nie ku nervu, ale v tomto prípade priamo pod paraneurálny obal v mieste bifurkácie *n. ischiadicus*
 - sledovať šírenie lokálneho anestetika pod týmto obalom jednak okolo celého nervu, jednak distálne od bifurkácie okolo *n. tibialis* a *n. peroneus communis*.
- v dnešnej dobe považovaná za najrýchlejšiu a najúčinnjšiu distálnu blokádu *n. ischiadicus*

Distálny prístup k *n. ischiadicus* - subparaneurálna technika

Popliteal Sciatic Block



Blokáda *n. ischiadicus* – schématické znázornenie. (Copyright Jennifer Gentry, American Society of Regional Anesthesia and Pain Medicine)

Komplikácie – trend výskytu LAST

**Lipids for
Lidocaine
Toxicity?**
Hmmm.
I Love Lipids!

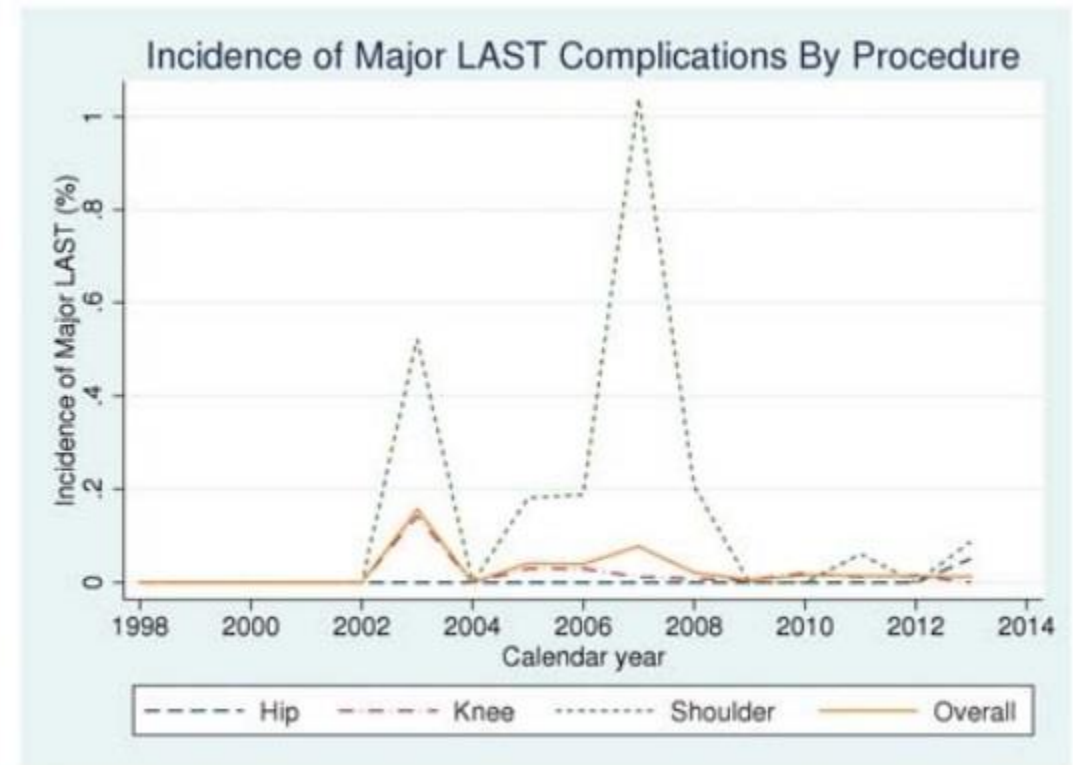
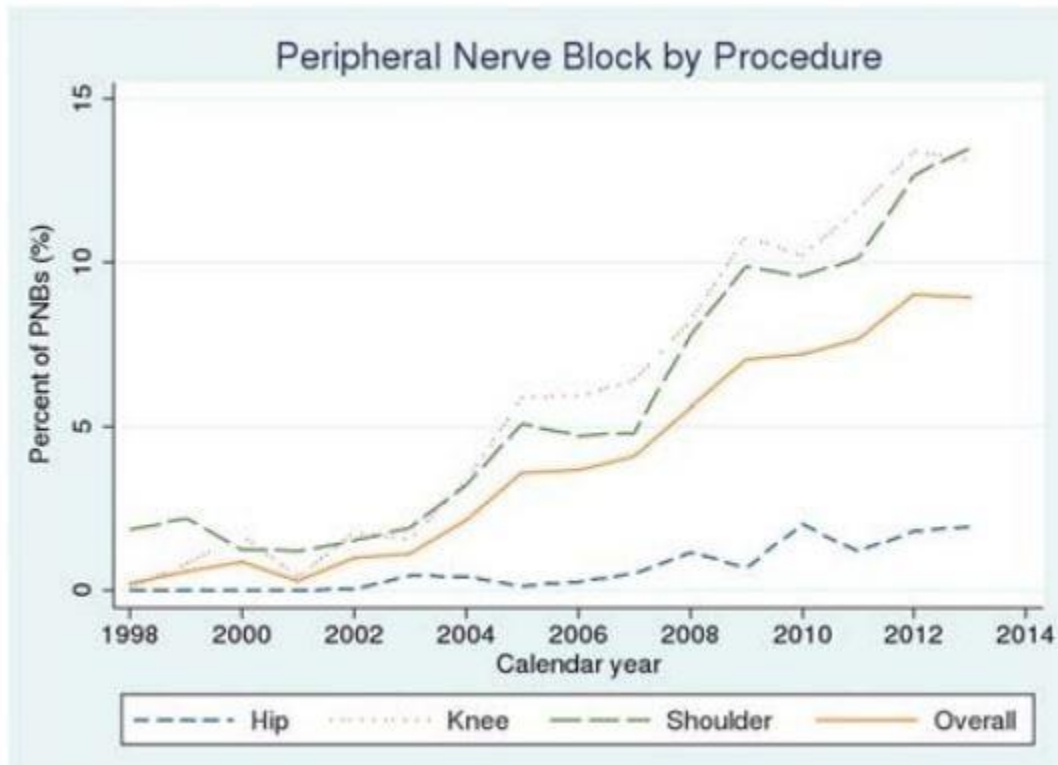


LAST

- výskyt LAST pri regionálnej anestézii k výmenám veľkých kĺbov na nohe – kolenný a bedrový kĺb, je výrazne nižší ako pri výmenách ramenného kĺbu
- napriek výraznému nárastu použitia regionálnej anestézie pri týchto operáciách, incidencia LAST v tomto období dokonca mierne klesá

Rubin, Daniel S., et al. "Local anesthetic systemic toxicity in total joint arthroplasty: incidence and risk factors in the United States from the National Inpatient Sample 1998–2013." *Regional Anesthesia & Pain Medicine* 43.2 (2018): 131-137.

LAST



Rubin, Daniel S., et al. "Local anesthetic systemic toxicity in total joint arthroplasty: incidence and risk factors in the United States from the National Inpatient Sample 1998–2013." *Regional Anesthesia & Pain Medicine* 43.2 (2018): 131-137.

Základné a nadstavbové PNB

Anatomical location	Plan A (basic blocks)	Plan B/C/D (advanced blocks)
Upper limb		
Shoulder	Interscalene brachial plexus block [14]	Superior trunk block, combined axillary and suprascapular nerve blocks
Below shoulder	Axillary brachial plexus block [15]	Infraclavicular block, supraclavicular block
Lower limb		
Hip	Femoral nerve block [16]	Fascia iliaca block, lumbar plexus block
Knee	Adductor canal block ^a [17]	Femoral nerve block ± IPACK block
Foot and ankle	Popliteal sciatic block [18]	Ankle blocks, proximal sciatic nerve block
Trunk		
Chest wall	Erector spinae plane block [19]	Paravertebral block, serratus plane block, PECS blocks
Abdominal midline	Rectus sheath block [20]	Quadratus lumborum blocks

IPACK, interspace between the popliteal artery and the capsule of the posterior knee; PECS, pectoral nerves.

^aRefers to selective blocks from the distal femoral triangle to Hunter's canal.

Turbitt, L. R., Mariano, E. R., & El-Boghdadly, K. (2019). Future directions in regional anaesthesia: not just for the cognoscenti. *Anaesthesia*.



BAKRA 2020

8.-9.FEBRUÁR 2020



Jediný SKARA workshop na západnom Slovensku určený začiatočníkom a záujemcom o regionálnu anestéziu, vedený formou prednášok a diskusií so skúsenými lektormi zo Slovenska aj zo zahraničia.

- **Základy regionálnej anestézie**
- **Dokumentácia, bezpečnosť a komplikácie**
- **Základy komunikácie s pacientom a operatórom**
- **Intenzívny USG scanning na figurantoch**

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